Generational Change in Party Support in Germany:

The Decline of the *Volksparteien*, the Rise of the Greens, and the Transformation of the Education Divide

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Abstract: Motivated by the eroding support for the old "Volksparteien" CDU/CSU and SPD, especially among younger voters, this study conducts an age-period-cohort analysis of vote choices in all twenty German elections, from 1949 to 2021. I study both generational differences in levels of party support and the changing effect of education on voting. The results, first, point to the importance of generational replacement in understanding party's shifting fortunes, with the CDU/CSU and the SPD being weaker in more recent cohorts and the Greens stronger. Second, while high education divides voters of the old right (CDU/CSU and especially FDP) and left (SPD) in earlier cohorts, it increasingly divides voters of the new-left Greens and the radical-right AfD in more recent cohorts. This study enhances our understanding of the changing patterns of party support in the German electorate and, as a broader lesson, shows how electoral realignment is driven by generational replacement.

Keywords: Age-period-cohort model, political socialization, generational change, realignment, education divide.

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1. Introduction

The 2021 Bundestag election marked a watershed moment in the history of the German party system. For the first time in the Federal Republic's history, the old "Volksparteien" ("people's parties") CDU/CSU and SPD together accounted for less than half of the party votes. Which structural changes in voter-party alignment are behind these shifts? And will the decline of the old „Volksparteien" continue? While questions about the future are difficult to answer with certainty, differences in voting by age groups in the 2021 election suggest that the trend might persist. Among those aged 70 and older, the CDU/CSU still received 37.5% and the SPD 34.8% of the vote. Yet, among the youngest voters, aged 18 to 24, these shares were just 10.8% and 15.6% respectively—both lower than the shares obtained by the liberal FDP (20.5%) and the Greens (24.0%) in this age bracket (Bundeswahlleiter 2022). These results point to large generational differences in vote choices in Germany, and by extension also in the social divisions underlying those. Yet, it is unclear to what extent they reflect stable differences across generations rather than age or life cycle effects, or even short-term reactions to the political situation around the 2021 elections.

Against this background, this study conducts an age-period-cohort (APC) analysis of voting behavior in Germany using data from post-election surveys for all twenty federal elections, from 1949 to 2021. It addresses two interrelated questions: First, are there persistent differences in party support across generational cohorts, net of age and period effects? In particular, is the long-term electoral decline of the CDU/CSU and the SPD, and the rise of the Greens, driven by generational replacement? Second, does education—a core socio-structural characteristic—affect party preferences differently in different cohorts? By addressing the second question, the article contributes to an ongoing debate on the (changing) impact of education on party preferences in Western democracies. A plethora of studies show how voting for (left-)libertarian vs. (right-)authoritarian parties is nowadays structured by high vs. lower formal

education, possibly giving rise to an "education cleavage" (Stubager 2010, 2013). Yet, this has not always been the case. Analyses of long time-series indicate a "reversal of the education cleavage" (Gethin et al. 2021, 2022): Whereas high education was associated with voting for the (economic) right in the past, it is now associated with voting for the (cultural) left. In this study, I argue that there is a strong generational component to these shifts and, drawing on the German case, investigate these cohort shifts in more detail than previous related studies (Gethin et al. 2021, van der Brug and Rekker 2021) using APC models.

While APC analyses have been increasingly used to study the evolvement of political attitudes, APC analyses of voting behavior are less widespread. To the best of my knowledge, there are only two such studies on Germany (Goerres 2008; Klein 2009). Yet, APC models hold enormous potential to better understand electoral change as such change is often driven by generational replacement (cf. van der Brug and Rekker 2021). Most studies on electoral change and de/realignment, studying solely variation over time, overlook this potentially crucial role of generational change. This omission is consequential as we may underestimate the degree of change if we look at the electorate at large and do not consider that older voters are often set in their ways. For example, if education is differently related to voting in different cohorts, these effects may cancel each other out in an analysis that averages over cohorts.

The results of this study underscore this importance of generational replacement in understanding parties' shifting fortunes. First, even net of age and period effects, the CDU/CSU and the SPD are much weaker within more recent cohorts. The Greens are notably stronger in more recent cohorts, though support for the Greens already plateaued with the baby boomers in Western Germany. Due to the mechanics of generational replacement, these findings imply a further decline of the CDU/CSU and the SPD and a further rise of the Greens as a plausible baseline scenario for the future evolvement of German parties over the medium turn. Second, holding high education matters differently in different generations. Among those born until the

end of World War II, high education goes along with an increased likelihood of a CDU/CSU and, especially, FDP vote as well as a decreased likelihood to vote for the SPD. Among those born later, high education primarily makes voting for the Greens more likely and, conversely, voting for the radical-right AfD less likely. The trend towards a widening educational gap is especially clear and strong for the AfD. We may thus expect voting for the AfD to become even more strongly associated with lower education in the future, if these differences persist, as older cohorts are replaced by newer ones. Overall, this study enhances our understanding of the changing patterns of party support in the German electorate and their likely future evolvement. Moreover, it holds broader lessons by demonstrating how processes of electoral change and realignment operate chiefly through generational replacement.

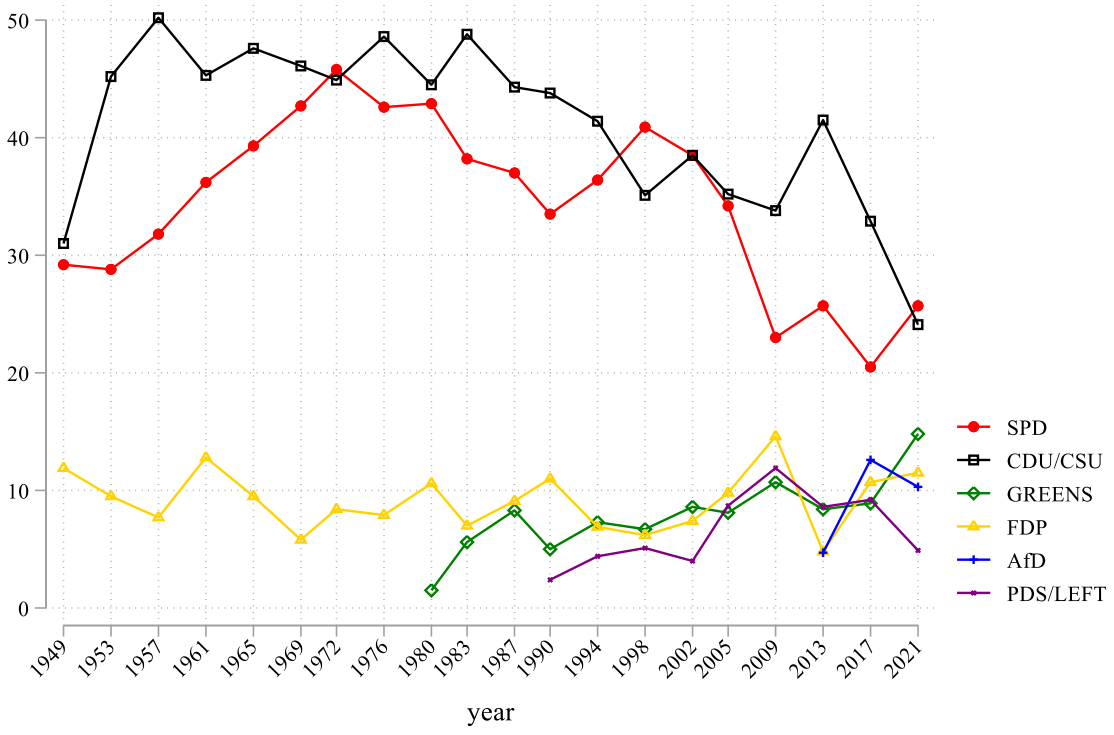
Building on the pertinent literature, the next section outlines the theoretical arguments of this study. Section three discusses data and methods. Section four presents the results. Section five summarizes the study and discusses implications.

2. The changing German party system, the role of political socialization and the education divide

In this section, I will first give an overview on aggregate election results in German elections since 1949 to outline the broad shifts in party support that took place. Next, I will elaborate on how political socialization and cohort effects might be relevant to these trends and discuss previous research on cohort differences in party support in Germany. I then turn to studies on the changing role of education for voting behavior in Western Europe and suggest that cohort effects might be driving these shifts. Along the way, I formulate a set of key expectations on cohort differences in party support in Germany that will be tested in the empirical part.

Figure 1 shows the vote shares of the six parties represented in the 20th German Bundestag for all twenty national elections since the founding election of 1949. The most striking trend is the decline in the strength of the old „Volksparteien“ since their highs in the 1960s and 1970s. Between 1953 and 1987, the combined vote share of the Christian Democrats and the Social Democrats had always been higher than 80%. In 2021, these parties received 24.1% and 25.7% of the votes respectively, together accounting for just 49.8% of the vote. Another remarkable tong-term trend, albeit partly driven by their good performance in 2021, is the rising strength of the Greens. Overall, the German party system has, after a period of consolidation in the early phase of the Federal Republic, become more fragmented over time, as have party systems in many other Western European democracies (Bergman et al. 2021: 682).

Figure 1: Party vote shares in elections to the German Bundestag



While in itself remarkable, these aggregate trends may mask even more dramatic shifts in the voting behavior between generational cohorts. In a recent review, Wouter van der Brug and Mark Franklin (2018) have characterized generational replacement as the "engine of electoral change". This view builds on the "formative years hypothesis", according to which political orientations tend to be formed and consolidated during adolescence and early adulthood and are persistent thereafter. There is ample research supporting the formative years hypothesis, especially when it comes to orientations that are central to individuals' political belief systems (Alwin and Krosnik 1991; Sears and Funk 1999; van der Brug and Franklin 2018). Depending on their political socialization, individuals who belong to different cohorts may look at the political world very differently. For example, recent studies show that citizens' left-right identifications relate to policy issues differently across cohorts, reflecting the salience of issues during the time when people were socialized into politics (Rekker 2016; Steiner 2021).

Similar dynamics are plausible when it comes to voting behavior, and they may lead to two different kinds of patterns. First, political socialization may leave lasting footprints in the form of different *levels* of party support across different cohorts. These cohort effects may arise directly in that people who were socialized during a particular era when a party was exceptionally popular are permanently more inclined to vote for that party. Such cohort effects may also arise more indirectly, for example when political socialization leads to certain attitudes being permanently more widespread in particular cohorts, which then make these cohorts support parties with corresponding positions. Second, similar mechanics of political socialization may also leave lasting footprints in the form of the *drivers* of party preferences being different across cohorts. For example, when the salience of political conflicts changes over time, divisions among older cohorts are likely to still reflect old conflicts whereas the dividing lines within younger cohorts are likely to be more strongly shaped by new conflicts. In line with this second possibility, van der Brug and Franklin (2018: 436) reason that

"realignments should have a strong generational component", yet note that their "literature search found this to be a very under-studied topic".

To analyze generational effects of either type, it is mandatory to separate cohort from age, or life cycle, and period effects. This is achieved by conducting age-period-cohort (APC) analysis of repeated cross-sectional data (Neundorf and Niemi 2014; Yang and Land 2013). While APC analyses have been increasingly used to study the evolvement of political attitudes (for recent examples, see: Neundorf et al. 2020; Steiner 2021; Wuttke et al. 2022), APC analyses of voting behavior are less frequent. Whereas there is a relevant body of such studies on the UK (e.g., Shorrocks 2016; Tilley 2002; Tilley and Evans 2014), for example, there are not even a handful of APC studies on voting in Germany. The two exceptions are Markus Klein's (2009) study of the Green vote and Achim Goerres' (2008) broader comparative study of the UK and Germany.

Klein (2009) analyzes voting for the Greens using survey data from the German General Social Survey from 1980 to 2006. He finds support for the Greens to be higher among those born between 1946 and 1964—usually labelled "baby boomers"—as compared to earlier cohorts. Klein attributes this result to post-materialist values being more widespread within this cohort (see Inglehart 1977), that is, to an indirect effect of socialization. Using Politbarometer surveys from 1997 to 2002, Goerres (2008) comes to a similar conclusion. Both also report that support for the Greens dissipated somewhat in succeeding generations. Goerres (2008) analyzes the other major parties as well. Support for the SPD, he finds, peaked among what he labels "the Brandt generation" (those born between 1946 and 1962), being lower before and especially thereafter. Conversely, the CDU/CSU had received less support from "the Brandt generation" compared to previous ones, especially the "Adenauer generation" (born between 1915 and 1945). Goerres attributes these differences to the direct effects of political socialization on party support: Those politically socialized under a strong CDU/CSU during the chancellorship of Konrad Adenauer support the Christian Democrats permanently more; whereas those politically

socialized under a strong SPD during the chancellorship of Willy Brandt are lastingly more supportive of the Social Democrats.

In this study, I reassess these generational differences in party support over an enlarged time horizon, covering over 70 years of German elections. I mostly focus on Western Germany given the longer time series and the more straightforward history of political socialization into party politics of the German Federal Republic. Yet, the addition of data from almost two decades after German reunification also allows me to contrast cohort patterns in Western Germany with those in the East. My guiding expectation is that the overall trends in party support are reflected in stable differences in party support across cohorts, especially in Western Germany.[1] Accordingly, and in line with the earlier evidence reported in Klein (2008) and Goerres (2009), I formulate three hypotheses:

H1: Support for the CDU/CSU is lower within more recent cohorts as compared to those born until 1945.

H2: Support for the SPD is lower within more recent cohorts as compared to baby boomers (born 1946 to 1964).

H3: Support for the Greens is higher within more recent cohorts as compared to those born until 1945.

The second goal of this study is to analyze whether the effect of education on party preferences differs across cohorts. Within the German context, this is an entirely new contribution: To the best of my knowledge, there is so far no publication investigating whether socio-structural

[1] Note that I am interested in the cohort differences at a descriptive level. Thus, I do not intend to study which mechanisms, direct or indirect, are responsible for the cohort differences. For example, I do not study how differences in attitudes might drive cohort differences in voting—which would be next to impossible with the available data in any case.

characteristics affect voting differently across cohorts in Germany. From past research, we know a lot about how the association between *social class* and voting has changed *over time* in Germany, in particular that working class membership has lost most of its capacity to predict the SPD vote (e.g., Elff and Roßteutscher 2017, 2022). However, this strand of research has not considered cohort differences in the effect of social class, nor has it paid much attention to the role of education as such (but see: Elff and Roßteutscher 2021).[2]

Yet, education has gained much attention as a socio-structural driver of the vote in recent comparative studies. On the attitudinal level, it is well documented that those with high levels of formal education are more liberal and cosmopolitan in their political outlooks (Bovens and Wille 2017; Hainmueller and Hiscox 2007; Hakhverdian et al., 2013; Kriesi et al., 2008). On the level of voting, the highly educated are much less likely to support parties of the radical right (Arzheimer and Carter, 2006; Ivarsflaten and Stubager, 2013). Instead, the highly educated disproportionately support parties with culturally liberal and cosmopolitan positions, especially "new left" Green or other left-libertarian parties (Abou-Chadi and Hix 2021; Gethin et al. 2022; Stubager 2013). For some authors, these political divisions between the high and the lower educated amount to new political cleavage—an "education cleavage" (Bovens & Wille 2017; Stubager 2010, 2013). In any case, in today's Western Europe high education is overall associated with preferring the libertarian (new) left over the authoritarian right. Yet, research has paid little attention to the possibility that this tendency still varies across generational cohorts.

[2] More generally, there is little work at all on how drivers of voting differ across cohorts. In their recent study on realignment across cohorts in the Netherlands, van der Brug and Rekker (2021: 780, 778) state that "hardly any research exists on generational differences in the determinants of the vote" and that theirs "is the first APC-model that focuses on the determinants of party choice".

The analyses in Gethin et al. (2021, 2022) show how the effect of education on voting has changed *over time*. Using a dichotomous distinction between parties of the left and the right, they document a "reversal of the education cleavage": High education was associated with voting for the "right" in the past and become associated with voting for the "left" only over time. This reversal is connected to the rising salience of cultural issues, which resulted in an increasingly two-dimensional policy space composed of an economic and a cultural dimension (Oesch and Rennwald 2018; Hillen and Steiner 2020). It is the liberal and cosmopolitan positions typically held by the highly educated on the cultural dimension of this space which make them vote for culturally libertarian parties of the new left and which put them in opposition to the radical-right. Accordingly, it seems important to distinguish between different party families within the left and the right (cf. Abou-Chadi and Hix 2021). So rather than just as a reversal of the education cleavage the transformation of the education divide may be more accurately characterized as follows: In the past, the highly educated preferred the "old" right (Conservatives, Christian Democrats and Liberals) over the "old" left (Social Democrats/Socialist) due to economic reasons arising from the privileged status of the higher educated; nowadays the highly educated prefer the new left (Greens) over the radical right due to cultural reasons. This reading is consistent with the idea of a new education cleavage that primarily sets apart voters of the new left from those of the radical right on the basis of cultural issues.[3]

Given the profound role of political socialization, it is plausible that this educational realignment is, at least partly, driven by generational replacement. Yet, the two existing studies investigating into this possibility—while ground-breaking—do not fully explore the account of

[3] It also accords with the detailed results by party family and country in Gethin et al. (2022: 27): While education is not consistently related to voting for the old right and old left, the tendencies of the highly educated to be more supportive of the Greens and less supportive of the radical right are (almost) uniform across countries today.

educational realignment as carved out in the previous paragraph. First, Gethin et al. (2022: 37) report themselves that "generational dynamics appear to have played a major role in the reversal of the education cleavage". However, they only present results from a period-cohort analysis, with all countries pooled together and parties sorted into their simple dichotomy of left-wing vs. right-wing. This is not sufficient to understand the more fundamental process of realignment outlined above as it requires analyzing parties (or party families) separately. Moreover, their analysis does not control for age effects, and thus is not able to discriminate between age and cohort effects. Second, van der Brug and Rekker (2021) run APC analyses on survey data from the Dutch elections between 1986 and 2017. Within their broader analysis of realignment over time and cohorts, they find that education explains more variance in voting propensities in more recent cohorts. However, concentrating on the overall variance explained by education, rather than the effects of education for specific parties, their study is not well suited either to reveal change in *how* education is related to the vote.

The present study builds on this important work by conducting an in-depth APC analysis of education's effects on voting in Germany that analyzes the effect of education on the probability to vote for individual parties and how it has changed across generational cohorts. The German case is well suited to this endeavor: The relatively high level of continuity of the German parties makes it possible to analyze reasonably long time series for at least five of the current six major parties.[4] In line with the expected transformation of the education divide, I will focus on two hypotheses to be tested on the German case:

[4] The time series covers more than 70 years of voting for the CDU/CSU, SPD, FDP (1949 to 2021), over 40 years of voting for the Greens (1980 to 2021) and over 25 years of voting for the Left Party/PDS (1994 to 2021). Only for the AfD (2013 to 2021), the time series is much more limited, rendering it impossible to separate cohort from age effects.

H4: Among those born until 1945, high education is primarily associated with a higher likelihood to vote for the old right (CDU/CSU and FDP) and a lower likelihood to vote for the old left (SPD).

H5: Within the more recent cohorts, high education is primarily associated with a higher likelihood to vote for the new left (Greens) and a lower likelihood to vote for the radical right (AfD).

