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Compulsory Voting, Habit Formation, and Political Participation*

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Abstract

Can electoral institutions induce lasting changes in citizens' voting habits? We study the long-term and spillover effects of compulsory voting in the Swiss canton of Vaud (1900–1970) and find that this intervention increases turnout in federal referendums by 30 percentage points. However, despite its magnitude, the effect returns to zero quickly after voting is no longer compulsory. We find minor spillover effects on related forms of political participation that also vanish immediately after compulsory voting has been abolished. Overall, these results question habit formation arguments in the context of compulsory voting. They are consistent with a more parsimonious theory in which individuals quickly adapt to externally imposed changes in the costs of non-voting.

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Keywords: Habit Formation, Compulsory Voting, Turnout, Political Participation, Social Norms

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Participation in elections is the most widespread form of civic engagement and a key mechanism through which citizens can hold elected officials accountable (Persson, Tabellini, and Trebbi 2003; Besley 2005; Schaltegger and Torgler 2007). However, many countries have experienced a long-term decline in political participation with turnout levels having reached all time lows (Solijonov 2016). To alleviate widespread concerns about the lack of democratic legitimacy and the potential policy bias due to low turnout (Jackman 2001; Mueller and Stratmannn 2003), a considerable number of countries have introduced compulsory voting.[1] While the existing evidence clearly suggests that compulsory voting increases turnout contemporaneously (Franklin 1999; Jackman 2001), we know surprisingly little about its long-term and spillover effects: Do compulsory voting laws have a lasting impact on turnout even after they have been abolished? Can compulsory voting increase citizens' willingness to engage in other types of political collective action for which participation has remained voluntary?

We explore these questions by studying a citizenry that has been exposed to a sanctioned compulsory voting law for over 20 years. Theories of habitual voting (Weber 1968; Almond and Verba 1963; Lijphart 1997; Plutzer 2002; Gerber, Green, and Shachar 2003; Fowler 2006) predict that citizens develop a voting habit under compulsory voting because they are more likely to having repeatedly engaged in this activity. Consistent with this reasoning, recent empirical work on the formation of voting habits documents that those who voted in today's election are also more likely to participate in subsequent elections (Meredith 2009; Fujiwara, Meng, and Vogl 2016). This habit-formation argument not only predicts the contemporaneous effect of compulsory voting on turnout in elections. It also suggests that compulsory voting has broader positive spillover effects on other types of political participation and has a lasting, positive impact on the level of civic engagement in a political system even after it has been abolished (Lijphart 1997; Cooter 2000; Fieldhouse and Cutts 2012).

Our study offers a comprehensive analysis of the effects of compulsory voting by dis-

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[1]According to the International Institute for Democracy and Electoral Assistance, about 14% of all countries practice compulsory voting (IDEA 2014).

tinguishing between its contemporaneous, long-term, and spillover effects on several types of political participation. We explore the impact of a sanctioned and long-standing, but eventually abolished compulsory voting law in the Swiss canton Vaud that aimed at building civic virtue by increasing citizens' participation in direct legislation (Matsusaka 1992). Vaud practiced compulsory voting in federal referendums, i.e., direct legislation, from 1925 to 1948. Abstention triggered a sizable fine that local police authorities collected by visiting nonvoters' homes in person, thereby adding a social shaming component to the monetary sanction imposed on non-voters.

Vaud exclusively sanctioned abstention in federal referendums, while other forms of political collective action remained voluntary. We exploit this specific design of Vaud's compulsory voting norm to explore the existence of positive spillover effects of compulsory voting for federal referendums on related forms of civic engagement that remained voluntary. Since policymakers aimed to foster civic participation more generally, the temporal variation in Vaud's compulsory voting norm in combination with its specific design provides a rare opportunity to test norm internationalization and habit formation arguments. Due to the large number of potential confounding factors that plague cross-country comparisons, an empirical evaluation of these theories poses formidable methodological challenges. Our case study of Vaud's compulsory voting law promises to yield more credible causal estimates of the immediate, long-term, and spillover effects of external sanctions on political participation than cross-country analyses, where case heterogeneity complicates causal inference. Providing such causal estimates instead of correlations is crucial because otherwise we cannot ascertain whether any changes in political participation are due to compulsory voting or other unobserved factors.

Using a synthetic control design (Abadie and Gardezabal 2003; Abadie, Diamond, and Hainmueller 2010) we find that the introduction of compulsory voting in Vaud massively increased turnout in federal referendums, by about 30 percentage points on average, when compared to a synthetic Vaud that did not introduce compulsory voting. The available cross-country data suggest that turnout is about 12 percentage points higher in political systems

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that practice compulsory voting (Blais and Young 1996). The fact that our treatment effect exceeds previous estimates by more than 100% strengthens the theoretical expectation that at least parts of the citizenry became habitual voters through repeated participation in referendums. Therefore, compulsory voting should have increased turnout even after it was abolished and it should also have increased participation in other types of civic engagement.

Our results suggest that compulsory voting had no long-term impact on participation in federal referendums. We document some contemporaneous, positive spillover effects on closely related forms of civic engagement, for example, turnout in cantonal referendums and federal elections, especially if these were concurrent with federal referendums. However, the spillover effects vanished as soon as Vaud abolished compulsory voting. In addition, we find that compulsory voting had no positive impact on citizens' political activity as measured by the number of signatures on petitions. Taken together, our results suggest that although compulsory voting strongly affects contemporaneous levels of political participation in ways consistent with rationalist models of turnout, its potential to induce changes in citizens' fundamental voting habits remains limited. This may reflect individuals' reluctance to internalize political participation norms that are externally imposed by political elites.

Compulsory Voting and Habit Formation

The idea of norm compliance as a consequence of internalization underlies prominent theories of preference formation through socialization (Durkheim 1922; Weber 1968) and social control (Ross 1896). As Weber (1968) points out, once a norm has been internalized, many individuals tend to follow it routinely "as the result of unreflective habituation to a regularity of life that has engraved itself as a custom" (p. 312). Previous work on the determinants of electoral behavior and political attitudes argues that habit formation occurs early in life (Franklin 2004; Healy and Malhotra 2013). Citizens are thought to develop a voting habit during their first experiences with elections and voting. More specifically, Franklin (2004) argues that a citizen's propensity to vote reflects whether, as a first time voter, she has

experienced a period of high turnout, i.e., a political culture that emphasizes the importance of civic engagement.

Most empirical studies analyzing the sources of habitual voting have estimated local average treatment effects of an exogenous stimulus on the probability of turnout for a small set of compliers (see Table A1 in the Appendix for an overview of existing studies). Fujiwara, Meng, and Vogl (2016) estimate that a one point decrease in turnout induced by higher precipitation lowers turnout in subsequent U.S. presidential elections by 0.7 to 0.9 percentage points. Analyzing individual-level data, Plutzer (2002) investigates how citizens transition from habitual nonvoters to habitual voters and documents a considerable degree of stability in political behavior over the life course that strongly correlates with an individual's parental political involvement. In line with the idea of voting as a habit-forming activity, Gerber, Green, and Shachar's (2003) field-experimental evidence suggests that get-out-the-vote campaigns based on face-to-face canvassing and direct mailings increase voter turnout in subsequent years. More recently, Meredith (2009) finds that voters who are barely 18 at the time of a presidential election, and hence eligible to vote, are also about four percent more likely to vote in the subsequent election than those who just missed the age cut-off.

The existing literature not only lends empirical credibility to the argument that political participation can be habit-forming over time. It also directs our attention to exogenous shocks in the costs of voting as an important explanation for the long-term dynamics of turnout (Hodler, Luechinger, and Stutzer 2015). For example, the habitual voting argument suggests that extended periods of high turnout due to compulsory voting should affect the long-term evolution of political participation through its habit-forming impact. Consequently, we expect that, even after compulsory voting has been abolished, the turnout levels we observe among individuals should exceed those one would expect if compulsory voting had not been practiced.

So far, scholars have almost exclusively analyzed the effects of compulsory voting on turnout in elections for which participation had been made compulsory. Yet long-standing compulsory voting laws may also change higher-order preferences for political participation in

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other types of political collective action for which engagement remained voluntary. According to Cooter (2000), long-term enforced compliance with a legal norm, e.g., adhering to speed limits for cars sanctioned by speeding tickets, will induce individuals to internalize a norm that prescribes more careful behavior in traffic more generally, e.g., when riding a bike or walking. In the realm of political behavior, political participation may also have such spillover effects. Increasing an individual's participation in one type of political activity could over time also cause an increase in engagement in other types of political collective action (Almond and Verba 1963; Berelson and Steiner 1964).[2] This argument predicts that compulsory voting has positive spillover effects on other types of political collective action even if these forms of civic engagement remain voluntary.

We empirically evaluate these theoretical predictions by studying how the introduction and eventual abolishment of a long-standing sanctioned compulsory voting law in the Swiss canton of Vaud affected participation in various types of political collective action.

Compulsory Voting in Switzerland

To understand the variation in compulsory voting laws that we exploit to estimate the effects of compulsory voting on turnout, we have to briefly outline the Swiss political system. Its federal structure dates back to the 1803 Act of Mediation, which marks the end of a longstanding conflict between Unitarists and Federalists (Kriesi and Trechsel 2008). The Act of Mediation re-installed the 13 old cantons and created six new ones.[3] After the Congress of Vienna, another six jurisdictions joined the Federation as cantons. Figure A1 in the Appendix shows a map of the Swiss cantons in the early 20th century. The Act of Mediation also empowered cantons to pass suffrage legislation determining which individuals had the right to vote (Jorio and Sonderegger 2007). Cantons generally disenfranchised female citizens

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[2]Peterson (1992) reviews a large number of observational studies that report a positive correlation between participation in the workplace and civic engagement (Lijphart 1997).

