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Christoph Koenig

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The Political Fallout of Chernobyl: Evidence from West-German Elections*

Christoph Koenig

The University of Warwick†

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Abstract

I study the effect of a formative experience on political beliefs in a distant country. This paper looks at the Chernobyl nuclear disaster of April 1986 and voters' response in West Germany. The analysis uses a diff-in-diff estimation which exploits variation in proximity to the nearest nuclear power plant (NPP) across 301 counties. Proximity is used as proxy for the shock from perceived risk of a nuclear accident. Using data over almost 40 years and 11 elections, my results indicate that living closer to an NPP benefited the explicitly *anti-* and *pro*-nuclear parties, the Greens and the Conservatives. The findings are persistent and robust to the inclusion of several socio-economic controls as well as checks for the validity of the identifying assumptions. The gains of the Greens are similar across social groups and in line with home-voter effects. The effect of proximity on the conservatives increases with education and the number of adolescents in their *impressionable years*. I argue that this can be explained by political belief formation and differences in assessing the economic benefits from nuclear power over the actual risk of an accident. Using variation in the scheduling of subsequent state elections, I can also show that the pro-nuclear response was stronger in counties which did not vote in the immediate aftermath of Chernobyl and thus had more time for a rational electoral choice.

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†Department of Economics. Email: C.Koenig@warwick.ac.uk

1 Introduction

The impact of experience on people's belief formation has recently received wide attention in the economics literature. The exposure to unusual, highly traumatic or joyful events in one's life has been shown to leave large footprints in people's minds and set the path for various future outcomes such as trust, political attitudes, or marriage decisions. The research until now has also been very diverse in terms of the analysed event and geography. Madestam and Yanagizawa-Drott (2012), for instance, look at how patriotic events affect political preferences in the United States and Chen and Yang (2015) investigate the impact of the Great Famine on political trust in China. Malmendier and Nagel (2011) and Giuliano and Spilimbergo (2014) both look at how recessions can shape young individuals' attitudes towards risk and redistribution. Nunn and Wantchekon (2011), on the other hand, study the effect of a long-term event like the slave trade on mistrust in contemporary Africa. What most studies have in common is the focus on first-hand experiences or events in people's immediate surroundings. Evidence on the impact of remote phenomena with an entirely psychological effect, however, has remained scarce until now.

This paper studies a distant event, the Chernobyl nuclear disaster of April 1986, and its political effects on Western Germany.[1] At the time of the accident, 18 nuclear power plants (henceforth *NPP*) were operating in Germany and 14 more were at a planning or construction stage. The use of nuclear energy was not a salient political issue until the disaster and only the recently founded Green party was openly opposing nuclear energy (Joppke, 1990). Protest against new NPPs was either highly localised or coming from radical leftist groups. My empirical analysis exploits the county variation in distance to the nearest nuclear facility to study the impact of the disaster on voting behaviour in the short and long-run. Proximity to the nearest facility is interpreted as the intensity at which the informational shock about the dangers of nuclear energy was perceived and has been analysed in similar applications (Abadie and Dermisi, 2008; Pignataro and Prarolo, 2012; Bauer, Braun, and Kvasnicka, 2014). I add to this literature by applying the proximity measure to the first and most important nuclear disaster in Europe.

The dataset features a list of all nuclear facilities in West Germany and the near abroad as well as results of 11 Federal elections in 301 counties in West Germany over the time period 1976 to 2013. Results are provided for the four main German parties including the emerging Green party. My empirical analysis exploits this data

[1] For the sake of simplicity, I refer in the remainder to the Federal Republic of Germany and post-unification Germany simply as *Germany* and to the German Democratic Republic as *East Germany*.

structure for a differences-in-differences estimation to study the change in proximity's impact on voting behaviour after April 1986. Concerns about the endogeneity of power plants' locations are met by controlling for a range of socio-economic factors such as age structure, economic well-being and education. My baseline results show that counties closer to the nearest NPP experience see a significant increase in votes for the leftist Green party as well as the centre-right conservative CDU/CSU at the expense of ideologically less extreme parties. Moving from the bottom to the top decile in proximity, results in a 0.25% higher vote share for Greens and a 1.34% increase for the CDU/CSU. My findings are robust to various robustness checks and are not driven by elections in the immediate aftermath of the disaster. Rather, polarisation continues through to the latest German Bundestag election in 2013.

In order to get at the mechanisms driving my results, I investigate three different channels. First, I look at other political outcomes to establish that proximity did not lead to a punishment of the parties who approved the respective power plant but on the other hand significantly increased turnout and polarisation of election results. Second, building on the importance of formative years and the persistence of political preferences, I also investigate variation in time to the next election and counties' age structure. I find that that late post-Chernobyl elections and higher share of 15-25 year old individuals at the time of the accident are positively increasing the proximity effect of the conservatives but not the Green party. A special role of this age group is in line with research on the importance of *impressionable years* for the formation of political beliefs (Krosnick and Alwin, 1989). Finally, I demonstrate that the effect is not depending on differences in economic well-being and that educational differences in areas of higher NPP-proximity are only benefiting the conservatives.

Taken together, the results suggest that living closer to a nuclear power plant during the Chernobyl accident had two separate effects on political attitudes in Germany. The first one is higher support for the *anti-nuclear* Green party which appears to be stemming from areas with lower numbers of adolescents and otherwise is independent of socio-economic characteristics. This finding is in line with the general aversion of citizens towards high-risk facilities in their surroundings, also known as NIMBY (Not In My BackYard) effects. The second effect is a rise in votes for the *pro-nuclear* CDU/CSU in areas closer to an NPP among the young and educated. Despite appearing counter-intuitive at first, this resembles similar findings on the 1976 California primary elections in which an anti-nuclear initiative was opposed particularly by the more educated part of society (Kuklinski, Metlay, and Kay, 1982). These authors find that voters with higher knowledge were relying stronger on a cost-benefit analysis in their decision process rather than ideology or

peers. This provides a link between the level of education and voting conservative after Chernobyl. In my context, such local benefits could be job opportunities and positive externalities such as investments in infrastructure. I argue that especially young and educated individuals may oppose the shut-down of nuclear facilities since they are more likely to adapt *and* have a more accurate assessment of the actual risk of a nuclear disaster (Shaw, 1996).

This paper links to several research areas. Most closely related are the studies of life-changing experiences and the formation and persistence of beliefs mentioned above. Furthermore, there exists a good amount of research on the health effects of the Chernobyl disaster (e.g. Lüning et al., 1989; Almond, Edlund, and Palme, 2009; Danzer and Danzer, 2014). I add to this work by investigating the political effects of Chernobyl in West Germany. Also the effect of NPP-proximity has been investigated in few recent studies. Pignataro and Prarolo (2012) look at how living closer to a planned power plant affected voting in the 2011 Nuclear referendum in Italy and find a positive effect on anti-nuclear voting decisions. Schumacher (2014), on the other hand, looks at how distance to an NPP correlates with votes for the German Green party between 1998 and 2009. Distance to an NPP can, however, also affect economic outcomes as Bauer, Braun, and Kvasnicka (2014) show in their study on the changes in housing prices after the Fukushima accident in 2013. My paper extends this literature in several ways. First, I relate proximity to an NPP also to votes of parties other than the Greens. Second, I study the effect of proximity to NPP at a point when the dangers of nuclear energy were most likely to be perceived as an informational shock.

The remainder of the paper is structured as follows. First, I will give a brief discussion of the conceptual framework and the predicted effects of the Chernobyl disaster in Germany according to the current state of research. This is followed by a description of the political and historical background of nuclear power usage in Germany in order to provide the reader with the necessary context of this case study. The next two sections discuss the data and the identification strategy. My empirical analysis starts by presenting the baseline results and several robustness checks and then moves on to exploring the mechanisms driving my findings on voting behaviour in West Germany. The final section concludes.

2 Conceptual framework

The political effects of the Chernobyl disaster can be divided into two categories. The first one concerns the persistence of the disaster's political impact. As exem-

plified in the study by Giuliano and Spilimbergo (2014), one would expect that Chernobyl as a formative event per se has long-lasting effects particularly on young people between the age of 18 and 25. Focus on this age group is motivated by psychological research which has shown that *impressionable years* are crucial for shaping beliefs and attitudes of an individual (Krosnick and Alwin, 1989). A long-term change in political behaviour could, however, also be rationalised through the general persistence in people's voting decisions. Spontaneous, one-time protest votes in response to the Chernobyl disaster could thus turn into long-term changes in electoral support. An empirical example of this mechanism are Kaplan and Mukand (2014) who show that party registrations in response to the 9/11 terrorist attacks strongly predict future party support.

The other category addresses differences in voters' electoral response to Chernobyl. Living closer to an NPP is a typical case in which one would expect *NIMBY* and *home-voter* effects. In essence, both theories predict that voters will opt *for* policy choices increasing the value of their home and *against* those which diminish it or are expected to be harmful.[2] Following these mechanisms would predict an increase in votes for anti-nuclear parties as a response to the Chernobyl disaster depending on how close voters live to the nearest NPP. This view is supported also for the issue of nuclear power plants in the study by Pignataro and Prarolo (2012) on the 2011 Nuclear Referendum in Italy and Schumacher (2014) in his work on the determinants of Green votes between 1998 and 2009.

The rejection of nuclear power among voters is, however, ambiguous. Kuklinski, Metlay, and Kay (1982), for instance, investigated the 1976 California primary elections in which the majority of people voted *against* a phase-out from nuclear power. Even though this event took place before the disastrous Three Mile Island accident in March 1979, which boosted the anti-nuclear movement in the United States, the study offers important insights. The authors find, for example, that educated people were more likely to object the 1976 proposal and that this may be based on their different abilities to assess the costs and benefits from abandoning nuclear power. Following this view, voters of higher education may react differently to an increased awareness from NPP-proximity and decrease or even offset the NIMBY effects described above.

Having described the conceptual framework of the analysis, I will now move on to give a detailed historical description of nuclear power usage in West Germany, the anti-nuclear movement and the aftermath of the Chernobyl.

[2] See (Pignataro and Prarolo, 2012) for a detailed discussion of the two mechanisms and an application to the issue of NPPs.

3 Historical background

3.1 Nuclear energy in West Germany, the new social movements, and the early years of the West German Greens

Germany's experience with nuclear energy goes back as far as WWII to the *Uranium Project* of the Nazi regime and the construction of several research reactors. After being banned from nuclear research until 1955, the first research reactor in Garching near Munich went into operation in October 1957 (Hassel, Koester, and Pabst, 1997). The civilian usage of nuclear power in West Germany started in November 1960 with the NPP in Kahl near Frankfurt am Main which was followed by five further plants during the 1960s. Table 1 provides an overview of all NPPs and their operation and approval. Initially, the arrival of this novel energy source was not politicised in any way and hailed by all three major German parties CDU/CSU, FDP, and SPD. This elite consensus was sustained by population and the media alike who showed little to no interest in the new technology until about the mid 1970s. Another sign of the low priority of nuclear power issues was the delegation of responsibilities regarding commissions and NPP sites to state ministries (Joppke, 1993).

The oil crises of the 1970s fundamentally changed the situation for several reasons: first, it encouraged a massive expansion of nuclear energy as it made Western Germany less dependent on oil-producing countries and secondly, it brought the limits of economic growth to the attention of the wider public and raised awareness about the environmental impact of growth (Joppke, 1990). Citizens' initiatives inspired by the student movement of the 1960s became the first anti-nuclear groups of West Germany and started to organise local protests against existing or planned NPPs. Anti-nuclear initiatives themselves differed substantially in respect to their usage of violent means as well as their social origins. While some were peaceful and organised with the broad support of the local population, others were dominated by radical communist and autonomous groupings from larger cities. For these, the opposition to nuclear energy was just one way of fighting the capitalist state in which the use of violence was legitimate and even encouraged (Joppke, 1993). Overall, the protest movement was thus confined to the urban radical left and the population living in the immediate surroundings of nuclear power plants.