Finally, there is an additional reason why cohort effects should be studied in conjunction with the effect of education on voting: The mass expansion of education that took place after World War II and the advent of a "knowledge society" it helped to bring about. In Germany, the share of those leaving school with a degree allowing university entry ("Abitur" and "Fachabitur") increased from just 7% in 1960 to over 50% after 2010 (Statistisches Bundesamt 2022). Thus, there are much more highly educated individuals in later cohorts compared to earlier ones. These compositional differences in education could also give rise to cohort differences in voting, so that it is important to study cohort and educational differences in voting in conjunction. Moreover, the shifting economic and social role of education is likely to have contributed to education playing a different political role across generations. Particularly in more recent cohorts, individuals with lower levels of education may view themselves as relative losers of socio-economic transformations (see Steiner et al. 2022), and the resulting populist sentiment (Spruyt et al. 2016) might be an additional reason why the lower educated in recent cohorts are more likely to vote for right-wing populist parties.

3. Data and methods

The analysis is in this article draws on post-election surveys from all twenty German federal elections from 1949 to 2021. For the elections from 1949 to 2017, I make use of the dataset

provided by Gethin et al. (2021). This dataset is a collection of harmonized data from post-election surveys containing core variables on vote choices and socio-demographic characteristics. To this dataset, I added harmonized data from the GLES post-election survey for the 2021 federal election (GESIS 2022).[5] The combined dataset includes 30,556 observations with valid information on the party vote (including abstention), an average of 1,528 per election, with a minimum of 689 (1969) and a maximum of 2,883 (2021).

Like van der Brug and Rekker (2021), I disentangle age, period, and cohort effects by including all three as predictors, coding birth years and age in life years into categories and estimating period effects freely by including dummy variables for each (but one) election year. Given the inevitable arbitrariness involved in such coding decisions, I assess the robustness of the results to using alternative cohort and age group classifications in the appendix.

To ease interpretability, the main classification of generational cohorts follows a well-known scheme, used widely in comparative public opinion research (see, e.g., Norris and Inglehart 2019):

1. World War (WW) generation: Born until 1927
2. Silent generation: Born between 1928 and 1945
3. Baby boomers: Born between 1946 and 1964
4. Generation X: Born between 1965 and 1979
5. (Post-)Millennials: Born 1980 and later

[5] I also went back to the original survey for 1961 (Scheuch et al. 2014) to code voluntary non-voting with zero in the turnout variable. In the dataset provided by Gethin et al. (2021), non-eligible citizens and voluntary non-voters are both coded missing on the turnout variable.

This scheme is well suited to the German context as well. The cohorts largely correspond with the political generations distinguished by Goerres (2008): The silent generation overlaps strongly with his "Adenauer generation", the boomers are almost equivalent with his "Brandt generation" and the generation X with his "Kohl generation" (see appendix A for a tabular comparison, including the classification used by Klein 2009, as well as the distribution of cohorts by election year).

For the main models, I code age into three groups, distinguishing between young adulthood (up to 35), middle adulthood (36 to 64) and late adulthood (65 and older). While this classification is admittedly coarse it helps to keep collinearity with cohorts at a moderate level (see the two-way tables for cohorts and age in appendix A) and thus to keep age and cohort effects apart. This becomes difficult otherwise, especially for the parties with shorter time series (Greens, PDS/Left).

To measure educational attainment, I use a binary indicator that is coded 1 for individuals who obtained at least a school degree qualifying for university entrance, that is an "Abitur" or "Fachabitur", or who studied at a university. It is coded 0 for all individuals whose highest school degree is below that. Thus, I do not make a distinction between the lower degrees, such as between "Hauptschulabschluss" (nine regular years of schooling) and "Realschulabschluss" (ten regular years of schooling), and instead focus on differences between the highly educated and the rest. This is in keeping with the literature on the education cleavage which conceives of it primarily as a divide between two groups: the highly educated and the lower educated (Bovens & Wille 2017; Stubager 2010, 2013). Within the segregated German schooling system, the distinction between those with an "(Fach-)Abitur" and those without seems most relevant to capture such a divide. The data closely track the strong trend towards higher levels of education in more recent cohorts noted above: Within the WW and the silent generations about

7% and 12% respectively hold an advanced school degree, while about 50% of all millennials do (see appendix B).

The dependent variables are a set of binary indicators of voting for each of the six represented in the current Bundestag, that distinguish between a party vote ("Zweitstimme") for the respective party and voting for another party. The Left and its predecessor PDS are treated as the same party for this purpose. Following standard practice, nonvoters are excluded from the main analyses, but are considered in robustness checks.

Using these dependent variables, I estimate a series of binary logistic regressions. In the first step, I am interested in how the probabilities to vote for the parties vary across cohorts. I estimate models of the following form, with all right-hand side variables treated as categorical:

$$\log\left(\frac{P}{1-P}\right)_i = \beta_0 + \beta_1 COHORT_i + \beta_2 COHORT_i * EAST_{i,t} + \beta_3 AGE_{i,t} + \beta_5 YEAR_t + \beta_6 EAST_{i,t} + \beta_7 GENDER_i + \varepsilon_{i,t} \quad (1)$$

EAST is a dummy variable for living in the Eastern rather than Western part of Germany that allows cohort effects on the two sides of the former wall to differ. YEAR denotes a set of dummy variables for the respective election year. I include gender as a basic socio-demographic control variable, but since I am interested in the descriptive differences between cohorts, I do not include further controls. To interpret the results of the model, I plot predicted probabilities (marginal means) for different values of COHORT and EAST in the main text (and report regression tables as well as predicted probabilities by AGE and YEAR in appendix C). I display 85% confidence intervals as their non-overlap approximates statistically significant differences in the predicted probabilities across conditions in the data at hand.

The time-series for the Left/PDS (1994 to 2021) and the AfD (2013 to 2021) do not go as far back in time as the time-series for the other parties. When analyzing these parties, I therefore collapsed the two earliest cohorts into one cohort of individuals born until 1945. In case of the

AfD, the time series is even too short to allow for a meaningful decomposition of cohort and age effects. The models for the AfD therefore omit AGE. The cohort effects estimated for the AfD are therefore valid only under assumption of there being no age effects, and thus need to be interpreted with caution.

In the second step, I am interested in how the effect of education differs across cohorts. The main analysis is limited to Western Germany for the reasons discussed above. I estimate models of the following form, where EDUCATION is the binary indicator for an advanced school degree:

$$\log\left(\frac{P}{1-P}\right)_i = \beta_0 + \beta_1 COHORT_i + \beta_2 COHORT_i * EDUCATION_{i,t} + \beta_3 AGE_{i,t} + \beta_4 AGE_{i,t} * EDUCATION_{i,t} + \beta_5 YEAR_t + \beta_6 YEAR_t * EDUCATION_{i,t} + \beta_7 GENDER_i + \varepsilon_{i,t} \quad (2)$$

In addition to interacting COHORT and EDUCATION, this model also allows the effect of education to vary with AGE and YEAR (treated as categorical). Thus, changes in the effect of education across cohorts are net of life cycle- and period-related variation in the effect of education.

I use weights that adjust the party vote shares, including the share of non-voters, in the sample to the official election results. Thus, the party vote shares in the weighted data reflect the actual shares in the respective elections. I thereby intend to make the results more representative of the actual electorates, while at the same minimizing distortions from different sampling frames across surveys and giving equal weight to each election survey no matter the size of its sample.[6]

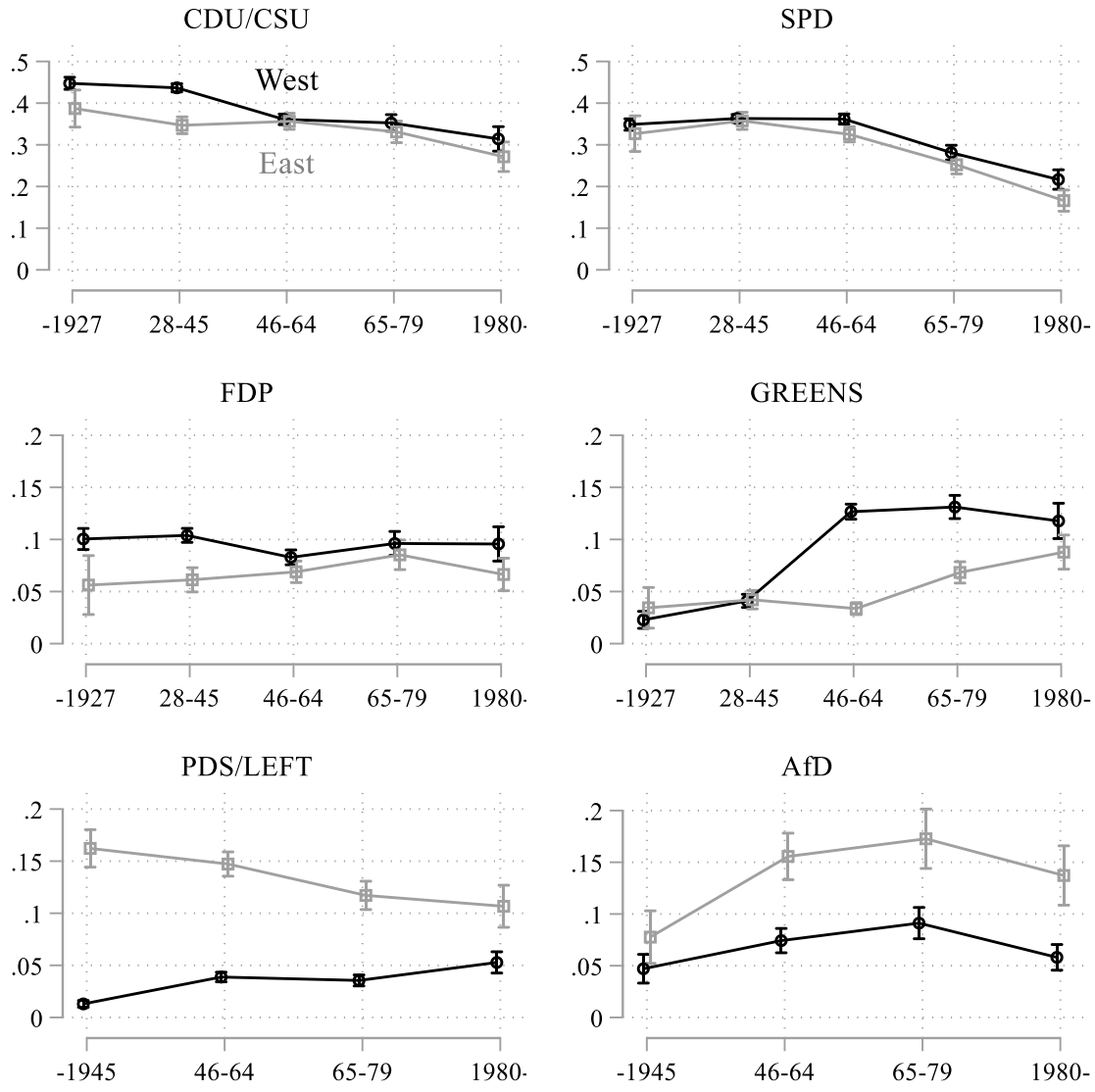
[6] These vote weights are computed separately for Western and Eastern Germany (if applicable). In models including Western and Eastern Germany, these weights are multiplied with a regional weight that adjusts the sample to the relative sizes of the two electorates, in order for the results not to be distorted by the oversampling of Eastern Germans in surveys from 1994 onwards. (Note that the 1990 survey still included only Western Germany.)

4. Results

4.1 Cohort differences in levels of party support

In Figure 2, I present the main results pertaining to H1 to H3. The plots show the predicted probability to vote for each of the six parties by cohort and Western vs. Eastern Germany based on the binary-logistic regression model specified in equation (1). In line with H1 and H2, the plots indicate lower support for the old "Volksparteien" among more recent cohorts in Western Germany. The probability to vote for the CDU/CSU is highest with about 45% within the WW and the silent generation. The probability of a CDU/CSU vote declines already substantially among boomers and then further falls to a low of about 31% among millennials. Support for the SPD peaks among boomers (36%) and then falls monotonically to a low of 22% among millennials. These patterns accord with H1 and H2. The results indicate that much of the secular decline in the strength of the two former "Volksparteien" is driven by varying levels of support across generations in combination with the demographical dynamics of generational replacement. This conclusion is bolstered by a look at the period effects (see Figure C1 in the appendix). Especially in case of the CDU/CSU, the trend towards lower levels of support within more recent generation is much clearer and more consistent than any trend over time. Regarding age, the probability to vote CDU/CSU increases over the life cycle whereas the probability of an SPD vote declines with age.

Figure 2: Predicted probability of party choice by cohorts and West vs. East



Note: Predicted probabilities (with 85% confidence intervals) from binary-logistic regression models with age, period and cohort effects. Weights employed that adjust vote choices to official election results. Full regression tables as well as plots with predicted probabilities by age and year are reported in appendix C.

In many ways, the cohort results for the Greens in Western Germany represent a mirror image of the results for the old "Volksparteien". The probability of a GREEN vote is low (<4%) for members of the WW and the silent generations. It jumps to about 12% among boomers and roughly stays on this level thereafter. This pattern is in line H3. There is thus a strong generational component to the Greens' tendency of performing better in more recent elections—rather than it being only or even mainly a period phenomenon (see Figure C1 in the

appendix for predicted probabilities across years). On top, the results indicate that the probability to vote for the Greens declines over the life cycle. Interestingly, the cohort patterns are very different in Eastern Germany with support for the Greens being much lower among boomers in Eastern Germany who were socialized into politics under much different conditions than their Western German counterparts. Among millennials, who were socialized into politics under more similar conditions, the East/West gap has virtually disappeared.

Cohort patterns differ even more dramatically in case of the PDS/LEFT whose support is higher in more recent cohorts in the West and lower in the East. These diametrically opposed patterns in the East and the West seem to originate in the status of the PDS as the legal successor of the Socialist Unionist Party (SED), the ruling party of the GDR, which has pulled Eastern Germans from earlier cohorts towards the party and pushed Western Germans from earlier cohorts away from it. Support for the AfD across cohorts follows an inverse U-shaped pattern in both the East and the West, with support being much higher in the East. Generational differences are least pronounced for the FDP, in line with the largely trendless fluctuation in its overall election results (see Figure 1).

In appendix D, I present alternative version of Figure 2 as robustness checks. First, not using the weight mainly affects the levels of party support but does not change the cohort patterns. Second, estimating the models as multilevel models with random intercepts for YEAR leads to similar results (Yang and Land 2013). Third, I employ a more fine-grained cohort scheme, consisting of birth decades. This leads to similar conclusions albeit with even larger differences across Western German cohorts: For example, while the probability to vote CDU/CSU is over 40% for all cohorts born before 1950, it is only 25% for those born in the 1990s. Support for the SPD peaks among those born in the 1950s with a predicted probability of 37% and then successively drops to just 19% for those born in the 1990s. For the Greens, the more fine-grained cohort scheme reveals an interesting tendency of a further increase in support among

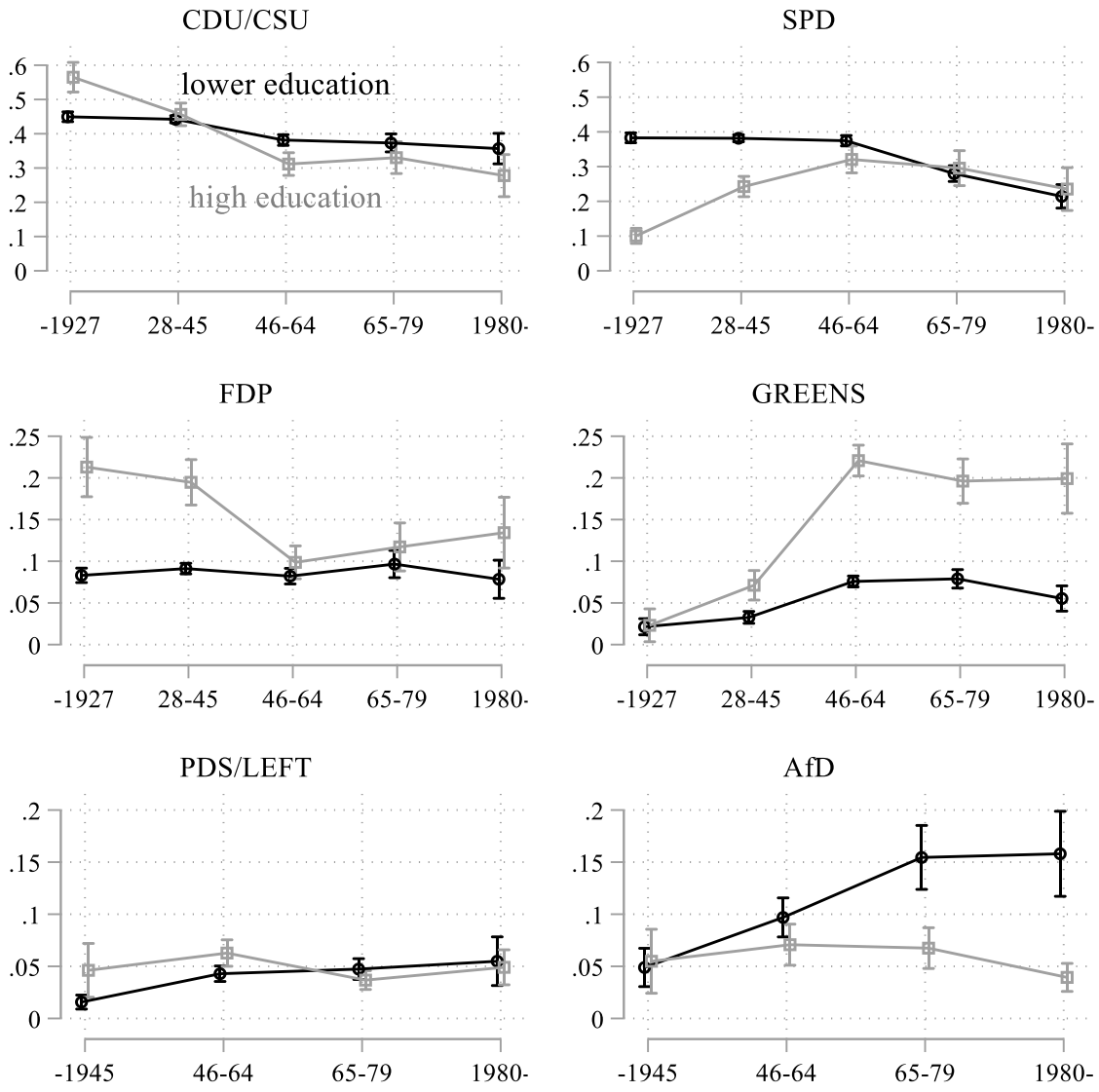
those born in the 1990s, after a slight drop in support among those born in the 1970s and 1980s compared to those born in the 1960s. Fourth, I present results using a more fine-grained classification of age groups that increases the risk of misattribution between cohort and life-cycle effects. The findings are again similar, though with a stronger tendency of support for the Greens declining after the boomer generation. Fifth, I present results including abstention (coded zero). This slightly changes the picture in ways that reflect the higher abstention among Eastern German voters as well as within more recent cohorts. For example, within all cohorts Western Germans are more likely than Eastern Germans to vote for the SPD once abstention is included, while there is no clear difference in Figure 2 that includes only voters.