[3]The new cantons were former tributary regions of the union *Alte Eidgenossenschaft.*

and male individuals that did not meet certain economic, age, or religious requirements.[4]

During the regeneration (1830-1848), Swiss cantons decided to extend the suffrage to all solvent Swiss adults. The 1848 Swiss constitution granted all male citizens the right to vote, but still provided cantons with some freedom to decide on the exact design of the electoral system (Tobler 1945). Some cantons introduced compulsory voting. Compulsory voting typically varied in domain (communal, cantonal, federal) and severity of the associated monetary sanctions for non-voting (see Table A5 in the appendix). Vaud's compulsory voting law stands out and lends itself particularly well to examine internalization and habit formation in the context of forced behavior because of three reasons. First, Vaud practiced compulsory voting for more than two decades and rigorously enforced a substantial monetary sanction, which leads us to expect that habit formation and participation spillovers should have been most likely to occur. Second, voting was compulsory only for federal referendums but remained voluntary for other types of political participation. We exploit this rare feature to empirically explore political participation spillovers on other forms of political collective action, e.g., participation in federal elections or the signing of petitions, which remained voluntary. Third, Vaud eventually abolished compulsory voting which presents a unique opportunity to empirically assess whether this legal norm had any lasting effects on political participation even after voting was no longer compulsory.

Vaud's parliament passed the bill on political rights # 113/49 on 17th November 1924. This electoral reform required all citizens between the age of 20 and 65 years to participate in federal referendums (Table A4 reports the original text of the bill). Citizens that did not vote in federal referendums had to pay a fine of two Swiss francs (Gazette de Lausanne 1924), an amount which appears substantial given the canton's income distribution. For an ordinary worker, this monetary sanction equaled about 150% of his average hourly wage (Siegenthaler and Ritzmann 1996, Table G.01).[5] In addition, local police authorities collected the fine by

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[4]Female suffrage on the federal level was only introduced in 1971.

[5]Plausibly, since the size of the fine was independent of an individual's income, it placed a larger burden on low-income citizens than on high earners (Bechtel, Hangartner, and Schmid 2016).

visiting nonvoters' homes in person, thereby adding a social shaming component that should have amplified the contemporaneous impact of compulsory voting on political participation (Funk 2010; Gerber, Green, and Larimer 2008; Knack 1992). Only individuals suffering from an illness and those having to travel long distances to reach the polling places could submit valid excuses within two days after the referendum. Each municipality's prefect decided about whether the excuse was valid. Citizens could not appeal this decision. In addition, citizens older than 65 were exempt from compulsory voting. According to the historical data, 9 percent of the population was older than 60 years. The share of individuals older then 65 was presumably substantially smaller because for those born in 1900 the life expectancy was still only 46 years. Arguably, the life expectancy for those born in the 1850s (this would be the cohort turning 65 in the year in which compulsory voting was introduced), was even lower, which means that the share of elderly in Vaud's population exempt from compulsory voting was minimal.[6]

Two key objectives motivated Vaud's parliament to introduce compulsory voting. First, policymakers intended to develop a more participatory political culture in Vaud that would foster political collective action. Specifically, advocates of compulsory voting expected that sanctioning nonvoting will "foster civic virtue in all classes of society" (Cantonal Chancellery of Vaud 1924). Second, political elites wanted to increase Vaud's national-level political say in federal legislation through higher participation rates in federal referendums. Since federal referendums require a double majority, i.e., a majority of the votes cast (*Volksmehr*) and a majority in at least half of the cantons (*Ständemehr*), an increase in turnout in a specific canton may indeed increase this region's influence on federal referendums (Gazette de Lausanne 1920).[7]

The revenues from the fine imposed on non-voters, which varied between 8'000 and 16'000 Swiss francs per referendum, helped financing a charity fund for poor people and

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[6]See `www.bfs.admin.ch/bfs/portal/en/index/themen/01/06/blank/key/04/04.html`, last accessed on 13 May 2016.

[7]Kriesi and Trechsel (2008) provide an overview of direct-democratic institutions in Switzerland.

public hospitals.[8] Vaud temporarily suspended its compulsory voting law because of military mobilization in the World War II period from 1940 to 1945 and reactivated it in late 1945 (Gazette de Lausanne 1945). The design of the compulsory voting law, for example the fine and the way in which it was collected, remained unchanged. Although Vaud's government continued to generally support compulsory voting, it eventually abolished compulsory voting in 1948 mainly because of its high administrative costs.

We will exploit this policy intervention to examine the contemporaneous effects of compulsory voting on turnout in federal referendums, whether it generated political participation spillovers on other forms of civic engagement, and whether it gave rise to a long-term increase in turnout that lasted even after Vaud had abolished compulsory voting.

Data and Method

We collected data on canton-level turnout in the 166 federal referendums held from 1900 to 1970. We also collected a large set of covariates that previous work has shown to help predict turnout including public spending and revenues, percentage of secondary students (Mueller 2005, p. 314), share of urban population, and share of people older than 50 or 60, respectively. Since canton-level economic indicators are only available since 1998, we use the number of motor vehicles per person as a proxy for the level of the economy (Ashenfelter and Kelley 1975; Knack 1995; Filer, Kenny, and Morton 1993; Duch and Stevenson 2010). Table A2 in the Appendix provides a complete list of variables and data sources.

As a first step, we simply compare average turnout rates in federal referendums in Vaud with turnout rates in cantons that did not practice compulsory voting. Table A3 shows these turnout rates along with the difference between Vaud and other cantons that did not practice compulsory voting. Prior to the introduction of compulsory voting (1900-1924), average turnout rates in Vaud (46%) were comparable to those in other cantons (47%). In

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[8]The appendix provides the legal text of the compulsory voting law and a copy of an original document that reports the federal revenues from the fine in one election (see Table A4 and Figure A9 in the Appendix).

the treatment period, however, turnout in federal referendums is on average around 84% in Vaud, which is about 30 percentage points higher than in other cantons (54%). In the post-treatment period, federal referendum turnout decreases to 35%, which is about 8 percentage points below the average participation rate in other cantons. A major problem with this comparison of turnout rates is, of course, that cantons differ on many characteristics that affect political participation and therefore, average turnout rates in cantons that did not practice compulsory voting may not provide us with a convincing counterfactual, i.e, turnout levels in Vaud that we would have expected in the absence of compulsory voting. To deal with this problem, we now turn to the synthetic control method.

We define our quantity of interest as the difference between turnout in Vaud under treatment conditions and turnout in Vaud under control conditions. Since we cannot observe turnout in Vaud under control conditions in the treatment period, we employ a synthetic control design as developed in Abadie and Gardezabal (2003) and Abadie, Diamond, and Hainmueller (2010) to impute this missing counterfactual. Specifically, we impute the missing counterfactual for the treated canton using a weighted average of control cantons in our donor pool. The weights are exclusively based on pre-intervention data (including turnout and covariates as predictors) to avoid post-treatment bias. In addition, this weighting procedure avoids extrapolation. This would be the case if a unit in the donor pool would receive a negative weight or a weight larger than unity, two common issues with regression-based approaches.

We exclude those cantons from the donor pool that also practiced some—typically not enforced—version of compulsory voting. These are Aargau, Appenzell Inner Rhodes, Appenzell Outer Rhodes, Glarus, Graubuenden, Schaffhausen, St.Gallen, Ticino, Thurgau, and Zurich (see also Table A5 in the appendix). This leaves us with a donor pool of 14 cantons. Figure A1 in the Appendix shows a map with the cantons included in the donor pool. Vaud introduced compulsory voting in 1924 and suspended it from late 1940 to 1945 due to World War II. Compulsory voting was reactivated in late 1945 and eventually abolished in 1948. Therefore, we define the 1900 to 1924 period as our pre-treatment period, 1925 to 1940 is

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our first treatment period, 1946 to 1948 the second treatment period, and 1949 to 1970 the post-treatment period.[9]

To probe the plausibility of our identification assumption, we conduct a falsification test and estimate a placebo treatment effect for the 1900 to 1924 pre-treatment period. This is an important step to check whether the treated and the synthetic Vaud followed the same turnout trajectory prior to the introduction of compulsory voting. In addition, we perform a series of placebo tests proposed by Abadie, Diamond, and Hainmueller (2010) which further increase the credibility of our findings. In the robustness section we also re-estimate our main results using panel data models with fixed effects. While our findings remain unchanged, additional analysis suggest that the panel data regressions assign negative weights to some of our control units. This means that the results from the panel regression approach will rely on stronger assumptions about the functional form that maps from the set of regressors to outcomes. The estimates based on the synthetic control method avoid this type of extrapolation and therefore offer less model-dependent inference (Abadie, Diamond, and Hainmueller 2015).

Empirical Results

Identifying Assumption

We first turn to the credibility of our results by exploring the plausibility of our identifiying assumption. The left panel in Figure 1 shows average turnout rates in federal referendums in Vaud. When considering the pre-treatment period (1900-1924), we find that turnout in synthetic Vaud tracks the observed turnout dynamics in treated Vaud very closely. The right panel of Figure 1 plots the differences between turnout in Vaud and its synthetic control. The differences are relatively small and fluctuate around zero. Since turnout in our synthetic control canton mimics the turnout trajectory in Vaud very closely, we conclude

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[9]The last referendums under voluntary voting took place on February 12th, 1924. The subsequent referendum on May 24th, 1925, took place under compulsory voting.

that the synthetic control unit performs well in approximating participation rates in federal referendums in the pre-treatment period. This increases our confidence in the identifying assumption, which says that in the absence of compulsory voting, we would have observed turnout levels that equal those in synthetic Vaud.