The roots of the German Green party lie within the new social movements (NSPs) of the 1960s and 1970s from which also the anti-nuclear movements originated and who distinguished themselves from established parties primarily through their focus on post-material values. Focal issues included environmental awareness and opposi-

Table 1: Nuclear power plants in West Germany

Nuclear power plant	State	Start of operation	Approving state government
Kahl	Bavaria	01/02/1962	CSU, GB/BHE
MZFR Karlsruhe	Baden-Württemberg	19/12/1966	CDU, FDP
GundremmingenA	Bavaria	12/04/1967	CSU
Lingen	Lower Saxony	01/10/1968	SPD, FDP
Obrigheim	Baden-Württemberg	01/04/1969	CDU, FDP
Juelich	Northrhine-Westphalia	19/05/1969	CDU
Grosswelzheim	Bavaria	02/08/1970	CSU
Stade	Lower Saxony	19/05/1972	SPD, CDU
Niederaichbach	Bavaria	01/01/1973	CSU
KNK KarlsruheI	Baden-Württemberg	21/02/1974	CDU
BiblisA	Hesse	26/02/1975	SPD
Wuergassen	Northrhine-Westphalia	11/11/1975	SPD
Neckarwestheim1	Baden-Württemberg	01/12/1976	CDU, SPD
BiblisB	Hesse	31/01/1977	SPD
Brunsbuettel	Schleswig-Holstein	09/02/1977	CDU, FDP
KNK KarlsruheII	Baden-Württemberg	03/03/1979	CDU
Isar/Ohu1	Bavaria	21/03/1979	CSU
Unterweser	Lower Saxony	06/09/1979	SPD
Philippsburg1	Baden-Württemberg	26/03/1980	CDU, SPD
Grafenrheinfeld	Bavaria	17/06/1982	CSU
Kruemmel	Schleswig-Holstein	28/03/1984	CDU
GundremmingenB	Bavaria	19/07/1984	CSU
GundremmingenC	Bavaria	18/01/1985	CSU
Grohnde	Lower Saxony	01/02/1985	SPD
Philippsburg2	Baden-Württemberg	18/04/1985	CDU
Brokdorf	Schleswig-Holstein	22/12/1986	CDU
Hamm-Uentrop	Northrhine-Westphalia	01/06/1987	CDU, FDP
Muelheim-Kaerlich	Rhineland-Palatinate	01/10/1987	CDU
Isar/Ohu2	Bavaria	09/04/1988	CSU
Emsland	Lower Saxony	20/06/1988	CDU
Neckarwestheim2	Baden-Württemberg	15/04/1989	CDU

tion to nuclear energy but also emancipation of women, gay rights, peace and civil rights. Yet, it was especially ecological initiatives which started from 1977 to form electoral alliances and to participate in local elections (Probst, 2013). After initial successes in municipal and state elections in northern Germany, the initially loose alliances in several states started to cooperate and formally registered as parties. Simultaneously, ecological alternatives also participated in the elections to the European Parliament 1979 as *SPV Die Grünen* which attained 3.2% in Germany.[3] This entitled *SPV Die Grünen* to 4.5 million Deutsche Mark of campaign funding and provided a crucial stepping stone for transforming the alliance into the new party *Die Grünen* in January 1980 (Falter and Klein, 2003). In the 1983 election, *Die Grünen* received 5.6% of the total votes and for the first time entered the German

[3] SPV is short for *Sonstige Politische Vereinigung*(Other Political Association The Greens).

parliament (*Bundestag*) and was now also represented in 6 out of 11 West German State parliaments.

3.2 Chernobyl and its effect on public opinion

On the 26th of April 1986, an accident in the Chernobyl nuclear power plant (Soviet Union, now Ukraine) led to a reactor explosion and the release of enormous amounts of radioactive material. The consequences for the local population and nature were devastating: areas within a 30km radius of the plant (about 330.000 inhabitants) were evacuated and are still not inhabitable today due to radiation. Research by the *Chernobyl Forum* estimated about 9,000 cancer deaths in highly contaminated areas directly related to the disaster (Ebermann and Junkert, 2011). Due to wind and rain patterns in the immediate aftermath of the accident, also wider parts of Europe were exposed to radioactive fallout. In Germany, contamination was strongly concentrated in the very South-East but so far could not be linked to direct health effects on the local population in scientific studies (Cort, 1998). The German Radiation Protection Commission (*Strahlenschutzkommission*) released recommended maximum radiation values for raw milk and leafy vegetables in May 1986 which led to the destruction of harvests particularly in Southern Germany (Ebermann and Junkert, 2011).

The German public had already been aware to some extent about nuclear energy's dangers before the accident. Since most of this awareness was coming from anti-nuclear initiatives rather than the state, there was a deep distrust towards official information and advice regarding the Chernobyl disaster's consequences. Attention-seeking media titles such as *"Mass death after Chernobyl"* or *"Chernobyl is killing Munich's children"* and the uncoordinated reactions by the official authorities turned Germans' scepticism about nuclear power into outright fear and even panic (Ebermann and Junkert, 2011). While the federal government was not taking any actions and played down the dangers of the disaster, some states started to introduce measures such as tolerance levels of radiation and bans on the certain vegetables which further deepened the pre-existing mistrust (Joppke, 1990).

A long-term result of the Chernobyl disaster was the drop in public support for nuclear energy and new power plants (Boer and Catsburg, 1988). At the political level, only the social democrats responded by starting to oppose the usage of nuclear energy while conservatives and liberals remained neutral and soon afterwards returned to a pro-nuclear stance. At the local level, the disaster led on the one hand to a radicalisation of the existing anti-nuclear power movement and on the other hand to the emergence of a more civilised middle-class protest movement. This new

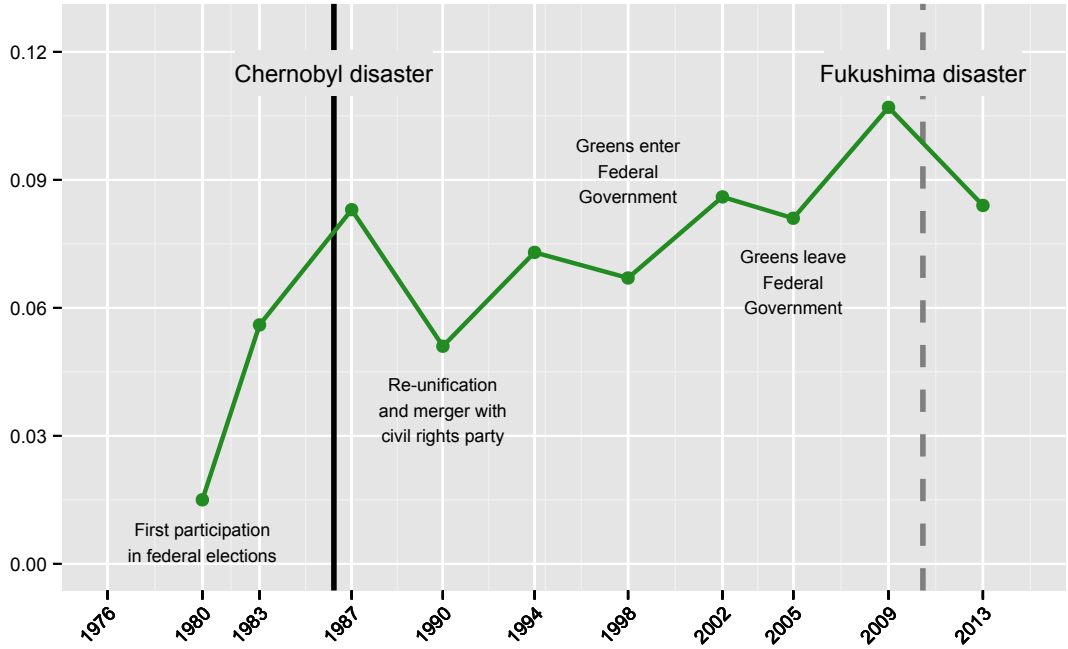
movement consisted mainly of concerned citizens preferring information campaigns and lobbying of politicians to violent rallies. The wider appeal of this grass-roots type of protest as opposed to its radical counterpart is exemplified by a petition against a nuclear power plant in Bavaria which gained almost 900,000 signatures (Joppke, 1990).

3.3 The Green party's ascend to power and Germany's exit from nuclear energy

During the 1987 elections – 10 months after the Chernobyl disaster and despite severe tensions between the orthodox and moderate party factions – the Greens could increase their vote share to 8.3%. A major success was the formation of a coalition with the social democrats in Hesse and the first entry into a state government. The German reunification in 1989 and the subsequent Bundestag election in December 1990 were an ambivalent experience for the party: on the one hand they started cooperating with the East German civil rights party *Bündnis 90*, on the other hand it was only for this cooperation and a one-time exception in the electoral law that the Greens remained in parliament. While the West German branch of *Die Grünen* only received 4.8%, its East German counterpart attained 6.1% and thus managed to cross the 5% hurdle at least in one part of the reunified country. The Greens' focus on environmental topics and the deliberate neglect of current issues such as the unification severely backfired in this case (Probst, 2013). The 1990 alliance was formally turned into an association in January 1993 and the party changed its name officially to *Bündnis 90/Die Grünen*. Figure 1 depicts the evolution of the German Green party using their vote shares in German Federal elections.

Throughout the 1990s the German Greens continued their trend towards more moderate policy positions and managed to increase their vote share to 7.3% in the 1994 Federal parliamentary election and enter state governments in Northrhine-Westphalia, Schleswig-Holstein, and Hamburg. Importantly, the decline of the more extreme wing within the party did not mean a more compromising position on the usage of nuclear power or environmental issues in general. This proved detrimental when in 1998 they adopted an electoral platform arguing for raising the price of petrol to 5 Deutsche Mark per liter over time. Political enemies of the Greens exploited this topic extensively which almost led to a repetition of the 1990 experience and the Greens received only 6.7% remaining well below their expectations. The strong gains of the social democrats, however, still made it possible to form the first federal government of SPD and *Bündnis/Die Grünen*. Apart from the foreign

Figure 1: Voting for the German Greens over time



ministry, which was now headed by party leader Joschka Fischer, the Greens also took over the ministries of health and environment (Falter and Klein, 2003). In June 2000 the new government reached a first agreement with energy suppliers about a complete exit from nuclear power within about 30 years depending on the spread of a negotiated maximum production cap over the existing NPPs. This agreement was turned into law in April 2002, only few months before the next parliamentary election. As a result, two power plants ceased operation in 2003 and 2005 (Rüdig, 2000; Jahn and Korolczuk, 2012).

After the 2005 election which led to a *Grand Coalition* between CDU/CSU and SPD without the Greens, the new nuclear law was left untouched despite the conservatives' strong favour for nuclear energy. This changed in 2009 when a coalition of conservatives and liberals took power and all parties responsible for the nuclear phase-out had left the government. Already in December 2010, law was changed anew to substantially extended operation times of existing NPPs. The Fukushima accident in March 2011 turned this policy into a boomerang for the new government. Facing three important state elections and an upset electorate, the CDU/CSU/FDP government hastily abandoned its pro-nuclear policy and decided on the immediate shutdown of the 8 oldest power plants and a complete exit from nuclear energy by 2022. Nevertheless, the CDU lost power after 58 years in the state of Baden-

Württemberg which has since been led by a first Green Minister-President of Germany (Gabriel and Keil, 2012; Jahn and Korolczuk, 2012).

4 Data

4.1 Distance to Nuclear facilities

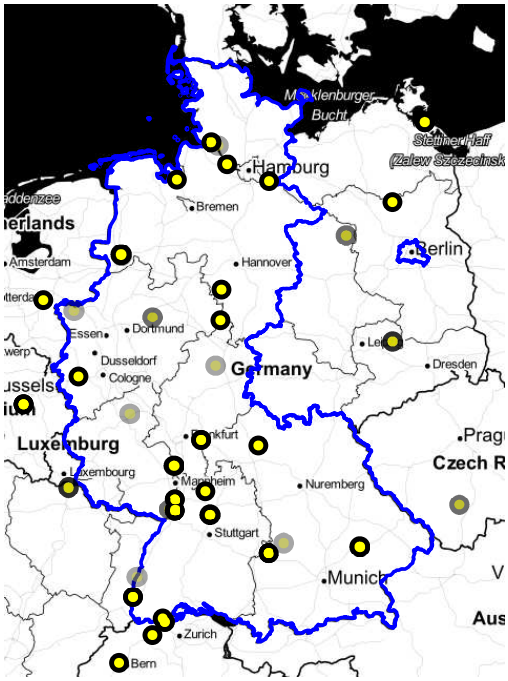
In order to construct my treatment variable, I collected data on nuclear facilities in Germany and the near abroad from several sources. Lists of reactors were taken from Bredberg et al. (2015) for Germany and from *nucleopedia.org* for all other European countries. Both sources also feature key dates of each facility such as start and end of operation, beginning of construction, and approval. Furthermore, the data allows me to differentiate between power plants and research reactors. From the website *election.de* I also obtained the names of the parties forming the state government at the time of approval and thus responsible for a specific facility in West Germany. Finally, I geocoded the location of all reactors using the website *OpenStreetMap.org* which is displayed in figure 2. This information is paired with a map of West German counties from the Federal Agency for Cartography and Geodesy (2014) and raster data on population density from CIESIN (2005).

