Ecological Economics 217 (2024) 108077

Contents lists available at ScienceDirect

Ecological Economics

journal homepage: www.elsevier.com/locate/ecolecon

# Power politics: How electric grievances shape election outcomes

Anton Brännlund [a,*], Lauri Peterson [a,b]

[a] Department of Government, Uppsala University, Sweden
[b] Law School, University of Eastern Finland, Finland

A B S T R A C T

We argue in this study that higher electricity expenditures increase voter support for the radical right because these parties oppose costly climate mitigation policies. We use data from Sweden, which experiences extremely high demand for heating energy during winter months. The demand for electricity differs greatly between geographical regions due to large temperature differences, from 0 in the southern regions to −50 Celsius in the north. We create our independent variable of *electric grievances* based on this variation, which increases faster with the spot price of electricity in neighborhoods with a low disposable income relative to the average electricity bill in that area. Using this setup, we find that electric grievances are associated with increased support for the radical right. We argue that soaring electricity prices tend to hurt parties with a mainstream profile since voters associate them them with more ambitious decarbonization policies, while the radical right gain support, since they tend to oppose costly solutions. Our results suggests that the transition to renewable energy can grind to a halt when electricity prices rise higher because voters may abandon the parties who push for the green transition.

## 1. Introduction

Governments around the world face the challenge of implementing the Paris Agreement's target for greenhouse gas emissions. The consumption and price of energy remains a key issue. The aim to limit the rise in global average temperature to 1.5 °C through domestic measures, such as carbon pricing and energy taxes, may prove to be difficult due to opposition from voters, who tend to associate green climate politics with an increased economic burden (Carattini et al., 2017). Furthermore, while carbon taxation is considered one of the most cost-effective climate measures, it is also relatively unpopular among consumers (Sivonen and Koivula, 2020). This has led some scholars to call into question the capacity of democracies to mitigate climate change (e.g. Mittiga, 2021), while others find democratic arrangements advantageous for ambitious climate action (Bättig and Bernauer, 2009; Neumayer, 2002; Peterson, 2021). We hope to contribute to this discussion by investigating how rising energy prices, especially the cost of electricity, affect election outcomes.

We believe that this investigation is important given the clear connection between political decisions, power production and carbon emissions. While parties on both sides of the left–right ideological divide have adopted decarbonization policies, there are clear partisan differences in the choice of instruments and/or the extent of policy stringency. Left/green governments are inclined to implement more "hard" policy measures, such as taxation and restrictions, to mitigate carbon emissions at the cost of voters' disposable incomes. Center and right governments, however, tend to introduce more "soft" measures, such as subsidies and information campaigns, which have a smaller visible effect on disposable incomes (Schulze, 2021). Voters frequently perceive climate change mitigation and economic outcomes as trade-offs (e.g. Hess and Renner, 2019). Many voters regard harsh policy efforts as driving up energy inflation – the short-term costs of comprehensive decarbonization pose a recognized challenge here, due to strong opposition from groups that may be disadvantaged by rising energy prices (Alesina and Drazen, 1991; Drazen and Grilli, 1993; Furceri, 2021). By contrast, the benefits that arise from mitigating greenhouse gases (GHG) are more subtle, being shared by all citizens globally and with future generations. The literature on this issue notes that – at least over the short term – "climate policies create new economic winners and losers" (Aklin and Mildenberger, 2020).

High energy inflation leads to lower support for renewables (Aklin, 2021) and even fuel riots (McCulloch et al., 2022). However, it is poorly understood just how the price of energy – and electricity in particular – affects electoral outcomes. We will therefore use the framework of economic voting to understand how electricity expenditures affect voting decisions. We use data from Sweden, which experiences extremely high demand for heating energy during winter months. The demand for electricity differs greatly between geographical regions due to large temperature differences, from absolute minimums close to 0 degrees Celsius in the southern regions to −50 degrees Celsius in the northern regions of Sweden.

Drawing on the literature on economic grievances, we create the

* Corresponding author.
*E-mail addresses:* anton.brannlund@statsvet.uu.se (A. Brännlund), lauri.peterson@statsvet.uu.se (L. Peterson).

https://doi.org/10.1016/j.ecolecon.2023.108077
Received 26 August 2022; Received in revised form 5 December 2023; Accepted 8 December 2023
Available online 26 December 2023

independent variable of *electric grievances* based on variation in temperatures, which increases faster with the spot price of electricity in neighborhoods with a low disposable income relative to the average electricity bill in that area. Using this setup, we find that electric grievances are associated with increased support for the radical right. We argue that soaring electricity prices tend to hurt parties with a mainstream profile since voters associate them with more ambitious decarbonization policies, while the radical right gain support, since they tend to oppose solutions, which are perceived as costly. We believe that our findings are of interest to both academia and a wider audience.

## 2. Theoretical framework

How do rising electricity prices affect election outcomes? This is not a clear-cut matter. A traditional approach to analyzing how energy expenditures affect politics, especially voting, involves applying the framework of *retrospective economic voting*, according to which voters judge politicians on the basis of what is known as *valence issues*. A valence issue is one on which a consensus is found among voters on preferable outcomes (see Clements, 2020, for a discussion on valence and salience). For example, most voters in recent decades have agreed that unemployment and inflation should be kept low and economic growth high, and prefer to elect politicians, who appear competent in accomplishing these goals (Duch and Stevenson, 2008; Palmer and Whitten, 1999). From the perspective of voters, the simplest and least costly method for selecting competent leaders is to reward and punish politicians based on their past performance: that is, to vote out the government when times are bad (i.e. economic decline, unemployment, and inflation), and to rally behind it when times are good (Lewis-Beck and Stegmaier, 2000, 2013). This is known as the *reward-punishment hypothesis*.

According to the traditional retrospective framework of economic voting, rising energy prices can affect voters both directly and indirectly. The indirect mechanism is imperative because all activity in some form, including economic activity, is dependent on energy consumption (see Chen et al., 2022; Huntington and Liddle, 2022; Kraft and Kraft, 1978). However, growth in energy prices affects different economies in various ways. Contractions can take place in energy-importing countries and regions when the price gets too high as the economy slows down, while booms can occur in energy-exporting regions due to an improved labor market (Arezki et al., 2020; Charles and Stephens, 2013; Sances and You, 2020). Voters may treat energy prices as a *valence* issue, because high prices slow down the economy and cause unemployment or slow down income growth as energy-dependent businesses close down. However, investigating the impact of rising energy prices could be tricky from the traditional valence approach due to the strong relationship between energy prices and businesses cycles.

But voters are also consumers, so they may treat the price of energy as a *pocketbook issue* and punish politicians when high energy costs reduce their own personal disposable income (e.g. Healy et al., 2017). Studies have shown that energy expenditures can affect election outcomes through a retrospective mechanism, whereby voters punish politicians either for higher prices of goods, services, and taxes, in general (Brännlund, 2021b; Tillman and Park, 2009), or gasoline, in particular (Cho and Gimpel, 2009; Kim and Yang, 2021). The 2018 "yellow vest" protests against rising fuel prices in France show the consequences of rising energy prices. High energy prices are a frequent factor behind violent riots across the globe (McCulloch et al., 2022).

