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 disappears 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.

I. Introduction

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, & Trebbi, 2003; Besley, 2005; Schaltegger & 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 & Stratmannn, 2003), a considerable number of countries have introduced compulsory voting.[1] While the 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 twenty years. Theories of habitual voting (Weber, 1968; Almond & Verba, 1963; Lijphart, 1997; Plutzer, 2002; Gerber, Green, & 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, & 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 & Cutts, 2012).

Our study offers a comprehensive analysis of the effects of compulsory voting by isolating 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 nonvoters.

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 attempted 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

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

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 & Gardezabal, 2003; Abadie, Diamond, & 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 that practice compulsory voting (Blais & 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 for 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.

II. 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 & 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, that is, 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 online appendix for an overview of existing studies). Fujiwara et al. (2016) estimate that a 1 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 the political involvement of an individual's parents. In line with the idea of voting as a habit-forming activity, Gerber et al.'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 4% more likely to vote in the subsequent election than those who just missed the age cutoff.

The 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, & 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 other types of political collective action for which engagement remained voluntary. According to Cooter (2000), long-term enforced compliance with a legal norm—for example, 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, such as 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 & Verba, 1963; Berelson & Steiner, 1964).[2] This argument predicts that compulsory voting has positive

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

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.

III.   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 briefly outline the Swiss political system. Its federal structure dates back to the 1803 Act of Mediation, which marks the end of a long-standing conflict between Unitarists and Federalists (Kriesi & Trechsel, 2008). The Act of Mediation reinstalled the thirteen old cantons and created six new ones. After the Congress of Vienna, another six jurisdictions joined the federation as cantons. Figure A1 in the online appendix shows a map of the Swiss cantons in the early twentieth century. The Act of Mediation also empowered cantons to pass suffrage legislation determining which individuals had the right to vote (Jorio & Sonderegger, 2007). Cantons generally disenfranchised female citizens and male individuals who did not meet certain economic, age, or religious requirements.[3]

During the regeneration (1830–1848), Swiss cantons decided to extend the suffrage to all solvent Swiss male 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 nonvoting (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 particularly likely to occur. Second, voting was compulsory only for federal referendums; it 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, such as 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 November 17, 1924. This electoral reform required all citizens between the ages of 20 and 65 years to participate in federal referendums (table A4 reports the original text of the bill). Citizens who did not vote in federal referendums had to pay a fine of 2 Swiss francs (Gazette de Lausanne, 1924), an amount that appears substantial given the canton's income distribution. For an ordinary worker, this monetary sanction equaled about 150% of his average hourly wage (Siegenthaler & Ritzmann, 1996, table G.01).[4] In addition, local police authorities collected the fine by 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, & 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 whether the excuse was valid, and citizens could not appeal this decision. In addition, citizens older than 65 were exempt from compulsory voting. According to the historical data, 9% of the population was older than 60 years. The share of individuals older than 65 was presumably substantially smaller because for those born in 1900, life expectancy was still only 46 years. Arguably, the life expectancy for those born in the 1850s (this would be the cohort just above 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.[5]

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 would "foster civic virtue in all classes of society" (Cantonal Chancellery of Vaud, 1924). Second, political elites wanted to increase Vaud's national-level political voice in federal legislation through higher participation rates in federal referendums. Since federal referendums require a double majority, 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 might indeed increase this region's influence on federal referendums (Gazette de Lausanne, 1920).[6]

The revenues from the fine imposed on nonvoters, which varied between 8,000 and 16,000 Swiss francs per referendum, helped financing a charity fund for poor people and public hospitals.[7] Vaud temporarily suspended its

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

[4] 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, & Schmid, 2016).

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

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

[7] The online 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).

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.

IV.   Data and Method

We collect 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), share of urban population, and share of people older than age 50 or 60, respectively. Since canton-level economic indicators are available only since 1998, we use the number of motor vehicles per person as a proxy for the level of the economy (Ashenfelter & Kelley, 1975; Knack, 1995; Filer, Kenny, & Morton, 1993; Duch & 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 the treatment period, however, turnout in federal referendums on average was around 84% in Vaud, about 30 percentage points higher than in other cantons (54%). In the posttreatment period, federal referendum turnout decreased to 35%, about 8 percentage points below the average participation rate in other cantons. A major problem with this comparison of turnout rates was, of course, that cantons differ on many characteristics that affect political participation; therefore, average turnout rates in cantons that did not practice compulsory voting may not provide us with a convincing counterfactual—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 et al. (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 preintervention data (including turnout and covariates as predictors) to avoid posttreatment bias. In addition, this weighting procedure avoids extrapolation. This would be the case if a unit in the donor pool received a negative weight or a weight larger than unity, two common issues with regression-based approaches.