We also explore the similarity of Vaud and synthetic Vaud in terms of their socio-demographic and economic characteristics. The better the pre-intervention characteristics of synthetic Vaud resemble those in treated Vaud, the more plausible the assumption that turnout in synthetic Vaud provides us with a convincing counterfactual for estimating the causal effect of compulsory voting (Abadie, Diamond, and Hainmueller 2015). Table A6 in the Appendix reports the means of those variables. These descriptives show that the two units are closely comparable in terms of their pre-treatment turnout rates (see also Figure 1) and with respect to their age structure, public revenue, population size, structure of the economy, and economic development. [10]

Contemporaneous Effects

The left panel in Figure 1 plots turnout in federal referendums in the observed Vaud and its synthetic counterpart. Turnout in the pre-treatment period is about 40% on average. In late 1924, voting becomes compulsory and non-voters are fined. This is when the turnout trajectories between observed and synthetic Vaud begin to diverge. Turnout averages in Vaud increase rapidly to levels between 80 and 90%. In synthetic Vaud, however, turnout fluctuates at around 50%, but remains well below turnout in treated Vaud. We also find that the variance in participation rates decreases, i.e., compulsory voting stabilizes turnout at significantly higher levels.[11] These pronounced differential dynamics persist until 1940,

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[10]For turnout in federal referendums, the weights forming synthetic Vaud are as follows: Bern (0.29), Obwalden (0.27), Geneva (0.25), Luzern (0.12), Schwyz (0.08). For annual turnout averages, the weights forming synthetic Vaud are as follows: Bern (0.27), Geneva (0.24), Luzern (0.21), Obwalden (0.12), Schwyz (0.10), Valais (0.06).

[11]During the treatment period the variance in turnout in Vaud is 9 percentage points. In contrast, the turnout variation in the control units is 21 percentage points.

when Vaud temporarily suspended compulsory voting. Turnout in Vaud reacts quickly to this policy change and drops to about 50%. This turnout level still appears higher than in synthetic Vaud, maybe because not all citizens were equally well informed about the fact that compulsory voting had been temporarily suspended. In the brief period between 1946 and 1948, Vaud re-activated compulsory voting, which again induces a sharp increase in turnout that clearly exceeds turnout in the synthetic control unit. This quick response to the repeated introduction of compulsory voting and its removal adds to our confidence that the turnout effects are causally attributable to the policy intervention. The right panel in Figure 1 shows the differences in turnout averages between the observed and the synthetic Vaud. The treatment effects are large, ranging from about 20 to 60 percentage points with an average of 30 percentage points. We also note that the effect decreases slightly over time, which may reflect that the real value of the fine, which remained constant in nominal terms, decreased, although many other potential explanations such as voter fatigue remain possible.

Arguably, the large effect of compulsory voting on turnout relies on the existence of mobilization potential. Specifically, we expect that less salient issues that would normally be associated with lower turnout levels form the basis for the mobilization effects of compulsory voting. We explore whether this is the case by plotting the estimated treatment effects by a referendum proposal's number of signatures as a measure of its salience.[12] This requires restricting our sample to optional referendums and popular initiatives. Figure A2 in the Appendix plots the estimated mobilization effect of compulsory voting against the number of signatures on ballot propositions. To explore the sensitivity of the relationship to outliers (propositions that received an exceptionally high number of signatures), we estimate two regression lines: one for the subset of propositions with up to 200'000 signatures (solid line) and one estimated on the basis of the full sample (dashed line). Irrespective of which sample we focus on, our results suggest that the salience of a proposal appears to explain some of

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[12]Note that popular initiatives were launched only if 50,000 valid signatures were collected, optional referendums required a minimum of 30,000 signatures. Overall, the number of signatures is a good predictor of turnout with a correlation of 0.31 in the period of 1900–1970.

the differences in the treatment effect. If the salience of a proposal is low (around 50'000 signatures), the average treatment effect is about 36 percentage points. However, in case the proposal is moderately salient the treatment effect decreases to 30 percentage points. The relationship is even stronger when we restricting our sample to ballot propositions with up to 200'000 signatures (solid regression line). This result is consistent with the idea that the salience of an issue moderates the positive effect of compulsory voting on political participation. Yet, this does not imply that the turnout effect of compulsory voting was confined to politically irrelevant referendums. Examples of important referendums with relatively low turnout include a proposal to change the Swiss political system into an autocratic state (*Fronteninitiative* in 1935) or a proposal to limit immigration (*Massnahmen gegen die Ueberfremdung* in 1928). Both referendums constitute crucial direct-legislative decisions on politically and economically important issues.

Our main estimate of 30 percentage points exceeds those reported in previous cross-country studies, which range from 7 to 15 percentage points (Panagopoulos 2011*b*; Franklin 2004; Blais and Young 1996; Jackman 1987), by a factor of 2 to 4.[13] Compared with these previous findings, our results suggest that compulsory voting mobilized citizens massively. This should have increased the probability of habit formation, thereby giving rise to long-term increases in turnout in federal referendums, and should also have induced political participation spillovers on forms of civic engagement other than turnout in federal referendums. In what follows we first examine the long-term effects and subsequently turn to an analysis of participation spillovers.

Long-term Effects

The habit-formation argument assumes that individuals' preferences, in particular those of younger persons, are socially programmable (Gintis 2003; Cooter 2000; Weber 1968; Ross

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[13]We also attempted to explore whether this effect varies as a function of community size (Panagopoulos 2011*a*; Funk 2010), but the community-level data we would need for such an analysis is unavailable for the historical time period we study.

1896). Against this theoretical background, we can compute a rough benchmark estimate of the expected long-term effect of compulsory voting on turnout in federal referendums. We focus on the number of first-time voters who were socialized as citizens under compulsory voting from 1925 to 1940. Based on birth rates data from the Swiss census, we can say that about 3,000 male individuals became potential first-time voters in Vaud each year. Thus, by the end of 1940, when Vaud temporarily suspended compulsory voting, about 45,000 individuals had become first-time voters under compulsory voting with monetary sanctions. The number of individuals eligible to vote equaled about 101,000. Thus, if only half of the younger age cohorts that had been socialized under compulsory voting developed a habit to turn out, we would expect a persistent effect on turnout of about 22 percentage points in the post-treatment period.

If we inspect the turnout differences in the post-treatment period (1949-1970) shown in the right panel of Figure 1, however, we observe no such persistent, positive turnout effect. Instead, when Vaud abolished compulsory voting, the treatment effect drops to zero with only erratic deviations in subsequent referendums. Synthetic Vaud and observed Vaud again experience roughly comparable turnout rates. This pattern suggests that, although compulsory voting substantially mobilized citizens to participate in federal referendums in the period in which Vaud severely sanctioned non-voting, this thorough law enforcement did not lead individuals to develop a voting habit. We refrain from studying the post-1970 period because Switzerland introduced female suffrage in 1971. Such a structural shock is likely to jeopardize the credibility of subsequent comparisons.

To more directly explore the existence of habit formation among young and first-time voters (Franklin 2004), Figure A7 in the Appendix reports the average long-term effects of compulsory voting on turnout, again estimated within a synthetic control design, broken down by various measures of districts' age composition. Since habit formation should be most pronounced among young voters, we would expect that Vaud's compulsory voting law should have increased turnout most strongly in districts with a high share of first-time voters. However, the results in Figure A7 suggest that the long-term turnout effects are indistin-

guishable from zero for all districts irrespective of their share of first-time voters. These results remain unchanged when using alternative measures of districts' age compositions.

Robustness: Placebo Tests, Extrapolation, Temporal Aggregation

We perform two placebo tests to explore the robustness of our main results. The first is a placebo test in space. The second is a placebo test in time (Abadie, Diamond, and Hainmueller 2010). Due to space constraints, we only report the results. The Appendix describes the tests in more detail. Turning to the placebo test in space, the left panel in Figure A3 in the Appendix shows the treatment effect during the 1925-1940 period in Vaud and the 14 placebo effects, one for each canton in the donor pool. We find that the effect of compulsory voting in Vaud exceeds all placebo effects. The p-value that corresponds to Vaud's treatment effect equals the smallest possible value given the sample size. This value is $\frac{1}{14} = .07$. The right panel in Figure A3 in the Appendix shows the results from our placebo test in time (see the Appendix for details about the implementation of this test). We find only negligibly small placebo effects. In fact, the differences between the 1900-1914 and the 1915-1924 period are, in absolute terms, of the same size. Specifically, we do not find an effect in the 1914-1924 period which directly precedes the true treatment period in which Vaud practiced compulsory voting. Thus, the placebo test in time also suggests that the large effects we document have a causal interpretation.[14]

We also re-estimate the effect of compulsory voting on turnout in federal referendums using panel data regressions in which we control for all available covariates, fixed effects for each district and referendum day, as well as linear and quadratic time trends. We employ two-way clustered standard errors that account for dependencies between observations at the cantonal level and referendum day. Table 1 in the Appendix reports the results. When

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[14]Vaud's compulsory voting norm required only citizens below the age of 65 to participate in federal referendums (see legal text in Table A4 in the Appendix). We therefore also examined whether the mobilizing effect of Vaud's compulsory voting norm decreases as a function of the share of elderly in the population. Empirically, however, we do not find such a pattern.

looking at the results from Model 4, which constitutes our preferred specification, we again find that turnout in federal referendums significantly increases by about 30 percentage points on average. Yet, this strong contemporaneous effect is not associated with a long-term increase in political participation once compulsory voting has abolished: The coefficient on the post-treatment indicator is close to zero (-0.01) and not statistically significant.

We explore the extent to which one would have to be skeptical of a regression-based approach by analyzing whether regression estimates of the effect of compulsory voting rely on extrapolation. Extrapolation in this context means that the counterfactual outcome would be imputed by assigning negative weights to one or more units that did not practice compulsory voting. If this was the case, the regression approach would go beyond the support of the characteristics we actually observe for the control units which, in turn, would mean that inferences will be more model-dependent (King and Zeng 2006). This analysis requires us to derive the weights that the panel regression design implicitly assigns to the control units (Abadie, Diamond, and Hainmueller 2015). Figure A8 in the Appendix reports those results. We find that the panel model assigns negative weights to seven out of the 14 cantons. In contrast to the panel regression results, our synthetic control estimates do not rely on this implicit extrapolation. We also investigate the sensitivity of our results to the use of pre-treatment outcome values in our estimation of the synthetic control weights. We re-construct synthetic Vaud based on weights that exclude pre-treatment turnout as a predictor variable and find that the results remain unchanged (see Figure A5 in the Appendix).