In the traditional framework of pocketbook voting, rising energy expenditures reduce voters' disposable income, resulting in grievances against the sitting government, irrespective of whether it is actually responsible or not. Some scholars, for instance, suggest that voters punish governments for rising gasoline prices (Kim and Yang, 2022). Although we agree that a pocketbook mechanism can be at work, we argue that voters instead react by choosing certain political parties in response to changes in their disposable income. The limitation of the simple pocketbook thesis is that climate-related issues have become important enough for large groups of voters, who favor climate action (Bättig and Bernauer, 2009; Neumayer, 2002; Peterson, 2021). However, mitigating emissions by taxing energy can lead to welfare losses in specific sectors of the economy. This makes high electricity prices comparable to a *positional issue*, where voters choose politicians based on their policy offerings (see Downs, 1957).

In the classic framework of political economics during the Keynesian era, political conflicts centered on the trade-off between high employment (preferred by left-wing voters) and low inflation (preferred by the right-wing community), along the lines suggested by the Philips curve (e.g. Hibbs, 1977). However, a serious realignment has taken place. The case can now be made that voters may perceive a trade-off between preserving climate mitigation and economic outcomes. Put simply: voters can choose parties based on economic and environmental issues. Partisan realignment has been driven by the spread of *post-material values*, which entail an awareness of the need for environmental protection (Booth, 2017; Norris and Inglehart, 2019). Radical right parties, however, represent political positions skeptical about climate change and tend to oppose renewable energy policies (Forchtner, 2019a; Vihma et al., 2021). Apergis and Pinar (2021) find that countries with highly polarized parliaments exhibit lower consumption of renewable energy and rely to a higher extent on fossil fuels for electricity generation.

Thus, a significant portion of the literature suggests that radical right parties are less keen to support climate action and environmental protection, especially at the cost of higher economic growth and jobs (see Kulin et al., 2021). Furthermore, once in power, radical right parties are more likely to obstruct the expansion of renewable energy on the grounds of cost (Forchtner, 2019b; McCright and Dunlap, 2011). Radical right parties further tend to capture voters, who feel economically left behind (McCright and Dunlap, 2011; Tranter and Booth, 2015). While some prior studies have argued that the skepticism of climate change by radical right parties is mainly driven by ideological opposition (Farstad, 2018) and anti-elite sentiment (Lockwood, 2018), we instead argue for the role of economic concerns. More specifically, the term *economic grievances* has been used to describe the mechanism between market forces and the growing support for radical right parties (Abou-Chadi et al., 2022; Lau and Sears, 1981). We suggest that an increased energy price leads to greater support for radical right parties among those who experience grievances from falling disposable incomes.

While contemporary wealthy middle-class voters are more likely to support stricter climate policies due to greater disposable income, working-class voters low on disposable income tend to prefer policies that preserve jobs and promote material security within the country, due to the smaller margins in their income (Booth, 2021). A spike in the price of energy, especially electricity (due to low price elasticity) will however, reduce voters' disposable income and lower demand for climate mitigation and carbon pricing, because policies, such as the deployment of renewable energy, are perceived to lower the welfare of the median voter today, while the expected payoff is shared by all in the future (see Stokes, 2016, for a discussion).

However, the effect of economic hardship is often not limited to voters with personal losses but can affect communities through a sociotropic effect (see Ansell et al., 2022; Lewis-Beck and Stegmaier, 2000). High electric prices would in a similar fashion stir up *electric grievances* among voters who live in areas where consumption is affected by higher electricity prices because higher than average electricity expenditures may potentially function as a signal of the high costs associated with increased energy taxation and the continued decarbonization of the electricity supply (Aklin, 2021). Thus, we hypothesize that: electric grievances produce support for radical right-wing parties.

## 3. Institutional setting and political background

We will evaluate our hypothesis using data from Sweden and ask which parties lose or gain votes when electricity prices increase. Fig. 1

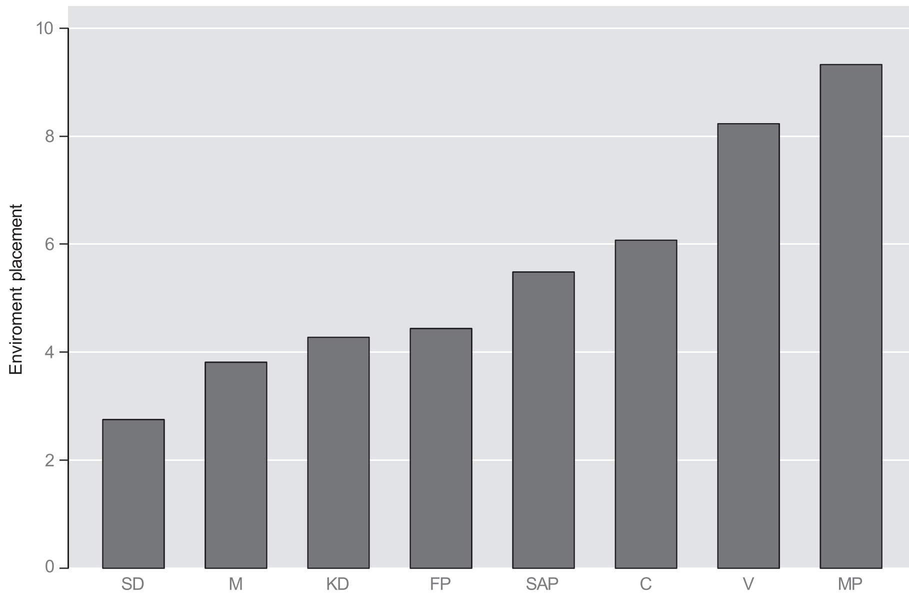


**Fig. 1.** This figure presents how the candidates for the political parties place themselves on the tradeoff between preserving the environment or preserving economic growth. The scale goes from 10 which indicate that the party favor the environment over economic outcomes and 0 which indicate that the party favor economic outcomes over preserving the environment. The parties are presented in the following order from the right: Green party (MP), Left Party (V), Centre Party (C), Social Democrats (SAP), Liberals (FP), Christian Democrats (KD), Moderate Party (M) and the Sweden Democrats (SD). Data has been collected from the Chapel Hill expert survey last election 2018 (freely available). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

illustrates how the political parties in Sweden position themselves on the trade-off scale between environmental protection versus economic outcomes. 10 indicates that the party strongly supports environmental protection even at the cost of economic growth. However, 0 indicates that the party strongly favor economic outcomes even at the cost of environmental protection. The data is taken from the Chapel Hill Expert Survey from 2018 on parties' political profiles. Their evaluation follows the prevailing left–right scale with most Swedish right-wing parties favoring economic growth over environmental protection. Our dependent variable in the main analysis will be based on the vote share for the Sweden Democrats, which shows the least support for environmental protection *vis à vis* economic growth compared to other Swedish parties. This is in line with Hultman et al. (2019), who find that the Sweden Democrats is the political party that most strongly opposes climate policy in Sweden. A lack of support for climate policies by Sweden Democrats has also been shown by survey data (Ohlsson et al., 2016).

