Dynamic Effects of Electoral Laws

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Abstract

A change in electoral laws is expected to substantially alter political outcomes as voters and elites adjust their behavior to new rules. However, testing the causal implications of this theory using electoral reforms has been difficult because election results before a reform are not the appropriate counterfactual for election results after a reform. This article leverages electoral reform in New Zealand and Norway and the synthetic control method to approximate the appropriate counterfactuals: election results in the period after reform, had the reform not occurred. In both countries I find evidence that electoral reform had a short-term effect on the size of the electoral party system, but no evidence of a lasting effect on the electoral party system.

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A country's electoral laws play a critical role in the process of democratic representation. Well established theory asserts both a direct and indirect influence of electoral laws on the number of political parties (e.g. Cox 1997; Duverger 1954). Comparing across countries, it predicts that countries with more proportional electoral laws should have more parties. This relationship is well documented in the literature (e.g. Clark and Golder 2006; Lijphart 1994; Taagepera and Shugart 1989). However, the theory also implies a relationship observable within countries over time: as electoral laws change, the number of parties should also change.

Testing the effects of within-country changes in electoral laws is important for fully understanding the mechanisms Cox and Duverger proposed. However, this is challenging for two reasons. First, it may be the case that party system change is a cause of electoral reform, rather than an effect of it. This would occur if elites adjust the rules to accommodate a changed party system, either to ensure their own survival or to increase their advantages (Benoit 2007; Colomer 2005; Remmer 2008). The empirical concern is that an unobserved and confounding variable is causing both the drive for reform and the post-reform party system, thereby preventing unbiased estimation of the effect of new electoral rules. Second, a finding that party systems do not expand when electoral laws are made more proportional does not necessarily mean that Duverger and Cox's theory is incorrect: according to the theoretical argument, increased proportionality only leads to an expanded party system when there is also demand among voters for new parties (Clark and Golder 2006; Duverger 1954; Neto and Cox 1997; Ordeshook and Shvetsova 1994; Riker 1982).

Despite these challenges, scholars are making advances in credibly testing the effects of within-country changes in electoral rules. Fiva and Folke (2016) use a centrally enacted reform on municipal elections in Norway to identify the effect of changing seat allocation formulae. Singer (2015) relies on population based changes in district magnitude in Spain to study the effect of changing magnitudes, and Singer and Gershman (2018) extend this strategy to a sample of 20 countries with proportional representation and population-based

redistricting. Fujiwara (2011) uses a discontinuity in Brazilian mayoral elections to study the differences between single ballot plurality and majority run-off rules. Finally, Lucardi (2017) exploits two natural experiments in Argentina to show that changes in district magnitude lead to more voters casting ballots for smaller parties. Together, these studies provide compelling evidence that minor changes to electoral laws impact party systems as predicted by theory.

Fully understanding of the impact of electoral laws, and specifically the limits of the institutional theory, also requires rigorously investigating the consequences of national-level reforms. The literature described above has largely focused on changes that operate within districts, such as changes to district magnitude, or the seat-allocation formula. In contrast, the impact of national-level changes, such as the addition of upper seat-allocation tiers, electoral thresholds, or transitions from one electoral system family to another, on the size of the party system are less well quantified. Studies of national-level reforms tend to focus on cross-family reforms of the 1990s, and often base inferences on before-and-after comparisons (e.g. D'Alimonte 2001; Gallagher 1998; Reed 2001), an approach that assumes a country's party system before reform is an appropriate counterfactual for that country's party system after reform. An exception is Best (2012), which employs a series of error-correction models to study effects of a variety of reforms, although most of the variation comes from smaller electoral reforms. The current study contributes to this literature by studying the consequences of two national-level reforms with a method that emphasizes the estimation of appropriate counterfactuals.

I study the impacts of two national-level reforms: New Zealand's introduction of a mixed-member proportional (MMP) system in 1996 and Norway's introduction of a secondary seat-allocation tier in 1989. Both reforms increased the proportionality of electoral laws, and therefore should be expected to increase the number of parties. While substantial evidence has been found that New Zealand's reform influenced outcomes such as attitudes toward politics (Banducci, Donovan and Karp 1999), turnout (Karp and Banducci 1999),

and strategic voting (Karp et al. 2002), the overall impact of the reform on the party system remains unclear (Bowler and Donovan 2013; Gallagher 1998; Scheiner 2008). Concerning Norway, little has been written about the reform's impact beyond suggestive evidence that it led to an immediate and lasting increase in the number of parties (Fiva and Smith 2017). The results of this study have the potential to develop our understanding of the consequences of these two reforms.

This study innovates by using the synthetic control method (Abadie, Diamond and Hainmueller 2010; 2015) to make inferences. This method bases inferences on comparisons to counterfactual approximations of the reform countries, constructed from combinations of countries which did not undergo equivalent electoral reform but are otherwise similar to the New Zealand and Norway.

The synthetic control method is an improvement in multiple ways. First, it takes seriously the concerns of Colomer (2005) and Remmer (2008) regarding the direction of causality, and addresses them by basing inferences on comparisons to countries experiencing party system change similar to the reform countries in the years before the reform, minimizing the concern that pre-reform party system change explains post-reform outcomes. Second, by comparing election results in the reform countries to results in many similar countries that did not undergo reform, this method minimizes the possibility that an idiosyncratic election in any single comparison country is driving the results.[1] Third, this method clearly identifies which comparison countries are used to make inferences about the effects of reform, allowing for qualitative assessment of their differences and similarities to New Zealand, and Norway.