In sum, the results suggest that shifts in the strength of parties over time are not primarily driven by period effects but reflect persistent differences in the propensities of different cohorts to support parties—in line with theories of political socialization. In the German case, this is foremost reflected in more recent cohorts' lower support for the old "Volksparteien" and their higher support for the Greens. If these patterns persist and as older cohorts leave the electorate, we are likely to see a further decline in the strength of the CDU/CSU and the SPD and a further fragmentation of the German party system.

4.2 Cohort differences in the effect of education on voting

In Figure 2, I present the main results pertaining to H4 and H5, i.e., the differential effect of education across cohorts. From another angle, these analyses relax the assumption implicit to the analysis in the previous section that cohort patterns are the same for the lower educated and the higher educated. Figure 2 shows predicted probabilities to vote for each of the six parties by cohort and lower vs. high education (in Western Germany).

Figure 3: Predicted probability of party choice by cohorts and high education in Western Germany



Note: Predicted probabilities (with 85% confidence intervals) from binary-logistic regression models with age, period, and cohort effects. Western Germany only. Weights employed that adjust vote choices to official election results. Full regression tables as well as plots with predicted probabilities by age and year are reported in appendix E.

In line with H4, high education is overall primarily associated with a higher likelihood to vote for the "old" right and a lower likelihood to vote for the "old" left among the early cohorts. This is especially clear for the WW generation and regarding voting for the SPD and the FDP. Highly educated members of the WW generation are about four times less likely to vote for the SPD

as lower educated members of the WW generation. Within the silent generation, there is still a notable gap of about 14 percentage points in the probability of an SPD vote between the two educational groups. This gap vanishes in subsequent cohorts. Conversely, within the WW and the silent generation, the higher educated are about twice as likely to vote for the FDP as their lower educated contemporaries. This gap also vanishes in subsequent cohorts. The pattern is less clearly in line with H4 for the CDU/CSU, though the results do show a reversal of the effect of education. Within the WW generation, the higher educated are more likely to vote for the party, in line with H4, among boomers they are less likely to do so. However, education makes no difference within the silent generation and differences in predicted probabilities by education are relatively small within all cohorts.

The first observation to note about the more recent cohorts, especially the generation X and the millennials, is that voting probabilities do not vary by level of education for the "old" parties: There are no statistically significant differences between the educational groups for the CDU/CSU, the SPD, and the FDP.[7] The same is true for the PDS/LEFT. This observation goes against the idea of an emerging education cleavage affecting all parties. Rather, in line with H5, high education is only associated with a higher likelihood to vote for the new left (Greens) and a lower likelihood to vote for the radical right (AfD). When it comes to voting for these two parties, education makes a big difference, though only so in more recent cohorts.

For the Greens, the percentage point difference is already quite high among boomers (=15 percentage points) and stays on a high level in subsequent cohorts. Higher educated millennials are about four times as likely to vote for the Greens than millennials with lower levels of education (20% vs. 6%). Within the WW and silent generations, support for the Greens is low

[7] With a p-value of 0.095, the difference is at best only borderline significant for the FDP among millennials.

no matter the level of education and education only makes a small difference within the silent generation.

The results for the AfD represent a mirror image but conform even more with the idea of a successively widening education divide. The highest and lowest probabilities to vote for the AfD are both found among millennials. Millennials with lower levels of education are about four times as likely to vote for the party as their higher educated contemporaries (16% vs. 4%). In contrast, among those born until 1945 as well as among boomers, education is not discernibly associated with the AfD vote.

On a superficial level, these results support the notion of a reversal of the education divide at the cohort level in that high education is associated with voting for the (old) right in older cohorts and associated with voting for the (new) left in more recent cohorts. Though, it seems that the results are more accurately characterized as indicating a vanishing of an old education divide between the "old" right, especially the FDP, and the "old" left SPD and the emergence of a new education with the new left Greens and the radical-right AfD at its poles. This new education divide is thus strongly related to the emergence of new parties.

It is striking to see how much this change in the role of education for the vote takes place at the cohort level rather than materializing through period effects. Recall that the results in Figure 3 are from a model that also allows the effect of education to vary over time (and with age). In contrast to the cohort results in Figure 3, the results in Figure E1 of the appendix show few clear trends, if any, in the effect of education on the vote to change over time. Perhaps, the clearest evidence of such over-time change can be seen for the AfD for which the education gap has also increased over the three elections it participated in since 2009, paralleling its full shift to the radical right (Arzheimer & Berning 2019). Regarding age, there is little evidence of life-cycle effects to vary depending on one's level of education.

The results in Figure 3 also qualify the results on the cohort trends from Figure 2. The CDU/CSU's losses are stronger among the highly educated than the lower educated. In contrast, the dwindling support for the SPD overall is driven by the lower educated. The party is actually stronger among higher educated millennials than higher educated members of the WW generation. The Greens' strength in post-1945 cohorts is mainly about the highly educated. Finally, the AfD is not per se stronger in post-boomer generations. This is only true for the lower educated. Cohort patterns even tend in the opposite direction for the higher educated.

The appendix contains a similar set of robustness checks as those used above in section 4.1 (see section F of the appendix). Results are again qualitatively similar when not using weights and with a random-effect specification for year. The use of the more fine-grained cohort scheme with birth decades confirms the conclusions from Figure 3. Some of the patterns become amplified. The results for the Greens point to a further increase in support among the highly educated most recent voters, and a further widening of the educational gap. The predicted probability of a GREEN vote is about 29% for highly educated individuals born in the 1990s, but just 7% for lower educated individuals born in the same decade. For the AfD, we see a tendency of declining support among those born in the 1990s relative to those born in the 1980s even for the lower educated (18% vs. 13%). Among the highly educated born in the 1990s the predicted probability of an AfD vote is just 3%—its lowest level overall. Using the more fine-grained categorization into age groups also leads to similar conclusions, albeit with somewhat lower levels of support for the Greens among millennials and an emerging tendency of the higher educated being more likely to vote SPD compared to the lower educated within the two most recent generations.

Including abstention changes the picture slightly, as it drives predicted probabilities of voting for each of the parties downward, especially for lower educated members of more recent cohorts. This results, for example, in a notable gap in the probability of an SPD vote between

higher educated and lower educated millennials (20% vs. 11%). In other words, that higher and lower educated individuals in recent cohorts are equally likely to vote SPD is only true if we consider exclusively voters. This points to the important fact that the education divide is also very much about different levels of electoral participation than about voting for different parties, as has been noted elsewhere (e.g., Bovens & Wille 2017).[8]

In a final supplementary analysis in appendix section H, I investigate cohort-by-education patterns for Eastern Germany. Regarding voting behavior in more recent cohorts, the results are similarly in line with H5. Within the generation X and among millennials, high education is primarily associated with a higher likelihood to vote for the new-left Greens and a lower likelihood to vote for the radical-right AfD. The results in the East point to a successive widening of the educational gap even more so than in the West. The probability to vote GREEN has successively increased among the higher educated (to 19% among higher educated millennials), whereas support has not appreciably increased among the lower educated (standing at 5% among lower educated millennials). For the AfD, as in the West, the education gap is largest among millennials with a probability to vote AfD of 28% among the lower educated and 9% among the higher educated. These tendencies are further amplified when using the more fine-grained cohort scheme with the probability of higher educated millennials voting GREEN rising to 24% and those of lower educated millennials to vote AfD to 35%.

However, results for the earlier cohorts are very different in the East. There are essentially no differences between the lower and the higher educated among those born until 1945 for any of

[8] While electoral turnout is not the main concern of this article, I therefore investigate electoral turnout directly in appendix section G through a similar set of binary-logistic APC regression models that I used for party choice. The results not only show that declining turnout is to large extent a cohort phenomenon (cf. Elff & Roßteutscher 2017) but that this decline chiefly concerns the lower educated (cf. Schäfer et al. 2020). Among higher educated millennials the predicted probability to turn out to vote is still 81%, not that far from the peak level of 91% for highly educated boomers. In contrast, barely just over one in two (54%) of lower educated millennials turn out to vote. Life-cycle effects on voter turnout also seem to vary by education, with turnout dropping above the age of 65 only for the lower educated.

the “old” parties CDU/CSU, SPD and FDP. Instead, within this cohort, but not the more recent ones, high education is associated with voting for the socialist PDS/Left party. This pattern can plausible be attributed to the communist past of Eastern Germany: Among early cohorts in the East, higher education is associated with having held elite positions in the GDR, and the greater allegiance to the regime associated with these elite positions has resulted in an increased propensity to support the SED’s successor parties after unification (cf. Klein & Caballero 1996). Thus, that patterns in the East and West differ among the earlier cohorts does not run counter to the claim that linkages between education and voting behavior are shaped by political socialization but are in line with it.

In sum, the results in this section show that education is differently related to voting behavior in earlier and more recent cohorts. In Western Germany and within the WW generation, high education is associated with an increased likelihood of voting for the “old” right CDU/CSU and especially the FDP and a decreased likelihood to choose the SPD. In case of the FDP and the SPD, the same tendencies hold within the silent generation. These differences—representing an “old” education divide in which the higher educated prefer the “old” right over the “old” left on economic grounds—vanished in subsequent cohorts. In both Western and Eastern Germany, education does not make a difference regarding voting for these “old” parties in more recent generations. Instead, in these cohorts, but not the earlier ones, high education makes a strong difference for the Green vote and, increasingly so, for the AfD. While higher educated millennials are about four times more likely to vote for the Greens than lower educated millennials, lower educated millennials are about four times more likely to vote for the AfD than higher educated millennials.

5. Conclusion

This study has conducted an APC analysis of vote choices in the German Federal Republic on the basis of harmonized data from election surveys for all twenty German federal elections from 1949 to 2021. It has focused on differences in vote choices for all six major parties currently represented in the German Bundestag across cohorts, both with regard to different levels of party support and different effects of education on vote choice. Both of these analyses point to generational replacement as a catalyst of electoral change.

First, net of election year-to-election year changes in vote choices as well as life-cycle effects, there is strong variation in party support across cohorts. In Western Germany, support for the old "Volksparteien" CDU/CSU and SPD is lower among the more recent cohorts, whereas the Greens fare better among those born after World War II. With period effects being less consistently related to long-term trends in party support in German federal elections, it appears that the secular decline of the old "Volksparteien" and the rise of the Greens are to a large extent a result of generational replacement. With many of those born before 1945 already having left the electorate (see Figure A1 in the appendix), generational replacement has already left its mark on election results—but if the trend persists, we may expect a further decline of the CDU/CSU and the SPD and a further rise of the Greens over the medium turn. These results add to previous APC analyses of levels of party support in Germany (Goerres 2008; Klein 2009) that were more limited in terms of scope and/or the time period covered.

Second, high formal education plays a very different role for different cohorts, again net of period- and age-related variation in the effect of education on party choice. In Western Germany, high education goes along with an increased likelihood of a CDU/CSU and, especially, FDP vote as well as a decreased likelihood to vote for the SPD among those born until the end of World War II. Within more recent cohorts, high education primarily makes

voting for the Greens more likely and, conversely, voting for the radical-right AfD less likely. In case of the Greens, the educational gap is already quite large among boomers in the West, in the East it is larger the more recent the cohort. In case of the AfD, the gap is largest among (post-)millennials. These results add to and qualify previous work on the changing effect of education on the vote in Western Europe (Gethin et al. 2021, van der Brug and Rekker 2021). Rather than to a "reversal of the education cleavage" (Gethin et al. 2021, 2022) or to the effect of education on the vote merely becoming larger in more recent cohorts (van der Brug and Rekker 2021), these results point to a transformation of the education divide away from an "old" education divide pitting the "old" left against the "old" right towards a "new"—one might say: cultural—education divide pitting the new-left Greens against the radical-right AfD. In a way, this new education divide is quantitatively more important than the old one as the high educated are a much larger group in more recent cohorts. Like with levels of party supports, these shifts seem to largely flow from cohort effects as there is little evidence of the effect of education to change over time (net of cohort effects). Again, there are straightforward implications: If the trends persist, the new education divide will further gain in importance in future electorates due to the mechanics of generational replacement.

An important broader lesson of this study lies in the extent to which electoral change and realignment are driven by generational replacement. This finding for the German case mirrors recent findings for the Netherlands (van der Brug and Rekker 2021). For future research, it implies that in order to understand processes of electoral change more attention should be paid to the cohort dimension, rather than assuming that at a single point in time drivers of the vote operate similarly for all cohorts. The insight that electoral realignment might operate through generational change also has implications for important debates around electoral realignment. For example, the re-orientation of working-class voters from the mainstream left to the radical right (Arzheimer 2013; Oesch and Rennwald 2018) may not be a matter of individuals

switching sides over time—for which there appears to be little evidence, but of voters from new cohorts voting differently than those from older cohorts.

As indicated at the outset, there are relatively few APC studies on vote choices, especially on the German case and on the question how drivers of the vote vary by cohort, period, and age. The present study has contributed towards addressing these gaps, but it is, of course, not without limitations. In particular, the model employed implies a number of simplifying assumptions that future studies may relax to gain additional insight. For example, it is conceivable that ageing and/or period effects differ across cohorts. This is a thorny issue but could potentially be addressed in more complex modelling exercises. Likewise, there are other aspects in which voting behavior likely differs across cohorts that could conceivably be incorporated. In particular, vote choices are likely to be more stable among both voters of higher age and from earlier cohorts (Rekker 2022)—which, in turn, has implications for the projections from such models. In these and other ways, future work, on the German case and beyond it, may build upon the analyses of this study to better understand the generational component of electoral change.

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Online Appendix

to

Generational Change in Party Support in Germany:

The Decline of the *Volksparteien*, the Rise of the Greens, and the Transformation of the Education Divide

Appendix A: Additional information on the cohort and age group classifications

Table A1: Comparing the cohort classification used in this study with alternative classifications used in previous studies

Cohort classification used in this study	**Cohort classification used in Goerres (2008)**	**Cohort classification used in Klein (2008)**
WW generation: Born until 1927	Empire: born until 1891 (men only)	"Vorkriegsgeneration": Born until 1921
	Weimar: 1892-1914 (men) born until 1914 (women)	
Silent generation: 1928-1945	Adenauer: 1915-1945	"Kriegs- bzw. Nachkriegsgeneration": 1922-1934
		"Adenauer-Generation": 1935-1945
Baby boomers: 1946-1964	Brandt: 1946-1962	"APO-Generation": 1946-1953
		"Generation der Neuen Sozialen Bewegungen": 1954-1964
Generation X: 1965-1979	Kohl: 1963-1976	"Generation Golf": 1965-1975
(Post-)Millennials: 1980 and later	Schröder: 1977 and later	"Wiedervereinigungsgeneration": 1976 and later

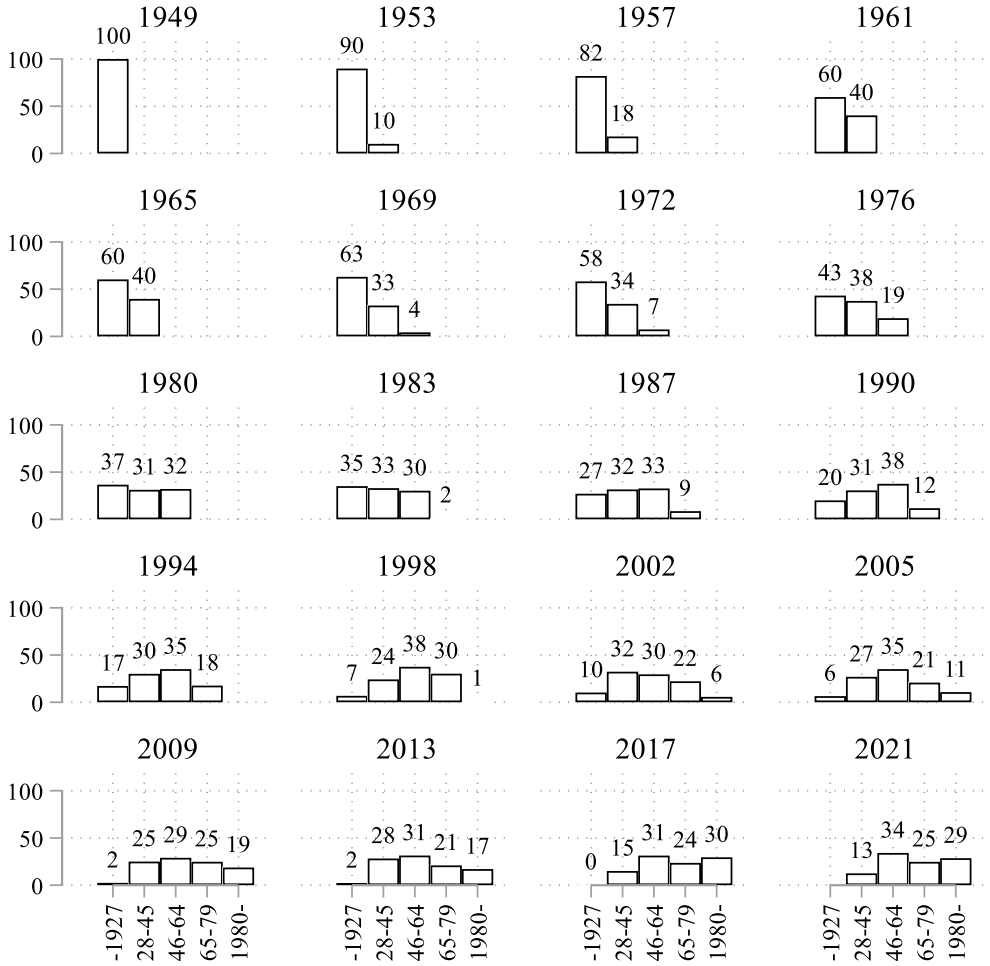
Table A2: Cross-tabulation of cohorts and age groups in Western European countries (all data)

		age groups			
		up to 35	36 to 64	65 and older	*total*
cohorts	WW II generation (<=1927)	1,894	11,908	7,780	*21,582*
	silent generation (1928-1945)	4,483	7,836	2,998	*15,317*
	baby boomers (1946 to 1964)	5,503	5,554	910	*11,967*
	generation X (1965 to 1979)	2,190	2,272	0	*4,462*
	millennials (>=1980)	2,078	307	0	*2,385*
	total	*16,148*	*27,877*	*11,688*	*55,713*

Table A3: Cross-tabulation of cohorts and age groups in Western European countries (data from 1980 onwards)

		age groups			
		up to 35	36 to 64	65 and older	*total*
Cohorts	WW II generation (<=1927)	0	2,485	4,327	*6,812*
	silent generation (1928-1945)	201	6,854	2,998	*10,053*
	baby boomers (1946 to 1964)	4,992	5,554	910	*11,456*
	generation X (1965 to 1979)	2,190	2,272	0	*4,462*
	millennials (>=1980)	2,078	307	0	*2,385*
	total	*9,461*	*17,472*	*8,235*	*35,168*

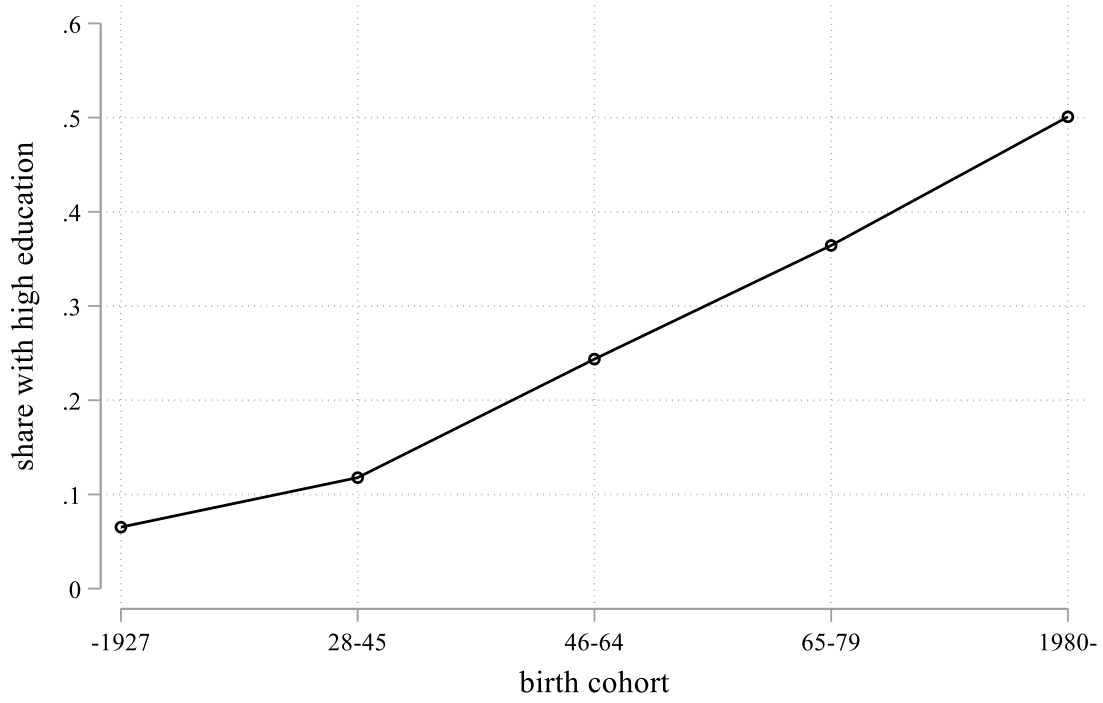
Figure A1: Cohort distribution in percent by election year



Note: Weights employed that adjust vote choices to official election results.