Moreover, energy policy is a highly debated issue in Swedish politics. The price of electricity has to begin with, always been a salient issue in Swedish politics given the prominence of Sweden's heavy industry and the massive winter heating demand of private households. A political consensus took shape in the 1950s on the need to attain energy self-sufficiency through nuclear power, given the nation's large uranium reserves. After the oil crisis of the 1970s, Swedish households began transitioning away from foreign oil (70% of all heating energy was oil-based at the time) to domestic energy sources. Nuclear power was seen in the 1970s as a cleaner alternative to oil, but optimism quickly turned into doubt after high profile nuclear accidents in the US and the USSR. As a consequence, Swedish voters decided, in a referendum, to phase out nuclear power over the coming decades (see discussion in Perman, 2008).

The prevailing view within the dominating Social Democratic Party (SAP) was that economic planning, rather than increased production, should be instituted for these purposes, and that households ought to keep a lid on their energy consumption, for both moral and environmental reasons. These ideas grew still more prominent with the birth of the Green Party (MP), which emerged from groups of nuclear skeptics who thought that the transition away from nuclear power was going too softly. The Social Democrats, further, used sticks and carrots to reduce households' demand for electricity during their time in power between 1994 and 2006. The aim was to become the world's first green welfare state by persuading households to consume less electricity while spending billions on renewable energy sources (Anshelm, 2002).

The turn away from nuclear power continued, as the Social Democratic government adopted a law with the support from the Center and Left Party. This law granted governments a mandate to close nuclear power plants as it saw fit (this bill was influenced by Agenda 21 and the Earth Summit in Rio in 1992). However, this deal enraged supporters of nuclear power in the right-wing opposition, unions, as well as the private industry, who argued that nuclear power was necessary to run industries and to heat homes (Anshelm, 2000). A total of12 nuclear power plants have been shut down since the referendum. Today, Sweden has six operational nuclear reactors, which generate approximately one third of the electricity that country consume today and there is a clear left–right divide on this issue.

The political conflicts over electricity production and energy taxation intensified even further in the 21st century, as climate change became a salient issue for both politicians and voters. The political parties offer very different solutions to climate change and how Sweden should produce electricity. The right-wing parties (except the Centre Party) argue that net-zero carbon emissions need to be achieved without large economic costs. The energy agreement in 2009 within the right-wing alliance, comprising Christian Democrats (KD), Liberal Peoples' Party (FP), Moderate Party (M) and the Centre Party (C), made clear that the share of renewable fuels needed to increase but nuclear power played a larger role in this agreement than earlier. The latest agreement, however, in 2016 between both traditional right and left-wing parties expressed the goal that Sweden's energy supply should come 100% from renewable sources by no later than 2041, which may add cost pressures on households and the industrial sector. Taxes and fees make up around 50% of electric bills for the final consumer. The only Swedish political party that has *consistently* argued against many of these policies in the 2002 and 2018 period has been the Sweden Democrats. The political party tends to represent climate change skeptics and opposition to climate change mitigation in Swedish politics (Hultman et al., 2019;

Jylhä et al., 2020).

## 4. Main variables

We use a rich dataset consisting of election results and registry data from the election years 2002, 2006, 2010, 2014, and 2018 in this study. Our empirical strategy is to exploit changes in the spot price of electricity and local sensitivity to these price changes from election to election. Electricity prices in the Swedish setting come with both empirical benefits and caveats. The spot price of electricity in Sweden is arguably exogenous to consumers in Sweden due to the common Nordic market. Sweden's neighbor Finland has traditionally relied on nuclear and hydro power for electricity generation but wind power has grown significantly in recent years. Denmark, while a significant producer of wind energy, generates a larger share of electricity from coal than the rest of the Scandinavian countries (Agency, 2021). Norway is similar to Sweden, in that both countries depend heavily on hydro power. This diversity in energy sources and underlying structures implies that the final prices on the spot market are influenced by a number of factors. Spot prices can been seen in Fig. 2 and the election years are marked with red dotted lines.

Swedish electricity prices also depend on weather but also conditions in other European countries. First, we have to account for the fact that electricity prices tend to correlate with weather conditions in Sweden: cold temperatures are followed by increased demand, while a dry and calm weather reduces the supply of hydro and wind power, respectively. Second, the coupling of the Nordic power system with the rest of the European continent means that for Swedish consumers the price of electricity is sensitive to changes in the price of gas and coal in the rest of the Nord Pool markets, as currently observed after the Russian invasion of Ukraine and related sanctions.

However, data on electricity consumption is not collected at the individual household level and not for all years due to national security concerns. We make use of an interaction term between election to election changes in the relative spot price and sensitivity toward these changes during our base year 2002 to create the independent variable, which we designate as *Electric grievances* (See Fig. 3. a). Consider the first step in creating our variable:

$$Sensitivity\ ratio_{im2002} = \frac{Average\ electricity\ cost_{m2002}}{Disposable\ income_{i2002}}$$

We specify the sensitivity to electricity prices for the individual $i$ (nested within municipality $m$) as the ratio between the average electricity cost for an individual in the municipality $m$ and the disposable income for that individual the year 2002. Disposable income refers to total income remaining after taxes and transfers, which has been collected for all individuals in Sweden from the LISA-database. To calculate the average cost of electricity, we need data on consumption, but such data is only available from Statistics Sweden at the level of municipalities. However, the correlation between individual consumption and the final cost of electricity is very strong within municipalities due to approximately identical heating demand. Average costs are calculated as the product of total household consumption in megawatt hours (MWh) multiplied by the price in 2002, which we then divide by the number of adult citizens in that municipality. The average cost will vary from the south of Sweden to the north due to a significant difference in average temperatures. In a nutshell, the measure captures sensitivity to electricity costs: individuals with a high sensitivity ratio suffer a more significant drop in consumption when the price of electricity increases.

We employ electoral district-level $d$ data on voting from election years during the period 2002–2018 since voting choices are not available at the individual level and we connect voting data with administrative records. Swedish electoral districts $d$ are small areas that usually contain around 1000–2000 eligible voters, which are nested within larger municipalities $m$. Moreover, using electoral district-level data is fruitful because it covers highly similar households.[1] Thus, the problem of aggregation bias should be limited at this level. Apart from a few of the smallest, municipalities comprise several districts. We take the district mean of the individuals' sensitivity ratios and multiply the district average with relative changes in the spot price of electricity to create the district variable (See Fig. 3. b):

$$\Delta Electric\ grievances_{dt} = \Delta\% Spot\ price_t {*} Average\ sensitivity\ ratio_{d2002}$$

When the average sensitivity ratio is high in a district, voters in those districts are forced to devote a large share of their disposable income to electricity expenditures due to high prices. However, when the sensitivity ratio is low, electricity expenditures make up a smaller share of voters' disposable income, even at a high electricity price. Thus, our independent variable *Electric grievances* aims to capture economic exposure to increased electricity prices in districts where voters on average are economically more sensitive to increased prices.