My empirical tests draw on data from New Zealand, Norway, and fifteen other democracies from 1949 to 2015. In New Zealand, the prediction of an expanded party system is met in the short-term. However, MMP's effect does not last: fifteen years after the reform, the party system in New Zealand and its synthetic control are effectively equivalent. Norway

[1] A limit of this method is that an idiosyncratic election in one of the reform countries can drive results. My approach of pooling elections into 5-year periods reduces the risk of this occurring, as any idiosyncratic election would be averaged together with either one or two other elections.

follows a similar pattern: in the first fifteen years after the introduction of the secondary seat-allocation tier, Norway's party system expands substantially in comparison to Synthetic Norway, but by the end of the observed period, the two party systems have converged in size.

Effects of Electoral Systems: Theoretical Argument

Electoral systems impact the number of parties winning votes and seats through two mechanisms: mechanical effects and psychological effects (Cox 1997; Duverger 1954). Taking parties' vote totals as given, mechanical effects cause party systems to be larger or smaller at the legislative level by disproportionally mapping vote totals into seat totals. The weakest mechanical effect is perfect proportionality, where each parties' share of the vote matches its seat share. In contrast, strong mechanical effects result in large discrepancies between parties' vote and seat shares. Typically, strong mechanical effects benefit large parties by giving them seat bonuses while preventing or limiting smaller parties' representation. Institutional features, such as district magnitudes, electoral thresholds, seat allocation formulae, and the number of seat-allocation tiers determine the amount of disproportionality, or strength of the mechanical effect (Benoit 2000; Elklit and Roberts 1996; Lijphart 1994). Mechanical effects are the direct effects of electoral laws, operating regardless of the strategic behavior of voters or elites. Furthermore, mechanical effects impact seat totals, playing no *direct* role in generating vote totals. However, they do indirectly influence electoral behavior, as voters and elites anticipate distortions from perfect proportionality caused by mechanical effects, and adjust their behavior accordingly. This adjustment is known as the psychological effect.

Electoral systems' indirect, or psychological, effects derive from voters' and elites' concern with the composition of the legislature. Voters are expected to strategically abandon parties with no realistic chance at gaining representation. Instead, they cast ballots for parties or candidates that are "in the running." Similarly, elites are expected to compete only when

they expect to have a realistic chance of winning at least one seat. When such a chance does not exist, elites strategically withdraw from competition to avoid the associated costs.

Thus, the number of parties receiving votes is a direct function of the psychological effect and an indirect function of the mechanical effect. When disproportionality is high, small parties are disadvantaged when votes are mapped into seats. Anticipating this, fewer elites will find it worthwhile to enter competition, reducing the size of the party system. Voters will reduce the size of the party system further, by strategically voting for competitive parties. In contrast, lower disproportionality should lead to larger party systems. Among the set of potential parties, more will enter competition, as small parties are not harshly punished when votes are mapped into seats. Similarly, voters will face less pressure to abandon their most preferred party, as even small parties can gain representation.

This theoretical argument produces clear expectations for consequences of changes in electoral laws: reforms which increase (decrease) proportionality should lead to larger (smaller) party systems. For reforms that increase proportionality, this expectation requires not only that elites and voters anticipate the impact of the new laws on representation, but also that there is demand for new parties (Clark and Golder 2006; Duverger 1954; Neto and Cox 1997). More specifically, there must be some political entrepreneurs who were discouraged from running because of the previous level of disproportionality and some set of voters who were strategically abandoning their preferred party.

Research Design

My analysis focuses on two cases of electoral reform. To improve the internal validity of my analysis, I use the synthetic control method (Abadie, Diamond and Hainmueller 2010; 2015) to approximate counterfactuals that serve as comparison units for countries that reformed. In doing so, I construct a test which minimizes differences between comparison units on all relevant dimensions except electoral rules. This allows me to directly evaluate the conse-

quences of electoral reform. In short, I answer the question "What would country X's party system be like with a different set of electoral laws?

Presentation of Cases

I construct counterfactual versions of party systems for elections to the lower or only house of the legislature in two countries that implemented electoral reforms which increased the proportionality of the electoral system: the Parliament of New Zealand, and the Norwegian Storting. These cases are ideal for studying the impact of changing electoral laws because (1) the new electoral laws were kept in place for multiple elections, giving voters and elites time to adjust to new rules, and (2) the reforms differed in their magnitude, allowing me to test the impact of national-level reforms of two different magnitudes.