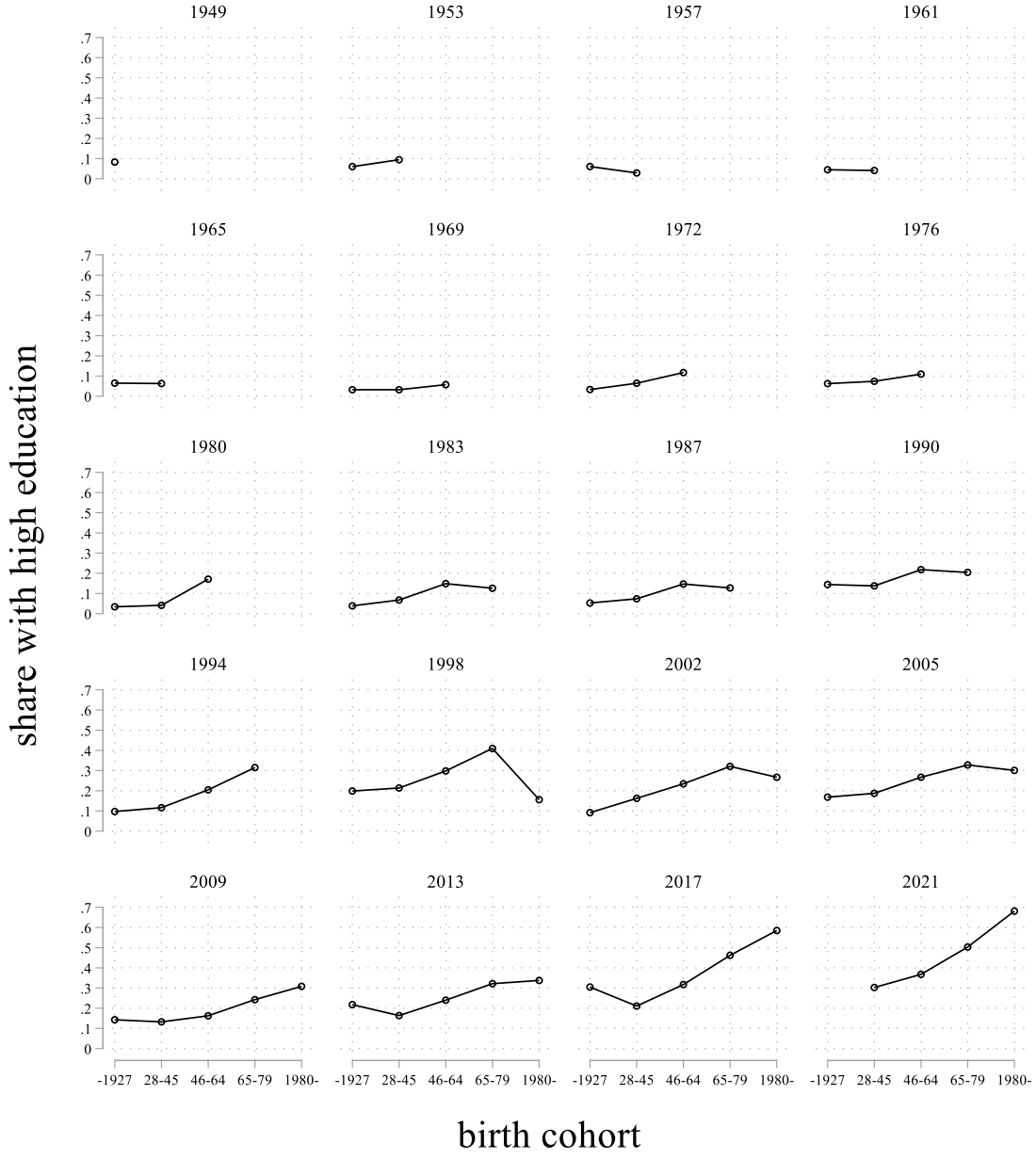
Appendix B: Levels of education across cohorts

Figure B1: Share with high education across cohorts



Note: Weights employed that adjust vote choices to official election results.

Figure B2: Share with high education across cohorts and years



Note: Weights employed that adjust vote choices to official election results.

Appendix C: Further results for Figure 2 (baseline APC model)

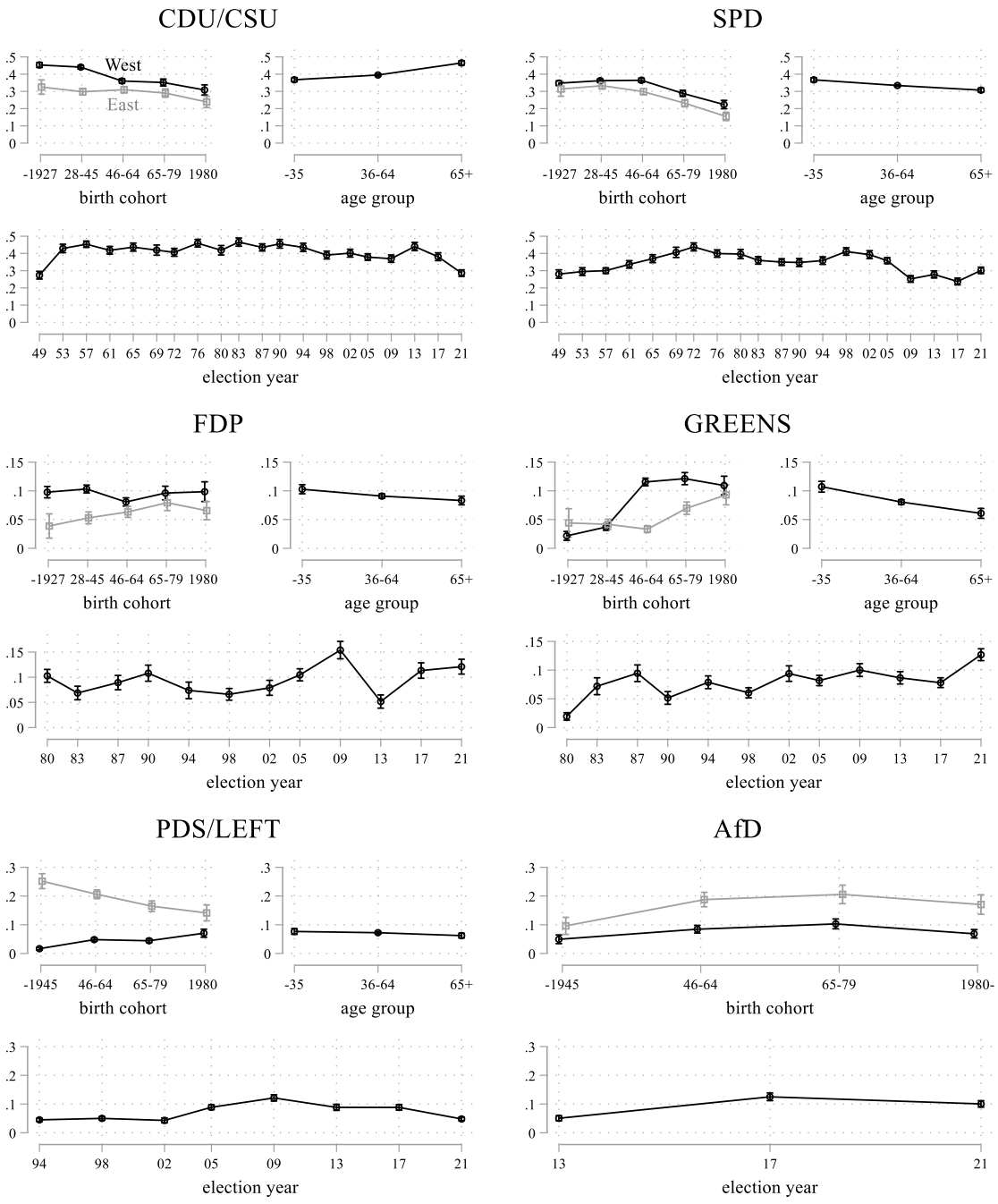
Table C1: Regression table for results in Figure 2

	CDU/CSU	SPD	FDP	GREENS	PDS/LEFT	AfD
Cohort						
(28)-45	-0.052	0.066	0.061	0.56*		
	(0.049)	(0.050)	(0.085)	(0.25)		
46-64	-0.39***	0.075	-0.21+	1.79***	1.10***	0.58*
	(0.070)	(0.070)	(0.13)	(0.26)	(0.20)	(0.26)
65-79	-0.43***	-0.28**	-0.018	1.85***	1.01***	0.80**
	(0.091)	(0.093)	(0.15)	(0.28)	(0.23)	(0.26)
1980-	-0.63***	-0.62***	0.0097	1.73***	1.51***	0.35
	(0.12)	(0.13)	(0.19)	(0.31)	(0.27)	(0.28)
East	-0.55***	-0.15	-0.99*	0.74	3.04***	0.73*
	(0.14)	(0.14)	(0.40)	(0.45)	(0.17)	(0.33)
Cohort X East						
(28)-45 # East	-0.077	0.023	0.27	-0.62		
	(0.15)	(0.15)	(0.42)	(0.48)		
46-64 # East	0.32*	-0.15	0.73+	-2.09***	-1.37***	0.21
	(0.15)	(0.15)	(0.42)	(0.47)	(0.20)	(0.37)
65-79 # East	0.27	-0.15	0.78+	-1.36**	-1.56***	0.11
	(0.16)	(0.17)	(0.42)	(0.47)	(0.22)	(0.38)
1980- # East	0.20	-0.30	0.55	-0.93+	-2.25***	0.32
	(0.19)	(0.20)	(0.44)	(0.47)	(0.23)	(0.40)
Year						
53	0.71***	0.071	-0.18			
	(0.093)	(0.100)	(0.14)			
57	0.81***	0.096	-0.50***			
	(0.080)	(0.085)	(0.12)			
61	0.66***	0.27**	0.028			
	(0.092)	(0.096)	(0.13)			
65	0.74***	0.41***	-0.29+			
	(0.095)	(0.099)	(0.16)			
69	0.67***	0.57***	-0.81***			
	(0.11)	(0.11)	(0.22)			
72	0.61***	0.70***	-0.40**			
	(0.097)	(0.098)	(0.14)			
76	0.83***	0.54***	-0.44**			
	(0.097)	(0.100)	(0.15)			
80	0.66***	0.53***	-0.11	0		
	(0.11)	(0.11)	(0.14)	(.)		
83	0.86***	0.37***	-0.55**	1.39***		
	(0.10)	(0.11)	(0.18)	(0.27)		
87	0.73***	0.33**	-0.26	1.70***		
	(0.100)	(0.10)	(0.17)	(0.26)		
90	0.82***	0.31**	-0.049	1.03***		
	(0.11)	(0.11)	(0.17)	(0.28)		
94	0.73***	0.36**	-0.47*	1.49***	0	
	(0.11)	(0.11)	(0.21)	(0.26)	(.)	
98	0.54***	0.59***	-0.59**	1.20***	0.12	
	(0.11)	(0.11)	(0.18)	(0.26)	(0.13)	
02	0.59***	0.51***	-0.40*	1.69***	-0.049	
	(0.11)	(0.12)	(0.19)	(0.27)	(0.17)	
05	0.49***	0.36***	-0.083	1.54***	0.78***	
	(0.11)	(0.11)	(0.16)	(0.26)	(0.13)	
09	0.45***	-0.15	0.36*	1.77***	1.16***	

	(0.11)	(0.12)	(0.17)	(0.26)	(0.13)	
13	0.75***	-0.011	-0.85***	1.60***	0.77***	0
	(0.12)	(0.12)	(0.23)	(0.26)	(0.14)	(.)
17	0.50***	-0.23+	0.0055	1.48***	0.77***	1.02***
	(0.12)	(0.13)	(0.18)	(0.27)	(0.14)	(0.16)
21	0.062	0.10	0.080	2.05***	0.072	0.76***
	(0.12)	(0.12)	(0.18)	(0.26)	(0.15)	(0.16)
Age group						
36-64	0.12**	-0.15***	-0.14+	-0.33***	-0.068	
	(0.044)	(0.044)	(0.072)	(0.090)	(0.13)	
65+	0.42***	-0.27***	-0.24*	-0.64***	-0.25	
	(0.064)	(0.065)	(0.11)	(0.16)	(0.19)	
Male	-0.22***	0.11***	0.12*	-0.29***	0.24***	0.66***
	(0.027)	(0.027)	(0.046)	(0.055)	(0.066)	(0.12)
Constant	-0.82***	-0.81***	-1.94***	-4.94***	-4.64***	-4.06***
	(0.079)	(0.082)	(0.11)	(0.32)	(0.22)	(0.26)
Observations	27295	27295	27295	17502	13637	5834
McKelvey-Zavoina-R^2	0.060	0.041	0.037	0.24	0.24	0.13

Note: Regression coefficients (with standard errors in parentheses) from binary-logistic regression models. Weights employed that adjust vote choices to official election results. $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

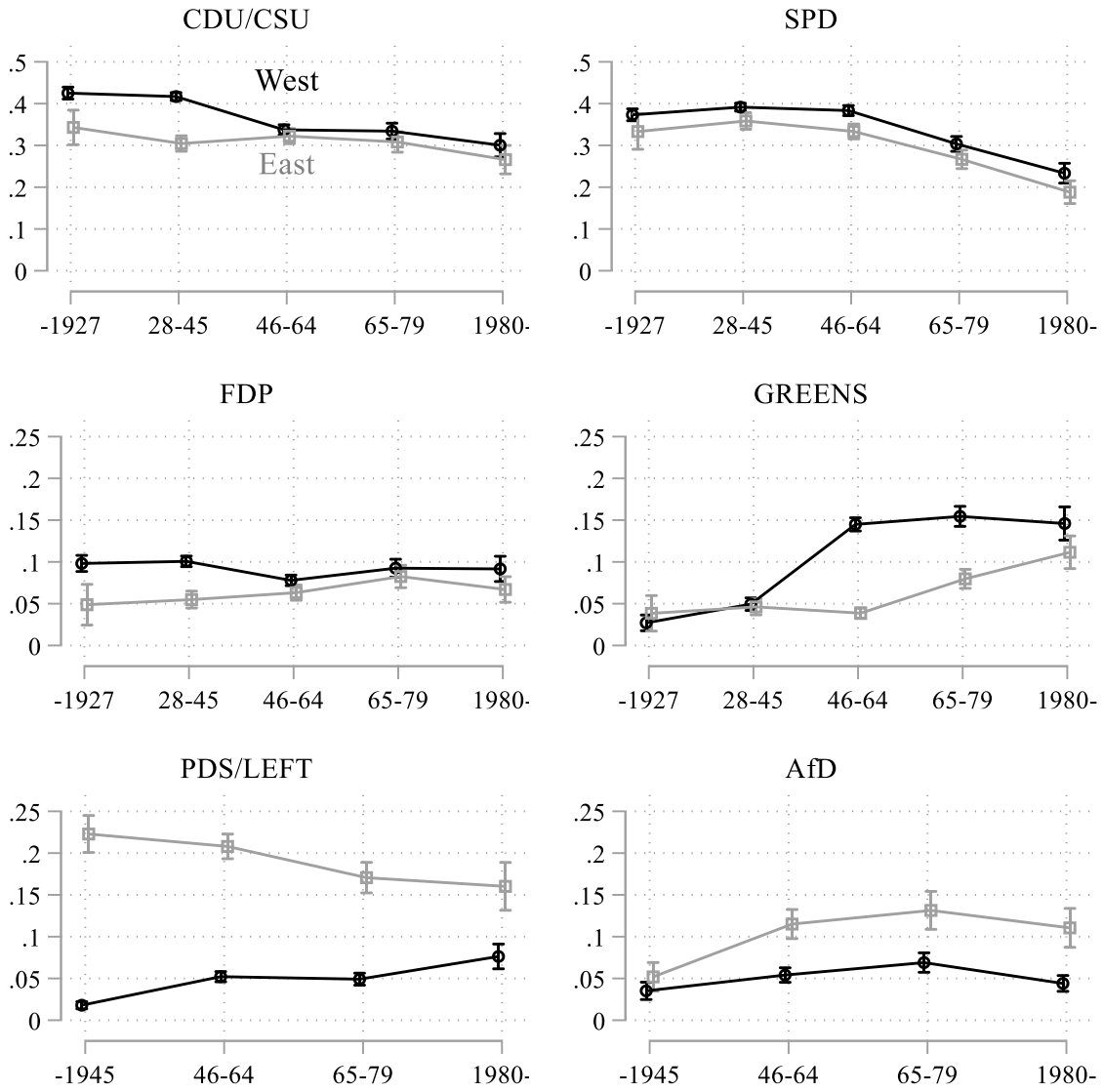
Figure C1: Predicted probabilities by cohort, age and election year from regressions in Table C1



Note: Predicted probabilities (with 85% confidence intervals) from the binary-logistic regression models in Table C1.