We employ an empirical strategy similar to a shift-share design where, where the share 'average cost to average income ratio', is fixed to 2002 and the time-varying shifter is denoted as changes in the relative price of electricity. Hence, it makes sense to restrict the sensitivity ratio to 2002 (not only due to data limitations) because shares in later years will depend on political attitudes and partisanship, or even changes in the spot price, which opens up the possibility of reverse causality and auto correlations (Broxterman and Larson, 2020).

Note, that we will only estimate a reduced form effect (electricity expenditures are not instrumented) since we do not observe actual electricity expenditures at the household level, which is highly common for shift-share designs (Goldsmith-Pinkham et al., 2018). However, we believe that this strategy requires additional work for our case. Poor and rich households alike need electricity to heat up their home during the winter months, and to run water heaters and other appliances throughout the year. Reliable access to electricity is essential for a minimum standard of living in Western countries (i.e., using electricity is a form of subsistence consumption) (Berg and Savvides, 1983; Brännlund and Mattias, 2021; Poyer et al., 1997). The elasticity of energy demand – especially for electricity – tends to be relatively low in Sweden relative to other countries (Andersson, 1997; Damsgaard, 2003). Changes in the cost of electricity are felt immediately among final users because a large share of the households pay the average monthly price for their electricity consumption rather than prices based on longer periods (see Statistics Sweden, 2023).

## 5. Empirical specification

The main idea behind our empirical strategy is to exploit variation in electric grievances caused by differences in sensitivity ratios (economic sensitivity to electricity price changes) and changes in the price of electricity over time. The non-parametric relationship between the dependent and independent variables is visible in the Appendix. In terms of econometric estimation consider the Eq. 3:

$$\Delta Vote\ share_{dt} = \beta_1 \Delta Electric\ grievences_{dt} + \varepsilon_{dt}$$

Here, the dependent variable is the change in support for the Sweden Democrats during the election in period $t$, where $t$ is the period 2010–2018 in electoral district $d$, which in turn is nested in the larger municipality $m$. We utilize the period 2010–2018, because Sweden Democrats were not voted into the national parliament *Riksdag* during prior elections. The findings for the other parties are presented for the longer period from 2006 to 2018. The main variables are expressed as differences to cancel out unobserved heterogeneity across electoral districts. The main variable of interest on the right-hand side of Eq. 3 is changes in district electric grievances – that is the interaction term

[1] It should be noted that we can only make use of electoral districts that remains over time which slightly reduce the sample.

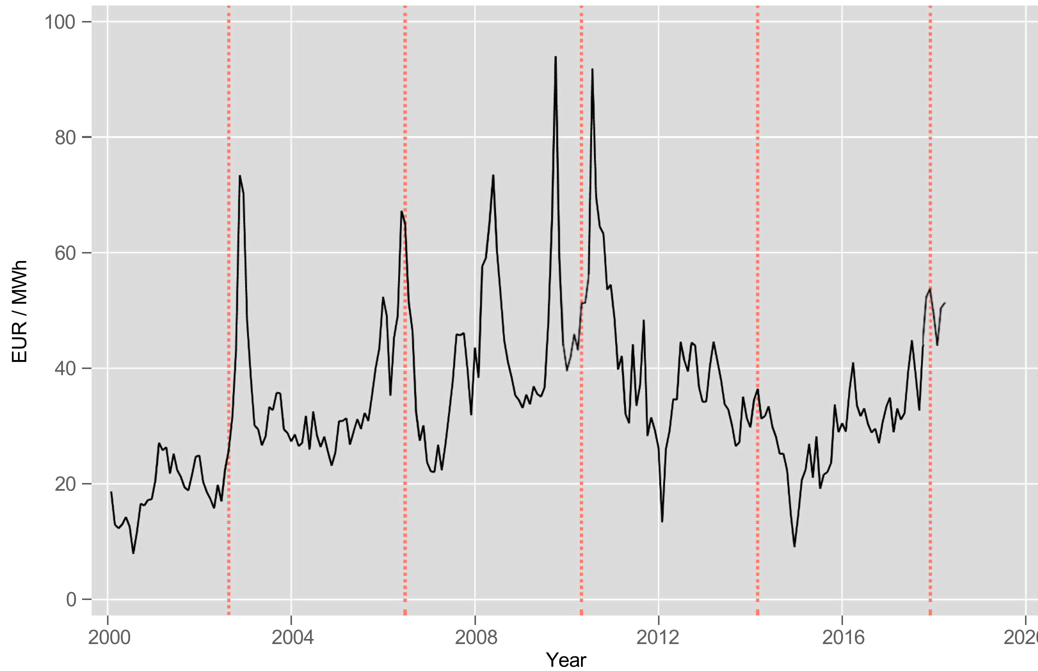


**Fig. 2.** This figure presents the path of Swedish electricity prices in EUR per MWh. Election years are marked with a red reference line. Data on the price of electricity has been provided by the spot-market Nord Pool and the price and can be seen in Fig. 4. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

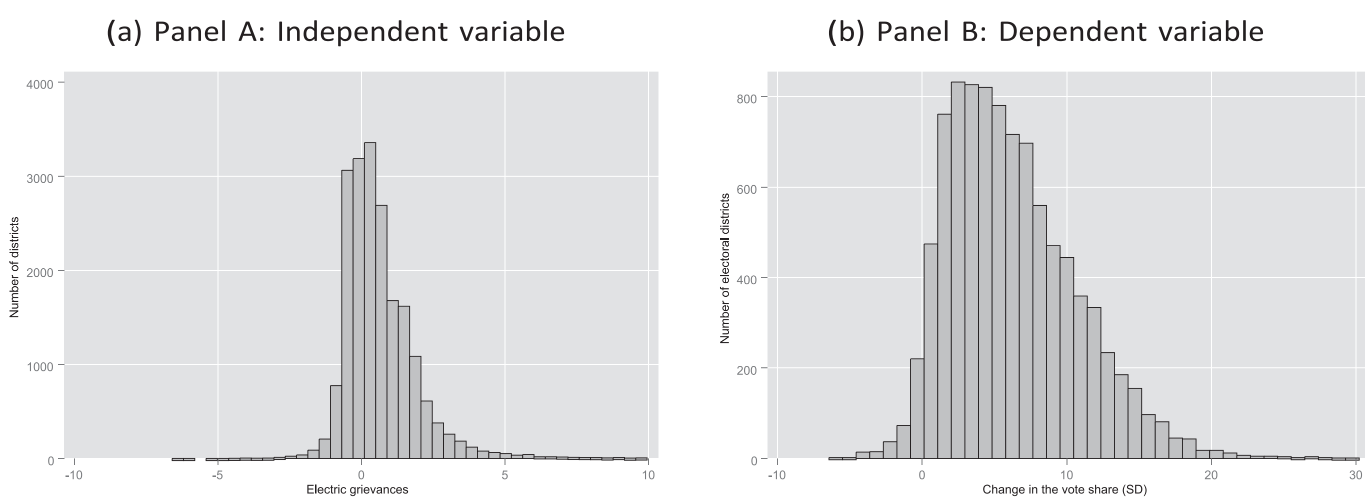


**Fig. 3.** Independent and dependent variables.
The figure to the left presents change in support across electoral districts 2010–2018. The figure to the right illustrates the distribution of electric grievances during the same period).

between relative changes in the spot price and the average sensitivity ratio in the districts 2002. We must understand where the variation in our independent variable comes from: disposable income on the one hand is district dependent but the average level of electricity costs will correlate across districts within the municipalities. This is necessary to take into consideration when we discuss fixed effects and clustering of standard errors.