New Zealand's members of parliament (MP) were elected in three ways during the period covered by my study. First, all elections from 1950 through 1993 were conducted using SMDs with plurality rules. There were approximately 90 districts per election in this period. Second, 60 MPs per election are elected from SMDs with plurality rules under the MMP system (1996–2015). Third, 60 MPs per election are elected from a single, nationwide PR district in the MMP system (1996–2015). Seats are allocated from closed lists based on the Sainte-Laguë method, and a party must win 5% of the PR vote or a single SMD seat to gain representation in parliament. Additionally, the SMD and PR tiers of the MMP are linked, meaning that parties' overall seat share depends primarily on their PR total.[2]

In Norway, MPs were elected from closed-lists in multi-member PR districts throughout the period I study. All seats were allocated according the Sainte-Laguë formula with a median district magnitude of seven. Prior to 1989, there was only a single seat allocation tier. The reform, adopted in 1988 and implemented in the 1989 election, introduced a secondary tier of 8 adjustment seats (expanded to 19 in 2003), which are allocated to parties that are underrepresented after the distribution of the first-tier seats. Parties obtaining at least 4%

[2]Specifically, seats won in the SMD tier are subtracted from allocated PR seat totals. Parties winning more seats in the SMD tier than they would get based on the PR vote are allowed to keep their extra seats.

of the national vote qualified for adjustment seats.

The Synthetic Control Method

To study the consequences of changing electoral systems on party systems, I follow the advice of Abadie, Diamond and Hainmueller (2010; 2015) and create synthetic controls to approximate the counterfactuals of New Zealand and Norway's party systems absent electoral reform. A synthetic control—a weighted average of comparison units—is ideal for researchers interested in understanding the effect of an uncommon intervention (electoral reform) on an aggregate unit (party systems). I estimate two synthetic controls, one for each reform country.

In each case, the synthetic control is constructed, through a process of constrained optimization, to be as similar as possible to the reform country before the reform. This is done by simultaneously generating weights on a set of covariates that are predictive of party system size and a set of weights on donor pool countries (the set of comparison countries which did not undergo electoral reform). The better a covariate does in predicting pre-reform party system size, the larger the weight it gets. Weights on countries are then selected to maximize balance on covariates, with emphasis put on obtaining balance on heavily weighted covariates. The weighted average of countries is the synthetic control unit. Because covariates that best predict party system size are emphasized in assigning weights to countries, the algorithm is not only constructing a synthetic control that maximizes covariate balance, but also one that implicitly minimizes pre-reform party system size differences between the reform country and the synthetic control.

After the weights have been generated, the covariate profiles and pre-reform party system size trend of the reform country and the synthetic counterpart can be compared. When the method is successful, differences in covariates and pre-reform party system size will be minimal.[3] When the pre-reform fit is good and we make the key identifying assumption that

[3]There is no statistical test or exact criteria which can be used to determine whether a synthetic control is

the timing of reform can be taken as exogenous, then the synthetic control can be treated as a counterfactual representing what would have happened absent reform. In this case, post-reform differences between a reform country and its synthetic control can be interpreted as the causal effect of reform.

To assess the significance of effects, Abadie, Diamond and Hainmueller (2010; 2015) recommend performing an in-space placebo analysis: fitting a synthetic control to every country in the donor pool, and then comparing the fit quality and effect magnitude of the placebo analyses to the reform country's analysis. They suggest the use of the root mean square predictive error (RMSPE) ratio to quantify the overall quality and magnitude of an effect. This quantity measure the ratio of post-reform differences between the treated country and synthetic control to the same difference in the pre-reform period. Only when the fit is good and the treatment effect is large will this quantity take on large values. Using the placebo synthetic controls, this quantity can be calculated for every country in the donor pool, and an exact p-value of obtaining an RMSPE ratio as large as the reform country's ratio can be calculated.

Measurement Strategy

My unit of analysis is the average of lower (or only) house legislative election outcomes within a five-year time period in a given country. Using five-year averages is necessary because the synthetic control method requires a balanced panel, in which each unit is observed at every included time period, and a panel of elections is far from balanced. For example, Luxembourg has an election almost every five years, while the United States has one every two years. I overcome this obstacle by breaking the data into five-year periods, and then averaging together the election results and covariate values for each five-year period.[4]

Countries are selected for the donor pool based on of two criteria: they must have de-

sufficiently similar to the treated unit. Instead, such determination must be made at the analyst's discretion; as Abadie, Diamond and Hainmueller (2010) explain, this prevents the use of "extreme counterfactuals".

[4]See Supplementary Information (SI) section 1 for further discussion of this decision. No elections under different rules in the treated countries are grouped together into a single period.

mocratized by 1950 and they must not have carried out electoral reform that introduced an additional allocation tier or otherwise substantially changed the electoral system.[5] The reason for the first requirement is that the synthetic control method requires a balanced panel. I further restrict the donor pool to countries that did not undergo large-scale electoral reform themselves because use of these countries would prevent the synthetic control from approximating a counterfactual, as electoral reform's effects would impact the synthetic control's party system size.[6] Left in the donor pool are Australia, Belgium, Canada, Costa Rica, Denmark, Finland, Germany, Iceland, Ireland, Luxembourg, Malta, the Netherlands, Switzerland, the United Kingdom, and the United States. The sample includes elections from 1949 until 2015.