Combining this information allows me to calculate the distance of each county's population centroid from each nuclear facility. In the baseline version of my treatment variable, I assign to each district the distance from the nearest nuclear power plant (NPP) in Western Europe only. This is because knowledge about sites in Eastern Europe might have been less accurate given the tight travelling restrictions to Communist countries in the 1980s. The literature also does not report any protests in West Germany against NPPs in Communist countries which could be related to the general leftist orientation of West Germany's anti-nuclear movement. In the analysis I also differentiate between active NPPs and those in the planning/construction stage in April 1986 and later on. In order to obtain proximity rather than distance to the respective facility, values are multiplied by -1. Figure 3 and 4 plot the geographic dispersion and density of proximity to the nearest operating or planned NPP at the time of the Chernobyl accident. The treatment has a mean about -50 and the median of -60 which reflects the distribution's skewness to the left.

4.2 Federal and state election data 1980–2013

Election results are the main outcome used in the empirical analysis in section 6. The first type are the Federal parliamentary (*Bundestag*) elections taking place

Figure 2: Locations of facilities: Operating and planned NPPs



every four years or after a dissolution of parliament. The electoral system is a *mixed member proportional representation* in which each citizen has two votes: one is for the nominated party candidates in his precinct, the second one is for a specific party and its list of candidates. The so-called *first vote* (Erststimme) follows a pure majority rule and determines which candidates win a seat in the Bundestag irrespective of their position in the party list. Votes for minority parties thus face a high risk of not being counted at all and are often given to a candidate of a different party with higher chances of winning. Since such incentives lead to heavy distortions of voters' actual political preferences, I focus on the *second vote* (Zweitstimme) which determines what fraction of total seats are going to be held by the respective party in general. Seats are allocated by the party lists in each state.

For each Federal election between 1980 and 2013 I obtained results at the county level from the Federal Statistical Office (FSO) and the State Statistical Offices (SSOs). Most of the recent data was made available on the FSO's website *Regionalstatistik.de* or the corresponding State equivalents. Older results had to be collected directly from the State offices. The parties I'm focussing on are Greens (B90/Die Grünen), Social-Democrats (SPD), Liberals (FDP), and Conservatives (CDU/CSU) whose shares are calculated as ballots cast for the respective party in each county and election divided by total ballots cast. Figure 5 shows the evolution

FIGURE 3: *NPP-Proximity*$_i$ ON APRIL, 26TH 1986 ACROSS GERMANY COUNTIES (STATE BORDERS IN BLUE, NON-SAMPLE STATES GREY)

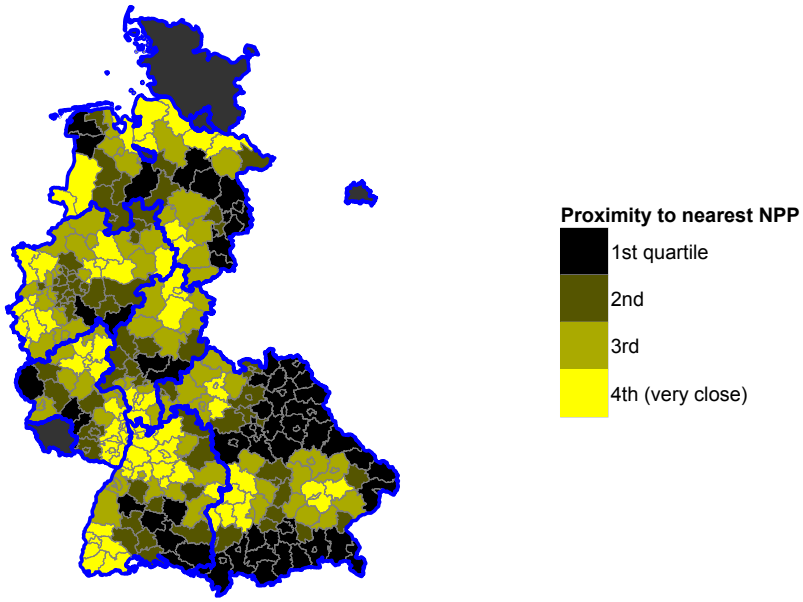


FIGURE 4: HISTOGRAM OF *NPP-Proximity*$_i$ ON APRIL, 26TH 1986

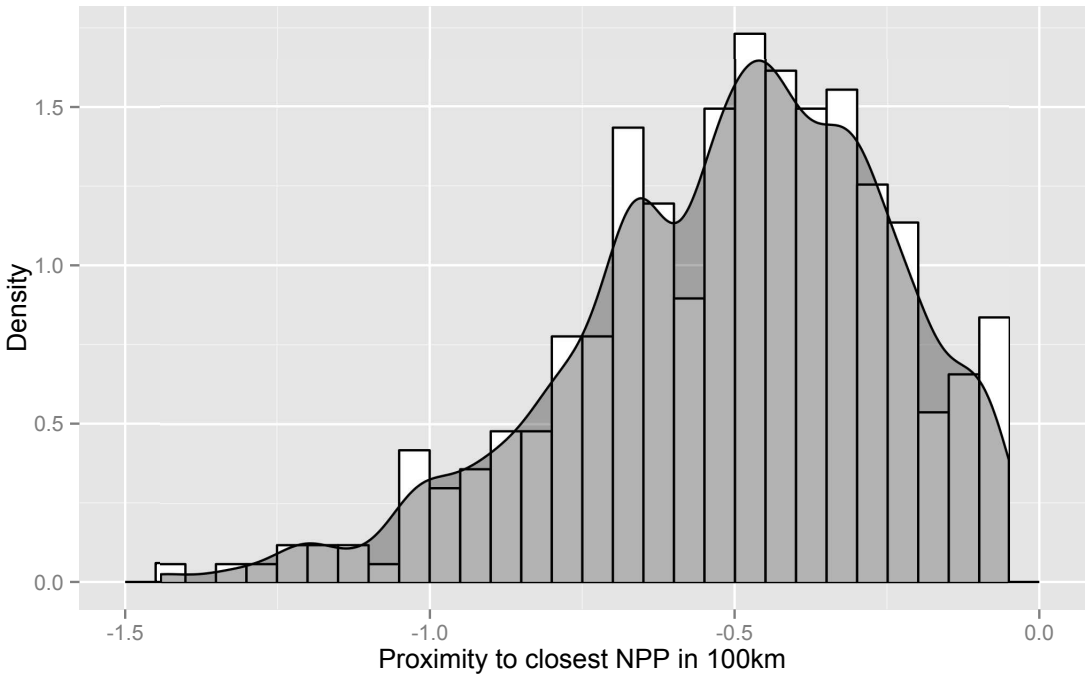
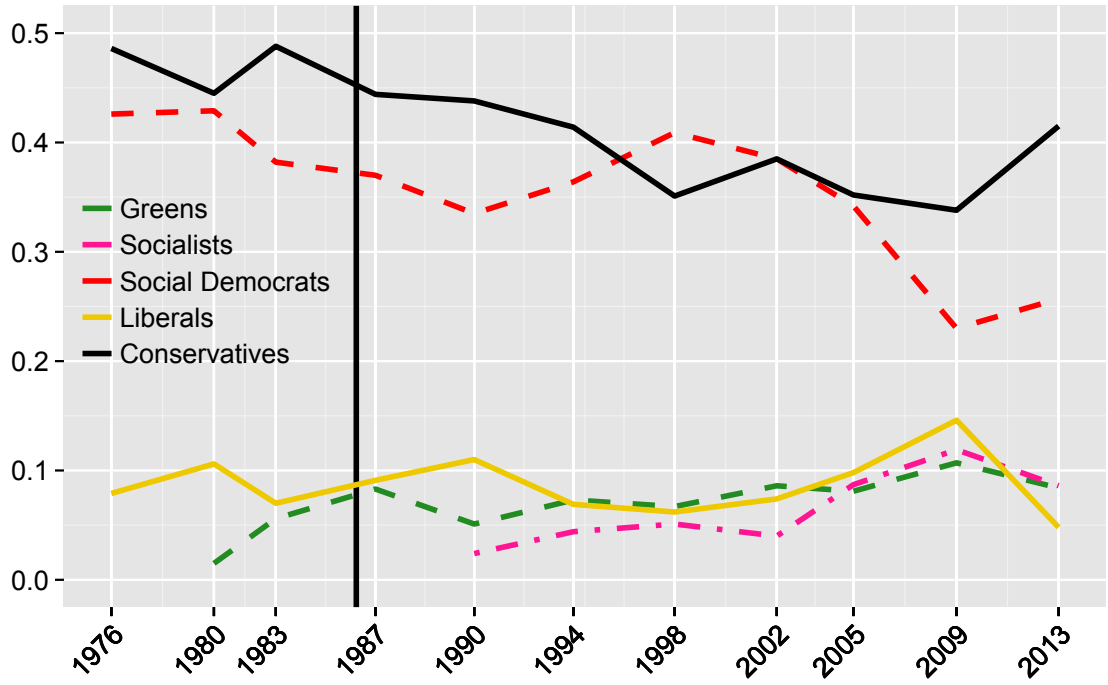


Figure 5: Evolution of election results in Germany (before 1990 only FRG)



of aggregate election results of West and post-unification Germany over the studied period. Results are displayed for the four main parties as well as the socialists who entered the German party system after the unification.

4.3 Control variables and construction of panel dataset

Using the same sources as the voting data, I also acquired extensive information on each county's socio-economic characteristics over the time period studied. The first is the log of the total population in each county which accounts for the notable differences in urbanisation. Two important determinant of Green votes which could also be confounders are age and gender which I account for by including the share of women and the share of 6 specific age groups in the overall population.[4] Other potential confounders are economic well-being and educational attainment: I measure well-being as the percentage of the total population receiving state benefits. Unlike average income, this variable has the advantage of being resistant to outliers on the top of the distribution and gives a precise estimate of the poor part of the local population. Education is an important factor given the Green party's focus on post-material values and is reflected in particularly good results in university towns

[4] The included groups are 15–20, 25–30, 30–40, 40–50, 50–65, ≥65. The share of 0–15 year olds is omitted as the baseline category.

Table 2: Descriptive statistics

	Obs	Mean	Std.Dev.	Min	Max
Vote share Greens	3,685	0.06	0.04	0.00	0.29
Vote share Conservatives	3,685	0.45	0.11	0.19	0.77
Vote share Social Democrats	3,685	0.35	0.11	0.10	0.64
Vote share Liberals	3,685	0.09	0.03	0.02	0.23
% Turnout	3,685	0.81	0.07	0.58	0.95
Prox. closest NPP (planned)	3,685	-0.71	0.39	-1.91	-0.05
Prox. closest NPP (operating)	3,685	-0.61	0.30	-1.44	-0.06
Prox. closest NPP (op. & plan.)	3,685	-0.51	0.26	-1.44	-0.05
Prox. closest reactor (op. & plan.)	3,685	-0.43	0.26	-1.44	-0.01
Population in 1,000	3,685	182.80	145.89	33.21	1,330.44
% female	3,685	0.52	0.01	0.49	0.57
% benefit recipients (−2005)	2,680	0.03	0.02	0.00	0.12
% benefit recipients (2005−)	1,005	0.01	0.01	0.00	0.09
% share of pupils in prep school	3,685	0.18	0.10	0.00	0.88

Notes: The unit of observation is one of the 301 counties in the sample at election t. Non-voting data available over several periods is linearly interpolated to the time of the election. Variables provided at the cross-sectional level only are reported accordingly and used in the analysis by interacting them with either a post-Chernobyl dummy or election fixed effects.

and among people of higher education in general. My final two control variables are therefore distance to the closest university and the share of 0–15 years olds attending grammar schools (*Gymnasium*).[5] All control variables are interacted with election dummies to allow for changing importance in people's voting decisions over time.[6]

The states for which all of the information mentioned above could be retrieved were Baden-Württemberg, Bavaria, Hesse, Lower Saxony, North Rhine-Westphalia, and Rhineland-Palatinate.[7] Together, these six regions account for about 90% of West Germany's area and population. As mentioned before, the unit of observation is county i at election t. Since there were almost no boundary changes during the studied period, I can track 301 counties over the whole period from 1980 to 2013. The values of the control variables are linearly interpolated to the election date since they are usually measured at a statistical reference date.[8] Table 2 shows summary statistics for the variables used in the empirical analysis.