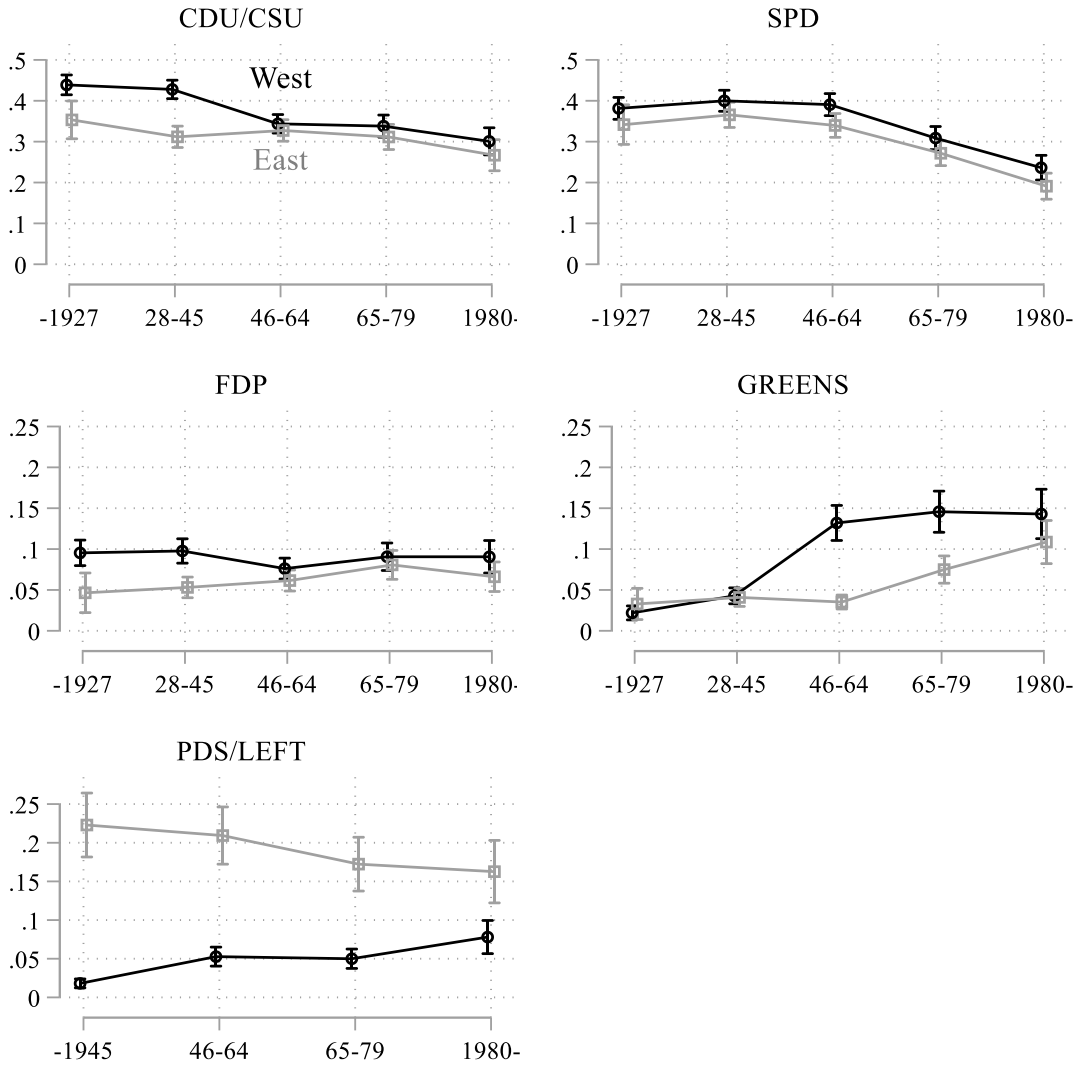
Appendix D: Results from robustness checks for Figure 2 (baseline APC model)

Figure D1: Predicted probability of party choice by cohorts and West vs. East (without weight)



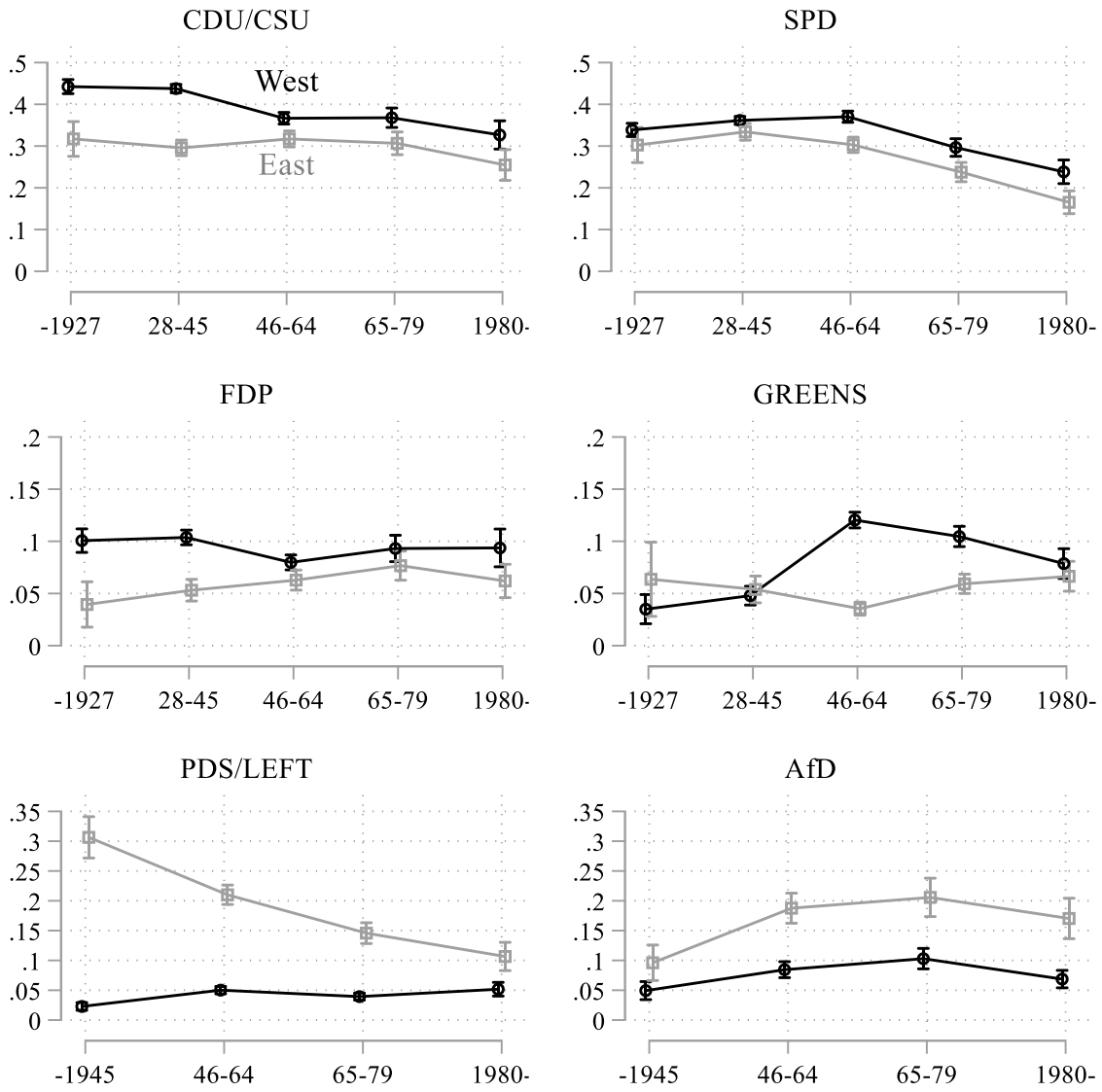
Note: Predicted probabilities (with 85% confidence intervals) from binary-logistic regression models with age, period and cohort effects. Models are equivalent to those of Figure 2 in the main text, albeit without weights employed.

Figure D2: Predicted probability of party choice by cohorts and West vs. East (multilevel model)



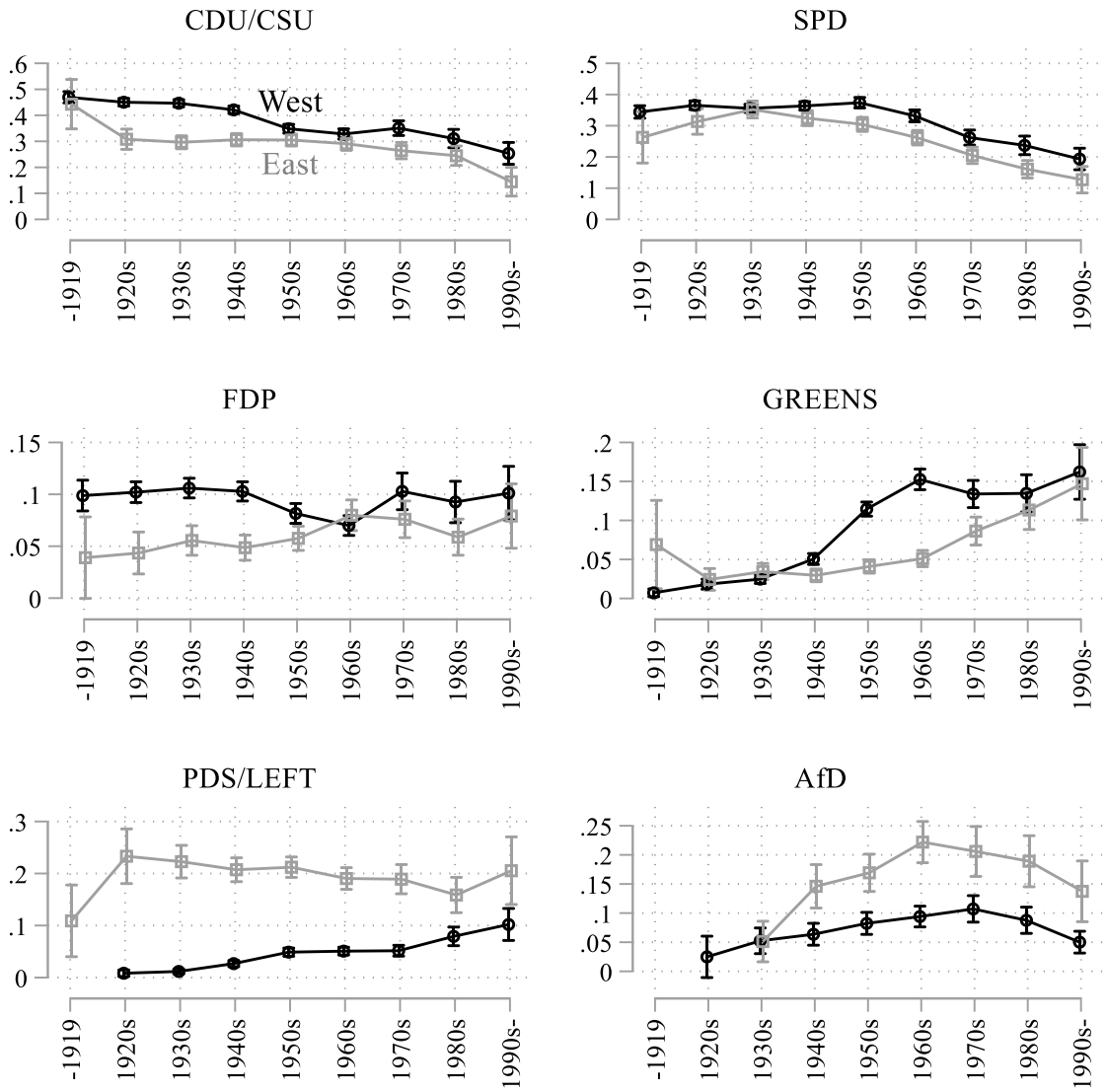
Note: Predicted probabilities (with 85% confidence intervals) from binary-logistic regression models with age, period and cohort effects. Models are equivalent to those of Figure 2 in the main text, albeit estimated as multi-level models with election years as random intercepts. Vote choice for the AfD omitted due to the low number of years/context units (n=3). No weights employed.

Figure D3: Predicted probability of party choice by cohorts and West vs. East (fine-grained age groups)



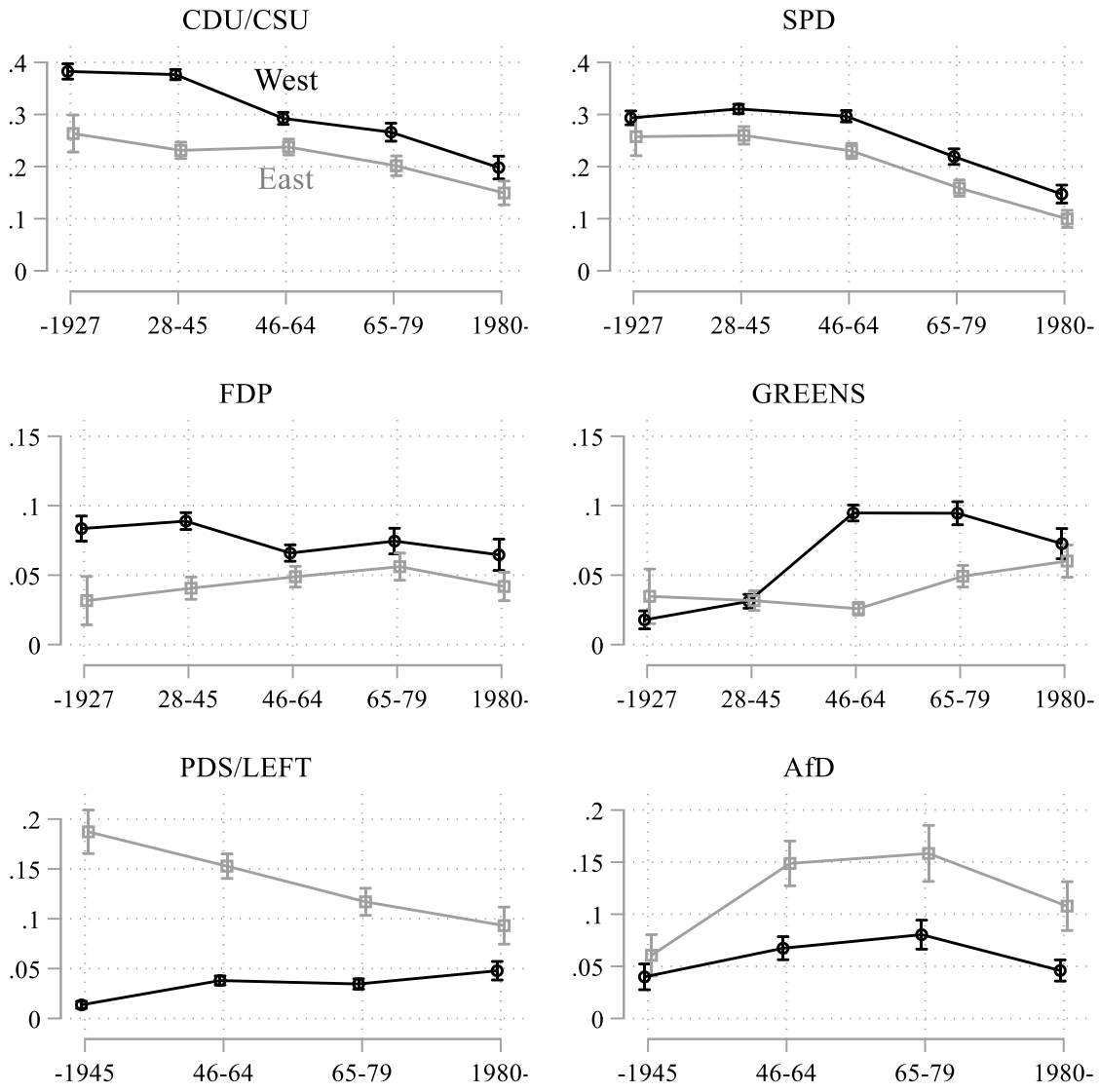
Note: Predicted probabilities (with 85% confidence intervals) from binary-logistic regression models with age, period and cohort effects. Models are equivalent to those of Figure 2 in the main text, albeit with a more fine-grained classification of age groups (-25; 26-39; 40-55; 56-70; 71-). Weights employed that adjust vote choices to official election results.

Figure D4: Predicted probability of party choice by cohorts and West vs. East (fine-grained cohorts)



Note: Predicted probabilities (with 85% confidence intervals) from binary-logistic regression models with age, period and cohort effects. Models are equivalent to those of Figure 2 in the main text, albeit with a more fine-grained cohort scheme. Weights employed that adjust vote choices to official election results.

Figure D5: Predicted probability of party choice by cohorts and West vs. East (including abstention)



Note: Predicted probabilities (with 85% confidence intervals) from binary-logistic regression models with age, period and cohort effects. Models are equivalent to those of Figure 2 in the main text, albeit including abstention (as zero).