I measure electoral party system size using district level election results.[7] Following the literature, I calculate the effective number of parties winning votes (*ENP*; Laasko and Taagepera 1979) at the district level to measure party systems.[8] I then calculate the average district level ENP or each election, as the synthetic control requires outcomes measured at the aggregate level. This is the outcome for all observations except for Germany and post-reform New Zealand. For these two cases, I use only the number of effective parties in the PR tier, as in an MMP system, it is the result in the PR tier that largely determines parties' overall representation in parliament.[9]

[5]This includes in the donor pool countries that have made minor changes to their electoral laws, for example, changes in districting structure. Including these countries in the donor pool runs the risk that electoral reform is impacting the party system of my synthetic control. To account for this, district magnitude is included as a covariate in the analyses below. Additionally, robustness tests in SI 2 and 3 show that the results for both New Zealand and Norway are unaffected by excluding Denmark (reforms in 1970 and 2005) and Iceland (reforms in 2000) from the donor pool, two countries which made more substantial reforms to their districting structures.

[6]Austria, France, Israel, Italy, Japan, and Sweden are removed from the donor pool for this reason. The reforms leading to Austria and Sweden's exclusion are the 1992 introduction of a third seat-allocation tier and the 1969 introduction of a secondary seat-allocation tier, respectively.

[7]Data on district level election comes from the Constituency-Level Elections Archive (Kollman et al. 2014), the Global Elections Database (Brancati 2014), Adam Carr's elections archive (`http://psephos.adam-carr.net`), Jack Vowles' data archive (`http://www.jackvowles.com/nzelect.html`), and Luxembourg's online election archive (`http://www.elections.public.lu/fr/elections-legislatives/`.

[8]*ENP* is calculated as $1/\Sigma v_i^2$, where v_i is party i's vote share in a given election.

[9]An alternative measurement strategy would be to weight all districts by their seat share. Unfortunately, this data is missing for some countries, preventing me from taking this approach.

To create synthetic controls that approximate counterfactuals, I use covariates that are predictive of party system size in the reform and donor pool countries. Abadie, Diamond and Hainmueller (2015) explain that the covariates should be "...predictors of post-intervention outcomes. These predictors are themselves not affected by the intervention" (p. 498). First, Ethnic and linguistic fractionalization measure social heterogeneity, which is known to play an important role in determining the demand for parties (Lipset and Rokkan 1967). Second, institutional variables, specifically federalism, and presidentialism, are included, as these can impact electoral coordination (Chhibber and Kollman 1998; Golder 2006). Third, I account for other institutional determinants of party systems by including the logged average lower-tier district magnitude as a control (Cox 1997; Lijphart 1994; Singer 2015). Fourth, I use the size of the parliamentary party system in the pre-reform period, as research has shown an equilibrium relationship between parliamentary and electoral party systems (Best 2010). Finally, I use lagged values of the outcome, specifically from the periods beginning 5 years and 10 years before reform.[10] I do this because the size of a party system in a given election is not independent of the size of party system in the prior election, meaning past party system size is a good predictor of future party systems. Furthermore, including pre-reform outcomes as covariates helps minimize unobservable heterogeneity between the reform countries and their synthetic controls. A more detailed justification of the covariates and their sources, is in SI.1.

Results: New Zealand

New Zealand's transition from SMD to MMP beginning in the 1996 election represented a dramatic shift for a country that was often thought of as the "purest example of the Westminster model of government" (Lijphart 1987: 97). New Zealand politics, before and after the reform, have been dominated by two parties: National and Labour. These parties alter-

[10]In SI.2 and SI.3, I show that the inclusion of both covariates and lagged outcomes produces a superior fit compared to fitting with either covariates or lagged outcome variables alone.

nated in office through much of the 20th century, and together generally received upwards of 85% of the vote in post-war elections.

Starting in the 1980s the number of parties began to increase. Smaller parties such as Social Credit in 1984, the Greens in 1990, and Alliance and New Zealand First in 1993 all gained substantial proportions of the vote, reducing the two-party dominance of the electorate. Coinciding with this was a high level of voter dissatisfaction with the policies of Labour and National (Nagel 1994). This trend continued in the 1996 election, the first under MMP rules. In the run-up to that election several new parties entered competition. Some were formed by sitting MPs, such as United New Zealand, the New Zealand Conservative Party, and the Christian Democrat Party; others were formed by political entrepreneurs (Boston et al. 1996). In the election these small parties did well, while Labour and National achieved a two party vote share of only 62%, almost an 8% decrease from 1993. To test if changes to the party system in 1996 and beyond can be attributed to MMP, I now turn to the results of a synthetic control analysis.

The synthetic control algorithm assigns four donor-pool countries positive weight in Synthetic New Zealand: the United States (0.47), Belgium (0.22), Ireland (0.19), and the United Kingdom (0.12).[11] Individually, these countries match New Zealand in several aspects.[12] The United States, for example, is a good match to New Zealand in terms of district magnitude, fractionalization, and parliamentary party system size.[13] Similarly, Belgium's fractionalization levels also resemble New Zealand's, while in terms of federalism and presidentialism,

[11] Malta is excluded from the New Zealand analysis as it did not hold an election in the 1956–1960 period.

[12] One country which one may expect to get positive weight but does not is Canada. While Canada and New Zealand are quite similar in terms of district magnitude, parliamentarism, and pre-reform party-system, they are quite different in terms of fractionalization and federalism, factors which prevent the algorithm from assigning weight to Canada.

