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Do (Green) Governments Matter?

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Abstract

We examine whether Green governments influence economic outcomes and environment-friendly policies. Our empirical strategy exploits that the Fukushima nuclear disaster gave rise to an unanticipated change in government in the German state Baden-Wuerttemberg. The incumbent rightwing government was replaced by a leftwing government led by the Green party. We use the synthetic control method to select control states against which Baden-Wuerttemberg's policies and outcomes can be compared. The results show that the Green government did not influence macroeconomic outcomes such as GDP per capita and and policy outcomes such as public debt. The Green government reduced brown coal-usage. However, the Green government decreased wind power.

Keywords: Green governments; partisan politics; government ideology; synthetic control method; causal effects; Fukushima nuclear disaster

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1 Introduction

We examine how Green-led governments influence economic policies and outcomes, and whether they are more likely to enact environment-friendly policies than governments led by other political parties. To deal with the endogeneity of partisanship, we exploit that the Fukushima nuclear disaster gave rise to an unanticipated change in government in the German state Baden-Wuerttemberg (BW). We use the synthetic control (SC) method ([Abadie and Gardeazabal, 2003](#)) to estimate the causal impact of a Green-led government on economic and environmental outcomes.

On March 11, 2011, a tsunami following an earthquake destroyed the Fukushima Daiichi Nuclear Power Plant in Okuma, Fukushima Prefecture. The Fukushima accident gave rise to an unanticipated change in government in BW. For the first time, a Green politician became the prime minister of the conservative BW that had been governed by prime ministers of the conservative Christian Democratic Union (CDU) for 58 years until the year 2011. The conservative CDU and its coalition partner, the market-oriented Free Democratic Party (FDP), had a majority in the polls just before the Fukushima disaster less than three weeks before the elections. Polls show how the conservative CDU and the market-oriented FDP lost their majority within the two-week period between the Fukushima natural disaster and the election day (cf. Section 2). The Green party benefited a great deal. The Fukushima natural disaster did not change election outcomes and coalition formation in other German states in 2011 and there has been no other Green prime minister up to now.

This unanticipated change of government provides a unique setting for estimating the causal effect of a Green-led government on both economic and environmental policies and outcomes. We use the SC method to construct a weighted average of other German states (referred to as “synthetic” BW), which measures how outcomes and policies would have evolved, had the rightwing government remained in office. The SC method is well-suited for our purposes. It is a transparent data-driven way for selecting control units and generalizes classical difference-in-difference methods, which are based on a single control unit or a simple average of control units selected by the researcher.

The results show that the Green government did not influence macroeconomic outcomes such as GDP per capita and policy outcomes such as public debt. The Green government reduced brown coal-usage. However, the Green government decreased wind power. Expanding wind power gives rise to trade-offs. On the one hand, wind power is an alternative energy that decreases relative energy usage from fossil fuels. On the other hand, windmills disfigure the landscape (the Greens needed to deal with “not in my back yard” movements) and windmills curtail natural habitats for animals such as birds.

1.1 Literature

The partisan theories predict that leftwing governments implement more expansionary economic policies than rightwing governments (Hibbs, 1977; Chappell and Keech, 1986; Alesina, 1987); see Schmidt (1996), Potrafke (2017, 2018) for surveys. They do so to gratify the needs of their constituencies: leftwing governments are expected to cater low-income citizens and rightwing governments are expected to cater high-income citizens. Low-income citizens are concerned about employment and tend to demand income redistribution which, in turn, gives rise to expansionary economic policies such as increasing public expenditure (in particular social expenditure) and increasing taxation of high-income citizens under leftwing governments. Clearly, party-systems drastically change these days. The platforms of established conservative and social-democratic parties have converged. Consequently, new political parties entered the political arena: Green parties have been represented in parliaments since the 1980s. Green parties have offered leftwing policy positions and belonged, for a long time, to the leftwing political camp. Populist parties have enjoyed electoral success since the 2000s.