Finally, we explore whether our findings are sensitive to the temporal aggregation of the pre-intervention turnout measure which serves as the basis for computing the synthetic control weights. Specifically, we probe whether our results change if we use referendum-day turnout as opposed to annual turnout averages to compute the weights for our synthetic control canton. Figure A6 in the Appendix shows the evolution of referendum-day turnout (left panel) and annual turnout averages (right panel) in Vaud along with two different versions of synthetic Vaud. For the left panel, we estimated the synthetic control weights using referendum-day turnout data. The right panel employs results based on annual turnout

averages. The turnout trajectories are virtually identical which suggests that our results do not depend on whether the weights are estimated on referendum-day turnout data or annual turnout averages.

Participation Spillovers

Did compulsory voting for federal referendums have more far-reaching spillover effects on other types of political collective action for which participation remained voluntary? To provide a more comprehensive assessment of these potential spillover effects we explore three types of civic engagement: Turnout in federal elections, turnout in cantonal referendums, and the number of signatures on ballot propositions.

First, we explore potential contagion effects on turnout in federal elections for which participation remained voluntary throughout the treatment period. Federal elections take place every four years, which strongly reduces the number of observations: There were two federal elections in Vaud in the pre-treatment period, six in the treatment period, and five in the post-treatment period. Panel A in Table 2 reports average turnout levels in both Vaud and the synthetic Vaud. Based on these quantities we compute a difference-in-differences estimate for the effect of compulsory voting in political participation. We find that compulsory voting for federal referendums also appears to significantly increase turnout in federal elections by about 12 percentage points when accounting for the pre-treatment differences between Vaud and its synthetic counterpart. Yet, when looking at the election that was concurrent with a federal referendum, we find that this effect is much larger, about 24 percentage points (since this effect is estimated based on cantonal-level turnout data from a single federal election, we do not report a standard error for this estimate). In contrast, turnout significantly increases by 9 percentage points in elections that were not concurrent with a federal referendum. This heterogeneity in the increase in election turnout suggests that the spillover effect largely stems from the fact that some elections were concurrent with federal referendums in which citizens had to participate to avoid the fine. Consequently, casting a vote in an election that was concurrent with a federal referendum posed little to

zero extra costs.

Our second test of potential spillover effects induced by compulsory voting examines turnout in cantonal referendums. Again, participation in cantonal referendums remained voluntary throughout the treatment period. We note, that the empirical basis for cross-cantonal comparisons remains somewhat limited for cantonal referendums, as these normally deal with specific, cantonal issues and are not temporally synchronized across cantons. Turning to the difference-in-differences results, Panel B in Table 2 suggests that turnout in cantonal referendums in Vaud significantly increases by about 20 percentage points. To what extent does this positive effect of compulsory voting for federal referendums reflect a habit-formation mechanism in which citizens develop a preference for political participation as opposed to simple cost-benefit calculations in which individuals adjust quickly to changes in the costs of non-voting? To explore this question, Table 2 also reports average turnout in cantonal referendums that were concurrent with federal referendums and those that were not. We again find strong heterogeneity in compulsory voting's mobilization effect: The difference-in-difference estimates suggest that turnout in cantonal referendums that are concurrent with federal referendums increases significantly by 53 percentage points on average. In contrast, turnout in cantonal referendums that are non-concurrent increases only by 13 percentage points. Again, this is consistent with the idea that turnout increased in concurrent cantonal referendums at least partly because in these cases casting a vote caused little extra costs.

How far-reaching were the spillover effects of compulsory voting for federal referendums? To address this question we collected data on the number of citizens that signed a petition. This form of political collective action provides an interesting case to more comprehensively examine the existence of participation spillovers that may originate from compulsory voting. The lower part of Table 2 (Panel C) reports the number of signatures on petitions for initiatives and referendums in Vaud in the pre-treatment and the treatment period as a share of the total number of signatures on ballot propositions in Switzerland. We find that the number of signed petitions in Vaud actually decreases during the period in which participation in federal referendums was compulsory. Thus, compulsory voting for federal

referendums did not systematically mobilize citizens to more actively participate in initiating direct legislation by signing petitions. Consistent with Dinas's (2012) results for elections, voting does not increase participation in other types of political collective action.

Conclusion

Previous research has devoted great effort to exploring the effects of compulsory voting on contemporaneous political behavior, but we have very little empirical knowledge about whether sanctioning abstention can contribute to the formation of voting habits. Our study addresses this question by evaluating the long-term and spillover effects of a compulsory voting law in the Swiss canton of Vaud. Such an analysis appears all the more important since a large body of theoretical work on the paradox of voting has resorted to a "civic duty" term to explain why levels of civic engagement strongly exceed those predicted by rationalist models of political participation (Downs 1957; Riker and Ordeshook 1968; Owen and Grofman 1984; Feddersen 2004). However, such a consumption benefit explanation of political collective action requires research that examines the conditions under which policymakers can cultivate a social norm of civic voluntarism. We contribute to this research by exploring whether electoral institutions can induce citizens to internalize a political participation norm and thereby generate a preference for civic engagement.

First, we find that compulsory voting increases turnout in federal referendums massively, by about 30 percentage points on average. However, this effect vanishes quickly as soon as voting is no longer compulsory. Second, the results suggest that compulsory voting can give rise to positive spillover effects on other forms of political collective action for which participation remains voluntary. While these spillover effects seem to exist, they are most pronounced in elections that are concurrent with federal referendums for which non-voters have to pay a fine. The spillover effects on turnout in non-concurrent elections are less pronounced and become negative when we examine participation in democracy as measured by the number of signatures on petitions for ballot propositions.

These results qualify theories of habit formation in the context of long-standing compulsory voting laws since socialization under compulsory voting failed to induce the evolution of voting habits. Instead, the findings appear more consistent with a simple model of political participation in which individuals quickly adapt to exogenous changes in the costs of non-voting even if they have been exposed to a specific regime for a long period. We can identify several potential explanations for our finding. First, one may argue *a posteriori* that forcing citizens to participate in political collective action will fail to cultivate civic voluntarism because individuals simply do not view political engagement as something normatively desirable. For example, if one abolished the annoying and unhygienic requirement for airline passengers to remove their shoes before security inspections, few individuals would continue to take off their shoes. Presumably, travelers will not have internalized this norm as they do not believe this behavior to truly increase security. However, this explanation appears difficult to square with the pervasive evidence on citizens' positive perceptions of civic involvement in political decision-making (Pattie, Seyd, and Whiteley 2003; Schaub 2012). For example, recent data from a post-referendum survey in Switzerland (FORS 2012) shows that 88% of all non-voters and 92% of all voters view citizen involvement in policy-making as important.[15] Although these figures are based on stated preferences, they at least suggest that citizens perceive participation in political collective action as something positive in nature and compulsory voting clearly seems to be an effective means to this end.

Another potential explanation for why our findings differ from previous studies (Gerber, Green, and Shachar 2003; Meredith 2009; Fujiwara, Meng, and Vogl 2016) highlights individuals' perceptions of the legislative process underlying an electoral reform. In Vaud, elites imposed compulsory voting on citizens. If, instead, citizens actively decided to introduce compulsory voting in a referendum, this could increase its public acceptance and serve as a signal to the citizenry that many view voting as normatively desirable behavior. To answer these and related questions would require the use of micro-level data on voters and non-voters which is not available for the historical time period we study here. However, they

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[15]In Vaud, 91% of all non-voters and 93% of all voters value civic engagement.

present promising avenues for future research.

Finally, one may ask how our results compare with studies that explore an increase in the costs of voting as opposed to an increase in the costs of non-voting. Lott and Kenny (1999) report that in the United States it took up to 30 years until turnout levels recovered from a pronounced decline in political participation due to the introduction of a poll tax. This could indicate that participation in political collective action adjusts more quickly to a decrease in the costs of non-voting than a decrease in the costs of voting. Future work may explore such asymmetries as well as their broader impact on participation in other types of political collective action.

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Tables and Figures

Figure 1: Compulsory Voting and Turnout in Federal Referendums: Vaud and Synthetic Vaud
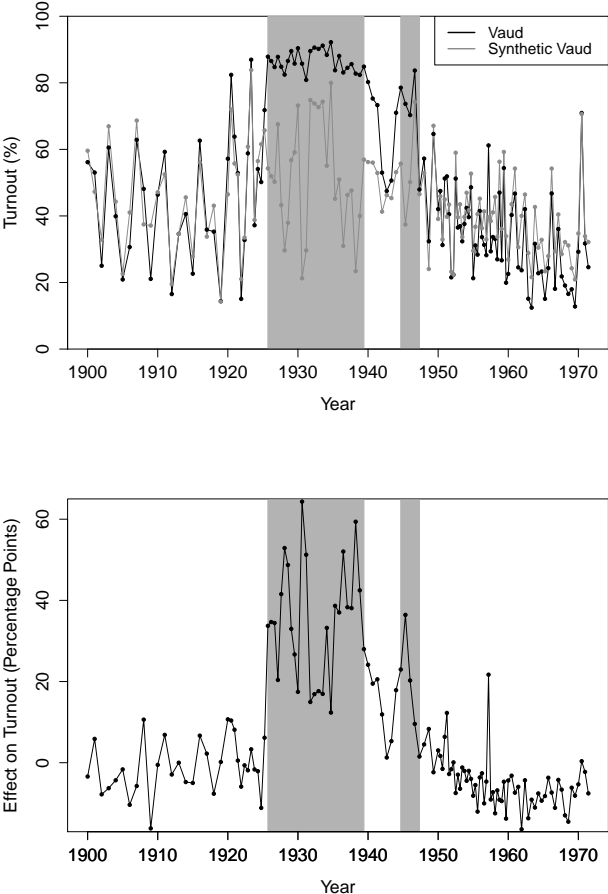
Note: The left panel shows turnout in treated and synthetic Vaud for federal referendums between 1900 and 1970. Periods in which Vaud practiced compulsory voting are shaded gray (1925-1940 and 1945-49). The right panel shows the difference in turnout between treated and synthetic Vaud.