[13] The inferences drawn from this analysis are fairly robust to the exclusion of the United States from the donor pool. When the United States is excluded, the United Kingdom is assigned the largest weight in Synthetic New Zealand, and the pre-reform party system differences are larger. In terms of covariate balance, excluding the United States leads to a Synthetic New Zealand that does not match well on ethnic or linguistic fractionalization, but does match well on federalism, presidentialism, magnitude, and parliamentary party-system size. Despite these differences, the ultimate inference the analysis excluding the United States leads to is the same: the post-reform differences still show a short-term effect of MMP but no lasting effect.

Ireland and the United Kingdom match New Zealand.

Table 1 shows the average covariate values for both New Zealand and Synthetic New Zealand during the pre-reform period. For ethnic and linguistic fractionalization, as well as the pre-reform party system size at the electoral level, there is little difference. In contrast, the match on federalism and presidentialism is weaker due to the large weight assigned to the United States. There are also differences in parliamentary party system size—New Zealand has one approximately one fewer effective party—and in district magnitude—Synthetic New Zealand's average magnitude is about two once un-logged. On aggregate, Synthetic New Zealand successfully replicates some of the important characteristics of New Zealand, but falls short of being a perfect match.

[Table 1 Here]

The upper-left panel of Figure 1 plots the trend of New Zealand (solid line) and Synthetic New Zealand's (dashed line) party systems, with a vertical line plotted to signify the beginning of MMP. Considering the pre-reform period, both party systems develop similarly. On average, the difference between the estimated party system for Synthetic New Zealand and the observed party system is only 0.12 effective parties; this gap never exceeds 0.25 effective parties. Furthermore, both party systems grow in the years immediately before reform, although Synthetic New Zealand's growth is less dramatic.

[Figure 1 Here]

Comparing New Zealand and Synthetic New Zealand in the post-reform period allows for an assessment of the prediction that MMP, by increasing proportionality, will lead to a larger party system. Initially the two lines diverge, indicating that MMP has caused the party system to expand by one effective party. The entrance and success of parties such as NZ First, Alliance, and ACT exemplify this. However, New Zealand and its synthetic counterpart subsequently converge. Initially, this is driven by voters coordinating around fewer parties,

notably Labour in the 1999 election at the expense of Alliance and NZ First. Yet, elites coordinating around fewer parties also drives this convergence: 21 and 22 registered parties competed in 1996 and 1999, respectively, but only 14 competed in 2002.[14]

By the 2006–2010 period, New Zealand's party system is only 0.02 effective parties larger than Synthetic New Zealand's, a gap which grows to only 0.12 in the last observed period. In the 2011 election, Labour and National together captured about 75% of the vote, their highest total since 1990. Simultaneously, only two other parties received more than 5% of the vote in the 2011 election, and only NZ First remained politically relevant among the several parties which entered the electoral arena in 1996. In sum, the synthetic control analysis produces evidence of a short-term effect of MMP on the party system, but no evidence of a lasting effect.

The lower-left panel of Figure 1 presents the results of an in-space placebo analysis, plotting the gap in party system size between each country in the sample and its synthetic control. Focusing on the post-reform period, New Zealand's gap is the largest in the first post-reform period, but then gradually moves to the center of the distribution. This suggests that New Zealand's initial post-reform party system growth cannot be explained by chance alone. A numeric consideration of the in-space placebo analysis further supports this position: the RMSPE ratio for New Zealand is 4.40, larger than the RMSPE ratio for any of the placebo analyses. The p-value of uncovering such a large overall post-reform gap relative to pre-reform gaps when assigning reform randomly is $1/15 \approx 0.067$. Further robustness checks and an in-time placebo analysis for the New Zealand analysis can be found in SI.2.

Results: Norway

Norway's 1989 electoral reform introduced a secondary seat-allocation tier, thereby reducing the disproportionality of the vote-to-seat translation. This reform was the result of a long process (Aardal 1990), and was largely driven by frustrations among smaller parties at the

[14]Registered party counts come from `http://www.electionresults.govt.nz`.

perceived advantages that the Labour Party, Norway's largest party, received under the Saint-Laguë system (Aardal 2011). Judging by the results in the 1989 election, the reform appears to have worked to the smaller parties' advantage: Labour gained none of the compensation seats (Aardal 2011) and the overall share of the vote going to the two largest parties, Labour and Conservative, decreased from 81.5% to 56.5%. Attributing the changes in the party system starting in 1989 directly to the reform is not straightforward, however, as this was also a period of volatility in Norwegian politics. Governments of both the left and right were in office in the years before the reform, unemployment was rising, and the populist Progress Party's popularity was rising, exemplified by their result of 12.3% of the vote in the 1987 local elections (Aardal 1990). To determine whether the expansion of the party system can be attributed to the introduction of the secondary seat-allocation tier, I now turn to the results of a synthetic control analysis.

Five countries receive positive weight in Synthetic Norway: the United Kingdom (0.32), Denmark (0.24), the Netherlands (0.24), Costa Rica (0.11), and Malta (0.08).[15] These countries are similar to Norway in important determinants of party system size. For example, they are generally homogenous countries where the strong national parliament. As Table 1 demonstrates, these countries combine to produce a synthetic control that matches Norway very well in terms of pre-reform covariates.