We exclude cantons from the donor pool that also practiced some—typically not enforced—version of compulsory voting: 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 fourteen 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 1900–1924 period as our pretreatment period: 1925 to 1940 is our first treatment period, 1946 to 1948 the second treatment period, and 1949 to 1970 the posttreatment period.[8]
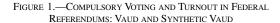
To probe the plausibility of our identification assumption, we conduct a falsification test and estimate a placebo treatment effect for the 1915–1924 pretreatment period. This is an important step to check whether the treated and the synthetic Vaud followed the same turnout trajectory prior to the introduction of compulsory voting. In addition, we perform a series of placebo tests proposed by Abadie et al. (2010), which further increases the credibility of our findings. In section VD, we reestimate our main results using panel data models with fixed effects. While our findings remain unchanged, additional analysis suggests 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, & Hainmueller, 2015).

V.   Empirical Results

A.   Identifying Assumption

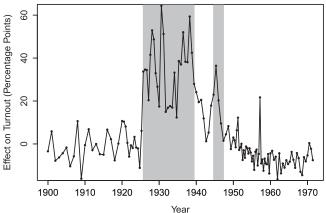We first turn to the credibility of our results by exploring the plausibility of our identifying assumption. The top panel in figure 1 shows average turnout rates in federal referendums in Vaud. When considering the pretreatment period

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

FIGURE 1.—COMPULSORY VOTING AND TURNOUT IN FEDERAL
REFERENDUMS: VAUD AND SYNTHETIC VAUD

The top 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 1945–1949). The bottom panel shows the difference in turnout between treated and synthetic Vaud.

also figure 1) and with respect to their age structure, public revenue, population size, structure of the economy, and economic development.[9]

B. Contemporaneous Effects

The top panel in figure 1 plots turnout in federal referendums in the observed Vaud and its synthetic counterpart. Turnout in the pretreatment period is about 40% on average. In late 1924, voting becomes compulsory and nonvoters 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: compulsory voting stabilizes turnout at significantly higher levels.[10] These pronounced differential dynamics persist until 1940, 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 reactivated 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 add to our confidence that the turnout effects are causally attributable to the policy intervention. The bottom 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 the number of signatures associated with a referendum proposal as a measure of its salience.[11] This requires

(1900–1924), we find that turnout in synthetic Vaud tracks the observed turnout dynamics in treated Vaud very closely. The bottom panel of figure 1 plots the differences between turnout in Vaud and its synthetic control. The differences are relatively small and fluctuate around 0. Since turnout in our synthetic control canton mimics the turnout trajectory in Vaud very closely, we conclude that the synthetic control unit performs well in approximating participation rates in federal referendums in the pretreatment 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 sociodemographic and economic characteristics. The better the preintervention 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 et al., 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 pretreatment turnout rates (see

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[9] 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), and 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), and Valais (0.06).

[10] 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.

[11] Note that popular initiatives were launched only if 50,000 valid signatures were collected; optional referendums required a minimum of 30,000

restricting our sample to optional referendums and popular initiatives. Figure A2 in the appendix shows the results. To explore the sensitivity of the relationship to outliers (propositions with an exceptionally high number of signatures), we estimate two regression lines in figure A2 in the appendix: 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 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 restrict 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) and 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, 2011b; Franklin, 2004; Blais & Young, 1996; Jackman, 1987), by a factor of 2 to 4.[12] 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.

C.   Long-Term Effects

The habit formation argument assumes that citizens' preferences, in particular those of younger persons, are socially programmable (Gintis, 2003; Cooter, 2000; Weber, 1968; Ross, 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 rate 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 posttreatment period.

When we inspect the turnout differences in the posttreatment period (1949–1970) shown in the bottom panel of figure 1, however, we observe no such persistent, positive turnout effect. Instead, when Vaud abolished compulsory voting, the treatment effect drops to 0, 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 nonvoting, 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 indistinguishable from 0 for all districts irrespective of their share of first-time voters. These results remain unchanged when using alternative measures of districts' age compositions.