The identification of the causal effect of partisanship is complicated by the reverse causality issues and omitted variables biases (e.g., Potrafke, 2017, 2018). Many early studies on partisan politics used panel data for OECD countries or federal states such as the United States and Germany. However, the results of these studies can typically not be interpreted as causal effects because government ideology is often endogenous. Studies since the late 2000s use Regression Discontinuity Designs (RDD) that focus on close vote margins and

thus exploit quasi-exogenous variation (e.g., [Ferreira and Gyourko, 2009](#); [Gerber and Hopkins, 2011](#)). The RDD-studies clearly advanced research on partisan politics. The major shortcoming of the RDD-studies is, however, that they focus on jurisdictions with close vote margins such as swing states and ignore jurisdictions with crystal-clear political majorities which often implement ideology-induced policies. Alternatively, where available, scholars use instrumental variables strategies. For example, the new study by [Lind \(2019\)](#) uses rainfall on election day in Norway as an instrumental variable for government ideology.

Other related studies deal with policies of Green parties in government. The previous studies use panel data and report correlations between variables considering Green parties in government or environmental policy positions and outcome variables such as environment protection or CO₂-emissions. Empirical evidence is quite mixed. The studies suggest that efforts to protect the environment were somewhat stronger and CO₂-emissions somewhat lower when Green parties were in government (e.g., [Neumayer, 2003](#); [Knill et al., 2010](#); [Jensen and Spoon, 2011](#); [Cheon and Urpelainen, 2013](#); [Garmann, 2014](#); [Lim and Duit, 2018](#)).

Our paper is also related to other studies that use the SC method to estimate causal effects of policy reforms. Examples include the effect of labor market regulations on undocumented immigrants ([Bohn et al., 2014](#)), the effect of establishing nuclear power facilities on local per capita income ([Ando, 2015](#)), the effects of municipal mergers on public expenditure ([Roesel, 2017](#)), the effect of decriminalizing sex work on sexual violence ([Cunningham and Shah, 2018](#)), the effect of fiscal rules on size of government ([Eliason and Lutz, 2018](#)).

2 The Fukushima disaster and the 2011 election

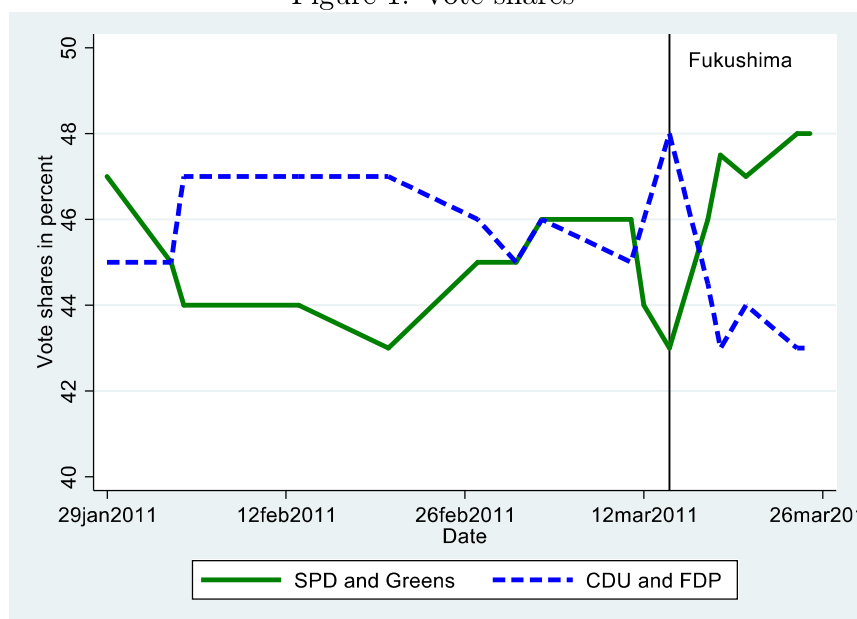
The 2011 state election in BW was an historic election. The conservative CDU set the prime minister for 58 years and lost the election in 2011 against the Greens and the social democratic SPD. Even more, a green politician — Winfried Kretschmann — became prime minister of a German state for the first time. There have been manifold reasons for the outcome of the election. The Fukushima accident tipped the scales. The electorates of the

catch-all parties CDU and SPD eroded. The established parties CDU, SPD, and FDP lost votes and the Green party drastically increased their votes. Voter turnout increased from 55.5% in 2006 to 66.8% in 2011. In particular, the Green party attracted votes from citizens that did not participate in previous elections (Haas, 2013).