The upper-right panel of Figure 1 plots the development of Norway (solid line) and Synthetic Norway's (dashed line) party systems. Throughout the pre-reform period, the two party systems follow extremely similar paths. The average difference between Norway and Synthetic Norway is only 0.08 effective parties, and at a max the difference is only 0.16 effective parties.

After the reform, Norway and Synthetic Norway diverge immediately and substantially. Initially, Norway's party system expands sharply while Synthetic Norway's party system slightly shrinks, indicating that the reform increased Norway's party system by 1.2 effective

[15]Luxembourg is excluded for the Norway analysis as it did not hold an election in the 1969–1973 period.

parties. This is exhibited in the success of the Progress Party and the Socialist Left Party, two smaller parties whose vote share increased in the 1989 election by 10 and 5 percentage points, respectively and in the entrance of several new electoral lists (Aardal 1990). Norway and Synthetic Norway's divergence grows to a maximum of approximately two effective parties by the 1999–2003 period. However, as with New Zealand, this divergence disappears in the last two observed periods. This convergence is partially due to Norway's party system shrinking, as voters abandoned smaller parties such as the Socialist Left and the Christian Democrats between the 2001 and 2005 election in favor of larger parties such as Labour and the Progress Party. Expansion in the party systems of the countries comprising Synthetic Norway also leads to the convergence: between the 2004–2008 and 2009–2013 periods, the Netherland's party system grew by 0.66 effective parties, while Denmark, Costa Rica, and the United Kingdom experienced party system expansions of 0.2, 0.25, and 0.1 effective parties, respectively. By the end of the observed period, the effect of the secondary seat-allocation tier has disappeared, and the party systems of Norway and its synthetic counterpart are effectively equal in size.

Figure 1's lower-right panel plots the results of an in-space placebo analysis for Norway. The divergence between Norway and its synthetic control in the first three post-reform periods are large relative to the placebo analyses. This suggests that the gaps seen in the Norway analysis are unlikely to be due to chance. However, as Norway and Synthetic Norway converge, these gaps become less unusual compared to the distribution of placebo gaps. In the last period, the gap between Norway and Synthetic Norway is actually smaller than any of the placebo gaps. When analyzed analytically through RMSPE ratios, it again appears unlikely that Norway would have experienced such a divergence from its synthetic control in the absence of an effect of electoral reform. Norway's RMSPE ratio is 11.48, larger than any RMSPE ratio among the placebo analysis. Considered as a p-value, there is a $1/15 \approx 0.067$ chance of uncovering such a large RMSPE ratio. Additional information on the Norway analysis, including robustness checks and an in-time placebo analysis, is available in SI.3.

Conclusion

Using a design that compares observed outcomes to the appropriate counterfactuals, this study evaluated the impact of changes in proportionality of electoral laws on the number of electoral parties in New Zealand and Norway. I found a similar effect of electoral reform in both countries. In each case, electoral reform led to a short-term expansion in the size of the electoral party system. In New Zealand this effect peaked in the first elections after reform, while in Norway the effect of reform was largest approximately 10–15 years after the reform. However, I do not find any evidence of a lasting effect of reform for either country: observed electoral party systems equal the estimated counterfactual after 10 and 25 years for New Zealand and Norway, respectively.

This research contributes to a more nuanced understanding of the impacts of electoral reform. The short-term effects of national-level reforms that I uncover complement earlier studies that find short-term effects of changes in district magnitude (Lucardi 2017; Singer 2015; Singer and Gershman 2018) and seat allocation formulae (Fiva and Folke 2016); together, they form a growing body of evidence showing that, in the short-term, electoral reform generally works "as expected" (Scheiner 2008). My findings suggest that this may not be the case for electoral party system size 10 to 25 years after reform, however.

This does not mean that these reforms should be considered failures. The theoretical argument also predicts that reform will alter the number of parliamentary parties. Additional analyses, reported in full in SI.4, consider this aspect of electoral reform's effect. I find lasting effects of reform on the parliamentary party system. New Zealand's parliamentary party system is 1.6 effective parties larger than Synthetic New Zealand's immediately after reform; this gap diminishes over time but remains approximately one effective party in the last observed period. Norway's parliamentary party system also immediately diverges from its synthetic control, as we would expect based on its expanding electoral party system. Unlike the electoral party system, however, Norway's parliamentary system remains 0.75 effective parties larger than its synthetic counterpart in the last observed period. New Zealand's

reform has also been shown to have impacted other outcomes, such as voters' attitudes and behaviors (Banducci, Donovan and Karp 1999; Karp and Banducci 1999; Karp et al. 2002). When judging the success or failure of reform, therefore, it is important to carefully consider which outcomes should be used in reaching a verdict. Electoral reforms, even if they do not have a lasting effect on the number of political parties running for office and receiving votes, can still make meaningful and beneficial changes to the political system.

Reconciling the lack of a lasting effect with the theoretical argument requires emphasizing the point that increased proportionality will only have an effect when there is demand for new parties. Indeed, scholars have asserted that electoral systems have a braking effect, not that they have an accelerating effect. Expansions in the size of the party system are, instead, thought to be primarily caused by the combination of sufficiently proportional electoral laws and societal demand for more parties (Clark and Golder 2006; Neto and Cox 1997). My findings are consistent with the interaction argument, and suggest that whatever desire for new parties was present among voters in Norway and New Zealand in the years immediately following reform dwindled after a few elections.