D.   Robustness: Placebo Tests, Extrapolation, and 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 et al., 2010). Due to space constraints, we report only the results; the appendix describes the tests in more detail. Turning to the placebo test in space, the upper panel in figure A3 in the appendix shows the treatment effect during the 1925–1940 period in Vaud and the fourteen 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

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signatures. Overall, the number of signatures is a good predictor of turnout, with a correlation 0.31 in the period 1900 to 1970.

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

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]
Posttreatment	−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^2	0.79	0.80	0.80	0.80
District FEs	✓	✓	✓	✓
Referendum day FEs	✓	✓	✓	✓
Covariates	✗	✓	✓	✓
Linear time trends	✗	✗	✓	✓
Quadratic time trends	✗	✗	✗	✓

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 1 in those two periods and is 0 otherwise. Standard errors are two-way clustered by canton and referendum days. Time trends are applied at the cantonal level.

the smallest possible value given the sample size. This value is $\frac{1}{14} = 0.07$. The lower 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 1915–1924 periods are, in absolute terms, of the same size. Specifically, we do not find an effect in the 1915–1924 period that 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.[13]

We also reestimate 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 reports the results. When looking at the results from model 4, 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 been abolished: the coefficient on the posttreatment indicator is close to 0 (−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 & Zeng, 2006). This analysis requires us to derive the weights that the panel regression design implicitly assigns to the control units (Abadie et al., 2015). Figure A8 in the appendix reports those results. We find that the panel model assigns negative weights to seven of the fourteen 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 pretreatment outcome values in our estimation of the synthetic control weights. We reconstruct synthetic Vaud based on weights that exclude pretreatment 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 preintervention 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.

E. Participation Spillovers

Did compulsory voting for federal referendums have 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 pretreatment period, six in the treatment period, and five in the posttreatment period. Part 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 pretreatment differences between Vaud

[13] Vaud's compulsory voting norm required only citizens below the age of 65 to participate in federal referendums (see the 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.

TABLE 2.—PARTICIPATION SPILLOVERS: FEDERAL ELECTIONS, CANTONAL
REFERENDUMS, AND SIGNED PETITIONS

	Vaud	Synthetic Vaud	DiD	N
A. Turnout in federal elections				
Precompulsory 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
Nonconcurrent with federal referendums	75.86	61.74	8.52	4
	(3.23)	(1.65)	(4.71)	
B. Turnout in cantonal referendums				
Precompulsory 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)	
Nonconcurrent with federal referendums	35.18	44.05	12.87	20
	(3.51)	(1.64)	(4.86)	
C. Signed petitions				
Precompulsory 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)	

This table shows the means of turnout in federal elections (panel A), cantonal referendums (panel B), and the average number of signatures in Vaud on petitions for federal referendums as a share of the total number of signatures 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 1 in those two periods and is 0 otherwise. DiD is the difference-in-differences estimate. N is the number of observations. Standard errors are in parentheses.

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 no 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, part 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 nonvoting?

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 nonconcurrent 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 in a federal referendum caused little extra cost.

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 who 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 (part C) reports the number of signatures on petitions for initiatives and referendums in Vaud in the pretreatment and the treatment period as a share of the total number of signatures 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.

VI.   Conclusion

Previous research has devoted a great deal of 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 & Ordeshook, 1968; Owen & 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 nonvoters have to pay a fine. The spillover effects on turnout in nonconcurrent elections are less pronounced and become negative when we examine participation as measured by the number of signatures 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 nonvoting 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 retrospectively 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 because they do not believe this behavior truly increases 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, & Whiteley, 2003; Schaub, 2012). For example, recent data from postreferendum surveys in Switzerland (FORS, 2012) show that 88% of all nonvoters and 92% of all voters view citizen involvement in policymaking as important.[14] 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 et al., 2003; Meredith, 2009; Fujiwara et al., 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 microlevel data on voters and nonvoters that is not available

for the historical time period we study here. However, they 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 nonvoting. Lott and Kenny (1999) report that in the United States, it took up to thirty 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 nonvoting 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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14 In Vaud, 91% of all nonvoters and 93% of all voters value civic engagement.

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