The then CDU/FDP-governments initiated the reconstruction of the main station in the state's capital Stuttgart (Stuttgart 21). The electorate was quite divided regarding the reconstruction of the main station. Rightwing voters were in favor to convert the terminal into an underground through station. Plans on how to reconstruct the main station have been discussed since the year 1985 (Wagschal and Wehner, 2013). The state parliament approved the plan for Stuttgart 21 in the year 2006, a referendum against the plans was denied in the year 2007, constructions started in 2010. Expected costs for the project were around 2.5 billion Euros in the year 1995 and more than 4 billion Euros in 2010 (some 7.7 billion Euros in the year 2018). Citizens demonstrated against the constructions. Violence escalated at the demonstrations on 30 September 2010. There were conciliations in fall 2010, including temporary building freezes. Stuttgart 21 influenced the 2011 state election — the CDU lost popularity and the Greens benefited (in November 2011, a referendum whether the state government should withdraw from the project did, however, not receive a majority).

The CDU-Prime Minister in BW, Stefan Mappus, was an unpopular incumbent (e.g., Wehner, 2013). Mappus was an aggressive career-politician who made his way within the CDU in BW by standing up against opponents. His unpopular image notwithstanding, his platforms on energy policy helped to make the Fukushima accident a game changer. The national government decided in September 2010 to extend the run-time of Germany's nuclear power plants. The decision of the conservative/market-oriented CDU/CSU/FDP government was made against the votes of the leftwing opposition in the German parliament. It was a prime example for what scholars would expect about ideology-induced environmental and energy policies. A prominent proponent was Stefan Mappus who advocated the "out of the nuclear phase out". Mappus was a rightwing politician in favor of nuclear energy. After the Fukushima accident, however, the rightwing national government made a U-turn regarding

Figure 1: Vote shares



Sources: infratest dimap, emnid, Forsa and Forschungsgruppe Wahlen and own calculations. The latest poll that was started before the Fukushima disaster predicted: CDU 42%, FDP 6%, SPD 22% and the Greens 21% (infratest dimap, published on March 14, polled March 10-12). The rightwing camp was in front by 48% to 43% (blue-dashed line in the figure). The Fukushima nuclear disaster in Japan occurred on March 11. Things changed in the next poll that was also conducted by infratest dimap, published on March 17, polled March 14-17: CDU 39%, FDP 5,5%, SPD 22% and the Greens 24%.

the nuclear policy positions and promoted nuclear phase outs: the 'phase out of the phase out of the nuclear phase out'. The CDU-incumbent in Baden-Württemberg, Stefan Mappus, now faced a dilemma: German citizens and the national government turned away from nuclear energy; the type of energy he was advocating for a long time. In fact, Mappus gave in and advocated the phase out of nuclear energy. He lost his credibility.

Figure 2 shows polls for the four major political parties before the 2011 state election. We use data from the four leading pollsters: infratest dimap, emnid, Forsa and Forschungsgruppe Wahlen. In December 2010, the vote share of the Greens was predicted to be 28%. Popularity of the Greens declined however in January and February 2011. The predicted vote share of the Greens decreased to 19% at the beginning of March; the polls were published on March

2 and related to surveys conducted during February 21-25. The latest poll that was started before the Fukushima disaster predicted: CDU 42%, FDP 6%, SPD 22% and the Greens 21% (infratest dimap, published on March 14, polled March 10-12). The rightwing camp was in front by 48% to 43%. The Fukushima nuclear disaster in Japan occurred on March 11. Things changed in the next poll that was also conducted by infratest dimap, published on March 17, polled March 14-17: CDU 39%, FDP 5.5%, SPD 22% and the Greens 24%. The vote share of the CDU decreased by three percentage points, the vote share of the Greens increased by three percentage points. The two latest polls before the elections polled by Forsa and emnid reported that the vote shares of the leftwing camp were five percentage points higher than the vote shares of the rightwing camp (43% to 48%). The CDU received 38%, the Greens 24% and 25%. The predicted vote shares of the SPD hardly changed. The Fukushima disaster gave rise to decreasing predicted vote shares of the conservative CDU and increasing predicted vote shares of the Greens. The state election took place on March 27. The change of power was sealed. Vote shares were: CDU 39%, FDP 5.3%, SPD 23.1% and the Greens 24.2%. The Greens formed a coalition with the SPD. Winfried Kretschmann became minister on May 12, 2011. The cabinet included the prime minister Kretschmann and twelve ministers: seven SPD-ministers and five Green-ministers (see Table 1 for details). The SPD had more ministers than the Greens because Kretschmann became prime minister. Kretschmann was Germany's first Green prime minister ever — a major achievement for the Green party. Nils Schmidt, the chairman of the SPD became the deputy prime minister and was heading a new “super-ministry” for public finance and economic affairs. The Green ministers were in charge for the environment, climate and energy, for example.