[5] A list of German-speaking universities in West Germany and Austria along with their geographic coordinates was kindly provided to me by Fabian Waldinger.

[6] Another important reason is the radical change in Germany's benefit laws in 2005, the so-called *Hartz* laws. This reduced the amount of benefit recipients dramatically without significant changes in poverty.

[7] I am currently in the process of digitising information for the city states Berlin, Bremen and Hamburg and the two smallest states of Schleswig-Holstein and Saarland.

[8] This is usually the 31st of December, apart from school enrolment data which takes mid-October (15th) as reference date.

5 Identification strategy

5.1 Differences-in-Differences specification

The panel structure of the data allows the simultaneous use of county and election fixed-effects. In doing so, one can account for all election- and county- specific characteristics. This is particularly helpful because the Chernobyl accident led to a general rise in Green votes as shown in figure 5 which is mechanically correlated with the changing effect of NPP-proximity after April 1986 and could thus result in a strong upwards bias. But also fixed local characteristics crucial to the location decision of an NPP such as proximity to navigable rivers and railroads could turn out to be problematic. Since better infrastructure could be correlated with higher income and education, this would open up an alternative link between nearby NPPs and good electoral performance of the Greens. After including both types of fixed effects, the remaining variation is only within counties and off any country-wide election-specific trend.

The main variable of interest is the interaction of $NPP\text{-}proximity_i$ with a dummy variable for any election after the Chernobyl disaster which measures the average change in NPPs effect on electoral outcomes after the disaster as opposed to before. The set and state of nuclear facilities is restricted to that of April, 26$^{\text{th}}$ 1986. This has the disadvantage of not being responsive to changes in status and location of plants but on the other hand is less prone to issues stemming from the endogeneity of NPP shutdown decisions. Such a scenario could arise, for instance, if voters were punishing the Greens for a shutdown in their vicinity which would open up an additional channel between proximity and voting outcomes.[9] Adding a set of control variables completes the baseline regression specification:

$$y_{it} = \alpha + \gamma_i + \lambda_t + \beta_t(NPP\text{-}Proximity_i \times postChernobyl_t) + \boldsymbol{\mu}\, \boldsymbol{X}_{it} + \epsilon_{it} \qquad (1)$$

5.2 Threats to identification

The identifying assumptions of the differences-in-differences estimation are twofold: the first is the absence of confounding events which would require any correlate of NPP location to change its effect on voting around the time of the Chernobyl disaster. Riester (2010), provides a short list of criteria used in Germany for choosing the sites of nuclear facilities:

[9] An alternative would be omitting shutdowns and confining attention only to NPPs starting to operate over time. I investigate this alternative specification as a robustness check in section 6.2.

1. Earthquake/flood-proof, suitable building ground
2. Not located in an urban agglomeration
3. Well connected to public road, train, and waterway network
4. Site should be already designated industrial estate
5. Vicinity to river with sufficient flow
6. Located in a region of high and preferably increasing energy consumption and with link to high-voltage grid

Criteria 2 and 6 together insinuate a quadratic relationship between proximity and urbanisation/population size. Since inhabitants of cities could systematically change their political preferences after April 1986, *log(population)* and *log(population)*^{2} seem to be crucial confounders and are therefore included in the regressions. Other factors such as connection to transportation, rivers, and soil quality are highly unlikely to change their effect on voting behaviour after Chernobyl and are thus already accounted for through the use of county fixed effects. Another endogeneity issue could be systematic selection into treatment. For example, environmental activists could move closer to NPPs after Chernobyl in order to facilitate protests and raise awareness of the local population. Alternatively, the Green party could also target campaigning towards affected areas. The first concern is addressed by the inclusion of age and education which captures changes in the electorate's composition towards those parts of the population most likely to support the Greens. The second one is met by checking for endogeneity of turnout with respect to NPP-proximity after Chernobyl which should be another consequence of increased campaign intensity.

The second main assumption is that election outcomes in counties of different proximity would follow identical patterns absent treatment and conditional on control variables. This condition breaks down if areas of different treatment intensities were already starting to diverge before the actual treatment due to anticipation or unobserved correlates. One could, for example, imagine that areas closer to an NPP were already better informed about the dangers of nuclear energy and would have increased their Green votes share even in the absence of Chernobyl. In a regression this would mechanically load the widening gap onto the interaction term $NPP\text{-}Proximity_i \times postChernobyl_t$ and lead to a large overstatement of the treatment effect. As a first attempt to investigate this issue, I plot the average vote share for the Green party over time in areas above and below the median of proximity to the nearest NPP in figure 6. Reassuringly, both groups have fairly similar support

Figure 6: Average Green vote share before/after Chernobyl depending on NPP-Proximity (median)

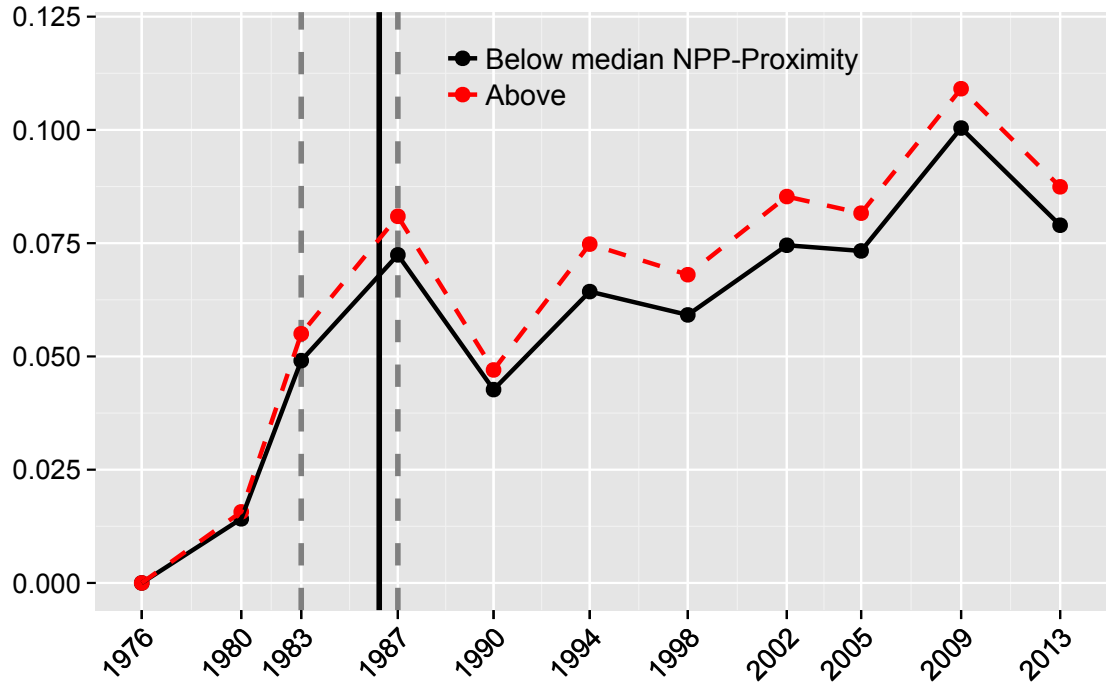
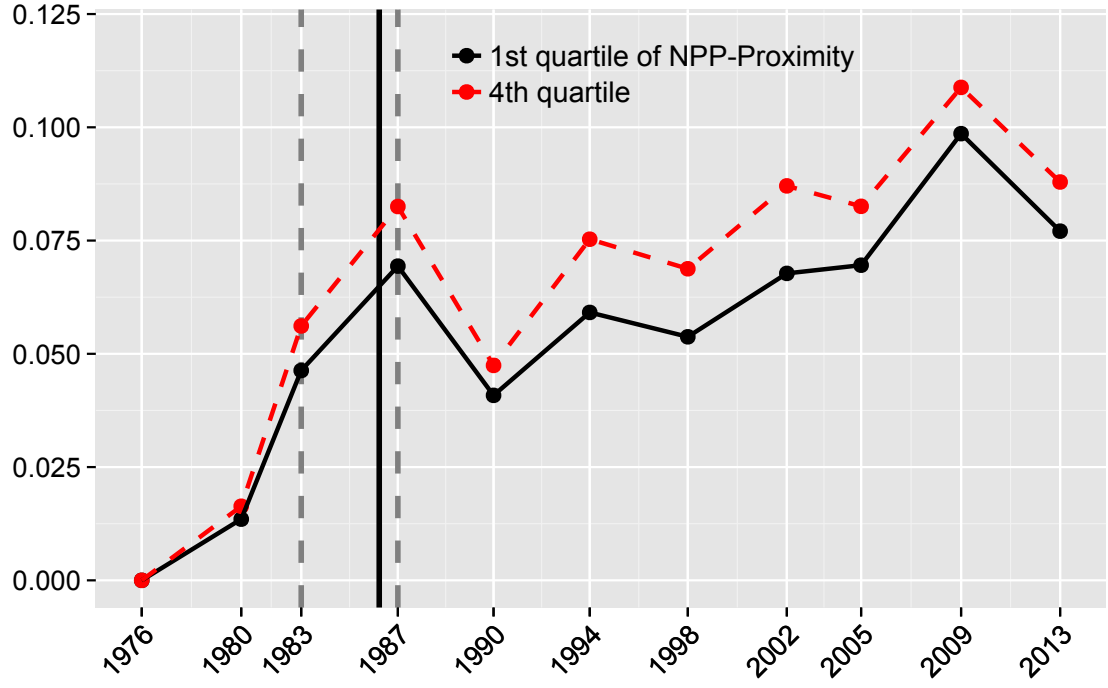


Figure 7: Average Green vote share before/after Chernobyl depending on NPP-Proximity (quartile)



levels before April 1986 and start to diverge in the 1987 election where counties closer to an NPP have about 1% higher Green vote shares. After a quick drop in 1990, the gaps continue to widen with a peak in 2002 until they are almost back to their pre-treatment gap in 2009.

However, looking at the more extreme case of counties in the lowest and highest quartile of the NPP-proximity in figure 7, divergence across groups may have already taken place between 1980 and 1983. This prompts for a more thorough investigation of the common trends assumptions which I carry out in several ways: first, I allow for non-linear trends at higher levels of aggregation by including state and district-specific time fixed-effects. In addition to that, I also include unit-specific trends which allow each county to exhibit an arbitrary linear pattern over the whole time period. Both procedures should leave the coefficient of interest unaffected in the absence of the corresponding pre-trend. Finally, I also interact the treatment with election fixed effects instead of a post-Chernobyl dummy. This makes it possible to investigate the changes in the effect of NPP-proximity with respect to a baseline election and to capture any non-linear relationship with the outcome of interest before the Chernobyl disaster. Bearing those caveats in mind, I will now proceed to the baseline results.