Changes in the spot prices can be potentially associated to other kinds of shocks that correlate with voting in a regional pattern. However, we include election-fixed effects $\delta_t$ to restrict the identifying variation in the electricity grievance measure to differences across districts with high and low sensitivity ratios across the whole country within election years. This setup allows us to exploit variation in our independent variable that comes from differences in temperatures between the southern and northern parts of Sweden during the same election years.

Furthermore, we can assume that different parts of Sweden are exposed to regional-level shocks that correlate with voting. Thus, we allow for heterogeneous macro-shocks when we multiply the year-effects $\delta_t$ with a regional county dummy $\zeta_c$. This interaction term allows us to use municipality-level variation in the grievance measure to a lesser extent because we only compare districts with the same county (which consist of multiple municipalities) and during the same year. However, we reduce the impact of regional shocks.

An even more stringent test would be to multiply the year fixed-effect $\psi_i$ with a parish dummy $\zeta_p$. This interaction term reduces the variation between districts with different sensitivity ratios within the same municipality, parish and year. There are currently 292 municipalities and roughly 1200 parishes in Sweden. Districts are nested in parishes within municipalities, which in turn are nested in counties. The parish-level is useful, because macro-shocks can have heterogeneous effects on local areas within larger jurisdictions. The term $\delta_t \times \zeta_p$ purges out much of these effects effectively since the variation is limited to a handful of districts within the same geographical border, i.e., the closest neighbors within the same municipality and election. Nevertheless, we lose the variation in grievances that are derived from the average cost across municipalities. In other words, $\delta_t \times \zeta_m$ restricts variation to rely more on the level of disposable income because all individuals within a municipality share the same average cost of electricity. Thus, we capture the impact of changes in the spot price between richer and poorer districts within a municipality when we include this term. However, given the structure of or independent variable, the county-by-years effect should be the preferred model.

We include a large set of observable characteristics to make sure that we pick up the impact of electricity-related grievances and not economic hardship in general. We include four key economic characteristics: the level of disposable income, the standard deviation of the districts disposable income, employment rates, and a proxy for the average level of wealth per voter as constructed in Brännlund (2021a). Another matter is demographic change between election years. Housing characteristics may matter, as the size and the cost to heat a home can attract different groups. We control for such patterns by including changes in district population size, the share of migrants, the mean age of the population, and the mean age squared.

We construct the aforementioned variables based on data from the LISA-register as well at the Swedish Wealth Register please see Appendix). Also, we figure that more active citizens will take greater steps to reduce their electricity expenditures when the price increases between years. These measures may become an issue if they correlate with voting behavior, so we include electoral participation as a control in our main specification. Finally, to make sure that we control for all possible confounding effects within the interaction term, we multiply all control variables with the average sensitivity ratio.

We also add unit $\gamma_d$ fixed effects, which is the same as controlling for linear trends in voting and all time-variant factors to grow between elections in a linear fashion. This control is important, given that the identifying assumption in a shift-share design with only one share resembles that of a standard difference-in-differences model with continuous treatment (Borusyak et al., 2018; Goldsmith-Pinkham et al., 2018). That is, we need districts with low and high ratios to be on a similar path, regardless of changes in the spot price; but adding a district fixed effect relaxes this assumption a bit. More precisely, we allow districts with high and low ratios to be on different trends (positive or negative) in voting if these trends have the same acceleration (see Mora and Reggio, 2012, for a discussion).

The final question concerns the clustering of standard errors, which in econometrics are commonly clustered on the level of the variation of interest. However, in our case we are presented with different possibilities. We could cluster the standard errors on the district-level for which we have voting and income data. However, we should also recognise that a large part of the variation in our independent variable stems from differences in the average cost of electricity across municipalities in Sweden. For the sake of argument, if districts in the northern parts of Sweden with high electricity expenditures implemented a policy unrelated to the spot price, the clustering of standard errors on district IDs could deflate the standard errors. Consequently, we cluster the standard errors on the level of municipalities and elections in the main results because we believe that simultaneous shocks on municipalities are likely during the election years. In the appendix, we provide results with both district and municipality-level clustering.

## 6. Results

In this section, we evaluate the main argument of this study: that the share of votes for radical right parties increases in areas where citizens are forced to cut down on consumption when electricity prices rise. The dependent variable is changes in the voting share for the Sweden Democrats and the independent variable is electric grievances: an interaction term between relative changes in the spot price of electricity and sensitivity toward price changes. The first column in Table 1 presents the bivariate relationship between changes in the independent dependent variable which is positive (2.8) and significant at the 99% level. This estimate suggests that the vote share for the Sweden Democrats increases on average 2.8 percentage points with a one unit increase of the variable electric grievances. The model exhibits good fit with an R-square of 0.3, suggesting that 30 percent of the variation in the vote share for the Sweden democrats can be predicted with the main independent variable. As we have previously noted, the standard errors are clustered at the municipal and year level but we present alternative clusters such as the district level in the appendix.

We add time-varying controls in column 2: changes in economic and demographic characteristics, political participation and their interaction with the district sensitivity ratio. These controls have a marginal effect as the estimate remains similar (2.91) and significant at the 99% level. The result is in itself interesting given that many of these variables could be potential mediators between electric grievances and voting if districts grow poorer, for example, due to higher electricity bills. Nevertheless, this is clearly not the case as the coefficient increases between column 1 and 2. Adding county-by-year effects in column 3 makes sure that we only compare districts within the same region and election year. This is important given that different parts of Sweden will experience different types of shocks and campaign promises during election years. County-by-year effects factor out average election specific events within these regions. However, the control reduces the variation in electric grievances that comes from local average electricity costs between municipalities since we do not compare districts across the whole country any more. The differences in average costs within the county will be smaller since the districts come from the same part of Sweden. Inclusion of this term reduces the estimate to 1.4 but the effect remains significant at the 99% level. It should be noted that we do not present the coefficients for the control variables in the main table but they can be found in the appendix.

The main identifying assumption in the model presented in column 3 is the parallel trend assumption: districts with high and low sensitivity to changes in the spot price must share similar trends in voting in the absence of a change in the spot price, conditional on all included controls. There is no effective manner of testing this assumption, but we can relax it a bit by introducing district fixed effects which control for linear trends in voting. Districts are now allowed to be on different trends as long as they are linear but this control does not move the coefficient in any significant way. However, we witness large effects when we introduce parish by year effects – leaving us to compare the effect of spot price changes across neighboring districts.