Clearly, the conservative CDU did not enjoy as much electoral support in the polls before the 2011 state elections than it did in previous elections. In any event, the CDU and his coalition partner FDP had a majority in the polls three weeks before the state elections. It is likely that they would have won the state election when the Fukushima nuclear accident would not have happened (e.g., [Wehner, 2013](#); [Wurster, 2018](#)).

3 Empirical strategy

3.1 Synthetic control

We use the SC method, invented by [Abadie and Gardeazabal \(2003\)](#), to estimate the causal effect of the change in government in BW. Let $j = 1, \dots, J + 1$ index states and $t = 1, \dots, T$ index time periods. The value $j = 1$ corresponds to BW and $j = 2, \dots, J + 1$ describe other German states that serve as controls. We denote by Y_{jt} the observed outcome of state j in period t ; see Section 3.4 for a description of the different outcomes. To explain the SC method, we adopt the potential outcomes framework ([Neyman, 1923](#); [Rubin, 1974](#)). Let Y_{jt}^N and Y_{jt}^I denote the potential outcomes with and without a change in government (which we refer to as our “treatment”). BW is untreated for $t = 1, \dots, T_0$ and treated for $t = T_0 + 1, \dots, T$. The control states remain untreated for all T periods. Thus, observed outcomes are related to potential outcomes as $Y_{jt} = D_{jt}Y_{jt}^I + (1 - D_{jt})Y_{jt}^N$ where $D_{jt} = 1\{j = 1, t > T_0\}$. The new Green-led government took office on May 12, 2011. We therefore consider the year 2011 as the first treatment period. Doing so follows studies on partisan politics which assign a year in which a government changes to the individual government that was in power for at least six months (e.g., [Potrafke, 2017](#)).

We are interested in the causal effect of the change in government in BW in the post treatment period:

$$\alpha_t = Y_{1t}^I - Y_{1t}^N, \quad t > T_0$$

Note that Y_{1t}^I (i.e., the potential outcome with the change in government) is observed in the post treatment period, whereas Y_{1t}^N (i.e., the potential outcome in the absence of a change in government) is fundamentally unobserved. In other words,

$$\alpha_t = Y_{1t}^I - Y_{1t}^N = Y_{1t} - Y_{1t}^N$$

Thus, to estimate α_t , we need to estimate Y_{1t}^N . We consider the following SC estimator of Y_{1t}^N :

$$\hat{Y}_{1t}^N = \sum_{j=2}^{J+1} \hat{w}_j Y_{jt} \tag{1}$$

In Equation (1), we approximate the potential outcome for BW using a weighted combination of the outcomes of the other states. We refer to this weighted combination as “synthetic BW”. The weights $\hat{w} = (\hat{w}_2, \dots, \hat{w}_{J+1})'$ are estimated based on the pre-treatment data. Let X_1, \dots, X_{J+1} denote vectors predictors for the states and define $X_0 \equiv [X_2, \dots, X_{J+1}]$. For our baseline specification, we choose X_j to be the vector of all pre-treatment outcomes, and consider additional predictors in the robustness checks. The weights \hat{w} are obtained by minimizing $\|X_1 - X_0 w\|$, the discrepancy between X_1 and X_0 according to some norm $\|\cdot\|$, subject to the restriction that (w_1, \dots, w_{J+1}) are non-negative and sum to one. Due to the constraints imposed on the estimation problem, \hat{w} will typically be a sparse vector (i.e., only contain few non-zero weights), which facilitates the interpretation of the synthetic BW.