Appendix E: Further results for Figure 3 (APC model with education interaction for Western Germany)

Table E1: Regression table for results in Figure 3 (APC model with education interaction for Western Germany)

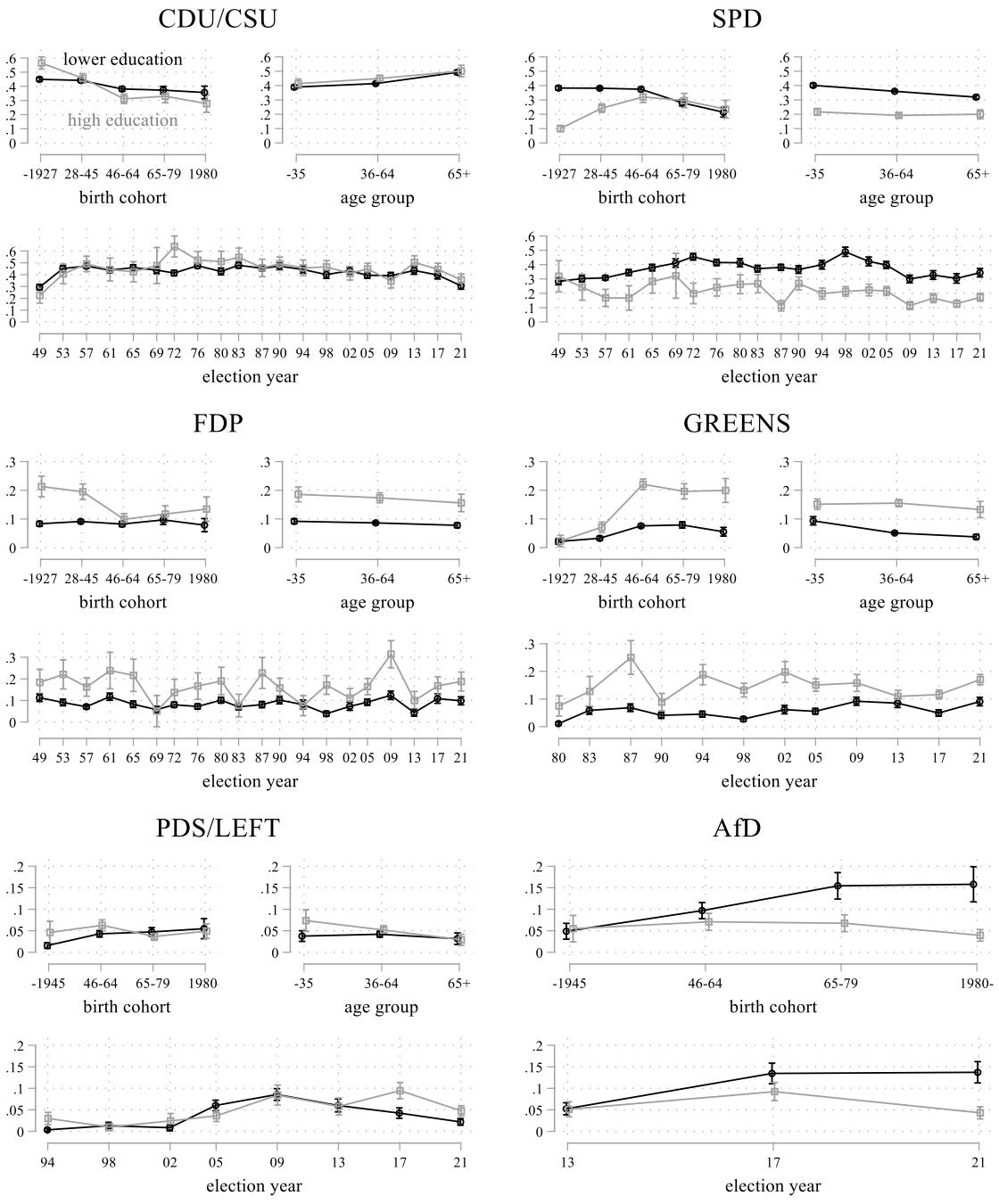
	CDU/CSU	SPD	FDP	GREENS	PDS/LEFT	AfD
Cohort						
(28)-45	-0.030	-0.0054	0.10	0.44		
	(0.052)	(0.053)	(0.095)	(0.29)		
46-64	-0.29***	-0.036	-0.013	1.34***	1.05**	0.75*
	(0.076)	(0.076)	(0.15)	(0.32)	(0.34)	(0.31)
65-79	-0.32**	-0.48***	0.17	1.39***	1.16**	1.29***
	(0.11)	(0.11)	(0.19)	(0.37)	(0.39)	(0.32)
1980-	-0.40*	-0.84***	-0.063	1.00*	1.32*	1.32***
	(0.16)	(0.16)	(0.27)	(0.45)	(0.53)	(0.35)
Education	-0.076	-0.80*	0.89**	0.51	3.46***	0.85
	(0.28)	(0.33)	(0.30)	(0.81)	(0.88)	(0.53)
Cohort X education						
(28)-45 # education	-0.42*	1.08***	-0.22	0.75		
	(0.18)	(0.23)	(0.23)	(0.69)		
46-64 # education	-0.81***	1.51***	-0.91**	1.18+	-0.72	-0.47
	(0.22)	(0.27)	(0.30)	(0.70)	(0.56)	(0.56)
65-79 # education	-0.68**	1.83***	-0.90*	0.98	-1.40*	-1.07+
	(0.26)	(0.32)	(0.36)	(0.74)	(0.64)	(0.57)
1980- # education	-0.87*	1.87***	-0.51	1.39+	-1.25	-1.67**
	(0.34)	(0.40)	(0.46)	(0.80)	(0.79)	(0.61)
Year						
53	0.69***	0.092	-0.24			
	(0.097)	(0.10)	(0.15)			
57	0.78***	0.12	-0.51***			
	(0.083)	(0.087)	(0.13)			
61	0.64***	0.29**	0.045			
	(0.095)	(0.098)	(0.14)			
65	0.72***	0.44***	-0.35*			
	(0.098)	(0.10)	(0.17)			
69	0.64***	0.57***	-0.73**			
	(0.11)	(0.11)	(0.23)			
72	0.54***	0.76***	-0.38*			
	(0.10)	(0.10)	(0.15)			
76	0.79***	0.59***	-0.49**			
	(0.10)	(0.10)	(0.17)			
80	0.59***	0.58***	-0.12			
	(0.12)	(0.12)	(0.16)			
83	0.81***	0.41***	-0.51**	1.75***		
	(0.11)	(0.11)	(0.19)	(0.35)		
87	0.70***	0.45***	-0.37*	1.92***		
	(0.10)	(0.11)	(0.18)	(0.34)		
90	0.77***	0.38**	-0.11	1.37***		
	(0.12)	(0.12)	(0.19)	(0.36)		
94	0.66***	0.53***	-0.37	1.47***		
	(0.13)	(0.13)	(0.24)	(0.36)		
98	0.48***	0.90***	-1.15***	0.95*	1.34+	
	(0.13)	(0.13)	(0.27)	(0.39)	(0.71)	
02	0.62***	0.62***	-0.48*	1.80***	0.89	
	(0.13)	(0.13)	(0.24)	(0.38)	(0.82)	

05	0.46***	0.52***	-0.23	1.69***	2.92***	
	(0.12)	(0.12)	(0.19)	(0.36)	(0.60)	
09	0.44***	0.081	0.11	2.25***	3.31***	
	(0.13)	(0.13)	(0.20)	(0.36)	(0.60)	
13	0.63***	0.21	-1.03***	2.16***	2.92***	
	(0.14)	(0.14)	(0.31)	(0.37)	(0.62)	
17	0.47**	0.100	-0.043	1.56***	2.55***	1.05***
	(0.14)	(0.15)	(0.23)	(0.39)	(0.64)	(0.24)
21	0.055	0.28*	-0.15	2.24***	1.86**	1.08***
	(0.14)	(0.14)	(0.22)	(0.38)	(0.65)	(0.24)
Year X education						
53 # education	0.22	-0.50	0.48			
	(0.36)	(0.48)	(0.39)			
57 # education	0.50	-1.02*	0.36			
	(0.32)	(0.43)	(0.35)			
61 # education	0.44	-1.19*	0.29			
	(0.39)	(0.56)	(0.43)			
65 # education	0.27	-0.62	0.56			
	(0.38)	(0.45)	(0.44)			
69 # education	0.58	-0.56	-0.71			
	(0.53)	(0.64)	(1.09)			
72 # education	1.39***	-1.44**	0.027			
	(0.40)	(0.50)	(0.47)			
76 # education	0.63+	-1.01*	0.37			
	(0.37)	(0.45)	(0.45)			
80 # education	0.78+	-0.88+	0.17			
	(0.40)	(0.47)	(0.44)			
83 # education	0.71+	-0.68	-0.50	-1.14+		
	(0.39)	(0.47)	(0.62)	(0.61)		
87 # education	0.43	-1.83***	0.64	-0.42		
	(0.38)	(0.48)	(0.46)	(0.55)		
90 # education	0.51	-0.64	-0.072	-1.17*		
	(0.36)	(0.45)	(0.43)	(0.58)		
94 # education	0.48	-1.21**	-0.65	-0.36		
	(0.38)	(0.46)	(0.61)	(0.54)		
98 # education	0.69+	-1.48**	1.07*	-0.29	-2.44*	
	(0.37)	(0.46)	(0.47)	(0.56)	(0.97)	
02 # education	0.31	-1.15*	-0.11	-0.63	-1.11	
	(0.37)	(0.47)	(0.51)	(0.56)	(1.01)	
05 # education	0.64+	-1.09*	0.087	-0.87	-2.72***	
	(0.36)	(0.46)	(0.43)	(0.54)	(0.74)	
09 # education	0.20	-1.44**	0.62	-1.37*	-2.20**	
	(0.39)	(0.49)	(0.45)	(0.55)	(0.72)	
13 # education	0.71+	-1.12*	0.31	-1.73**	-2.22**	
	(0.38)	(0.48)	(0.56)	(0.56)	(0.75)	
17 # education	0.61	-1.34**	-0.069	-1.06+	-1.32+	-0.42
	(0.38)	(0.49)	(0.46)	(0.56)	(0.75)	(0.40)
21 # education	0.63+	-1.15*	0.18	-1.26*	-1.38+	-1.26**
	(0.38)	(0.49)	(0.46)	(0.55)	(0.77)	(0.43)
Age group						
36-64	0.11*	-0.18***	-0.068	-0.67***	0.11	
	(0.049)	(0.050)	(0.087)	(0.15)	(0.30)	
65+	0.43***	-0.37***	-0.18	-1.00***	-0.18	
	(0.070)	(0.072)	(0.13)	(0.25)	(0.48)	
Age group X education						
36-64 # education	0.055	0.017	-0.015	0.70***	-0.50	
	(0.13)	(0.13)	(0.17)	(0.20)	(0.41)	
65+ # education	-0.043	0.26	-0.037	0.84*	-0.81	
	(0.20)	(0.22)	(0.27)	(0.35)	(0.70)	
Male	-0.24***	0.20***	0.073	-0.37***	0.32**	0.60***
	(0.029)	(0.029)	(0.048)	(0.061)	(0.11)	(0.16)

Constant	-0.80***	-0.77***	-2.07***	-4.90***	-6.80***	-4.22***
	(0.084)	(0.086)	(0.12)	(0.41)	(0.69)	(0.33)
Observations	22230	22230	22230	12437	8609	3935
McKelvey-Zavoina-R^2	0.057	0.058	0.047	0.31	0.31	0.15

Note: Regression coefficients (with standard errors in parentheses) from binary-logistic regression models. Weights employed that adjust vote choices to official election results. $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

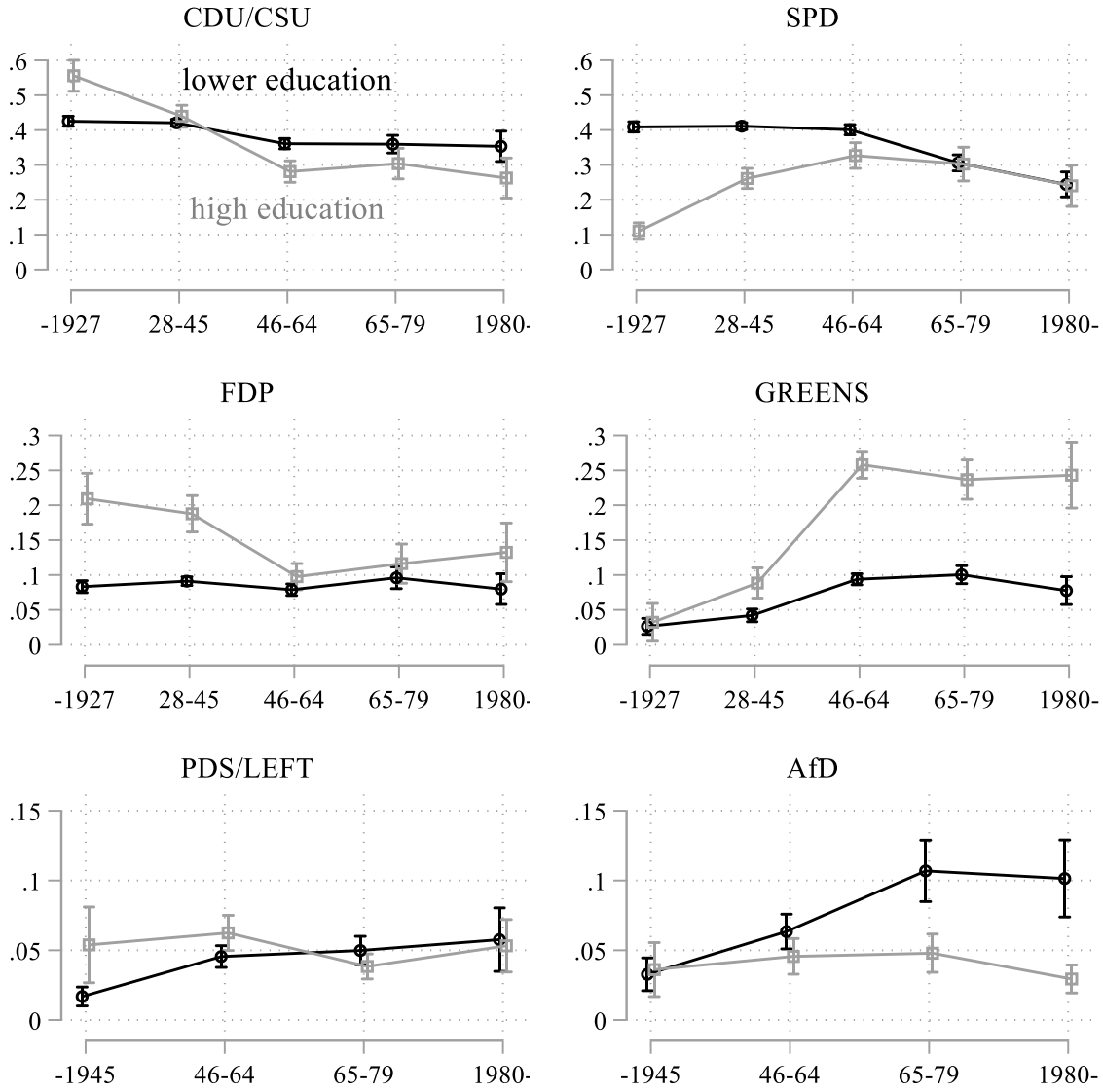
Figure E1: Predicted probabilities by cohort, age and election year from regression in Table C2



Note: Predicted probabilities (with 85% confidence intervals) from binary-logistic regression models

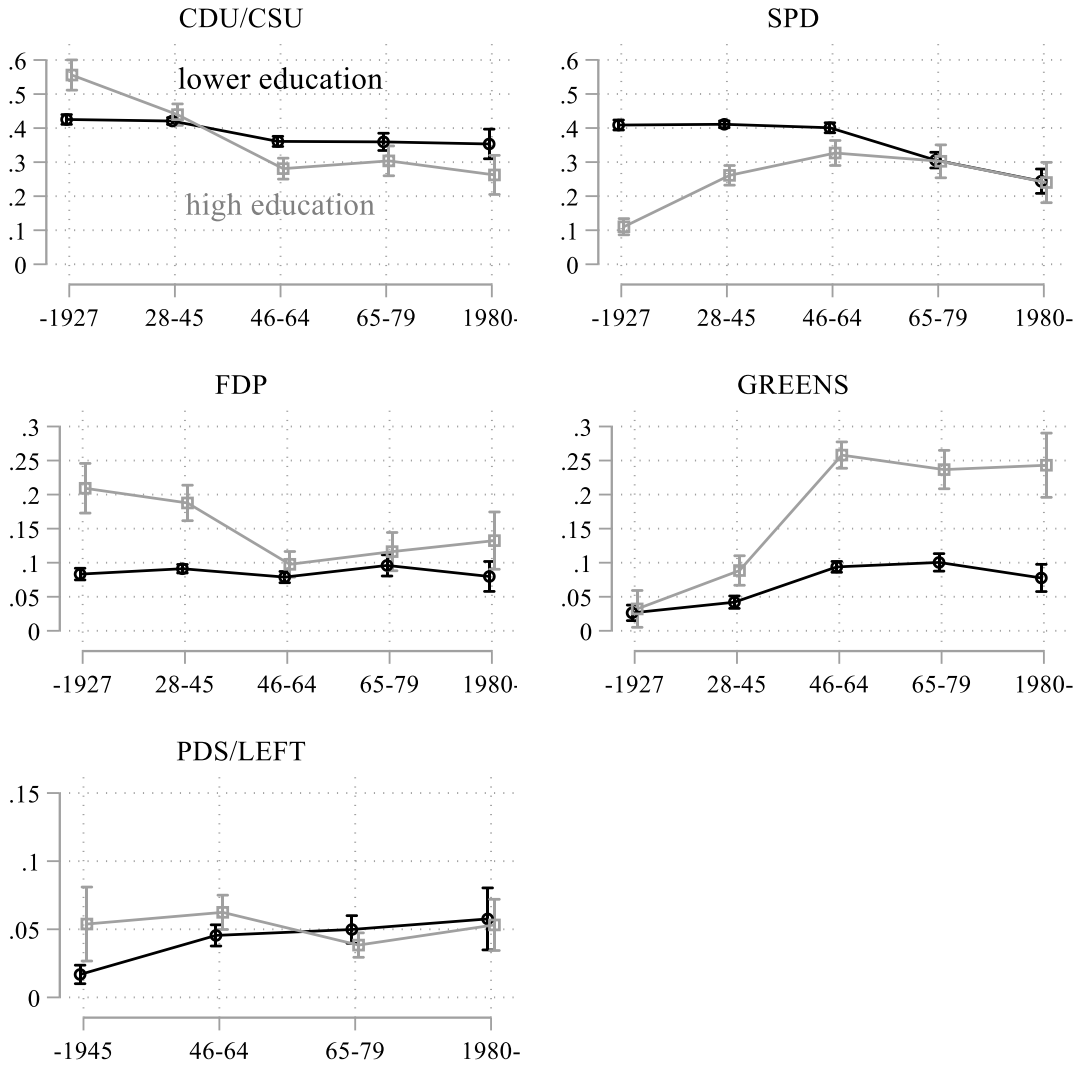
Appendix F: Results from robustness checks for Figure 2 (APC model with education interaction for Western Germany)

Figure F1: Predicted probability of party choice by cohorts and high education (without weight)



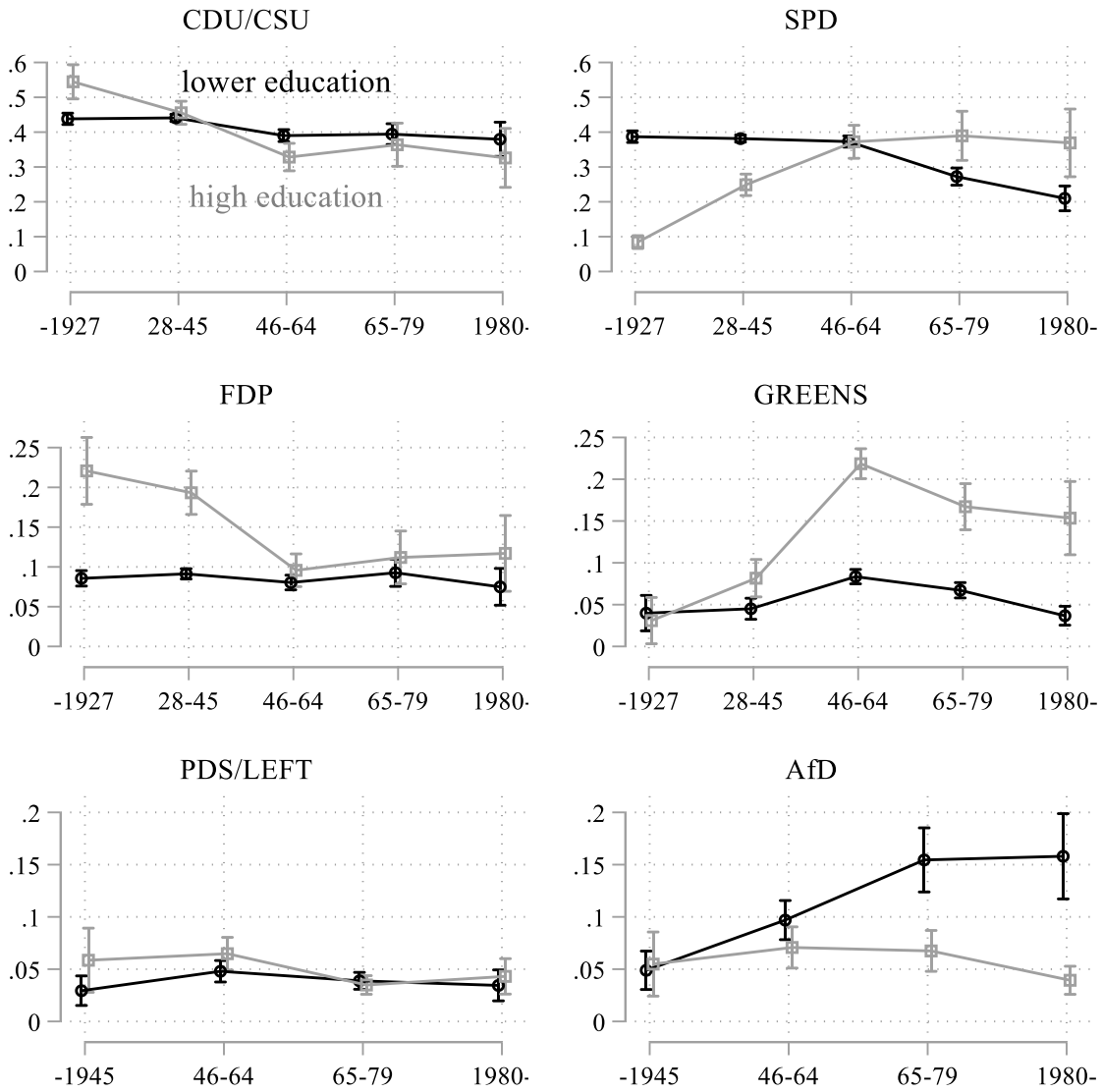
Note: Predicted probabilities (with 85% confidence intervals) from binary-logistic regression models with age, period and cohort effects. Western Germany only. Models are equivalent to those of Figure 3 in the main text, albeit without weights employed.