It's crucial to comprehend that the variation of interest in a "shift-

**Table 1**
Electric grievances and party voting.

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Δ *Electric grievances* | 2.816*** | 2.910*** | 1.410*** | 1.379*** | 0.530*** |
| | (0.169) | (0.162) | (0.200) | (0.206) | (0.177) |
| Constant | 5.957*** | 7.335*** | 6.370*** | 6.373*** | 9.309*** |
| | (0.232) | (0.677) | (0.542) | (0.514) | (1.355) |
| N | 9305 | 9305 | 9305 | 9305 | 9118 |
| r2 | 0.303 | 0.372 | 0.464 | 0.465 | 0.905 |
| Controls X Ratio | No | Yes | Yes | Yes | Yes |
| County by year effects | No | No | Yes | Yes | No |
| District fixed effect | No | No | No | Yes | Yes |
| Parish by year effects | No | No | No | No | Yes |

Standard errors in parentheses clustered at the municipality and year level.
* $p < .10$, ** $p < .05$, *** $p < .01$.

share" design originates from the ratio of disposable income to typical electricity expenditures. This typical ratio is relatively low with a mean value of 0.014, but it also displays a certain degree of variation, given that the highest value reaches 0.163 and the standard deviation is

0.01. So, one way to investigate the size of the effect is to compare the impact of electricity prices across different parts of the distribution of our "share". We do so with the margins command in Stata. For instance, a 1% increase in electricity prices in the average district will lead to a 0.047 percentage point increase in support for the Sweden Democrats. In districts that spend the most on electricity costs, a 1% increase would lead to 0.26% increase in support for this political party. Moreover, the variation in electricity prices ranges quite dramatically, from −41.2% to 145% so the price of electricity will have substantial effects on voting behavior. Finally, assuming that the effect range between 0.5 and 1.4 (column 4 and 5), a standard deviation increase in the independent variable (0.9) would increase the vote share for the Sweden Democrats by 0.45 to 1.26 percentage points. This is a small but relevant effect because the average change in vote share for the party was +6.23% with a standard deviation of 4 in our sample.

The next step is to investigate whether other types of parties gain or lose support due to electric grievances, which are presented in Fig. 4. We break down the results based on individual parties using both the county by year effect model and the more stringent parish by year effect model that compares rich and poor neighborhoods when the price of electricity rises (both models include district effects and the other controls).

The findings in Panel A on the left come from county by year model and a polarizing effect is imminent: the parties at the extremes of the left-right scale gain voters (more to the right however) while the "green liberal" Centre Party in Swedish politics loses the most votes. The only positive coefficient for a left bloc party is for the Left Party, which strongly opposes the marketization of the electricity and the common market. Once we move to the parish by year fixed effect model, we find that Sweden Democrats is the only party that wins over poorer districts when electricity prices rise.[2] Both figures suggest that higher electricity expenditures produce political polarization in some form.

We present in the supplementary appendix some additional analyses to discuss any concerns with our main results. The greatest threat to our results is the standard errors and the fact that some districts have altered their borders between the election periods. Nevertheless, it is not clear cut on what level we should cluster the standard errors given that the average cost of electricity is available on the level of municipalities, while disposable income is a district-level characteristic. Rather than to guess the suitable level, we aggregate all our variables to the municipality level, but the results remain the same. For robustness, we also cluster the standard errors in the main analysis on how similar the districts are in terms of sensitivity ratios, but these clusters do not affect the main result.

## 7. Conclusion

Do high electricity prices provoke a partisan reaction among voters? In this study we argue that high electricity prices are external shocks, which are more likely to elicit a partisan rather than a incumbent-based response from voters. While the field of political economy has been dominated by studies on the electoral implications of higher taxes (Drews and Van den Bergh, 2016) and an emerging literature has established the role of energy costs for public opinion (Aklin, 2021; Castanho Silva et al., 2022; Stokes, 2016), we still have limited knowledge of the particular effect of electricity expenditures on voting behavior. We focus on the case of Sweden, where electricity costs are particularly consequential for voters due to high heating costs in the winter months. We theorize that voters, whose disposable income is more sensitive to changes in electricity prices, tend to shift their support to political parties that are expressly against perceived costly climate mitigation measures. From the perspective of economic voting, we argue that voters more sensitive to price volatility due the sharp decrease in disposable income will increase support for radical right parties, such as Sweden Democrats, which have a record of opposing increased energy taxes and the expansion of renewable energy generation.

We employ an empirical approach, which is similar to a shift-share design. As such, we fix the ratio of average cost to average income from 2002 and employ the time-varying shift of change in the relative price of electricity. We find that support grows for the radical right when electricity expenditures exceed total consumption in the area. This result holds across different empirical specifications and analyses. Although, we acknowledge that the study has been conducted in the context of Sweden, similar findings have been shown in the rest of Europe as well (Aklin, 2021).

A significant relationship between voting and electricity expenditures could have implications for both political science and society at large due to the low elasticity of electricity demand. In fact, energy policies have traditionally been seen as redistributive (see Lowry, 2008). Climate mitigation and environmental protection can for instance, be seen as a form of global redistribution, because the benefits are shared with everyone on the planet, even-though the cost is incurred by voters at home (Stokes, 2016; Tvinnereim and Ivarsflaten, 2016). However, our finding casts some doubt on the assumption that voters vulnerable to high energy costs will continue to endorse parties that support ambitious climate politics without additional policy measures. Contrary to Farstad (2018), our study suggests that climate politics can be analyzed within the traditional framework of economic voting since voters' demand for climate solutions depends on their ability to afford such policies. The energy transition as set out in the Paris Agreement is likely to stall in Europe if energy inflation remains high as even mainstream parties may find it difficult to adopt a carbon neutral agenda.

Nevertheless, our goal is not to make an argument for *climate doomism*. Rather, our study spells out a need for a *just transition* that takes into consideration the pernicious effect of energy poverty (Newell and Mulvaney, 2013). Previous literature has shown that energy and climate policy can be potentially a source of political polarization among both voters and policy makers (see Hazboun et al., 2020; Jeong and Lowry, 2021; Mayer, 2022; Otteni and Weisskircher, 2022, for a discussion). Thus, further research is needed on the popular support for climate change mitigation in the absence of policy measures that offset potentially negative impacts for voters. Our empirical results are especially relevant now, as energy prices have been soaring across Europe. However, comparative studies are needed in order to fully understand the cross-national impact.

### CRediT authorship contribution statement

**Anton Brännlund:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. **Lauri Peterson:** Conceptualization, Investigation, Project administration, Writing – original draft, Writing – review & editing.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

[2] It should be noted that the estimates are based on accelerations/decelerations in the parties' growth rates because we combine a first difference setup with unit fixed effects. Linear growth between elections will be factored out by the unit fixed effects.