To make inference, we use the permutation method proposed by [Abadie et al. \(2010\)](#); see, for example, [Firpo and Possebom \(2018\)](#) and [Abadie \(2019\)](#) for excellent discussions.¹ The basic idea of this approach is to permute the treatment assignment and estimate treatment effects for all the states in the donor pool. The distribution of the treatment effects then provides a permutation distribution against which the treatment effect estimate for BW can be compared. The effect is deemed significant when its magnitude is extreme relative to the permutation distribution. This method reduces to classical randomization inference ([Fisher, 1935](#)) if the treatment is randomly assigned. When random assignment fails, which is likely in our setting, this method can be interpreted as evaluating significance relative to a benchmark distribution of the assignment process ([Abadie, 2019](#)) and may need to be interpreted more qualitatively ([Arkhangelsky et al., 2018](#)).

3.2 Discussion of the identifying assumptions

We discuss the key identifying assumptions underlying our empirical strategy.²

¹The permutation inference procedure is a finite sample inference approach. It conditions on the data and exploits the randomness induced by the treatment assignment. Sampling-based inference approaches have been proposed by [Chernozhukov et al. \(2019a\)](#), [Chernozhukov et al. \(2019b\)](#), and [Li \(2019\)](#).

²[Abadie \(2019\)](#) provides an excellent general discussion of the contextual and data requirements for the SC method.

First, as with classical difference-in-differences, unbiasedness of the SC estimates requires that there be no anticipation effects. In Section 2, we show that the Fukushima disaster gave rise to decreasing predicted vote shares of the conservative CDU and increasing predicted vote shares of the Greens, which lead to the change in government. Because the Fukushima disaster happened unexpectedly, we are convinced that anticipation effects are unlikely to bias our results.

Second, we require the availability of a suitable control group (often referred to as “donor pool”). The control units should be homogeneous enough such that a convex combination of control outcomes provides a stable and accurate approximation to the counterfactual outcome for the treated unit. We argue that the other German states provide a suitable donor pool: Germany is a federal state with 16 German states. The constitution is the Basic Law for the Federal Republic of Germany (Grundgesetz). It applies to all German states. National policies apply, of course, to all German states. Culture across the German states is quite homogeneous compared to other countries. The states do have state constitutions and enjoy room to maneuver in designing individual policies. We further assess the quality of the approximation when we discuss the empirical results. It is also important to ensure that none of the control states experiences a similar government change; see Section 3.3.

Third, spillovers may bias our results. As in most (if not all) difference-in-differences and synthetic control applications where the units are states or even countries, spillovers are a potential concern in our setting. If control states, which are affected by spillovers, are included in the donor pool, the resulting SC estimates may be biased. We discuss the potential direction of the bias when describing our results and argue that even if spillovers are present, our results are informative lower/upper bounds on the effect of interest. We also present robustness checks, where we exclude the direct neighbors of BW. Under the assumption that spillovers only affect direct neighbors, this strategy will provide unbiased estimates of the treatment effects (e.g., [Clarke, 2017](#)).

3.3 Choice of donor pool

For our empirical strategy, it is important to ensure that none of the control units is treated (cf. Section 3.2). Therefore, states affected by the same or similar events should be excluded from the donor pool. There have been seven state elections in 2011. In Berlin, state elections took place on September 18, 2011. A grand coalition (SPD and CDU) followed a leftwing government (SPD and Left Party). In Bremen, state elections took place on May 22, 2011. The incumbent leftwing government (SPD and Green) remained in office and somewhat enlarged its parliamentary majority. In Saxony-Anhalt, state elections took place on March 20, 2011. The grand coalition (CDU and SPD) remained in office. The vote share of the Green party increased by 3.5 percentage points. The Green party received 7.1 percent of the votes and entered parliament again since 1994. In Hamburg, state elections took place on February 20, 2011. A single-party SPD government replaced a CDU/Green government. The state elections took place before the Fukushima accident on March 11. In Mecklenburg-Pomerania state elections took place on September 4, 2011. The incumbent grand coalition (SPD and CDU) remained in office. The vote share of the Green party increased by 5.3 percentage points — the Greens entered parliament again. Overall, the Greens increased their vote shares in state elections in other states, but they did not participate in state governments other than in Bremen where they had been the junior coalition partner already before the year 2011.