Table 1: The Effect of Compulsory Voting: Panel Regression Estimates

Model	(1)	(2)	(3)	(4)
Compulsory voting	0.31	0.33	0.33	0.33
	(0.01)	(0.01)	(0.01)	(0.01)
	[0.00]	[0.00]	[0.00]	[0.00]
Post-treatment	-0.06	-0.01	-0.01	-0.01
	(0.02)	(0.02)	(0.02)	(0.02)
	[0.00]	[0.66]	[0.66]	[0.66]
Observations	1,950	1,950	1,950	1,950
R-squared	0.79	0.80	0.80	0.80
District FEs	✓	✓	✓	✓
Referendum Day FEs	✓	✓	✓	✓
Covariates	✗	✓	✓	✓
Linear time trends	✗	✗	✓	✓
Quadratic time trends	✗	✗	✗	✓

Note: This table shows the coefficients from panel regressions with two-way clustered standard errors (in parentheses) and *p*-values (in brackets). Vaud practiced compulsory voting from 1925 to 1940 and 1945 to 1949. The variable *Compulsory Voting* equals one in those two periods and is zero otherwise. Standard errors are two-way clustered by canton and referendum days. Time trends are applied at the cantonal level.

Table 2: Participation Spillovers: Federal Elections, Cantonal Referendums, and Signed Petitions

	Vaud	Synthetic Vaud	DiD	N
(A) Turnout in Federal Elections				
Pre-compulsory voting (1900-1924)	69.12	63.52		2
	(2.22)	(2.01)		
Compulsory Voting (1925-1940, 1945-1949)	78.1	60.98	11.53	5
	(3.36)	(1.39)	(4.71)	
concurrent with federal referendums (1925)	87.07	57.39	24.09	1
non-concurrent with federal referendums	75.86	61.74	8.52	4
	(3.23)	(1.65)	(4.71)	
(B) Turnout in Cantonal Referendums				
Pre-compulsory voting (1900-1924)	23.84	45.58		20
	(2.57)	(1.39)		
Compulsory Voting (1925-1940, 1945-1949)	43.45	46.03	19.16	24
	(4.84)	(1.21)	(5.78)	
concurrent with federal referendums	84.82	54.18	52.39	4
	(1.28)	(2.75)	(4.22)	
non-concurrent with federal referendums	35.18	44.05	12.87	20
	(3.51)	(1.64)	(4.86)	

(C) Signed Petitions

Pre-compulsory voting (1900-1924)	12.69	5.93		26
	(2.29)	(0.3)		
Compulsory Voting (1925-1940, 1945-1949)	4.89	6.35	-8.22	18
	(1.07)	(0.49)	(2.59)	

Note: This table shows the means of turnout in federal elections (Panel A), cantonal referendums

(Panel B), and the average number of signatures on petitions for federal

referendums in Vaud as a share of the total number of signatures on petitions for ballot propositions in Switzerland (Panel C) for Vaud and

Synthetic Vaud. Vaud practiced compulsory voting from 1925 to 1940 and 1945 to 1949.

The variable *Compulsory Voting* equals one in those two periods and is zero otherwise.

DiD is the difference-in-differences estimate. N is the number of observations. Standard

errors are in parentheses.

by

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Synthetic Control Method

This summary follows the exposition of the synthetic control method in Abadie, Diamond, and Hainmueller (2010). To impute the missing counterfactual for the treated canton, we create a weighted average of control cantons $j = 2, \ldots, J + 1$ in our donor pool. To that end, let $W = (w_2, \ldots, w_{J+1})'$ denote a set of weights with $w_j \geq 0$ for $j = 2, \ldots, J + 1$ and $w_2 + \cdots + w_{J+1} = 1$. Each set of weights characterizes one possible synthetic control canton. The weights are exclusively based on pre-intervention data to avoid post-treatment bias. For the preintervention period $t \leq T_0$, let $Y_{i1}, \ldots, Y_{iT_0}$ denote observed turnout rates and $Z_{i1}, \ldots, Z_{iT_0}$ the corresponding set of predictors. If $W = W^*$ such that

$$\sum_{j=2}^{J+1} w_j^* Z_j = Z_1, \ \sum_{j=2}^{J+1} w_j^* Y_{j1} = Y_{11}, \ \cdots \ , \ \sum_{j=2}^{J+1} w_j^* Y_{jT_0} = Y_{1T_0}.$$

then, for the treatment periods $t \in \{T_0 + 1, \ldots, T_1\}$, we obtain an unbiased estimator of the effect on turnout, α_{1t}, given by:

$$\widehat{\alpha}_{1t} = Y_{1t} - \sum_{j=2}^{J+1} w_j^* Y_{jt}.$$

Let $X_1 = (Z_1, Y_{11}, \ldots, Y_{1T_0})'$ denote a $(k \times 1)$ vector of preintervention characteristics containing relevant predictors and our outcome variable (turnout) and let X_0 be a $(k \times J)$ matrix which contains the same variables for our control cantons. We choose W^* such that it minimizes $\|X_1 - X_0 W\|$ in the pre-treatment period subject to the convexity constraint

on the weights.[16]

We exclude those cantons from the donor pool that also practiced some—typically not enforced—version of compulsory voting. These are Aargau, Appenzell Inner Rhodes, Appenzell Outer Rhodes, Glarus, Graubuenden, Schaffhausen, St Gallen, Ticino, Thurgau, and Zurich (see also Table A5 in the appendix). This leaves us with a donor pool of 14 cantons. Figure A1 in the Appendix shows which cantons are included in the donor pool. Vaud introduced compulsory voting in 1924 and suspended it from late 1940 to 1945 due to World War II. Compulsory voting was reactivated in late 1945 and eventually abolished in 1948. Therefore, we define the 1900 to 1924 period as our pre-treatment period, 1925 to 1940 is our first treatment period, 1946 to 1948 the second treatment period, and 1949 to 1970 the post-treatment period.[17]

Description of Placebo Tests in Space and Time

The placebo test in space rests on the idea that we can (falsely) pretend that a control unit has been treated even though it has not been. Under this assumption we can we generate a synthetic control canton for each unit in the donor pool using the synthetic control method. We then compute placebo treatment effects for each donor canton for the period in which Vaud practiced compulsory voting. This provides us with an estimate of the distribution of the treatment effect under the null hypothesis that compulsory voting has no effect on turnout (Abadie, Diamond, and Hainmueller 2010). We then rank the (absolute) size of the treatment effect for the treated canton Vaud relative to the computed placebo effects for all cantons in the donor pool.

We also conduct a placebo test in time. This test relies on the idea that we can shift the

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[16]We consider $\|X_1 - X_0W\|_V = \sqrt{(X_1 - X_0W)'V(X_1 - X_0W)}$, where V is the $(k \times k)$ symmetric and positive semi-definite matrix that minimizes the mean squared prediction error in the pre-treatment period (Abadie, Diamond, and Hainmueller 2010).

[17]The last referendums under voluntary voting took place on February 12th, 1924. The subsequent referendum on May 24th, 1925, took place under compulsory voting.

true treatment period and (falsely) assume compulsory to have been practiced in a period in which it has not been. We implement this test by redefining the pre-treatment period and use only a small subset of the pre-treatment observations to compute weights for the donor pool. We then use these weights to compute turnout in the synthetic Vaud and estimate placebo effects for the remaining pre-treatment period. More specifically, we use the 1900-1914 period to compute the weights and compare the difference between the turnout trajectories of Vaud and its synthetic counterfactual in the 1915-1924 period. Large placebo effects would question the findings from our main analysis. A very small pre-treatment difference between the treated and the synthesized control canton, however, would lend further credibility to a causal interpretation of our results.

Table A1: Voter Turnout and Complier Characteristics

Stimulus/Treatment	Turnout Effect (Complier Share)	Complier characteristics	Habit formation	Country	Time Period	Study
Discontinuity in voting-age restrictions	44%	Young voters that had just passed the 21-year cutoff	Voting in 1968 increases probability of voting in 1970 by 27 pp. Persists for 30 years	USA	1965-1997	Dinas (2012)
Compulsory voting: CHF 2 fine and police visit	30%	No individual data available, likely low-income citizens (Bechtel, Hangartner, and Schmid 2016)	Minor contemporary spill-over effects, no long-term habit formation	Switzerland	1900-1970	This study
Discontinuity in voting-age restrictions	29%	Young voters that had just passed the 18-year cutoff	Voting in 2000 increases probability of voting in 2004 by 5-7.5 pp	California	2000-2004	Meredith (2009)
Moving while aged 16-23	3.3% (for moving once)	Voters who participate because they didn't move places while aged 16-23	Voting in an election increases probability of voting in subsequent election by 13 pp	Great Britain	1979-1997	Denny and Doyle (2009)
Downstream effects of GOTV	2%	Marginal voters who participated because of GOTV campaign (letter and door-to-door canvassing)	Voting in 1998 increased probability of voting in 1999 local elections by 47 pp	New Haven, CT	1998-1999	Gerber, Green, and Larimer (2008)
Rainfall on election day	0.4% (for a 7mm rainfall shock)	Marginal voters who participated because it did not rain on election day	Voting in one election increases probability of voting in subsequent election by 90 pp	United States	1952-2012	Fujiwara, Meng, and Vogl (2016)

- *Turnout*: Percentage of voters as share of total number of citizens eligible to vote. Period of measurement: 1900-1924. Source: Bolliger, Linder, and Rielle (2010)

- *Population over 40*: Number of individuals over 50 as share of total population. Period of measurement: 1900-1924. Source: SFS (2010)

- *Population over 50*: Number of individuals over 50 as share of total population. Period of measurement: 1900-1924. Source: SFS (2010)

- *Population over 60*: Number of individuals over 60 as share of total population. Period of measurement: 1900-1924. Source: SFS (2010)

- *Population*: Number of residents in a canton in logs. Period of measurement: 1900-1924. Source: Siegenthaler and Ritzmann (1996)

- *Urban Population*: Share of individuals living in a city. Period of measurement: 1900-1924. Source: Hofferbert (1976)

- *Public Revenues*: Public revenues per capita. Period of measurement: 1900-1924. Source: Siegenthaler and Ritzmann (1996)

- *Public Spending*: Public spending per capita.