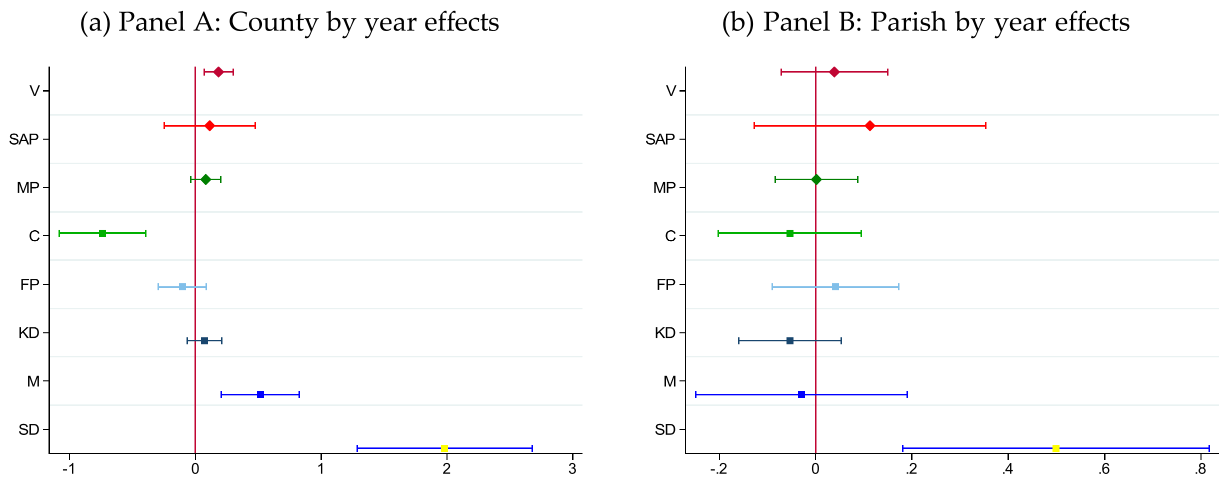


**Fig. 4.** Individual parties with different levels of fixed-effects.
The figure shows the estimate of change in support across electoral districts 2006–2018 for all parties and 2010–2014 for SD. All control variables and district fixed effects are included in the models.)

## Data availability

Data will be made available on request.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ecolecon.2023.108077.

## References


Abou-Chadi, T., Cohen, D., Wagner, M., 2022. The Centre-right versus the radical right: the role of migration issues and economic grievances. J. Ethn. Migr. Stud. 48 (2), 366–384.

Agency, I.E., 2021. Key World Energy Statistics 2021.

Aklin, M., 2021. Do high electricity bills undermine public support for renewables? Evidence from the European Union. Energy Policy 156, 112400.

Aklin, M., Mildenberger, M., 2020. Prisoners of the wrong dilemma: why distributive conflict, not collective action, characterizes the politics of climate change. Glob. Environ. Polit. 20 (4), 4–27.

Alesina, A., Drazen, A., 1991. Why are stabilizations delayed? Am. Econ. Rev. 81 (5), 1170–1188.

Andersson, B., 1997. Essays on the Swedish electricity market. PhD thesis.

Ansell, B., Hjorth, F., Nyrup, J., Larsen, M.V., 2022. In: Sheltering populists? House prices and the support for populist parties. J. Polit. 84 (3), 1420–1436.

Anshelm, J., 2000. Mellan frälsning och domedag: om kärnkraftens politiska idéhistoria i Sverige 1945–1999. Brutus Östlings Bokförlag Symposion.

Anshelm, J., 2002. Det gröna folkhemmet. Striden om den ekologiska moderniseringen i Sverige. In: Naturen som brytpunkt : om miljöfrågans mystifieringar, konflikter och motsägelser. Symposium, pp. 34–61.

Apergis, N., Pinar, M., 2021. The role of party polarization in renewable energy consumption: fresh evidence across the EU countries. Energy Policy 157, 112518.

Arezki, R., Djankov, S., Nguyen, H., Yotzov, I., 2020. Reversal of Fortune for Political in-Cumbents: Evidence from Oil Shocks. In: English. Tech. Rep. 9287. World Bank, Washington, DC.

Bättig, M.B., Bernauer, T., 2009. National Institutions and global public goods: are democracies more cooperative in climate change policy? Int. Organ. 63 (2), 281–308.

Berg, S.V., Savvides, A., 1983. The theory of maximum kW demand charges for electricity. Engl. Energy Econ. 5 (4), 258–266.

Booth, D., 2017. Postmaterialism and support for the environment in the United States. Soc. Nat. Resour. 30, 1–17.

Booth, D.E., 2021. Post-materialism's social class divide: experiences and life satisfaction. J. Human Values 27 (2), 141–160.

Borusyak, K., Hull, P., Jaravel, X., 2018. Quasi-Experimental Shift-Share Research Designs. Working Paper 24997. National Bureau of Economic Research.

Brännlund, A., 2021a. Labor market conditions and partisan voting: how unemployment hurts the left. Polit. Behav. 43 (1), 363–396.

Brännlund, A., 2021b. Zero per cent accountability? How low interest rates save governments from electoral defeats. Eur. J. Polit. Econ. 68, 101986.

Brännlund, R., Mattias, V., 2021. Peak and off-peak demand for electricity: is there a potential for load shifting? Energy Econ. 102, 105466.

Broxterman, D.A., Larson, W.D., 2020. An empirical examination of shift-share instruments. J. Reg. Sci. 60 (4), 677–711.

Carattini, S., et al., 2017. Green taxes in a post-Paris world: are millions of nays inevitable? Environ. Resour. Econ. 68 (1), 97–128.

Castanho Silva, B., Wäckerle, J., Wratil, C., 2022. Determinants of Public Opinion Support for a Full Embargo on Russian Energy in Germany. Tech. rep. ECONtribute Discussion Paper.

Charles, K.K., Stephens, M., 2013. Employment, wages, and voter turnout. Am. Econ. J. Appl. Econ. 5 (4), 111–143.

Chen, H., Liu, K., Shi, T., Wang, L., 2022. Coal consumption and economic growth: a Chinese city-level study. Energy Econ. 109, 105940.

Cho, W., Gimpel, J., 2009. Presidential voting and the local variability of economic hardship. Forum 7.

Clements, B., 2020. Salience, valence, positions and voting: international affairs and British electoral politics in the 1960s. Int. Hist. Rev. 42 (5), 891–912.

Damsgaard, N., 2003. Deregulation and regulation of electricity markets.

Downs, A., 1957. An economic theory of democracy. English. Harper & Row, New York.

Drazen, A., Grilli, V., 1993. The benefit of crises for economic reforms. Am. Econ. Rev. 83 (3), 598–607.

Drews, S., Van den Bergh, J.C., 2016. What explains public support for climate policies? A review of empirical and experimental studies. Clim. Pol. 16 (7), 855–876.

Duch, R.M., Stevenson, R.T., 2008. The Economic Vote: How Political and Economic Institutions Condition Election Results. Political Economy of Institutions and Decisions. Cambridge University Press.

Farstad, F.M., Nov. 2018. What explains variation in parties' climate change salience? Party Polit. 24 (6), 698–707. Publisher: SAGE Publications Ltd.

Forchtner, B., 2019a. Climate change and the far right. Wiley Interdiscip. Rev. Clim. Chang. 10 (5), e604.

Forchtner, B., 2019b. The far right and the environment: Politics, discourse and communication. Routledge.

Furceri, D., 2021. Are Climate Change Policies Politically Costly? English.