Rhineland-Palatinate may be considered as a critical candidate in the donor pool. In Rhineland-Palatinate, state elections took place on March 27, 2011, on the same day as in BW. The incumbent SPD was forming a single-party government over the period 2006-2011, but lost 9.9 percentage points in the 2011 state elections. The vote share of the Green party increased, in turn, by 10.8 percentage points. The leftwing SPD and Greens formed a coalition government over the period 2011-2016. The SPD-prime minister, Kurt Beck, remained in office. Consequently, the change in government in Rhineland-Palatinate was clearly less drastic than in BW. In any event, Rhineland-Palatinate is a direct geographical neighbor of BW, and we examine the extent to which inferences change when Rhineland-

Palatinate is excluded from the donor pool.

In the years after treatment in 2011, the Greens joined coalition governments as junior partner in some states. In Schleswig-Holstein, the Greens joined a coalition government with the SPD and the Danish minority party in 2012. In Lower-Saxony, they joined a coalition government with the SPD in 2013. In Hesse, they joined a coalition government with the CDU in 2014. In Thuringia, they joined a coalition government with the SPD and the leftwing party in 2014. In any event, there has been no other Green prime minister in Germany until now, except for Winfried Kretschmann in BW. The Greens do not have so much executive power in any German state as they have in BW.

3.4 Data

Germany has 16 states: ten West German states and six East German states (including Berlin). The German Unification occurred in October 1990. Consequently, data for the East German states are available since the early 1990s. When we would like to exploit data for the full donor pool including all the other 15 German states apart from BW, the maximal pre-treatment period encompasses up to 20 years — treatment occurred in the year 2011.

Macro-economic variables such as unemployment rates, GDP and public debt is available since the 1990s for all 16 German states and since the 1970s or earlier for the 10 West German states. We estimate models both based on 40 pre-treatment years (e.g., 1970-2010) using the West German states and 20 pre-treatment years (e.g., 1991-2010) using all German states in the donor pool (the results do not change). We use macroeconomic variables that are likely to be influenced by government ideology (partisan theories). The German Statistical Office only provides data on public expenditure and budget composition till the year 2011 — new time series data on public expenditure and budget composition is not expected to be published soon. The German Statistical Office has staffing shortages to compile this data. We therefore cannot use data on public expenditure and budget composition. In any event, German state governments have only limited responsibility to influence expenditure (they do so regarding issues in education, cultural affairs and inner security etc.) and hardly any

say in designing taxes.

One may also want to examine more fine-grained economic policies that are likely to be directly influenced by government ideology. In particular, the reform of the fiscal constitution in 2006 re-assigned rights and duties between the state governments and the national government. Since 2006, for example, the state governments set the real estate transfer tax rates and to design salaries of civil servants. What is more, the German Supreme Court permitted the state governments to charge tuition fees in January 2005. Scholars have examined the correlation between government ideology and the individual policies measures state government have been allowed to design since the mid/late 2000s (e.g., [Kauder and Potrafke, 2013](#); [Krause and Potrafke, 2019](#)). Using these individual policy measures in an SC model is, however, hardly suitable because the pre-treatment period encompasses just some four or five years.

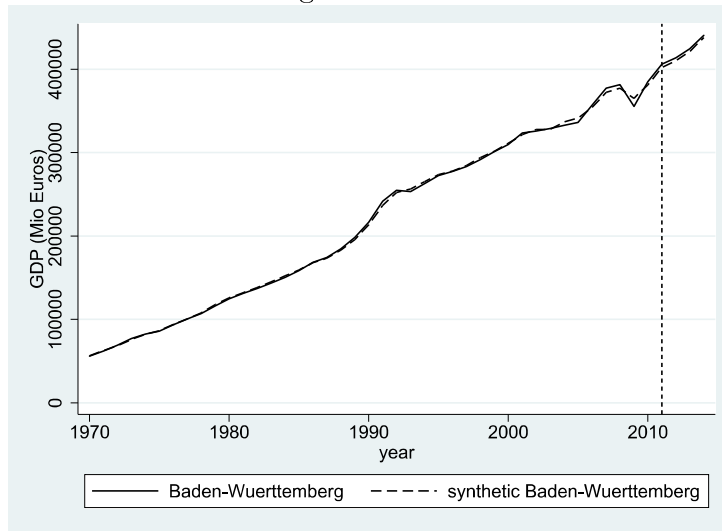
Green governments are especially concerned about environmental policies. We therefore employ outcome variables that relate to environmental policies such as CO2 emissions, wind power, and photo-voltaic facilities. The time period considered before treatment depends on data availability of the individual variables.