  Period of measurement: 1900-1924. Source: Siegenthaler and Ritzmann (1996)

- *Primary Sector*: Share of individuals working in primary sector in terms of total population. Period of measurement: 1900-1924. Source: Siegenthaler and Ritzmann (1996)

- *Secondary Sector*: Share of individuals working in secondary sector in terms of total population.

  Period of measurement: 1900-1924. Source: Siegenthaler and Ritzmann (1996)

- *Motor Vehicles*: Number of motor vehicles per individual. Period of measurement: 1900-1924. Source: Siegenthaler and Ritzmann (1996)

Table A3: Political Participation in Federal Referendums in Vaud, 1900-1970

Period	Vaud	Other Cantons	Difference (points)
Pre-Treatment (1900-1924)	46	47	-1
Treatment (1925-1940, 1946-1949)	84	54	30
Post-Treatment (1950-1970)	35	43	-8

Note: Average turnout rates in federal referendums in percent. Other cantons only include cantons that did not practice compulsory voting.

Table A4: Compulsory Voting Norm in the Swiss Canton of Vaud

Original Text

Vote obligatoire

Art. 49. En matière constitutionnelle ou législative fédérale, l'exercice du droit de vote est obligatoire pour tout citoyen âgé de moins de 65 ans révolus, inscrit au rôle des électeurs. Le citoyen qui n'a pas pris part au scrutin doit présenter, par écrit, une excuse à la municipalité au plus tard le deuxième jour après la clôture des opérations. La municipalité transmet au préfet, dans les dix jours, la liste des défaillants et les excuses qui lui sont parvenues. Le préfet statue sans recours sur ces excuses. Il tablit la liste définitive des citoyens soumis à la contribution prévue à l'art. 113 et l'adresse au receveur pour perception. Un arrêté du Conseil d'Etat fixe les détails d'exécution. Pour chaque votation fédérale, cet article est inséré dans l'arrêté cantonal.

Vote obligatoire. Contribution.

Art. 113. Tout citoyen, âgé de moins de 65 ans, qui n'a pas pris part à une votation fédérale, sans excuse valable, est tenu de verser une contribution de deux francs.Ne sont considérés comme excuses valables que les cas de force majeure tels que l'absence nécessaire, le grand éloignement et la maladie.

English Translation

Compulsory voting

Art. 49. Concerning the federal constitution or legislation, the exercise of the suffrage is compulsory for any citizen under 65 years of age registered as a voter. The citizen who did not take part in the ballot has to excuse himself in writing to the municipality no later than the second day after the closing of the polls. The municipality sends to the prefect the list of defaulters and the excuses they submitted. The prefect decides with no recourse on these excuses. He compiles the definitive list of citizens subject to the fee according to art. 133 and addresses it to the receiver for the collection. A decree of the cantonal council records

the details of the execution. For every federal vote, this article is inserted in the cantonal decree.

Compulsory voting. Fee.

Art. 113. Any citizen under 65 years of age who did not participate in a federal vote without any valid excuse is required to pay a fee of two francs. Only cases of forced absence due to Force majeure, a long distance or disease, are considered as valid excuses.

## Table A5: Overview of Compulsory Voting in Switzerland

Canton	Compulsory Voting		Fine
	Not sanctioned	Sanctioned	
Aargau	1885-today	1905-1971	2 SFR
Appenzell Inner Rhodes	1872-today	1891-1924	0.50 to 5SFR
Appenzell Outer Rhodes	1908-	1834-1959	
Basel-Landschaft	-	1863-1882	
Basel-Stadt	-	?-1833	10 Batzen
Bern	1851-1980	1851-1869	1 SFR
Fribourg	-	-	
Geneva	-	-	
Glarus	1887-today	1887-1961	1 SFR
Graubuenden	Unclear	Unclear	
Lucerne	1899-1971	-	
Neuchatel	1891-1916	-	
Nidwalden	1913-today	-	
Obwalden	1895-today	-	
Schaffhausen	-	1904-today	1 SFR, since 1973 3 SFR
Schwyz		1848-1876	
Solothurn		1856-1899	
St Gallen	1981-2003?	1872-1981	2 SFR, since 1976 5 SFR
Thurgau	1869-1904	1904-1954	0.50 to 1 SFR
Ticino		1920-today?	up to 3 SFR, depending on municipality
Uri	1875-today	-	
Valais	-	-	
Vaud	-	1925-1948	2 SFR
Zug	1894-	-	
Zurich	1955-1985	1869-1955	0.30 to 1 SFR, later 1 to 3 SFR (GV up to 50SFR)

Table A6: Covariate Balance

	Treated	Synthetic	Donor Pool
Population over 40	30.79	30.70	29.12
Population over 50	18.81	18.75	17.65
Population over 60	9.62	9.65	8.99
Public Revenues	85.22	81.88	68.94
Public Spending	89.42	92.96	75.98
Log Population	12.65	11.70	11.30
Urban Population	27.42	26.68	21.43
Working Population	46.91	47.05	46.27
Primary Sector	13.52	13.58	13.47
Secondary Sector	16.55	17.90	19.18
Motor Vehicles	2.67	2.65	1.84
Turnout 1900–1912	39.90	42.74	47.18
Turnout 1913–1924	50.71	49.62	46.06

Note: The table shows the means of the variables in the treated units, the synthetic control units, and the (unweighted) donor pool using the (non-annual) federal referendum data.

Figure A1: Cantons of Switzerland
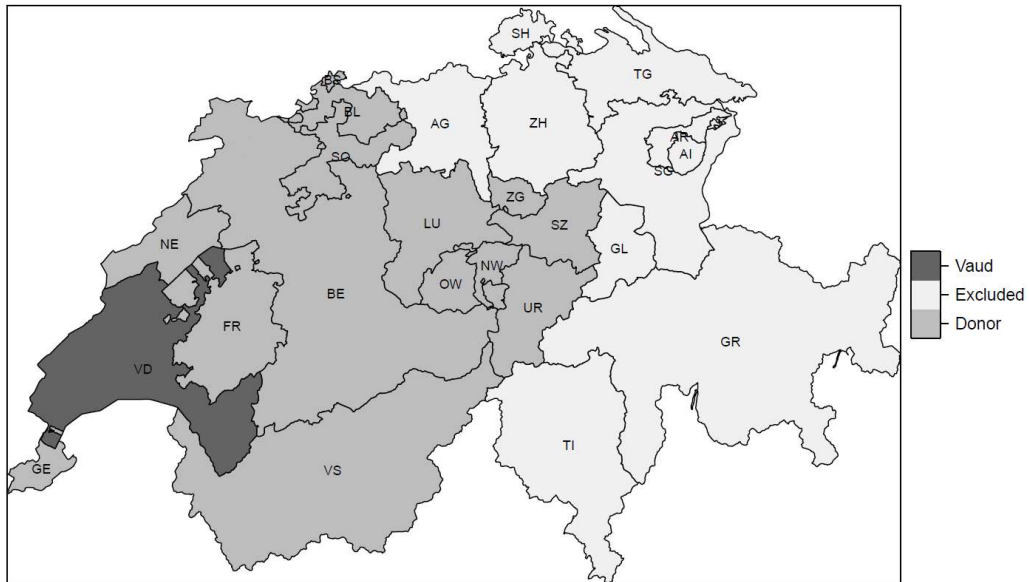
Note: The map shows the boundaries of the Swiss cantons in early 1900. The canton of Vaud is shaded black, cantons that are included in the donor pool are shaded dark gray. Cantons which were excluded from the donor pool are shaded light gray. In 1900, Switzerland consisted of the following cantons: Aargau (AG), Appenzell Inner Rhodes (AI), Appenzell OuterRhodes (AR), Basel-Landschaft (BL), Basel-Stadt (BS), Bern (BE), Fribourg (FR), Geneva (GE), Glarus (GL), Graubuenden (GR), Luzern (LU), Neuchatel (NE), Nidwalden (NW), Obwalden (OW), Schaffhausen (SH), Schwyz (SZ), Solothurn (SO), St Gallen (SG), Thurgau (TG), Ticino (TI), Uri (UR), Valais (VS), Vaud (VD), Zug (ZG), and Zurich (ZH).