6 The effect of nuclear facilities on elections in West Germany

6.1 Baseline results

Table 3 shows the effect of NPP-Proximity on Green party votes after subsequently accounting for two-way fixed effects and control variables. Initially, there seems to be a strong negative correlation between proximity to the nearest NPP and Green votes which is even increasing in magnitude after the inclusion of fixed effects in specification 2. The only takeaway from this is that the omitted time-invariant local characteristics are correlated in the same way with the outcome and the treatment variable $NPP\text{-}Proximity_i \times postChernobyl_t$. Once I also include election fixed effects in the next column, the negative correlation observed before remains significant but turns positive. Since the correlation between $NPP\text{-}Proximity_i \times postChernobyl_t$ and t is negative by construction and the Green party share is increasing over time, this does not come as a surprise. The final specification in column 4 controls for an extensive set of county characteristics. While this decreases the coefficient of interest further to 0.004 it remains significant at 10%. According to the baseline

Table 3: Baseline estimates

	Green party vote share			
	(1)	(2)	(3)	(4)
NPP-Proximity	−0.043***	−0.079***	0.013***	0.004*
	(0.004)	(0.004)	(0.004)	(0.002)
County FE	N	Y	Y	Y
Election FE	N	N	Y	Y
Controls	N	N	N	Y
Counties	301	301	301	301
Observations	3,685	3,685	3,685	3,685
R^2	0.135	0.574	0.902	0.970

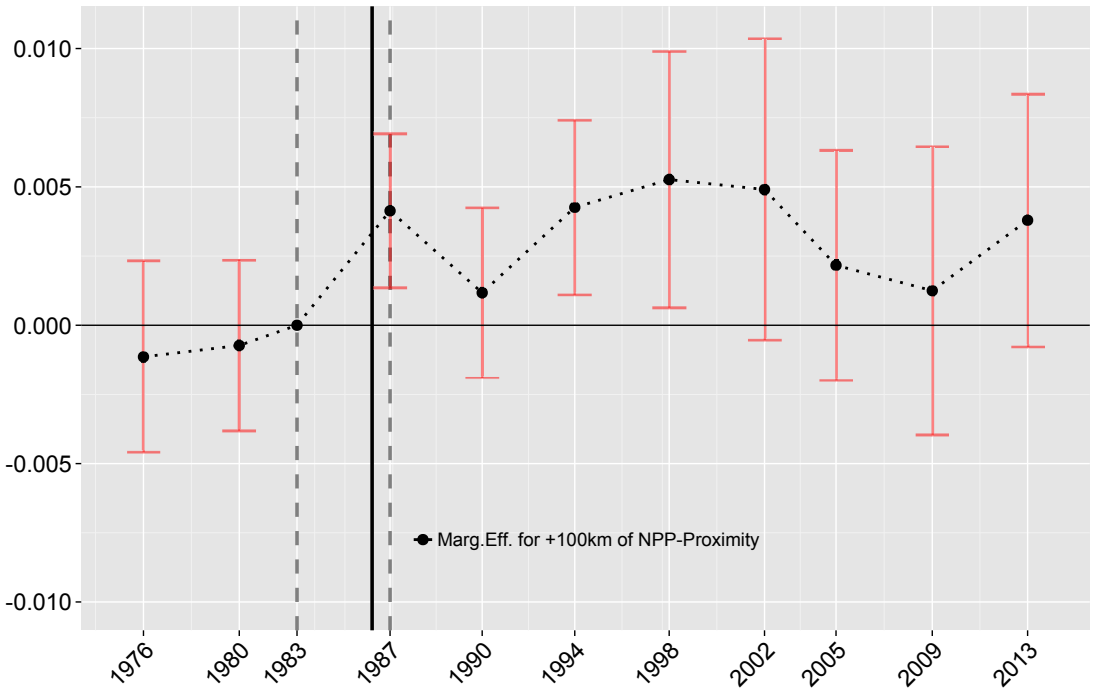
Notes: Standard errors clustered at the precinct level in parantheses, *p<0.1; **p<0.05; ***p<0.01; Notation: all displayed coefficients are interacted with a *postChernobyl* dummy, which is omitted from the table for better visualisation; Controls: Log(population); Log(population)^2; % Female; % Population aged 15–25, 25–30, 30–40, 40–50, 50–65, ≥65 by gender; % Recipients of social benefits; % Pupils of prep school in age cohort 0–15; Proximity to closest university; % Turnout 1983 (all interacted with election FE)

estimate, counties located 100km closer to an operating or planned NPP have on average a 0.4% higher support for the Green party in Bundestag elections after the Chernobyl disaster, ceteris paribus.

Since the gains of the Greens from NPP-Proximity have to be at the expense of other parties, I investigate in table 4 the treatment effect on the rest of Germany's party system. Interestingly, it turns out that proximity to an NPP after April 1986 did *not* lead to a general swing to the left but instead lowered votes for the Social Democrat and the Liberal parties and benefited the Conservative CDU/CSU even more than the Greens. Also minority parties saw their combined vote share marginally decline. The large responses of the conservative and social-democratic parties are, however, mainly due to their overall higher amount of votes: standardizing the coefficients reveals that a one standard increase in NPP-Proximity yields an increase of 0.034 standard deviations in Green vote share as opposed to 0.058 for the conservatives.[10] This means that although the nominal effect on the main parties is notably higher, the impact of NPP-Proximity on Green and Liberal vote shares given their scale is not very different. In sum, the baseline results suggest a polarisation of voting patterns in response to the Chernobyl accident depending on being located closer or farther away from an NPP where both the most left-wing and the most right-wing of the main parties gained. The next section evaluates the validity of the identifying assumptions and the sensitivity of the baseline results.

[10] The standardized coefficients are reported in table 13 in the appendix.

Figure 8: Time-varying treatment effect estimates and 90% CI: Green party vote



6.2 Robustness checks

The first tests will address the doubts about the validity of the common trends assumption raised by figure 7. To start with, I include area-specific election fixed effects into the baseline regression. Doing so purges the entire effect of state/district specific variables from the estimation. If the observed effect of NPP-Proximity was driven by pre-treatment divergence from state or district unobservables, this should leave the coefficient of interest insignificant. In the next step, I add county-specific time trends to take into account arbitrary long-term linear developments in voting patterns which might be mistakenly identified as a treatment effect. Finally, I also use combinations of these additional variables. Columns 2 and 3 in table 5 show that the baseline estimate is particularly sensitive to the inclusion of state- and district-specific election fixed effects. County-specific trends in specification 4, on the other hand, strengthen the baseline estimate. Also when using both linear trends and area-specific election dummies, the coefficient for NPP-Proximity drops in size and is insignificantly different from zero. Taken together, these results caution that non-linear pre-trends stemming from differences at the district or state level could be driving the results.

Another way to assess the prevalence of diverging patterns before the Chernobyl accident is allowing for a time-varying treatment effect. This can be implemented

Table 4: The effect of NPP-proximity on other parties

Vote share	Greens	Social-Democrats	Liberals	Conservatives	Others
	(1)	(2)	(3)	(4)	(5)
NPP-Proximity	0.004*	−0.018***	−0.004	0.020***	−0.002
	(0.002)	(0.005)	(0.003)	(0.006)	(0.003)
County FE	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Counties	301	301	301	301	301
Observations	3,685	3,685	3,685	3,685	3,685
R^2	0.970	0.979	0.936	0.969	0.961

Notes: Standard errors clustered at the precinct level in parantheses, *p<0.1; **p<0.05; ***p<0.01; Notation: all displayed coefficients are interacted with a *postChernobyl* dummy, which is omitted from the table for better visualisation; Controls: Log(population); Log(population)^2; % Female; % Population aged 15–25, 25–30, 30–40, 40–50, 50–65, ≥65 by gender; % Recipients of social benefits; % Pupils of prep school in age cohort 0–15; Proximity to closest university; % Turnout 1983 (all interacted with election FE)

Table 5: Baseline results and different FE specifications

	Green party vote share					
	(1)	(2)	(3)	(4)	(5)	(6)
NPP-Proximity	0.004*	−0.000	0.000	0.005**	0.002	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
County FE	Y	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
Election × State FE	N	Y	N	N	Y	N
Election × District FE	N	N	Y	N	N	Y
County FE × t	N	N	N	Y	Y	Y
Counties	301	301	301	301	301	301
Observations	3,685	3,685	3,685	3,685	3,685	3,685
R^2	0.970	0.977	0.983	0.985	0.989	0.992

Notes: Standard errors clustered at the precinct level in parantheses, *p<0.1; **p<0.05; ***p<0.01; Notation: all displayed coefficients are interacted with a *postChernobyl* dummy, which is omitted from the table for better visualisation; Controls: Log(population); Log(population)^2; % Female; % Population aged 15–25, 25–30, 30–40, 40–50, 50–65, ≥65 by gender; % Recipients of social benefits; % Pupils of prep school in age cohort 0–15; Proximity to closest university; % Turnout 1983 (all interacted with election FE)

by interacting NPP-proximity with election fixed effects instead of a post-Chernobyl dummy and normalising the effect to zero at the last election before the disaster. Doing so provides a placebo test and makes it possible to check whether proximity to a nuclear plant already had an effect on voting outcome prior to April 1986 and whether this effect was already increasing over time beforehand. Figure 8 plots the estimated time-varying effect of NPP-proximity on the vote share of the Green party from 1976 up to 2013. Reassuringly, the results suggest that the effect of living closer to an NPP in 1983 was not significantly different from that of the two elections before. After 1983, the coefficient rises from around 0 to almost 0.005 where it remains until 2002 with the exception of the unification election in 1990. The effect drops sharply for the 2005 and 2009 election and sees a slight rebound in 2013. Taken together, these patterns are compatible with the view that Chernobyl led to a persistent increase in Green votes until a phase-out from nuclear energy was officially decided in 2002. The result for 1990 does not fit the pattern but was dominated by one of the most important events in Germany's contemporaneous history which the Green party deliberately ignored. Germany's abandonment of the exit strategy from nuclear energy and the Fukushima accident brought this topic back to the public's attention. This can also be seen from the rising coefficient in 2013 which is, however, not significant at the 10% level.

The final set of checks is concerned with the estimates' robustness to alternative definitions of NPP-proximity regarding the set of facilities used to calculate proximities as well as the functional form used. The analysis starts with table 7 which presents the regression results for 8 alternative treatment specifications. The specifications differ on three dimensions: 1) status (planned or operating), 2) purpose (including research reactors or not) and 3) location (Germany, Western Europe, or the entire Europe). Column 5 repeats the baseline results for easier comparison. From the first three columns one can see that the most of the effect is driven by the proximity to *planned* nuclear power plants rather than an *operating* ones. When looking only at facilities in Germany as done in column 1, the two separate effects actually go into the opposite direction. A speculative explanation of this finding could be that within Germany, operating plants may be an important employer and the Greens are thus seen as a threat to local employment after the Chernobyl disaster.[11] When pooling operating and planned facilities together, the two effects cancel each other out in column 4 while in 5 and 6 this pooling only adds some noise and the point estimate remains almost the same. The last three specifications look at the

[11] An alternative story could be that people had a strong dislike for NPPs being replaced by less-clean fossil fuel power plants like coal.

impact of proximity to the nearest NPP *or* research reactor. Doing so diminishes the size of the coefficients in columns 4 to 6 and leaves them insignificant. Overall, the results in table 7 show that the baseline result is not completely dependent on the set of NPPs chosen for the proximity measure. The restriction to one single coefficient rather than two separate ones for planned and operating NPPs, however, also comes at the cost of masking some heterogeneity in the effect. The precise way in which NPP-proximity was affecting voting behaviour and which parts of the population were most responsive is addressed in the following section.

Table 6: Differences-in-Differences estimates with time-varying treatment effect

Vote share	Greens	Social-Democrats	Liberals	Conservatives	Others
	(1)	(2)	(3)	(4)	(5)
NPP-Proximity × 1976	−0.001	−0.000	−0.004*	−0.000	0.006
	(0.002)	(0.004)	(0.002)	(0.006)	(0.005)
1980	−0.001	0.004	0.002	−0.007	0.001
	(0.002)	(0.004)	(0.003)	(0.005)	(0.002)
1987	0.004**	−0.014***	0.001	0.006	0.002
	(0.002)	(0.003)	(0.002)	(0.004)	(0.002)
1990	0.001	−0.008**	−0.003	0.014*	−0.003
	(0.002)	(0.004)	(0.003)	(0.007)	(0.004)
1994	0.004**	−0.013***	−0.007***	0.014**	0.002
	(0.002)	(0.005)	(0.002)	(0.007)	(0.003)
1998	0.005*	−0.024***	−0.005**	0.022***	0.003
	(0.003)	(0.006)	(0.002)	(0.008)	(0.004)
2002	0.005	−0.005	−0.005	−0.002	0.007***
	(0.003)	(0.009)	(0.003)	(0.012)	(0.002)
2005	0.002	−0.016*	−0.007*	0.021**	0.000
	(0.003)	(0.008)	(0.004)	(0.009)	(0.004)
2009	0.001	−0.024***	−0.004	0.030***	−0.004
	(0.003)	(0.007)	(0.006)	(0.011)	(0.005)
2013	0.004	−0.023***	−0.012***	0.034***	−0.002
	(0.003)	(0.007)	(0.003)	(0.010)	(0.005)
County FE	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Counties	301	301	301	301	301
Observations	3,685	3,685	3,685	3,685	3,685
R^2	0.971	0.979	0.936	0.969	0.961