4 Results

4.1 Macroeconomic outcomes

Figure 2 shows the results of the baseline SC model for real GDP since 1970. The outcome in the treated and control units is very similar in the pre-treatment period. Figure 2 also shows that the change in government in BW did not influence GDP.

Figure 2: GDP

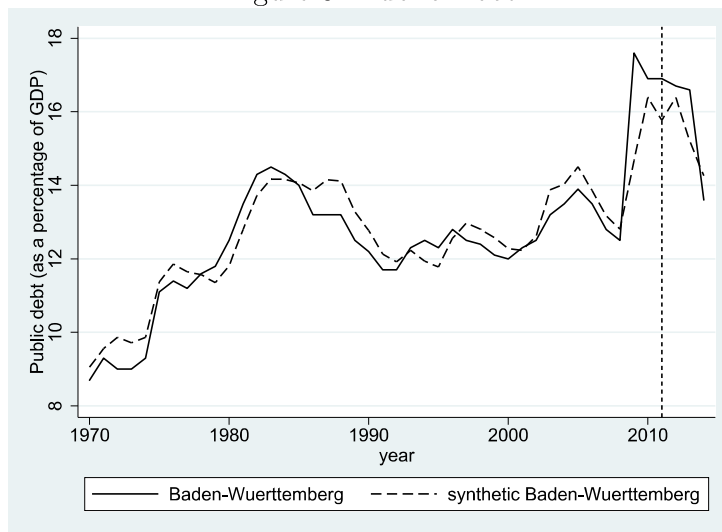


Sources: German Federal Statistical Office

Figure 3 shows the results for the public debt-to-GDP ratio. The fit between the treated and control unit before treatment is less precise than for GDP. The results do not suggest that the Green-led government influenced the public debt-to-GDP ratio. The Green government was unlikely to drastically increase public debt because of the German debt brake. In 2009, the national government introduced a debt brake into the national constitution. The national government's budget needed to be balanced by the year 2020. The state governments' budgets needed to be balanced by the year 2020. Kretschmann's Green government thus had the opportunity to issue new debt, but less so than previous state governments. Descriptive evidence across all 16 German states shows that political parties differed in their rhetoric when discussing the debt brake — the SPD, Greens and Left Party were more opposed to the debt brake than the CDU and FDP — but government ideology was hardly correlated with budget deficits till the year 2010 (e.g., [Potrafke et al., 2016](#)).

[TO BE CONTINUED.]