Figure F2: Predicted probability of party choice by cohorts and high education in Western Germany (multilevel model)



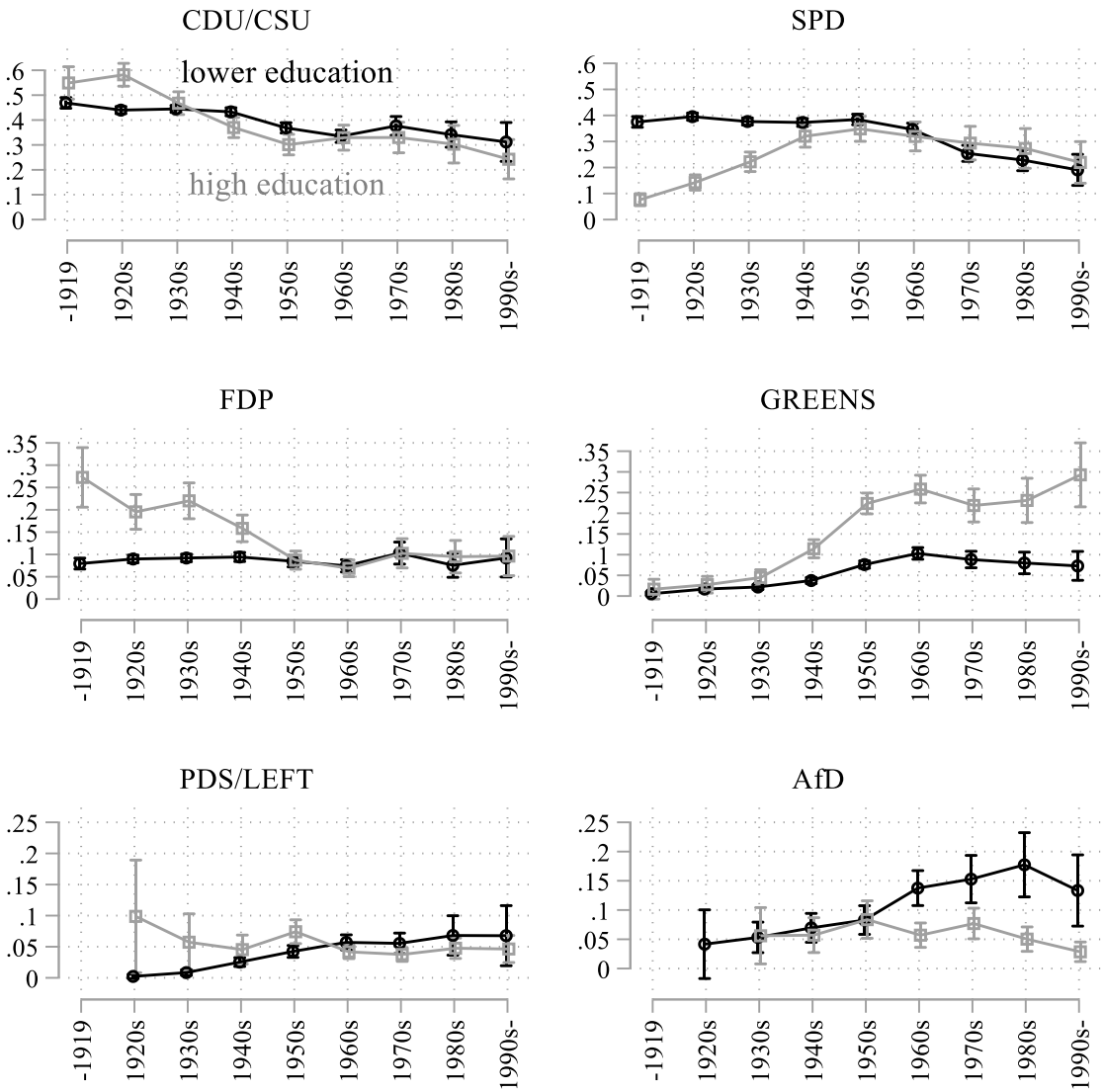
Note: Predicted probabilities (with 85% confidence intervals) from binary-logistic regression models with age, period and cohort effects. Western Germany only. Models are equivalent to those of Figure 2 in the main text, albeit estimated as multi-level models with election years as random intercepts. Vote choice for the AfD omitted due to the low number of years/context units (n=3). No weights employed.

Figure F3: Predicted probability of party choice by cohorts and high education in Western Germany (fine-grained age groups)



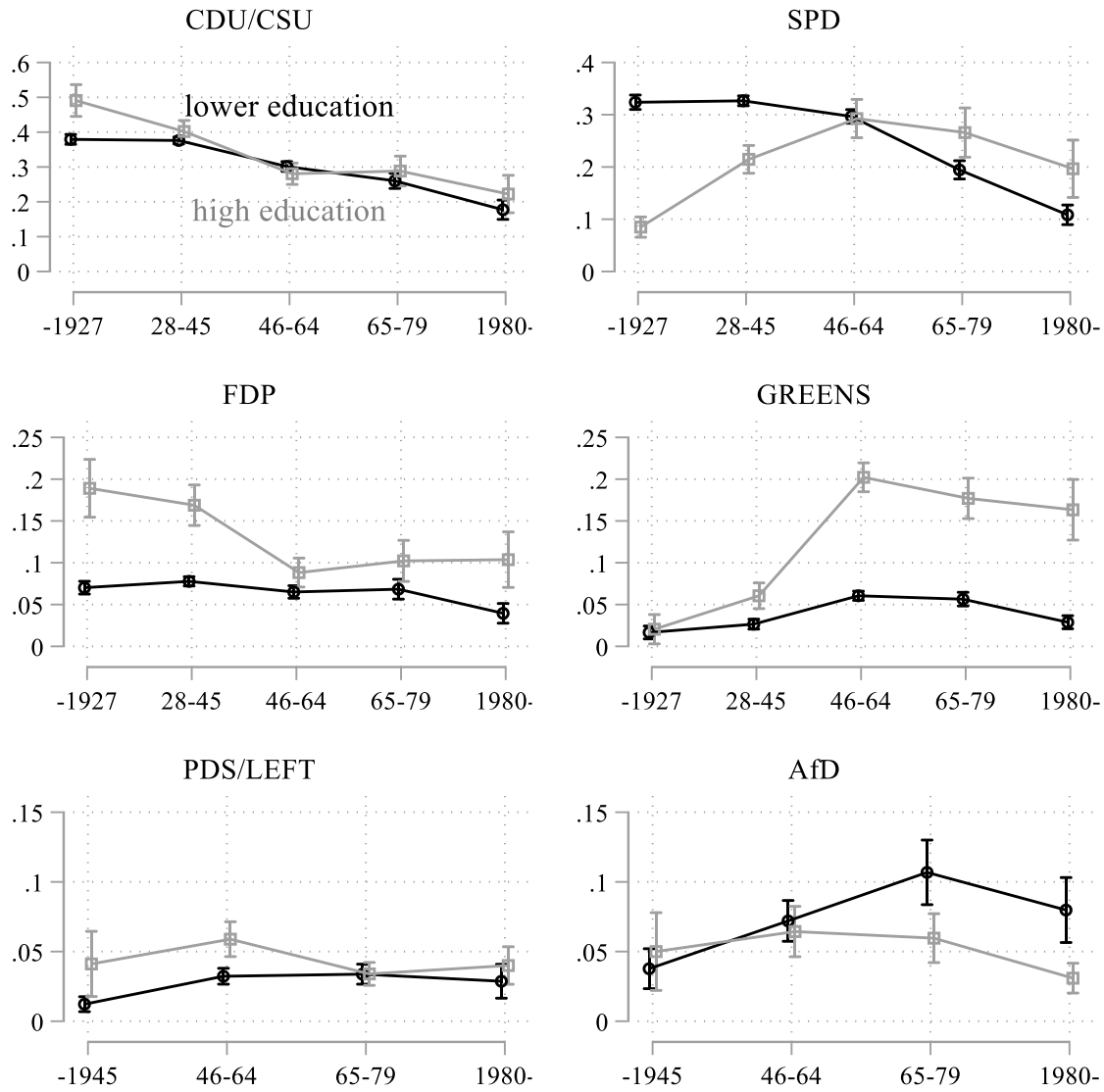
Note: Predicted probabilities (with 85% confidence intervals) from binary-logistic regression models with age, period and cohort effects. Western Germany only. Models are equivalent to those of Figure 3 in the main text, albeit with a more fine-grained classification of age groups (-25; 26-39; 40-55; 56-70; 71-). Weights employed that adjust vote choices to official election results.

Figure F4: Predicted probability of party choice by cohorts and high education in Western Germany (fine-grained cohorts)



Note: Predicted probabilities (with 85% confidence intervals) from binary-logistic regression models with age, period and cohort effects. Western Germany only. Models are equivalent to those of Figure 3 in the main text, albeit with a more fine-grained cohort scheme. Weights employed that adjust vote choices to official election results.

Figure F5: Predicted probability of party choice by cohorts and high education in Western Germany (including abstention)



Note: Predicted probabilities (with 85% confidence intervals) from binary-logistic regression models with age, period and cohort effects. Western Germany only. Models are equivalent to those of Figure 2 in the main text, albeit including abstention (as zero).

Appendix G: Results for voter turnout

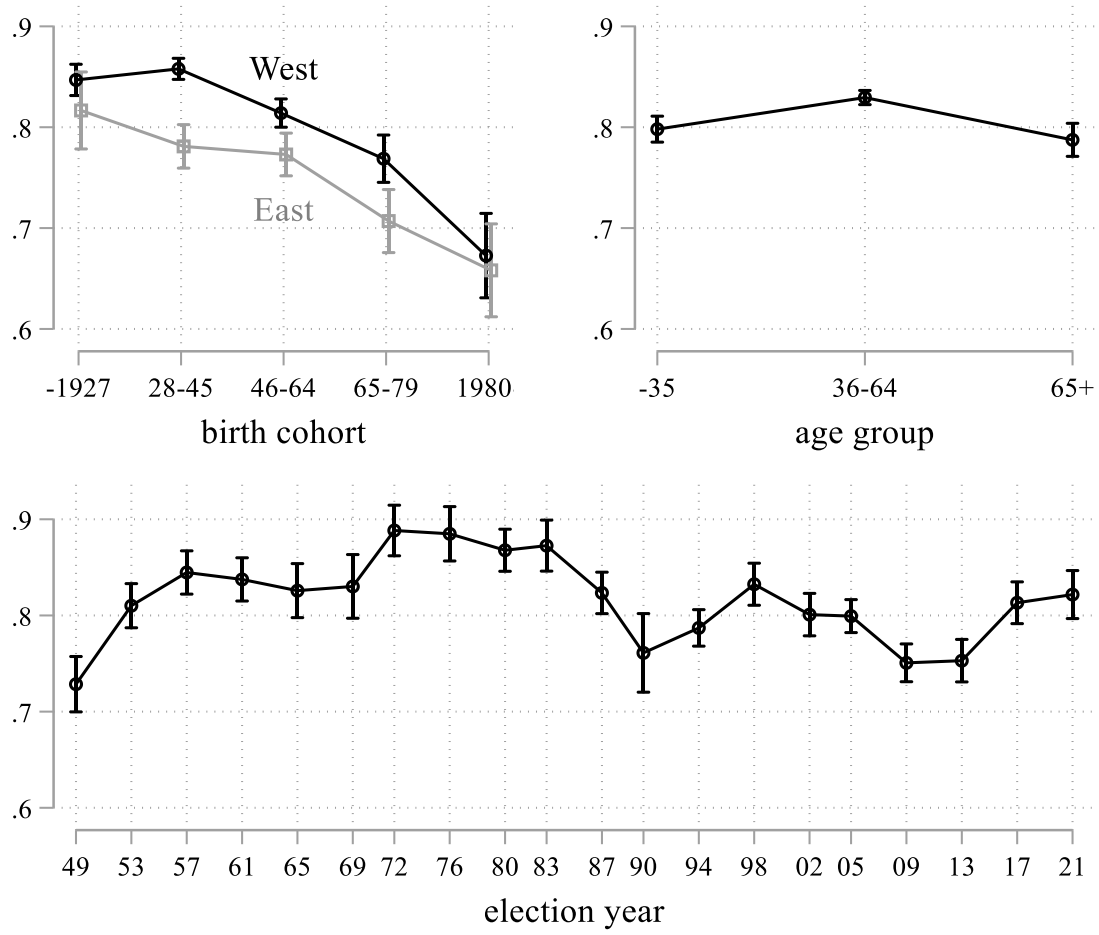
Table G1: Regression table for voter turnout

	Turnout (1)	Turnout (2)
Cohort		
(28)-45	0.089	0.071
	(0.093)	(0.099)
46-64	-0.24	-0.38**
	(0.12)	(0.13)
65-79	-0.52***	-0.82***
	(0.16)	(0.17)
1980-	-1.01***	-1.57***
	(0.20)	(0.22)
East	-0.22	
	(0.19)	
Cohort X East		
(28)-45 # East	-0.31	
	(0.21)	
46-64 # East	-0.036	
	(0.21)	
65-79 # East	-0.11	
	(0.22)	
1980- # East	0.15	
	(0.23)	
education		-10.8
		(18.8)
Cohort X education		
28-45 # high education=1		0.074
		(0.37)
46-64 # high education=1		0.82
		(0.48)
65-79 # high education=1		1.03
		(0.58)
1980- # high education=1		1.12
		(0.71)
Year		
53	0.48***	0.48***
	(0.098)	(0.098)
57	0.73***	0.72***
	(0.11)	(0.12)
61	0.67***	0.67***
	(0.12)	(0.12)
65	0.59***	0.58***
	(0.14)	(0.14)
69	0.62***	0.62***
	(0.17)	(0.17)

72	1.12***	1.12***
	(0.19)	(0.19)
76	1.08***	1.09***
	(0.21)	(0.21)
80	0.92***	0.90***
	(0.16)	(0.16)
83	0.96***	0.98***
	(0.19)	(0.19)
87	0.57***	0.60***
	(0.14)	(0.15)
90	0.18	0.17
	(0.19)	(0.19)
94	0.33*	0.34*
	(0.14)	(0.15)
98	0.63***	0.51**
	(0.17)	(0.19)
02	0.42**	0.40*
	(0.16)	(0.18)
05	0.41**	0.36*
	(0.15)	(0.17)
09	0.12	0.17
	(0.15)	(0.17)
13	0.13	0.097
	(0.16)	(0.18)
17	0.50**	0.30
	(0.18)	(0.20)
21	0.56**	0.29
	(0.19)	(0.22)
Year X education		
education # election year		0.0055
		(0.0097)
Age group		
36-64	0.22**	0.21**
	(0.073)	(0.081)
65+	-0.068	-0.12
	(0.11)	(0.12)
Age group X education		
36-64 # education		-0.16
		(0.26)
65+ # education		0.45
		(0.48)
Man	0.31***	0.33***
	(0.046)	(0.052)
Constant	0.98***	0.99***
	(0.088)	(0.094)
Observations	30444	24514
McKelvey-Zavoina-R^2	0.077	0.097

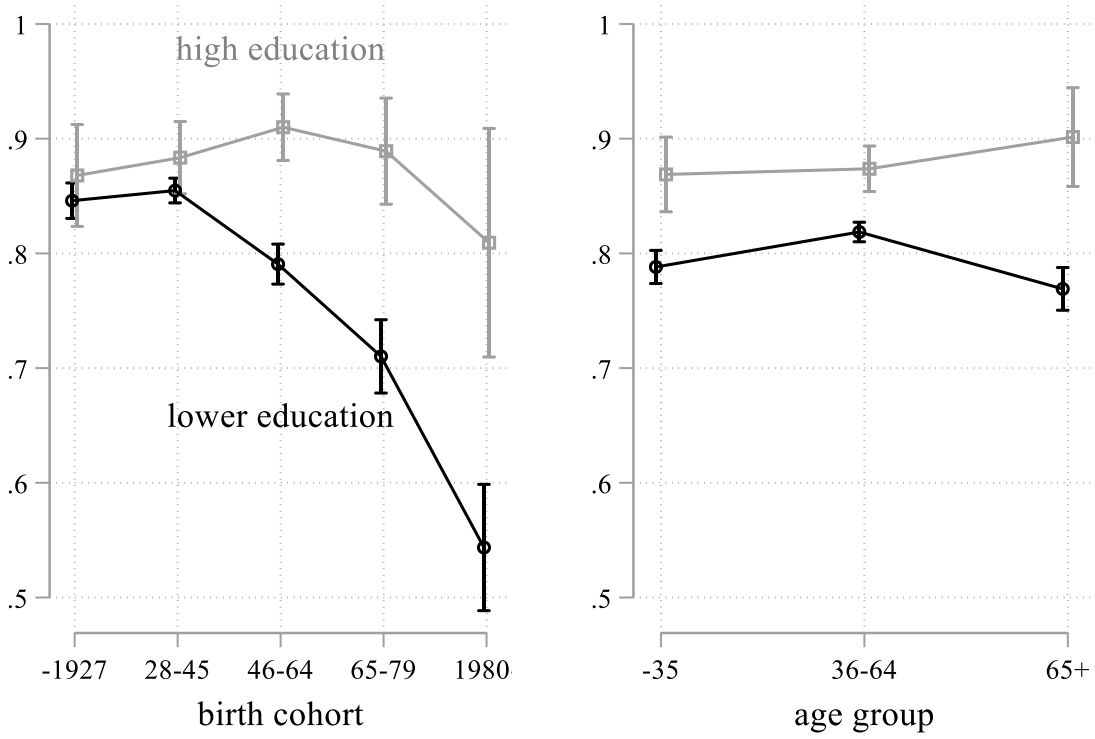
Note: Regression coefficients (with standard errors in parentheses) from binary-logistic regression models. In difference to the models for party choice, the interaction between year and high education treats year as a continuous variable. Including year as categorical in the interaction causes a problem of perfect prediction as high education predicts turnout perfectly in 1972. Weights employed that adjust vote choices to official election results.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Figure G1: Predicted probability of turning to vote across cohorts, age groups and elections (from model 1 in Table G1)