Notes: Standard errors clustered at the precinct level in parantheses, *p<0.1; **p<0.05; ***p<0.01; Notation: all displayed coefficients are interacted with a *postChernobyl* dummy, which is omitted from the table for better visualisation; Controls: Log(population); Log(population)^2; % Female; % Population aged 15–25, 25–30, 30–40, 40–50, 50–65, ≥65 by gender; % Recipients of social benefits; % Pupils of prep school in age cohort 0–15; Proximity to closest university; % Turnout 1983 (all interacted with election FE)

Table 7: Sensitivity to alternative treatment definitions

	Green party vote share								
Used facilities	Nuclear power plants						NPPs + research reactors		
Sample	Germany	Western Europe	Europe	Germany	Western Europe	Europe	Germany	Western Europe	Europe
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
NPP-Proximity				0.002	0.004*	0.004*	0.002	0.003	0.003
				(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
NPP-Proximity (operating)	−0.004*	0.001	0.001						
	(0.002)	(0.002)	(0.002)						
NPP-Proximity (planned)	0.004**	0.003**	0.004**						
	(0.002)	(0.001)	(0.002)						
County FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Counties	301	301	301	301	301	301	301	301	301
Observations	3,685	3,685	3,685	3,685	3,685	3,685	3,685	3,685	3,685
R^2	0.971	0.971	0.971	0.970	0.970	0.970	0.970	0.970	0.970

Notes: Standard errors clustered at the precinct level in parantheses, *p<0.1; **p<0.05; ***p<0.01; Notation: all displayed coefficients are interacted with a *postChernobyl* dummy, which is omitted from the table for better visualisation; Controls: Log(population); Log(population)^2; % Female; % Population aged 15–25, 25–30, 30–40, 40–50, 50–65, ≥65 by gender; % Recipients of social benefits; % Pupils of prep school in age cohort 0–15; Proximity to closest university; % Turnout 1983 (all interacted with election FE)

7 Mechanisms

7.1 Changes in the political landscape

As the results in table 4 have already shown, it was not only the Green party which gained after April 1986 in areas closer to an NPP but also the conservative CDU/CSU. The parties losing were SPD and FDP who were positioned more at the centre of the political spectrum. In general, there are many ways of how to explain this notable change in the political landscape after Chernobyl. One of these would be that voters systematically punish politicians responsible for the NPP in their area. Since the location decision is carried out at the state level (Joppke, 1993), this would imply punishing the parties in power at the time of approval. In order to investigate the relevance of such *punishment votes*, I construct for each county the party vote share of the government in power during the approval of the nearest NPP. This, however, can only be done using the sample of NPPs inside West Germany, assuming that voters cannot punish foreign governments. Another way in which the disaster could have changed voting patterns is by raising political awareness and participation in political life in favour of parties with more extreme positions. As mentioned in chapter 5.2, this could be either because of NPP-proximity itself or as a result of targeted campaigning in the surrounding areas of nuclear power plants. Any proximity effect on turnout will thus not be able to differentiate between these two mechanisms. A third additional explanation would be that the sudden politicisation of nuclear power usage led to political polarisation in the local population. Potential lines of conflict in this case could be economic dependency on the NPP as an employer and the perceived danger or awareness of nuclear energy's risks. Voting patterns could have diverged since only the parties on the very left and right would guarantee the implementation of a distinct pro- or anti-nuclear policy. In order to measure political polarisation, I construct an index similar to Xezonakis (2012) for each election in each county.[12]

The three mentioned channels are investigated in table 8. Since the punishment effect can only be evaluated using nuclear facilities in West Germany, I also report the results for the Greens and the CDU/CSU in columns 1 and 2. Column 3 shows that the parties approving the respective plant did *not* receive less votes in areas located closer to the NPP but, if anything, actually *gained* after the Chernobyl accident. Hence, there is no empirical support for a punishment mechanism. Turnout,

[12] The formula used is: $Polarisation = \sqrt{\sum_{j=1} VoteShare_{jk}(Ideology_{jk} - \overline{Ideology}_k)^2}$. The four main parties are placed on a discrete left-right ideology scale between -2 and 2 (omitting 0) for the sake of simplicity.

Table 8: The effect of NPP-proximity on the political landscape

Vote share	Greens	Conservatives	NPP Approvers	Turnout	Polarisation
	(1)	(2)	(3)	(4)	(5)
NPP-Proximity (West. Germany)	0.002	0.022***	0.008		
	(0.002)	(0.006)	(0.009)		
NPP-Proximity (West. Europe)				0.009***	0.023***
				(0.003)	(0.006)
County FE	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Counties	301	301	301	301	301
Observations	3,685	3,685	3,685	3,685	3,685
R^2	0.970	0.969	0.921	0.978	0.962

Notes: Standard errors clustered at the precinct level in parantheses, *p<0.1; **p<0.05; ***p<0.01; Notation: all displayed coefficients are interacted with a *postChernobyl* dummy, which is omitted from the table for better visualisation; Controls: Log(population); Log(population)^2; % Female; % Population aged 15–25, 25–30, 30–40, 40–50, 50–65, ≥65 by gender; % Recipients of social benefits; % Pupils of prep school in age cohort 0–15; Proximity to closest university; % Turnout 1983 (all interacted with election FE)

on the other hand, increases significantly as a response to NPP-proximity after April 1986. According to the estimate, living 100km closer to an NPP increases election participation by almost 1% which is about 1/8 of a standard deviation of turnout. Given the size of the coefficient, higher participation could explain the comparatively small gains of the Green party but not the much larger ones of the conservatives. Finally, in accordance with the single party results, also polarisation increases significantly after Chernobyl in areas closer to a nuclear power plant. Areas located 100km closer to a nuclear power plant see polarisation increase by 0.023 which is about one quarter of a standard deviation of the constructed index.

7.2 Chernobyl as a formative event

The results in table 6 not only provide a robustness test but also reveal that the effect of NPP-proximity on voting behaviour persists even more than 20 years after the Chernobyl accident. In the following, I investigate the reasons and mechanisms underlying this persistence. I evaluate two channels which are both concerned with the role of Chernobyl as a formative event in people's life. The first of these is considering the path-dependence of voting decisions taken shortly after the accident. As recent empirical research has shown, voters are very hesitant in adjusting political choices made in the past such as party registration (Kaplan and Mukand, 2014).

Spontaneous electoral choices made under the emotional influence of a formative event such as the Chernobyl disaster may therefore have long-lasting effects on voting. In order to investigate this channel, I exploit the fact that two large German states were holding state elections between April 1986 and the next Bundestag election in January 1987: Lower Saxony (15^{th} of July 1986) and Bavaria (12^{th} of October 1986). This allows me to check whether the effect of NPP-proximity lasted longer depending on the amount of time voters had before going to the ballot boxes.

Table 9 shows that the proximity effect changes depending on months until the next election. The impact on the large parties CDU/CSU and SPD seems to be benefiting from voters' having more time to think about their choice for the next election. As table 9 shows, the negative effect on the social democrats is mainly driven by counties who could vote shortly after Chernobyl while that of the conservatives only gains significance in areas which did not vote immediately after the disaster. This could be because coherence within the SPD was low during this time and facilitated a spontaneous swing to left-wing fringe parties. Both regression output and marginal effect plot in figure 9 also show that NPP-proximity did not notably change its effect on Greens' votes. The effect of proximity is decreasing for Liberals and other parties in months until the next election. As table 9 shows, fringe parties are actually significantly benefiting from NPP-proximity and close elections. Path dependency originating from early elections after Chernobyl is thus, if anything, mostly favouring fringe parties.[13]

The second channel looks into the role of age as a proxy for how formative the effect of NPP-proximity was for the average population of a county. This assumes that the political beliefs of youths are easier to shape than those of elder people. Giuliano and Spilimbergo (2014), for instance, have shown that experiencing economic recession during the *impressionable years* of 18 to 25 has considerable long-term effects on people's political views. In order to explore this mechanisms, I interact the treatment variable with the share of 15 to 25 years olds at the time of the accident.[14] The regression results in table 10 immediately show that mostly conservatives and others are affected by the interchange between NPP-proximity and the share of adolescents around April 1986. The effect on the Green party, in contrast, is decreasing in the affected counties' share of 15 to 25 year olds and is only significant in the lower third

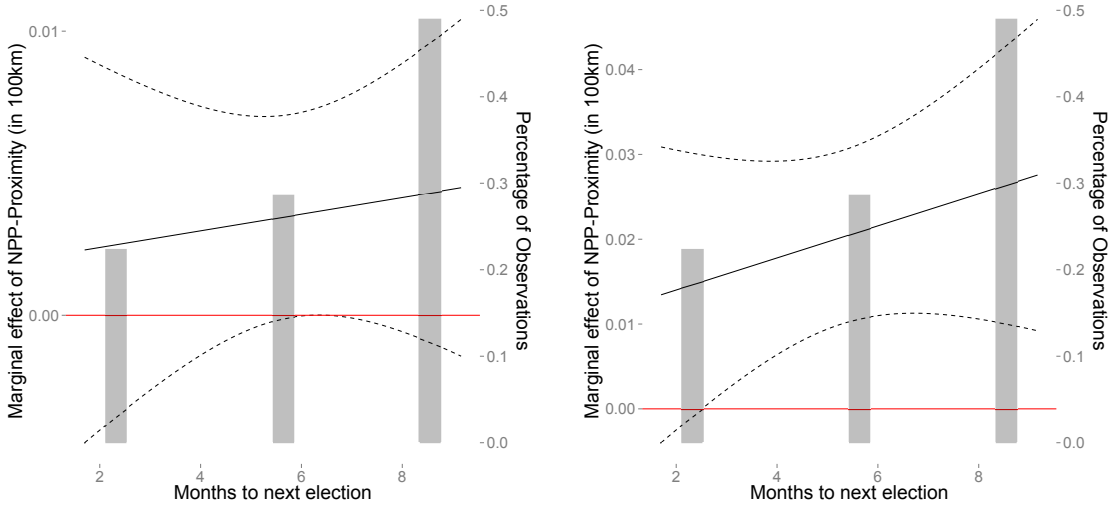
[13] Liberals are not counted as fringe parties in this case. The marginal effect of NPP-proximity on the FDP is close to zero and insignificant in counties with an early election and significantly negative otherwise.

[14] This procedure requires the inclusion of *% aged 15-25*$_{1983}$ $\times$ *post-Chernobyl* along with *% aged 15-25*$_t$ $\times$ *election* which could create a multicollinearity problem. I thus use pre-Chernobyl controls as of 1983 interacted with election fixed-effects in all regressions looking at the effect of pre-Chernobyl characteristics.

Table 9: Memory effect of NPP-proximity

	Greens	Social-Dem.	Liberals	Conser-vatives	Others	Turnout
	(1)	(2)	(3)	(4)	(5)	(6)
NPP-Proximity	0.002	−0.028**	0.006	0.010	0.011	0.004
	(0.005)	(0.012)	(0.007)	(0.014)	(0.007)	(0.008)
Months until next election	0.001**	0.001	0.000	−0.002*	−0.000	−0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Prox. × Mon.s next elec.	0.000	0.002	−0.002*	0.002	−0.002*	0.001
	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)
County FE	Y	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
Counties	301	301	301	301	301	301
Observations	3,685	3,685	3,685	3,685	3,685	3,685
R^2	0.971	0.979	0.937	0.969	0.961	0.979

Notes: Standard errors clustered at the precinct level in parantheses, *p<0.1; **p<0.05; ***p<0.01; Notation: all displayed coefficients are interacted with a *postChernobyl* dummy, which is omitted from the table for better visualisation; Controls: Log(population); Log(population)^2; % Female; % Population aged 15–25, 25–30, 30–40, 40–50, 50–65, ≥65 by gender; % Recipients of social benefits; % Pupils of prep school in age cohort 0–15; Proximity to closest university; % Turnout 1983 (all interacted with election FE)



Bündnis/Die Grünen CDU/CSU

Figure 9: Marginal effect of NPP-Proximity on voting conditional on months to next election after Chernobyl

of the distribution. Figure 10 shows that the treatment effect for the CDU/CSU is strongest for the upper half of the adolescents' distribution and insignificant or even negative for the other one. The positive effect of NPP-proximity on conservative votes is thus driven by areas with a young population during the Chernobyl accident which insinuates that young people in those areas were mainly socialised towards *pro*-nuclear parties rather than the Greens.