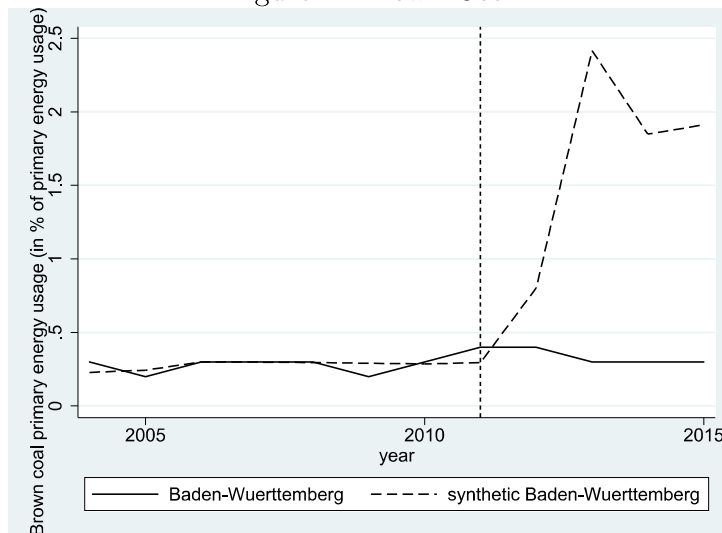
Figure 3: Public Debt



Sources: German Federal Statistical Office

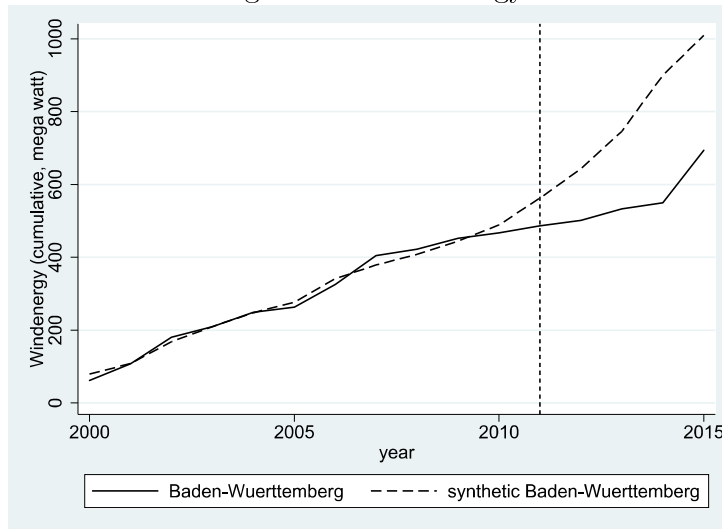
4.2 Environmental outcomes

Figure 4: Brown Coal



Sources: Agency for Renewable Energies

Figure 5: Wind Energy



Sources: Agency for Renewable Energies

5 Robustness

We submit our results to rigorous robustness tests. [TO BE ADDED.]

6 Conclusion

In many industrialized countries, party systems become more fragmented. Populist and Green parties enjoy electoral success. Green parties clearly benefit from climate change because citizens perceive Green parties as being competent in handling climate change. They are also well prepared in forming coalition governments with other established political parties such as social-democratic and christian-democratic parties. A major question therefore is which policies Green governments are likely to implement and whether Green governments influence macroeconomic and environmental outcomes.

We examine how Green governments influence macroeconomic and environmental outcomes. Identifying causal effects how government ideology influences economic policies and

outcomes has been challenging. Scholars have used RDD to estimate Local Average Treatment Effects that were based on governments with tight vote margins. The RDD-studies clearly advanced empirical research on ideology-induced policies but did not overcome the problem of not considering jurisdictions with crystal-clear political majorities. We employ the SC method to make causal inference. The Fukushima natural disaster in Japan gave rise to an unanticipated change of government in the German state BW. The Green party benefitted from the Fukushima-disaster and set the prime minister in BW since 2011. It is the first and so far only Green prime minister.

The results show that the Green-led government did not influence macroeconomic outcomes such as GDP and public debt. The Green-led government was active in environmental policies, however. It decreased brown coal energy usage. The Green-led government also influenced wind energy — wind energy decreased. Expanding wind power gives rise to trade-offs. On the one hand, wind power is an alternative energy that decreases relative energy usage of fossil fuels. On the other hand, windmills disfigure the landscape (the Greens needed to deal with “not in my back yard” movements) and windmills curtail natural habitats for animals such as birds.

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A Additional tables and figures

Table 1: Ministers Cabinet Kretschmann (2011-2016)

Name	Ministry	Party
Winfried Kretschmann	Prime Minister	Green
Nils Schmid	Deputy Prime Minister; Finance and Economics	SPD
Silke Krebs	State Ministry	Greens
Reinhold Gall	Interior	SPD
Rainer Stickelberger	Justice	SPD
Gabriele Warminski-Leitheusser (until 07.01.2013) Andreas Stoch (from 23.01.2013)	Education, Youth and Sports	SPD
Theresia Bauer	Science, Research and Culture	Greens
Katrin Altpeter	Labor, Social Affairs, Families, Women and Senior Citizens	SPD
Winfried Hermann	Transport and Infrastructure	Greens
Franz Untersteller	Environment, Climate Protection and Energy	Greens
Alexander Bonde	Rural Affairs and Consumer Protection	Greens
Bilkay Öney	Integration	SPD
Peter Friedrich	Bundesrat, Europe and International Affairs	SPD