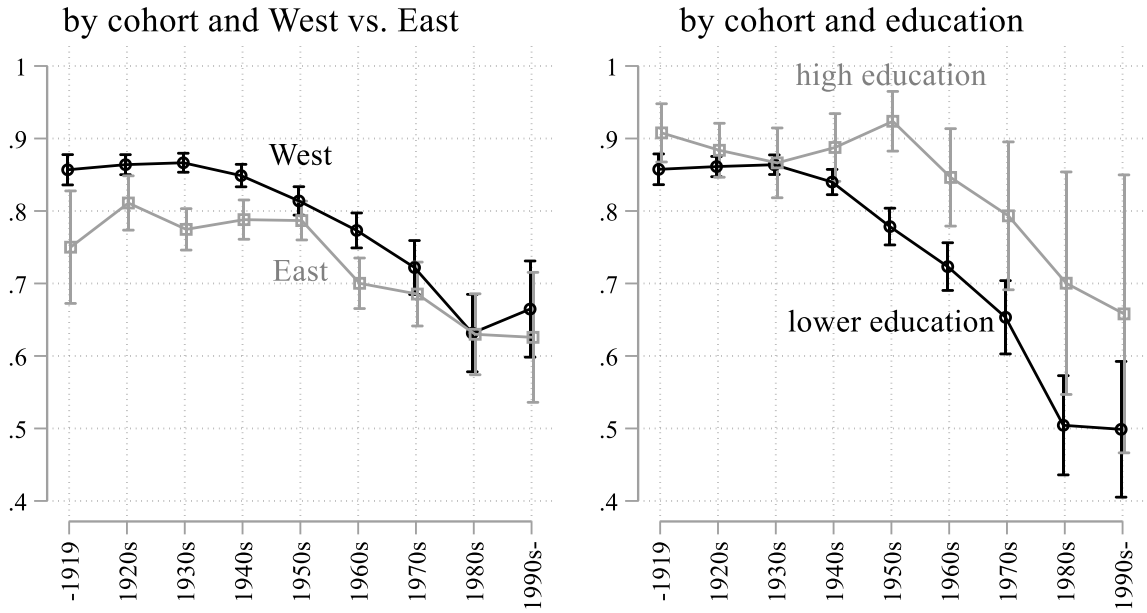
Note: Predicted probabilities (with 85% confidence intervals) from binary-logistic regression model.

Figure G2: Predicted probability of turning to vote across cohorts and age groups (from model 2 in Table G1)



Note: Predicted probabilities (with 85% confidence intervals) from binary-logistic regression model.

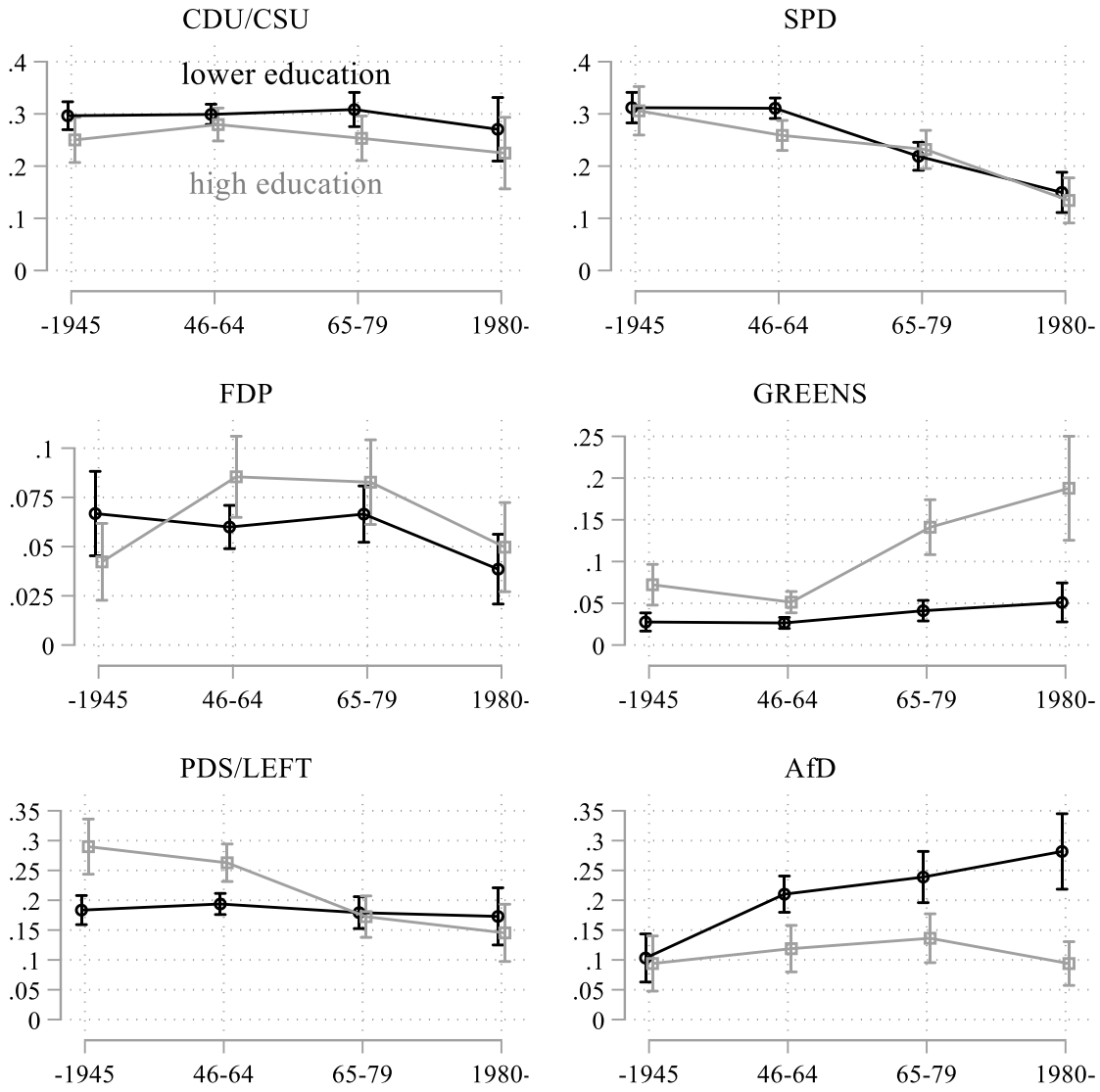
Figure G3: Predicted probability of voting across cohorts and age groups (fine-grained cohorts)



Note: Predicted probabilities (with 85% confidence intervals) from binary-logistic regression models. Specification is similar to models 1 and 2 in Table G1 but with more fine-grained cohort scheme.

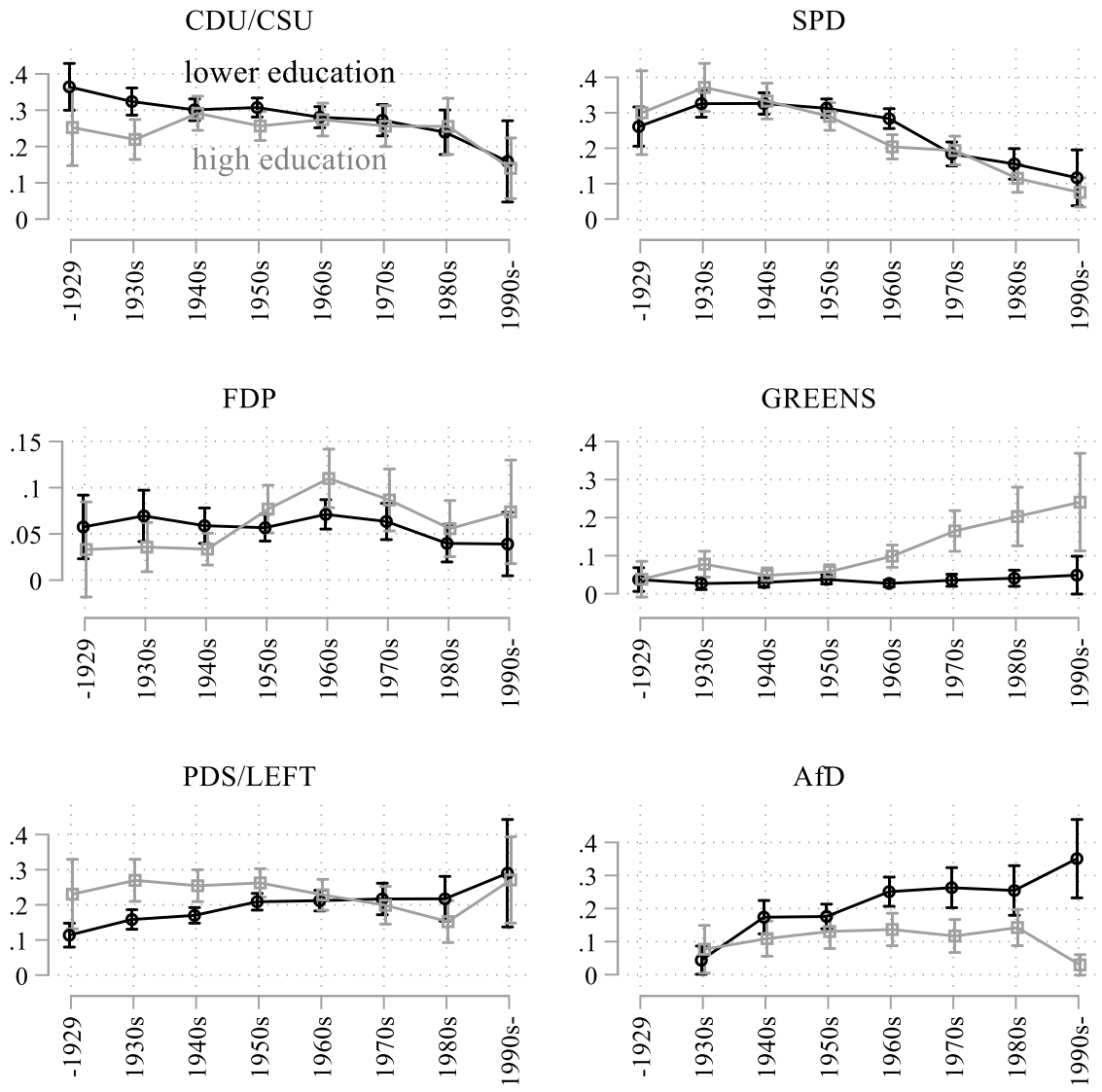
Appendix H: Results on the education divide for Eastern Germany

Figure H1: Predicted probability of party choice by cohorts and high education in Eastern Germany



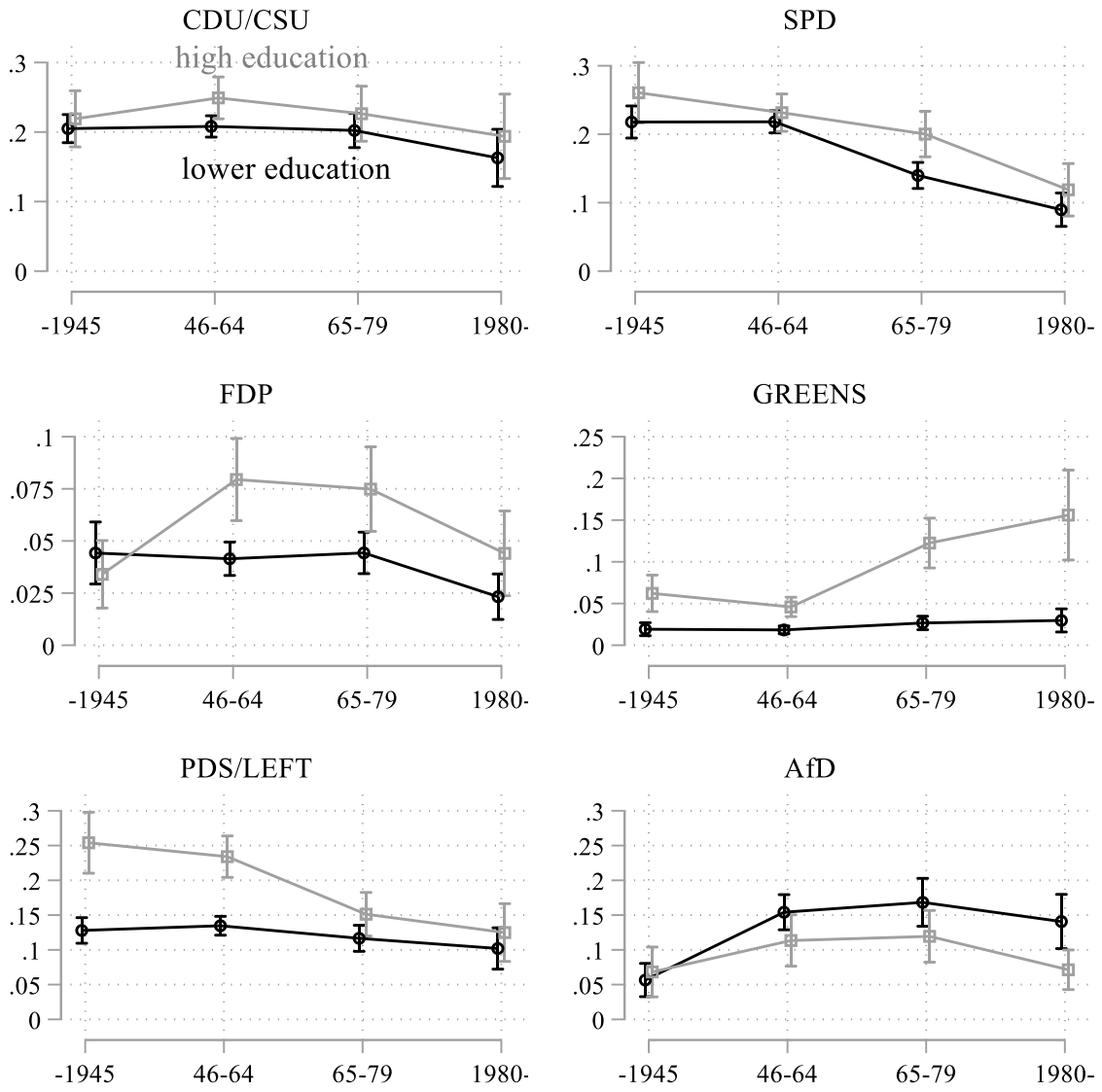
Note: Predicted probabilities (with 85% confidence intervals) from binary-logistic regression models with age, period and cohort effects. Eastern Germany only. Due to the shorter time period, the first two cohorts have been collapsed for all parties. Weights employed that adjust vote choices to official election results.

Figure H2: Predicted probability of party choice by cohorts and high education in Eastern Germany (fine-grained cohorts)



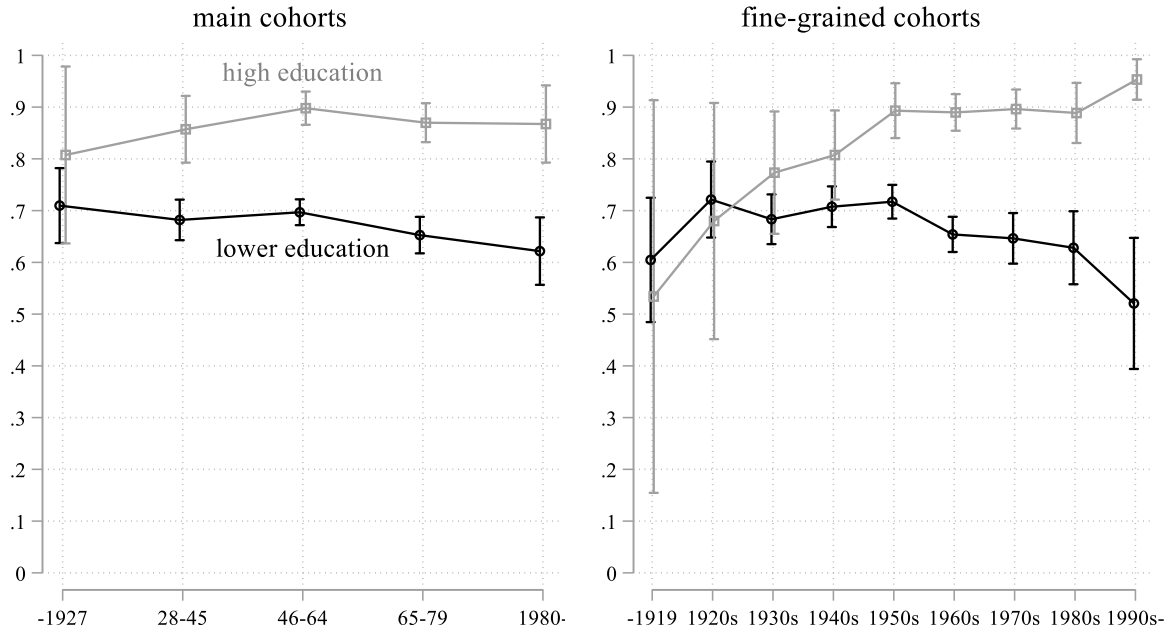
Note: Predicted probabilities (with 85% confidence intervals) from binary-logistic regression models with age, period and cohort effects. Eastern Germany only. Models are equivalent to those of Figure H1, albeit with a more fine-grained cohort scheme. Weights employed that adjust vote choices to official election results.

Figure H3: Predicted probability of party choice by cohorts and high education in Eastern Germany (including abstention)



Note: Predicted probabilities (with 85% confidence intervals) from binary-logistic regression models with age, period and cohort effects. Eastern Germany only. Models are equivalent to those of Figure H1, albeit including abstention (as zero). Weights employed that adjust vote choices to official election results.

Figure H4: Predicted probability of voting across cohorts by education within Eastern Germany



Note: Predicted probabilities (with 85% confidence intervals) from binary-logistic regression models. In contrast to the models for Western Germany (see Table G1), the models include an interaction between education and year as a categorical variable as this does not lead to problems of perfect prediction.