Goldsmith-Pinkham, P., Sorkin, I., Swift, H., 2018. Bartik Instruments: What, when, why, and how. Working Paper 24408. National Bureau of Economic Research.

Hazboun, S.O., Howe, P.D., Layne Coppock, D., Givens, J.E., 2020. The politics of decarbonization: examining conservative partisanship and differential support for climate change science and renewable energy in Utah. Energy Res. Soc. Sci. 70, 101769.

Healy, A.J., Persson, M., Snowberg, E., 2017. Digging into the pocketbook: evidence on economic voting from income registry data matched to a voter survey. Am. Polit. Sci. Rev. 111 (4), 771–785.

Hess, D.J., Renner, M., 2019. Conservative political parties and energy transitions in Europe: opposition to climate mitigation policies. Renew. Sust. Energ. Rev. 104, 419–428.

Hibbs, D.A., 1977. Political parties and macroeconomic policy. Am. Polit. Sci. Rev. 71 (4), 1467–1487.

Hultman, M., Björk, A., Viinikka, T., 2019. The far right and climate change denial: denouncing environmental challenges via anti-establishment rhetoric, marketing of doubts, industrial/breadwinner masculinities enactments and ethno-nationalism. In: The Far Right and the Environment. Routledge, pp. 121–135.

Huntington, H., Liddle, B., 2022. How energy prices shape OECD economic growth: panel evidence from multiple decades. Energy Econ 111, 106082.

Jeong, G.H., Lowry, W., 2021. The polarisation of energy policy in the US congress. J. Publ. Policy 41 (1), 17–41.

Jylhä, K.M., Strimling, P., Rydgren, J., 2020. Climate change denial among radical right-wing supporters. Sustainability 12 (23), 10226.

Kim, S.E., Yang, J., 2021. Gasoline in the voter's pocketbook: driving times to work and the electoral implications of gasoline price fluctuations. Am. Politics Res. 0 (0), p. 1532673X211043445.

Kim, S.E., Yang, J., 2022. Gasoline in the voter's pocketbook: driving times to work and the electoral implications of gasoline price fluctuations. Am. Politics Res. 50 (3), 312–319.

Kraft, J., Kraft, A., 1978. On the relationship between energy and GNP. J. Energy Dev. 3 (2), 401–403.

Kulin, J., Johansson Sevä, I., Dunlap, R.E., 2021. Nationalist ideology, rightwing populism, and public views about climate change in Europe. Environ. Polit. 30 (7), 1111–1134.

Lau, R.R., Sears, D.O., 1981. Cognitive links between economic grievances and political responses. Polit. Behav. 3 (4), 279–302.

Lewis-Beck, M.S., Stegmaier, M., 2000. Economic determinants of electoral outcomes. Annu. Rev. Polit. Sci. 3, 183–219.

Lewis-Beck, M.S., Stegmaier, M., 2013. The VP-function revisited: a survey of the literature on vote and popularity functions after 40 years. Public Choice 157 (1), 367–385.

Lockwood, M., 2018. Right-wing populism and the climate change agenda: exploring the linkages. Environ. Polit. 27 (4), 712–732.

Lowry, W.R., 2008. Disentangling energy policy from environmental policy. Soc. Sci. Q. 89 (5), 1195–1211.

Mayer, A., 2022. Development channelization, partisanship, and populism: possibilities for rural renewal in the death throes of coal. Sociol. Perspect. 65 (3), 529–554.

McCright, A.M., Dunlap, R.E., 2011. Cool dudes: the denial of climate change among conservative white males in the United States. Glob. Environ. Chang. 21 (4), 1163–1172.

McCulloch, N., Natalini, D., Hossain, N., Justino, P., 2022. An exploration of the association between fuel subsidies and fuel riots. World Dev. 157, 105935.

Mittiga, R., 2021. Political legitimacy, authoritarianism, and climate change. Am. Polit. Sci. Rev. 1–14.

Mora, R., Reggio, I., Dec. 2012. Treatment Effect Identification Using Alternative Parallel Assumptions. UC3M Working papers. Economics we1233.. Universidad Carlos III de Madrid. Departamento de Economía.

Neumayer, E., 2002. Do democracies exhibit stronger international environmental commitment? A cross-country analysis. J. Peace Res. 39 (2), 139–164.

Newell, P., Mulvaney, D., 2013. The political economy of the 'just transition'. Geogr. J. 179 (2), 132–140.

Norris, P., Inglehart, R., 2019. Cultural backlash. In: Cultural Backlash: Trump, Brexit, and Authoritarian Populism. Cambridge University Press, pp. i–ii.

Ohlsson, J., Oscarsson, H., Solevid, M., 2016. Ekvilibrium. In: Ohlsson, H. Oscarsson & M. Solevid (red.), Ekvilibrium, pp. 11–44.

Otteni, C., Weisskircher, M., 2022. Global warming and polarization. Wind turbines and the electoral success of the greens and the populist radical right. Eur J Polit Res 61 (4), 1475–6765 issn.

Palmer, H.D., Whitten, G.D., 1999. The electoral impact of unexpected inflation and economic growth. Br. J. Polit. Sci. 29 (4), 623–639.

Perman, K., 2008. Från el till värme en diskursanalytisk policystudie av energiomställning på statlig, kommunal och hushållsnivå. English;Swedish; PhD thesis.

Peterson, L., 2021. Silver lining to extreme weather events? Democracy and climate change mitigation. Glob. Environ. Polit. 21 (1), 23–53.

Poyer, D.A., Henderson, L., Teotia, A.P., 1997. Residential energy consumption across different population groups: comparative analysis for Latino and non-Latino households in USA. Energy Econ. 19 (4), 445–463.

Sances, M.W., You, H.Y., 2020. Voters and Donors: The Unequal Political Consequences of Fracking. Working Paper.

Schulze, K., 2021. Policy characteristics, electoral cycles, and the partisan politics of climate change. Glob. Environ. Polit. 21 (2), 44–72.

Sivonen, J., Koivula, A., 2020. How do social class position and party preference influence support for fossil fuel taxation in Nordic countries? Soc. Sci. J. 1–21.

Statistics Sweden, 2023. EN0301: Energy use in the industrial sector. Accessed: 2023-06-13.

Stokes, L.C., 2016. Electoral backlash against climate policy: a natural experiment on retrospective voting and local resistance to public policy. Am. J. Polit. Sci. 60 (4), 958–974.

Tillman, E.R., Park, B., 2009. "Do voters reward and punish governments for changes in income taxes?" English. J. Elect. Publ. Opin. Parties 19 (3), 313–331.

Tranter, B., Booth, K., 2015. Scepticism in a changing climate: a cross-national study. Glob. Environ. Chang. 33, 154–164.

Tvinnereim, E., Ivarsflaten, E., 2016. Fossil fuels, employment, and support for climate policies. Energy Policy 96, 364–371.

Vihma, A., Reischl, G., Nonbo Andersen, A., 2021. A climate backlash: comparing populist parties' climate policies in Denmark, Finland, and Sweden. J. Environ. Dev. 30 (3), 219–239.