7.3 The socio-economic dimension of the Chernobyl effect

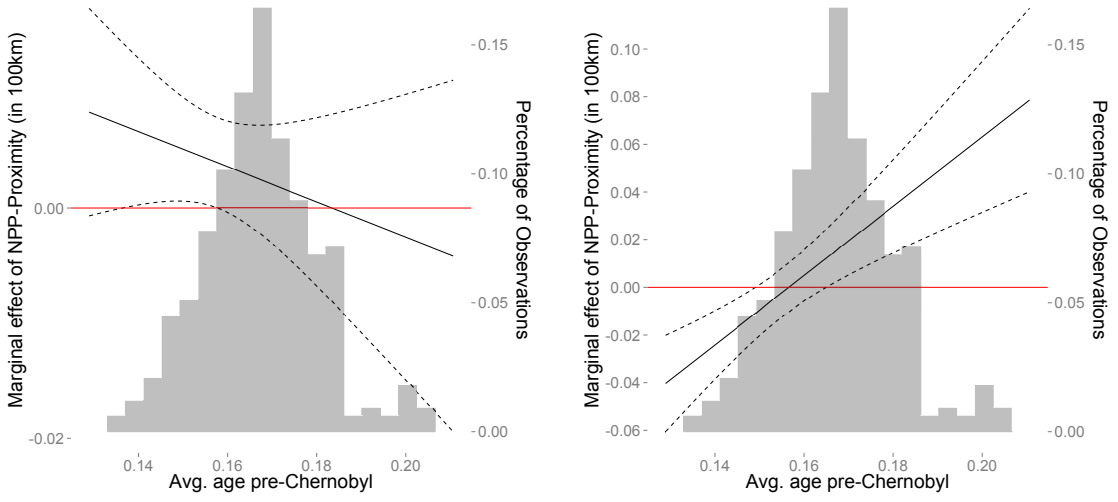
The final mechanism I am investigating addresses how different parts of society were responding to the Chernobyl disaster and living closer or farther away from a nuclear power plant. For this analysis, I look at effect heterogeneity along two important socio-economic dimensions – economic well-being and education – which I can measure before the treatment at the county level. Table 11 shows the results of the baseline specification after interacting NPP-proximity with the population share of benefit recipients before April 1986. Doing so only decreases the coefficient for the conservatives but leaves the remaining parties unaffected. The marginal effect plots in figure 11 for the parties benefiting from NPP-proximity illustrate that the treatment effect on both Greens and CDU/CSU is strongest in the middle of the distribution even though the marginal effects are never significant. Overall, differences in economic well-being seem to have little explanatory power for heterogeneity in the proximity effect.

Given that these results could also reflect differences in educational attainment, the analysis proceeds with exploring the heterogeneity coming from variation in the level of education. Unlike age and economic well-being, education seems to be a dimension which only increases the effect from NPP-proximity for the conservative parties. Looking at the non-interacted coefficients on NPP-proximity in table 12, the gains of the CDU/CSU from nuclear plants after Chernobyl turns negative for (hypothetical) counties with no children attending preparatory school, while the coefficient on the Green party barely changes. The fact that the baseline effect is shifted far more towards the conservatives is, according to the estimates in table 12 mostly a result of county differences in educational attainment. The higher the share of students in preparatory schools, the more the CDU/CSU is gaining from NPP-proximity and the more social democrats and liberals are losing from proximity to the nearest NPP. In the marginal effect plots in figure 12, one can see that the marginal effect for the Greens is almost invariant to educational attainment unlike the conservatives who see their effect strongly rise in counties of higher education.

Table 10: Effect heterogeneity of NPP-proximity depending on age

	Greens	Social-Dem.	Liberals	Conser-vatives	Others	Turnout
	(1)	(2)	(3)	(4)	(5)	(6)
NPP-Proximity	0.028	0.062	0.035	−0.228***	0.103***	−0.017
	(0.027)	(0.050)	(0.032)	(0.063)	(0.037)	(0.035)
Prox. × % aged 15-25 pre-Cherno.	−0.153	−0.487	−0.211	1.455***	−0.605**	0.137
	(0.170)	(0.314)	(0.204)	(0.406)	(0.239)	(0.214)
County FE	Y	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
Counties	301	301	301	301	301	301
Observations	3,685	3,685	3,685	3,685	3,685	3,685
R^2	0.968	0.979	0.936	0.975	0.956	0.974

Notes: Standard errors clustered at the precinct level in parantheses, *p<0.1; **p<0.05; ***p<0.01; Notation: all displayed coefficients are interacted with a *postChernobyl* dummy, which is omitted from the table for better visualisation; Controls: Log(population); Log(population)^2; % Female; % Population aged 15–25, 25–30, 30–40, 40–50, 50–65, ≥65 by gender; % Recipients of social benefits; % Pupils of prep school in age cohort 0–15; Proximity to closest university; % Turnout (all as of 1983 and interacted with election FE)



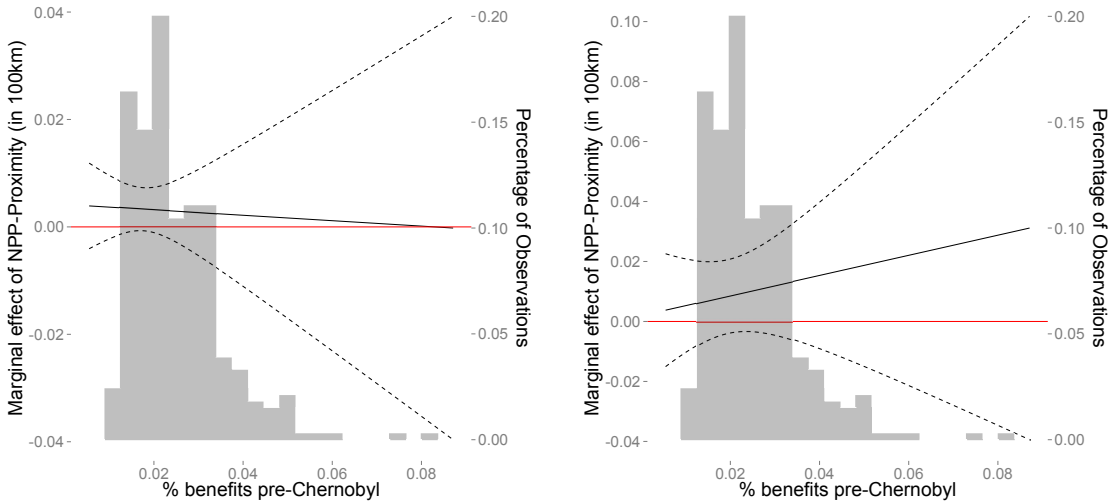
Bündnis/Die Grünen CDU/CSU

Figure 10: Marginal effect of NPP-Proximity on voting conditional on % ages 15-25 before Chernobyl

TABLE 11: EFFECT HETEROGENEITY OF NPP-PROXIMITY DEPENDING ON ECONOMIC WELL-BEING

	Greens	Social-Dem.	Liberals	Conser-vatives	Others	Turnout
	(1)	(2)	(3)	(4)	(5)	(6)
NPP-Proximity	0.004	−0.019	0.004	0.002	0.009	−0.001
	(0.007)	(0.013)	(0.007)	(0.014)	(0.007)	(0.008)
Prox. × % Benefit recip. pre-Ch.	−0.050	0.107	−0.158	0.336	−0.234	0.353
	(0.343)	(0.561)	(0.338)	(0.624)	(0.371)	(0.378)
County FE	Y	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
Counties	301	301	301	301	301	301
Observations	3,685	3,685	3,685	3,685	3,685	3,685
R^2	0.968	0.979	0.936	0.975	0.956	0.974

Notes: Standard errors clustered at the precinct level in parantheses, *p<0.1; **p<0.05; ***p<0.01; Notation: all displayed coefficients are interacted with a *postChernobyl* dummy, which is omitted from the table for better visualisation; Controls: Log(population); Log(population)^2; % Female; % Population aged 15–25, 25–30, 30–40, 40–50, 50–65, ≥65 by gender; % Recipients of social benefits; % Pupils of prep school in age cohort 0–15; Proximity to closest university; % Turnout (all as of 1983 and interacted with election FE)



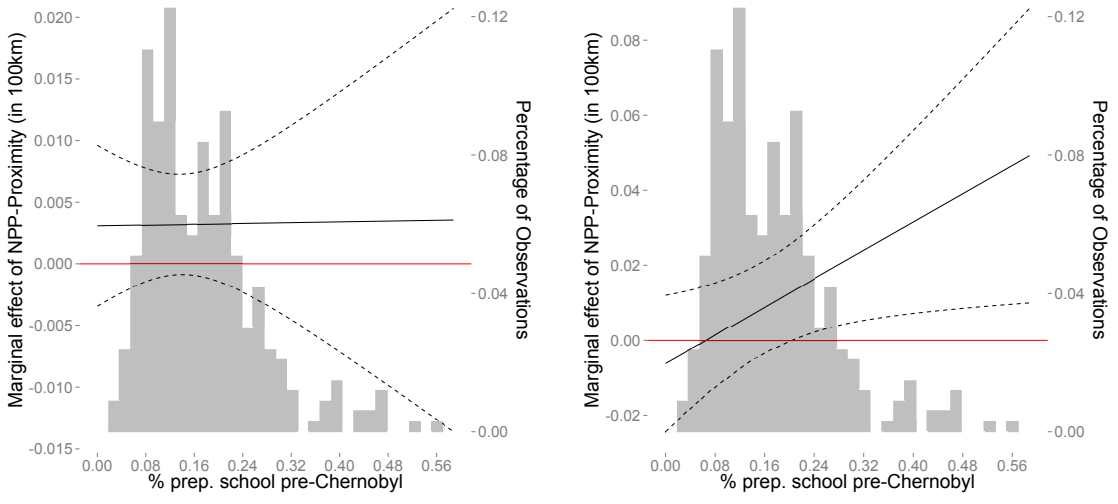
Bündnis/Die Grünen CDU/CSU

FIGURE 11: MARGINAL EFFECT OF NPP-PROXIMITY ON VOTING CONDITIONAL ON % BENEFIT RECIPIENTS BEFORE CHERNOBYL

Table 12: Effect heterogeneity of NPP-proximity depending on education

	Greens	Social-Dem.	Liberals	Conser-vatives	Others	Turnout
	(1)	(2)	(3)	(4)	(5)	(6)
NPP-Proximity	0.003	−0.012	0.007	−0.006	0.008*	0.001
	(0.004)	(0.010)	(0.004)	(0.011)	(0.005)	(0.005)
Prox. × % Prep. school pre-Cherno.	0.001	−0.034	−0.040*	0.094*	−0.021	0.027
	(0.023)	(0.046)	(0.022)	(0.052)	(0.028)	(0.027)
County FE	Y	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
Counties	301	301	301	301	301	301
Observations	3,685	3,685	3,685	3,685	3,685	3,685
R^2	0.968	0.979	0.936	0.975	0.956	0.974

Notes: Standard errors clustered at the precinct level in parantheses, *p<0.1; **p<0.05; ***p<0.01; Notation: all displayed coefficients are interacted with a *postChernobyl* dummy, which is omitted from the table for better visualisation; Controls: Log(population); Log(population)^2; % Female; % Population aged 15–25, 25–30, 30–40, 40–50, 50–65, ≥65 by gender; % Recipients of social benefits; % Pupils of prep school in age cohort 0–15; Proximity to closest university; % Turnout (all as of 1983 and interacted with election FE)



Bündnis/Die Grünen CDU/CSU

Figure 12: Marginal effect of NPP-Proximity on voting conditional on % prep. school before Chernobyl

Without an in-depth analysis, one can only speculate about the reasons for the patterns described in this section. It seems, however, that polarisation from NPP-proximity after Chernobyl consists of two different effects: higher votes for the Green party may actually be the result of increased environmental concerns which would explain to some extent the losses of the ideologically close social-democrats. Given the results on education and share of benefit recipients, this effect seems to be independent of socio-economic characteristics. The treatment effect on the CDU/CSU, in turn, was shown to originate from counties with a high levels of education. If one also takes into account the positive impact of adolescents on the conservative gains after Chernobyl, one can conclude that comparatively young and educated counties near a nuclear power plants were switching their votes more towards the conservative parties after Chernobyl. A possible explanation for this could be fear of declining economic prosperity after a shut-down of the nuclear facility or different level a backlash caused by the hysteria about the safety of NPPs in Germany immediately after the Chernobyl disaster.