Figure A2: The Effect of Compulsory Voting on Turnout by Number of Solicited Signatures on Ballot Propositions: Popular Initiatives and Optional Referendums
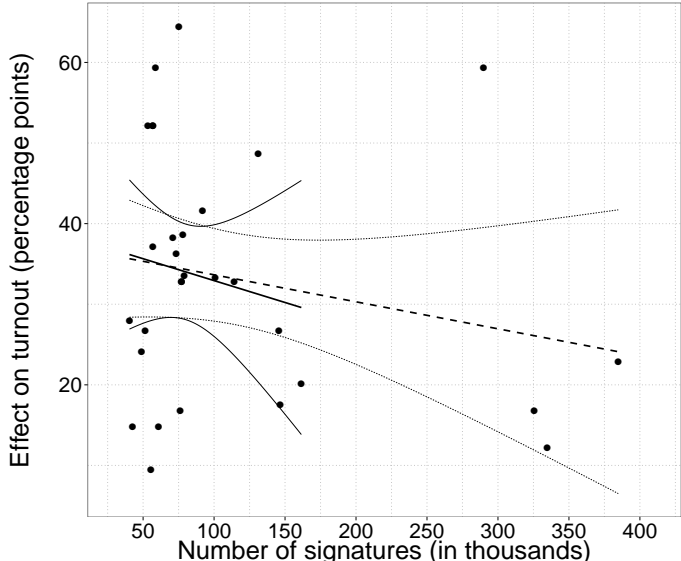

Note: This figure plots the estimated treatment effect against a ballot proposition's solicited number of signatures with two linear regression lines superimposed together with a 95%-confidence interval. The solid regression line is estimated for ballot propositions with 0 to 200'000 signatures (the slope is −0.54). The dashed regression line is estimated on the full sample (the slope is −0.34).

Figure A3: Placebo Tests in Space and Time for Compulsory Voting and Average Turnout in Federal Referendums
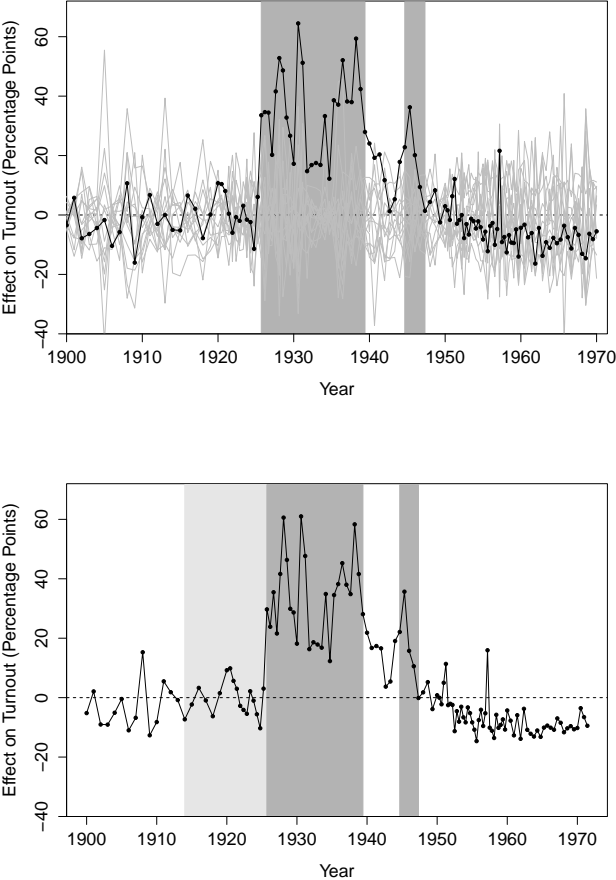

Note: Top panel shows the treatment effect in treated and synthetic Vaud for federal referendums-between 1900 and 1970. In the top panel, the treatment period is shaded gray. In the bottom panel, the placebo treatment period is shaded dark gray and the true treatment period is shaded light gray. The bottom panel shows the estimated placebo effects when assuming that the treatment period was from 1915 to 1924. For this analysis, we use the 1900-1914 period to compute the synthetic control weights.

Figure A4: Turnout in Federal Referendums in Vaud and Cantons included in the Donor Pool (1900-1970)
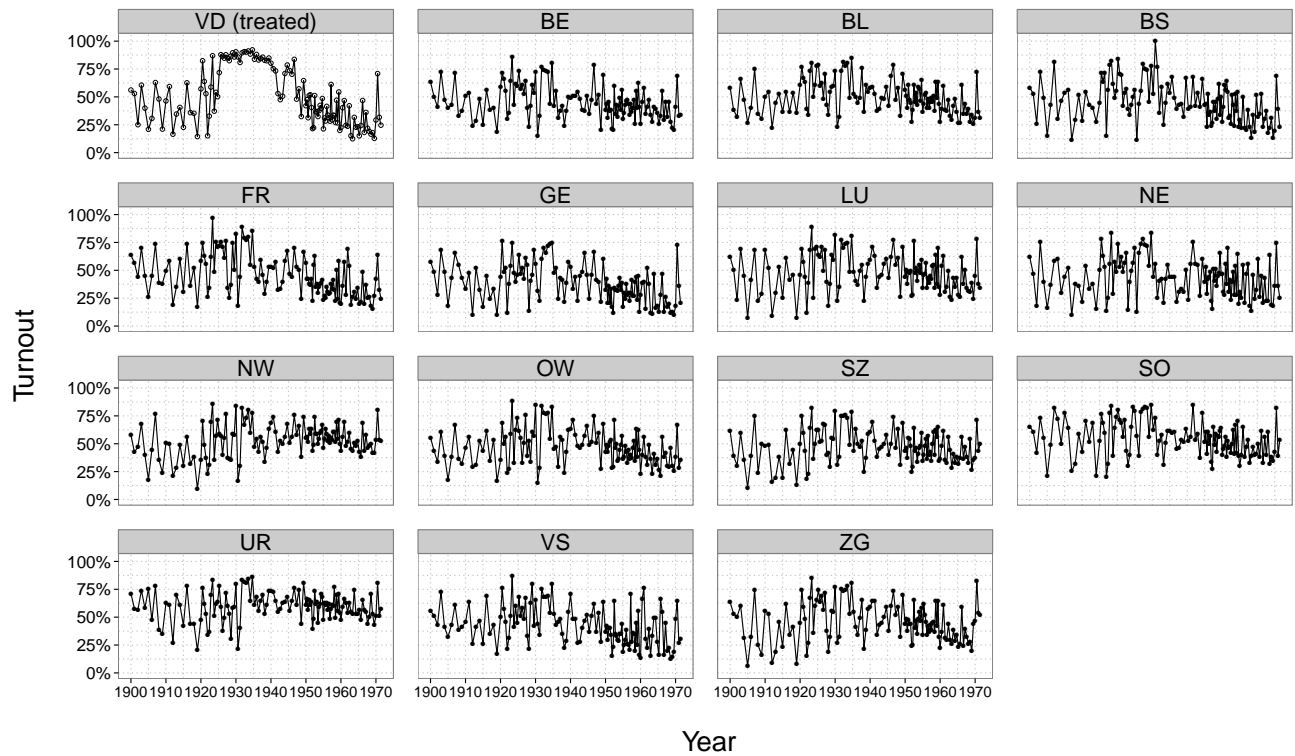

Note: The figure shows the turnout in federal referendums in Vaud and cantons included in the donor pool from from 1900 to 1970. VD=Vaud, BE=Bern, BL=Basel-Land, BS=Basel-Stadt, FR=Fribourg, GE=Geneva, LU=Luzern, NE=Neuchatel, NW=Nidwalden, Obwalden=OW, SZ=Schwyz, SO=Solothurn, UR=Uri, VS=Valais, ZG=Zug.

Figure A5: The Short- and Long-term Effects of Compulsory Voting: Excluding Pre-treatment Turnout as a Predictor
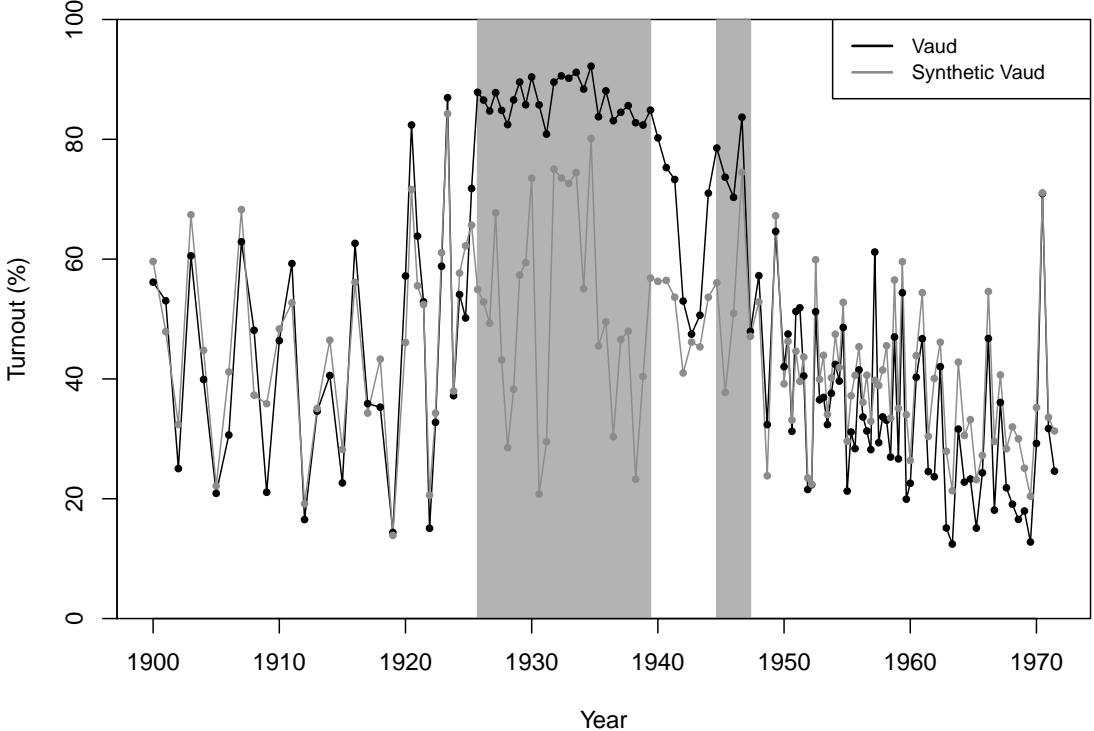

Note: The figure shows referendum-day turnout in observed and synthetic Vaud. The variables used to compute the synthetic control weights exclude pre-treatment turnout.