It is also possible that the transitory nature of party system expansion after reform observed in this study is part of a more general pattern. Given that this study only considers two cases of reform, a first step in evaluating this possibility will be investigating additional cases, such as Sweden's (1969) and Austria's (1992) reforms introducing upper seat-allocation tiers. Considering mechanisms that explain any general patterns will also be crucial. It may be party decisions, such as the amount of resources invested in developing a stable organization (see Tavits 2013) or the ideological positions parties adopt in a more crowded electoral field, that explain the lack of lasting party system expansion. Voter decisions likely also play a role in making post-reform party system expansion temporary: for example, support for new parties may be based on protesting the behavior of the established parties, rather than on committed support for new parties' platforms. Future research assessing these mechanisms will be valuable for developing a more complete understanding of the

consequences of electoral reform.

While this study's focus on approximating counterfactuals has led to new insights about the consequences of reform in New Zealand and Norway, it is not without limitations. First, the efficacy synthetic control method for studying national-level electoral reform is limited by the small number of potential donor pool countries, which means that it is not always possible to generate synthetic controls that perfectly match the reform country. Second, the outcome of this study is aggregated to the national level, preventing it from uncovering possible within-country heterogeneity in the effect of reform. My approach also does not allow for disentangling the behavior of elites and voters as the source of reform's effects. A final limitation is that the credibility of my estimates rests on the strong assumption that the timing of reform can be treated as exogenous.

That MMP's proportional rules did not lead to lasting expansion of New Zealand's electoral party system does not mean that the institutional theory, and specifically Duvereger's Law, is not working in New Zealand. In contrast, studies that consider differences in fragmentation between the SMD and PR tiers of the MMP have shown consistently smaller party systems in the SMD tier, as Duverger's Law predicts (see Moser and Scheiner 2012, p. 110). What this study does suggest for New Zealand's party system, which was not following Duverger's Law prior to the reform, is that it would have been unlikely to have started following Duverger's Law had reform not occurred. Synthetic New Zealand's party system shows this, as it holds steady around three parties throughout the post-reform period. Investigating why and when party systems enter and exit equilibria under Duverger's Law represents an important direction for future research.

References

Aardal, Bernt. 1990. "The Norwegian Parliamentary Election of 1989." *Electoral Studies* 9(2):151–158.

Aardal, Bernt. 2011. "The Norwegian Electoral System and its Political Consequences." *World Political Science Review* 7(1):1–32.

Abadie, Alberto, Alexis Diamond and Jens Hainmueller. 2010. "Synthetic control methods for comparative case studies: Estimating the effect of California's tobacco control program." *Journal of the American Statistical Association* 105(490):493–505.

Abadie, Alberto, Alexis Diamond and Jens Hainmueller. 2015. "Comparative Politics and the Synthetic Control Method." *American Journal of Political Science* 59(2):495–510.

Banducci, Susan A., Todd Donovan and Jeffrey A. Karp. 1999. "Proportional Representation and Attitudes about Politics: Results from New Zealand." *Electoral Studies* 18(4):533–55.

Benoit, Kenneth. 2000. "Which Electoral Formula is the Most Proportional? A New Look with New Evidence." *Political Analysis* 8(4):381–388.

Benoit, Kenneth. 2007. "Electoral Laws as Political Consequences: Explaining the Origins and Change of Electoral Institutions." *Annual Review of Political Science* 10:363–90.

Best, Robin E. 2010. "Increasing irrationality? The equilibrium relationship between electoral and legislative party system size, 1950-2005." *Electoral Studies* 29:105–116.

Best, Robin E. 2012. "The long and the short of it: Electoral institutions and the dynamics of party system size, 1950-2005." *European Journal of Political Research* 51:141–165.

Boston, Jonathon, Stephen Levine, Elizabeth McLeay and Nigel S. Roberts. 1996. *New Zealand Under MMP: A New Politics*. Auckland University Press.

Bowler, Shaun and Todd Donovan. 2013. *The Limits of Electoral Reform*. Oxford University Press.

Brancati, Dawn. 2014. "Global Elections Database." Date Accessed 09/01/2014.

Chhibber, Pradeep and Ken Kollman. 1998. "Party Aggregation and the Number of Parties in India and the United States." *American Political Science Review* 92(2):329–342.

Clark, William Roberts and Matt Golder. 2006. "Rehabilitating Duverger's Theory: Testing the Mechanical and Strategic Modifying Effects of Electoral Laws." *Comparative Political Studies* 39(6):679–708.

Colomer, Josep M. 2005. "It's Parties That Choose Electoral Systems (or, Duverger's Laws Upside Down)." *Political Studies* 53:1–21.

Cox, Gary W. 1997. *Making Votes Count: Strategic Coordination in the World's Electoral Systems*. Cambridge University Press.

D'Alimonte, Roberto. 2001. "Mixed Electoral Rules, Partisan Realignment and Party System Change in Italy". In *Mixed-Member Electoral Systems: The Best of Both Worlds?*, ed. Matthew Soberg Shugart and Martin P. Wattenberg. Oxford University Press pp. 323–350.

Duverger, Maurice. 1954. *Political Parties: Their Organization and Activity in the Modern State*. Metheun Press.