8 Conclusion

This paper investigated the effect of an experience with a mainly psychological impact on political beliefs in a distant country. In a case study, I looked at the electoral response to the Chernobyl disaster in West Germany and analysed how counties located closer or farther away from the nearest nuclear power plant responded in Bundestag elections after April 1986. The disaster can be regarded as a formative experience since nuclear energy and awareness of its dangers were not a salient political issue at this time and only opposed by the small Green party and minor groupings. At the political level, I find a small, significant impact of NPP-proximity after April 1986 on Green party vote which is in line with research on the NIMBY effect. The results, however, also indicate a general and long-lasting polarising effect and highlight that the party benefiting the most from proximity were in fact the conservatives. Since they were the only pro-nuclear party after Chernobyl, this vote can be interpreted as a signal of support for nuclear energy.

In terms of mechanisms, I demonstrate that the role of Chernobyl as an experience only materialises in the gains of the conservative CDU/CSU who are particularly benefiting from proximity in areas with a larger share of 15-25 year olds. Further analysis reveals that counties with high educational attainment counties exhibit a similar pattern. The results are similar to findings on the the 1976 California primary elections in which particularly educated citizens voted against an exit

from nuclear energy. Economic differences across areas do not explain the intensity of this proximity effect. The results can be reconciled by the fact that knowledge about an NPP's actual danger may lower risk perception and turn citizens attention more towards the economic consequences of abandoning nuclear energy. This is in line with economic research on the relation between education and risk assessment (Shaw, 1996).

References

Abadie, Alberto and Sofia Dermisi. 2008. "Is Terrorism Eroding Agglomeration Economies in Central Business Districts? Lessons from the Office Real Estate Market in Downtown Chicago." *Journal of Urban Economics* 64 (2):451–463.

Almond, Douglas, Lena Edlund, and Mårten Palme. 2009. "Chernobyl's Subclinical Legacy: Prenatal Exposure to Radioactive Fallour and School Outcomes in Sweden." *The Quarterly Journal of Economics* 124 (4):1729–1772.

Bauer, Thomas K., Sebastian Braun, and Michael Kvasnicka. 2014. "Distant Event, Local Effects? Fukushima and the German Housing Market." Kiel Working Paper 1857, Kiel Institute for the World Economy.

Boer, Connie de and Ineke Catsburg. 1988. "A Report: The Impact of Nuclear Accidents on Attitudes Toward Nuclear Energy." *The Public Opinion Quarterly* 52 (2):254–261.

Bredberg, Ines, Johann Hutter, Kerstin Kühn, Katarzyna Niedzwiedz, Frank Philippczyk, and Achim Thömmes. 2015. "Statusbericht zur Kernenergienutzung in der Bundesrepublik Deutschland 2014."

Chen, Yuyu and David Y. Yang. 2015. "Historical Traumas and the Roots of Political Distrust: Political Inference from the Great Chinese Famine." mimeo.

CIESIN. 2005. "Gridded Population of the World Version 3 (GPWv3): Population Density Grids." Available at: http://sedac.ciesin.columbia.edu/gpw.

Cort, M. de, editor. 1998. *Atlas of caesium deposition on Europe after the Chernobyl accident*, *EUR*, vol. 16733. Luxembourg: Office for Official Publications of European Communities.

Danzer, Alexander M. and Natalia Danzer. 2014. "The Long-Run Consequences of Chernobyl: Evidence on Subjective Well-Being, Mental Health and Welfare." Munich Discussion Paper 2014-25, Department of Economics, University of Munich.

Ebermann, Lutz and Arthur Junkert, editors. 2011. *Der Reaktorunfall 1986 in Tschernobyl*. Salzgitter: Bundesamt für Strahlenschutz, 4 ed.

Falter, Jürgen W. and Markus Klein. 2003. *Der lange Weg der Grünen: Eine Partei zwischen Protest und Regierung*, *Beck'sche Reihe*, vol. 1504. München: C.H. Beck.

Federal Agency for Cartography and Geodesy. 2014. "Administrative Areas 1:1000000: VG1000 and VG1000-EW." Available at: http://www.bkg.bund.de.

Gabriel, Oscar and Silke Keil. 2012. "The Baden-Württemberg State Election of 2011: A Political Landslide." *German Politics* 21 (2):239–246.

Giuliano, P. and A. Spilimbergo. 2014. "Growing up in a Recession." *The Review of Economic Studies* 81 (2):787–817.

Hassel, Gert, Lothar Koester, and Martin Pabst, editors. 1997. *40 Jahre Atom-Ei Garching: 1957-1997*. München.

Jahn, Detlef and Sebastian Korolczuk. 2012. "German Exceptionalism: The End of Nuclear Energy in Germany!" *Environmental Politics* 21 (1):159–164.

Joppke, Christian. 1990. "Nuclear power struggles after Chernobyl: The case of West Germany." *West European Politics* 13 (2):178–191.

———. 1993. *Mobilizing against nuclear energy: A comparison of Germany and the United States*. Berkeley: University of California Press.

Kaplan, Ethan and Sharun Mukand. 2014. "The Persistence of Political Partisanship: Evidence from 9/11." mimeo.

Krosnick, Jon A. and Duane F. Alwin. 1989. "Aging and Susceptibility to Attitude Change." *Journal of Personality and Social Psychology* 57 (3):416–425.

Kuklinski, James H., Daniel S. Metlay, and W. D. Kay. 1982. "Citizen Knowledge and Choices on the Complex Issue of Nuclear Energy." *American Journal of Political Science* 26 (4):615–642.

Lüning, Günther, Michael Schmidt, Jens Scheer, and Heiko Ziggel. 1989. "Early Infant Mortality in West Germany before and after Chernobyl." *The Lancet* 334 (8671):1081–1083.

Madestam, Andreas and David Yanagizawa-Drott. 2012. "Shaping the Nation: The Effect of Fourth of July on Political Preferences and Behavior in the United States." HKS Faculty Research Working Paper Series RWP12-034.

Malmendier, U. and S. Nagel. 2011. "Depression Babies: Do Macroeconomic Experiences Affect Risk Taking?" *The Quarterly Journal of Economics* 126 (1):373–416.

Nunn, Nathan and Leonard Wantchekon. 2011. "The Slave Trade and the Origins of Mistrust in Africa." *American Economic Review* 101 (7):3221–3252.

Pignataro, Giuseppe and Giovanni Prarolo. 2012. "One more in my backyard? Insights from the 2011 Italian nuclear referendum." Working Paper 837, Dipartimento Scienze Economiche, Universita' di Bologna.

Probst, Lothar. 2013. "Bündnis 90/Die Grünen (GRÜNE)." In *Handbuch Parteienforschung*, edited by Oskar Niedermayer. Wiesbaden: Springer VS, 509–540.

Riester, Adolf. 2010. *Baugeschichte der Kernkraftwerke in der Bundesrepublik Deutschland*. Ph.D. thesis, TU Berlin, Berlin.

Rüdig, Wolfgang. 2000. "Phasing Out Nuclear Energy in Germany." *German Politics* 9 (3):43–80.

Schumacher, Ingmar. 2014. "An Empirical Study of the Determinants of Green Party Voting." *Ecological Economics* 105:306–318.

Shaw, Kathryn L. 1996. "An Empirical Analysis of Risk Aversion and Income Growth." *Journal of Labor Economics* 14 (4):626–653.

Xezonakis, Georgios. 2012. "Party System Polarisation and Quality of Government: On the Political Correlates of QoG." QoG Working Paper Series 14.

A Tables

Table 13: The effect of NPP-proximity on other parties (Standardised coefficients)

Vote share	Greens	Social-Democrats	Liberals	Conservatives	Others
	(1)	(2)	(3)	(4)	(5)
NPP-Proximity	0.034*	−0.053***	−0.040	0.058***	−0.011
	(0.018)	(0.016)	(0.026)	(0.019)	(0.018)
County FE	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Counties	301	301	301	301	301
Observations	3,685	3,685	3,685	3,685	3,685
R^2	0.970	0.979	0.936	0.969	0.961

Notes: Standard errors clustered at the precinct level in parantheses, *p<0.1; **p<0.05; ***p<0.01; Notation: all displayed coefficients are interacted with a *postChernobyl* dummy, which is omitted from the table for better visualisation; Controls: Log(population); Log(population)^2; % Female; % Population aged 15–25, 25–30, 30–40, 40–50, 50–65, ≥65 by gender; % Recipients of social benefits; % Pupils of prep school in age cohort 0–15; Proximity to closest university; % Turnout 1983 (all interacted with election FE)

Table 14: Baseline results using pre-treatment controls only

	Greens	Social-Dem.	Liberals	Conservatives	Others	Turnout
	(1)	(2)	(3)	(4)	(5)	(6)
NPP-Proximity	0.003	−0.017***	0.001	0.008	0.005	0.005
	(0.003)	(0.006)	(0.003)	(0.007)	(0.004)	(0.004)
County FE	Y	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
Counties	301	301	301	301	301	301
Observations	3,685	3,685	3,685	3,685	3,685	3,685
R^2	0.968	0.979	0.936	0.975	0.956	0.974

Notes: Standard errors clustered at the precinct level in parantheses, *p<0.1; **p<0.05; ***p<0.01; Notation: all displayed coefficients are interacted with a *postChernobyl* dummy, which is omitted from the table for better visualisation; Controls: Log(population); Log(population)^2; % Female; % Population aged 15–25, 25–30, 30–40, 40–50, 50–65, ≥65 by gender; % Recipients of social benefits; % Pupils of prep school in age cohort 0–15; Proximity to closest university; % Turnout (all as of 1983 and interacted with election FE)

Table 15: Baseline results and different functional forms

	Green party vote share			
	(1)	(2)	(3)	(4)
NPP-Proximity	0.004*	−0.002	−0.008	−0.024
	(0.002)	(0.007)	(0.014)	(0.032)
NPP-Proximity^2		0.006	0.016	0.064
		(0.006)	(0.026)	(0.095)
NPP-Proximity^3			−0.006	−0.059
			(0.013)	(0.107)
NPP-Proximity^4				0.020
				(0.040)
County FE	Y	Y	Y	Y
Election FE	Y	Y	Y	Y
Controls	Y	Y	Y	Y
Counties	301	301	301	301
Observations	3,685	3,685	3,685	3,685
R^2	0.970	0.971	0.971	0.971

Notes: Standard errors clustered at the precinct level in parantheses, *p<0.1; **p<0.05; ***p<0.01; Notation: all displayed coefficients are interacted with a *postChernobyl* dummy, which is omitted from the table for better visualisation; Controls: Log(population); Log(population)^2; % Female; % Population aged 15–25, 25–30, 30–40, 40–50, 50–65, ≥65 by gender; % Recipients of social benefits; % Pupils of prep school in age cohort 0–15; Proximity to closest university; % Turnout 1983 (all interacted with election FE)

Table 16: Memory effect of NPP-proximity (detailed)

	Greens			Conservatives			Turnout		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
NPP-Proximity	0.004*	0.002	0.002	0.020***	0.013*	0.010	0.009***	0.007	0.004
	(0.002)	(0.003)	(0.005)	(0.006)	(0.007)	(0.014)	(0.003)	(0.004)	(0.008)
Late election		0.010***			0.004			0.006*	
		(0.003)			(0.008)			(0.004)	
NPP-Proximity × Late election		−0.001			0.026*			0.004	
		(0.005)			(0.015)			(0.007)	
Months to next election			0.001**			−0.002*			−0.001
			(0.001)			(0.001)			(0.001)
NPP-Proximity × Months to next election			0.000			0.002			0.001
			(0.001)			(0.002)			(0.001)
County FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Election FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Counties	301	301	301	301	301	301	301	301	301
Observations	3,685	3,685	3,685	3,685	3,685	3,685	3,685	3,685	3,685
R^2	0.970	0.972	0.971	0.969	0.969	0.969	0.978	0.978	0.979

Notes: Standard errors clustered at the precinct level in parantheses, *p<0.1; **p<0.05; ***p<0.01; Notation: all displayed coefficients are interacted with a *postChernobyl* dummy, which is omitted from the table for better visualisation; Controls: Log(population); Log(population)^2; % Female; % Population aged 15–25, 25–30, 30–40, 40–50, 50–65, ≥65 by gender; % Recipients of social benefits; % Pupils of prep school in age cohort 0–15; Proximity to closest university; % Turnout 1983 (all interacted with election FE)