Figure A6: The Short- and Long-term Effects of Compulsory Voting: Sensitivity to Alternative Weights
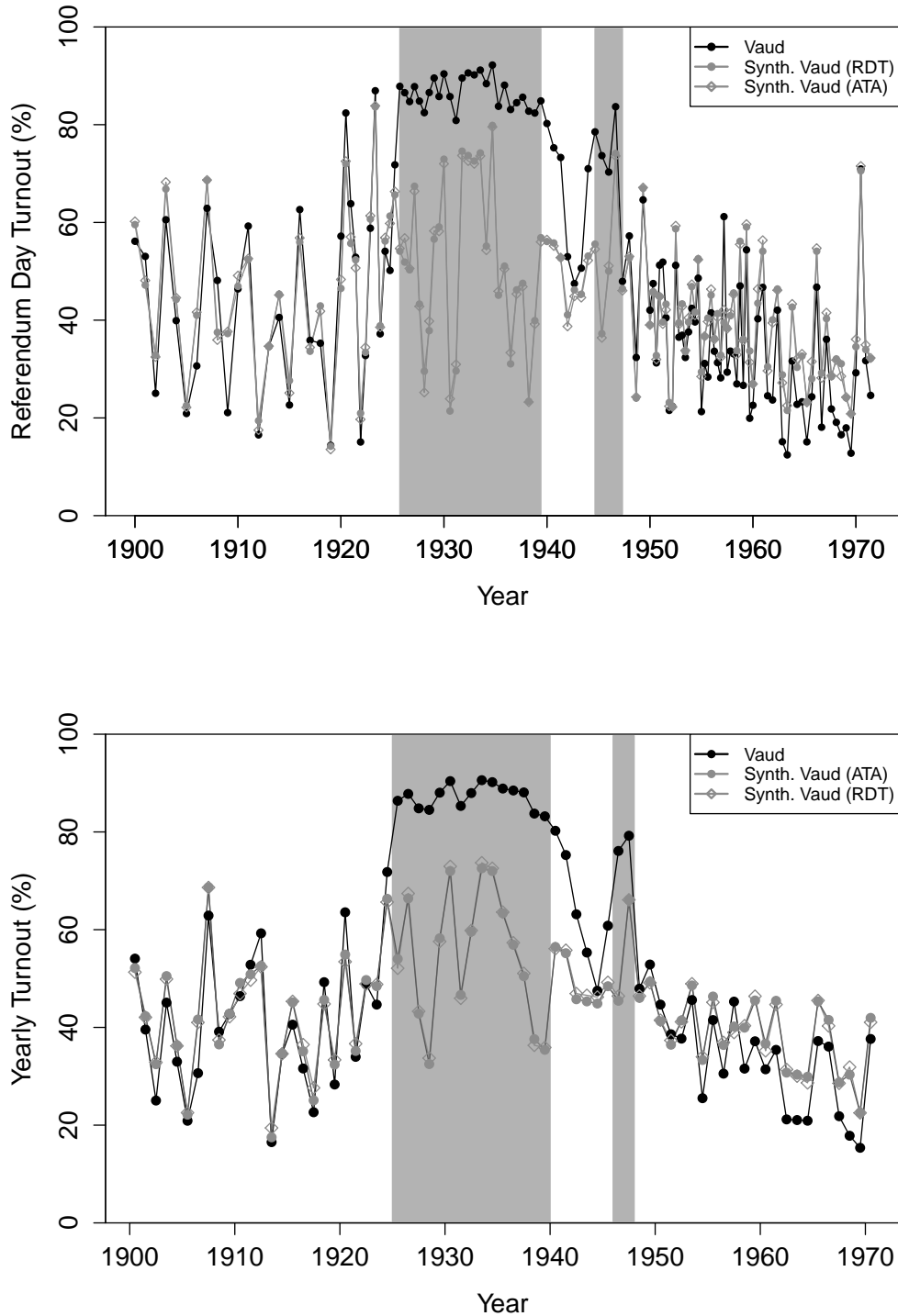

Note: The figure shows referendum-day turnout (top panel) and annual turnout averages (bottom panel) with two different synthetic turnout trajectories based on referendum-day turnout (RDT) and annual turnout averages (ATA).

Figure A7: The Long-Term Effects of Compulsory Voting on Turnout by Districts' Age Composition
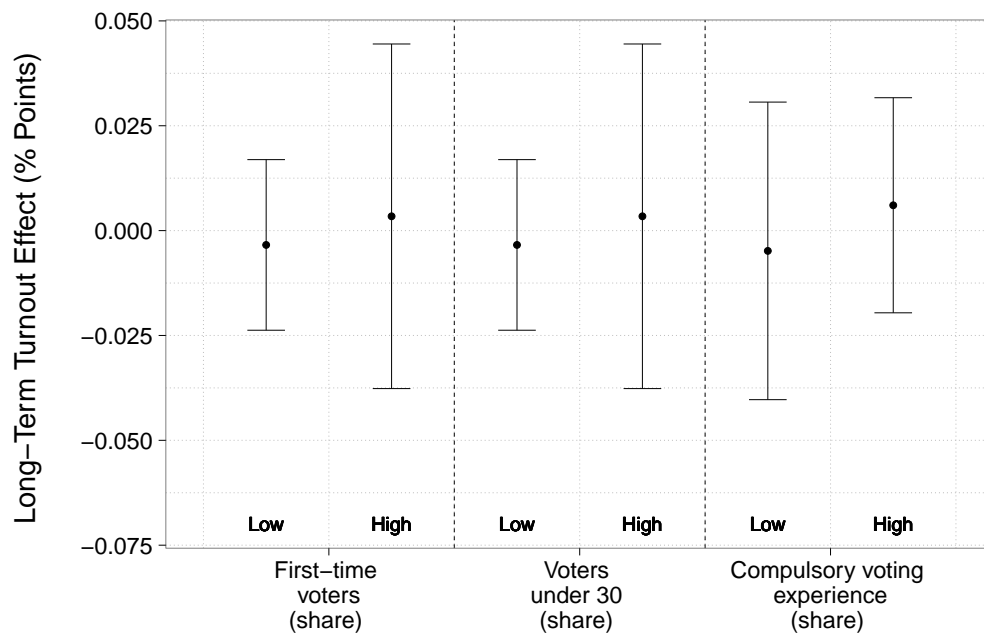
Note: The figure shows the long-term effects (black dots) of compulsory voting on turnout in Vaud estimated with the synthetic control method. Vertical lines indicate 95%-confidence intervals. The left panel compares districts with a low vs. a high share of first-time voters under compulsory voting. The middle panel compares districts with a low vs. a high share of voters that were below the age of 30 during compulsory voting. The right panel compares districts with a low vs. a high total number of years under compulsory voting relative to the population's total years of voting experience. For each comparison the median is used as a cutoff value to define the two groups. N=19 districts. Information about districts' age structures is based on 1950 census data.

Figure A8: Comparison of Weights: Synthetic Control Unit and Panel Regression
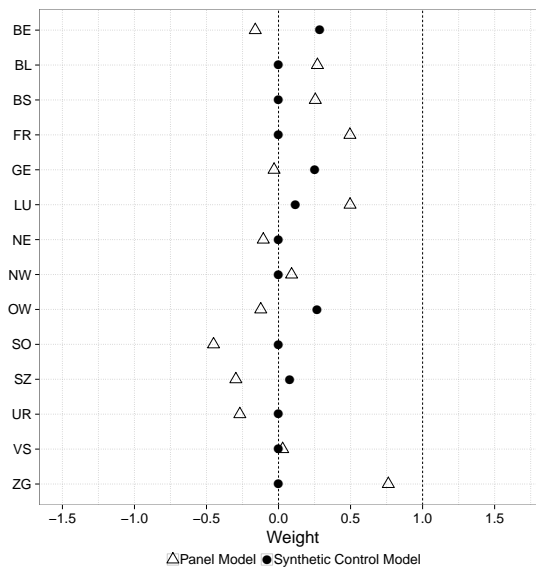
Note: This plot reports the weights assigned to the different cantons in the panel regression model (triangles) and synthetic control design (black dots).

Figure A9: Number of Voters and Fines Collected in Vaud in a 1926 Federal Referendums by District

INTÉRIEUR 7

TABLEAU

indiquant la participation des électeurs à la votatiou fédérale des 4 et 5 décembre 1926 (vote obligatoire).

Districts	Electeurs inscrits	Votants	Citoyens			
			n'ayant pas voté	âgés de plus de 65 ans	Excusés	Soumis à la contribution de Fr. 2.—
Aigle	6282	5255	1027	311	213	503
Aubonne	2287	2100	187	119	36	32
Avenches	1483	1347	136	71	21	44
Cossonay	3560	3303	257	147	45	65
Echallens	2712	2619	93	29	29	35
Grandson	3893	3442	451	230	67	154
Lausanne	21348	17704	3644	421	1085	2138
La Vallée	1757	1465	292	142	48	102
Lavaux	2993	2598	395	198	78	119
Morges	4928	4485	443	201	108	134
Moudon	3133	2936	197	92	46	59
Nyon	3977	3542	435	174	69	192
Orbe	5081	4556	525	208	77	240
Oron	1847	1710	137	59	31	47
Payerne	3473	3246	227	104	21	102
Pays d'Enhaut	1456	1174	282	73	67	142
Rolle	1804	1613	191	91	58	42
Vevey	9009	7800	1209	326	269	614
Yverdon	5499	5077	422	197	94	131
Totaux	86522	75972	10550	3193	2462	4895

Note: The document provides information about the number of voters and nonvoters in the federal referendums on 4th and 5th December 1926 in Vaud by district. The last column reports the number of citizens that have paid the fine of two Swiss Francs. Source: Canton de Vaud (1926).