Elklit, Jørgen and Nigel S. Roberts. 1996. "A category of its own? Four PR two-tier compensatory member electoral systems in 1994." *European Journal of Political Research* 30(2):217–240.

Fiva, Jon H. and Daniel M. Smith. 2017. "Norwegian parliamentary elections, 1906-2013: representation and turnout across four electoral systems." *West European Politics* pp. 1–19.

Fiva, Jon H. and Olle Folke. 2016. "Mechanical and Psychological Effects of Electoral Reform." *British Journal of Political Science* 46(2):265–279.

Fujiwara, Thomas. 2011. "A Regression Discontinuity Test of Strategic Voting and Duverger's Law." *Quarterly Journal of Political Science* 6:197–233.

Gallagher, Michael. 1998. "The Political Impact of Electoral System Change in Japan and New Zealand, 1996." *Party Politics* 4(2):203–228.

Golder, Matt. 2006. "Presidential Coattails and Legislative Fragmentation." *American Journal of Political Science* 50(1):34–48.

Karp, Jeffrey A., Jack Vowles, Susan A. Banducci and Todd Donovan. 2002. "Strategic voting, party activity, and candidate effects: testing explanations for split voting in New Zealand's new mixed system." *Electoral Studies* 21(1):1–22.

Karp, Jeffrey A. and Susan A. Banducci. 1999. "The Impact of Proportional Representation on Turnout: Evidence from New Zealand." *Australian Journal of Political Science* 34(3):363–77.

Kollman, Ken, Allen Hicken, Daniele Caramani, David Backer and David Lublin. 2014. *Constituency-Level Elections Archive [data file and codebook]*. Ann Arbor, MI: Center for Political Studies, University of Michigan.

Laasko, Markku and Rein Taagepera. 1979. "Effective Number of Parties: a Measure with Application to West Europe." *Comparative Political Studies* 12(1):3–27.

Lijphart, Arend. 1987. "The Demise of the Last Westminster System? Comments on the Report of the New Zealand's Royal Commission on the Electoral System." *Electoral Studies* 6:97–103.

Lijphart, Arend. 1994. *Electoral Systems and Party Systems*. Oxford University Press.

Lipset, Seymour M. and Stein Rokkan. 1967. *Party Systems and Voter Alignment: Cross-National Perspectives*. New York: Free Press.

Lucardi, Adrián. 2017. "The Effect of District Magnitude on Electoral Outcomes: Evidence from Two Natural Experiments in Argentina." *British Journal of Political Science* pp. 1–21.

Moser, Robert G. and Ethan Scheiner. 2012. *Electoral Systems and Political Context: How the Effects of Rules Vary Across New and Established Democracies*. Cambridge University Press.

Nagel, Jack H. 1994. "What Political Scientists Can Learn from the 1993 Electoral Reform in New Zealand." *PS: Political Science and Politics* 27(3):525–529.

Neto, Octavio and Gary W. Cox. 1997. "Electoral Institutions, Cleavage Structures and the Number of Parties." *American Journal of Political Science* 41(1):149–174.

Ordeshook, Peter C. and Olga Shvetsova. 1994. "Ethnic Heterogeneity, District Magnitude, and the Number of Parties." *American Journal of Political Science* 38(1):100–123.

Reed, Steven R. 2001. "Duverger's Law is Working in Italy." *Comparative Political Studies* 34(3):312–327.

Remmer, Karen L. 2008. "The Politics of Institutional Change: Electoral Reform in Latin America, 1978-2002." *Party Politics* 14(1):5–30.

Riker, William H. 1982. "The two-party system and Duverger's law: An essay on the history of political science." *American Political Science Review* 76:753–766.

Scheiner, Ethan. 2008. "Does Electoral System Reform Work? Electoral System Lessons from Reforms of the 1990s." *Annual Review of Political Science* 11:161–181.

Singer, Matthew M. 2015. "Does increasing district magnitude increase the number of parties? Evidence from Spain, 1982-2011." *Electoral Studies* 38:82–136.

Singer, Matthew and Zachary Gershman. 2018. "Do changes in district magnitude affect electoral fragmentation? Evidence over time at the district level." *Electoral Studies* 54:172–181.

Taagepera, Rein and Matthew Soberg Shugart. 1989. *Seats and Votes: The Effects and Determinants of Electoral Systems*. Yale University Press.

Tavits, Margit. 2013. *Post-communist Democracies and Party Organization*. Cambridge University Press.

Table 1: Pre-Reform Covariate Means for Reform Countries and Synthetic Controls

	New Zealand		Norway	
Covariate	Observed	Synthetic	Observed	Synthetic
Ethnic Fractionalization	0.40	0.39	0.06	0.11
Linguistic Fractionalization	0.17	0.25	0.07	0.18
Federalism	0.00	0.48	0.00	0.00
Presidentialism	0.00	0.47	0.00	0.11
log(Magnitude)	0.00	0.69	2.03	2.02
ENP Seats	1.98	2.91	3.19	3.31
District Level ENP_{R-5}	3.12	2.94	3.45	3.46
District Level ENP_{R-10}	2.36	2.61	3.69	3.58

Note: Values represent averages for the pre-reform period except where noted.

Figure 1: Synthetic Control Analysis Results for New Zealand and Norway