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Age and vote choice: Is there a conservative shift among older voters?☆

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ABSTRACT

Ageing is often believed to induce a movement towards the right of the political spectrum. Yet, empirical evidence remains inconclusive due to a dearth of longitudinal datasets covering multiple cohorts. Using eleven rotating panels of the Norwegian Election Studies (1977–2017) and exploiting first-derivative properties of the vote choice function, our empirical approach identifies non-linear life-cycle effects while controlling for cohort and period effects. Our main findings indicate that shifting towards the left is more likely among the young (under 40 years) whereas shifting towards the right occurs at an older age (over 55 years). Evaluating potential mechanisms, we find that individuals' income, retirement, family status and political interest explain only a small part of the observed ageing effect. Life-cycle shifts in (some) policy preferences may play a bigger role. Finally, aging effects are similar across women and men, and only marginally stronger among groups with lower education and income levels.

1. Introduction

The relationship between age and voting behavior has been of long-standing concern to social scientists (Dassonneville, 2017; Peterson et al., 2020; Gethin et al., 2022), and folk wisdom holds that "if you are not a liberal when young, you have no heart; if you are not a conservative when old, you have no brain."[1] Although this belief holds broad popular acceptance, academic research into exactly how age(ing) affects individuals' party preferences and vote choice is at best inconclusive. Some studies find no evidence that individuals' political position shifts towards the right with age (Tilley, 2005; Goerres, 2008; Gethin et al., 2022), while others find limited support (Peterson et al., 2020) or very strong support (Tilley and Evans, 2014).[2]

One reason for this wide diversity in findings is that extant work has remained severely hindered by a lack of longitudinal datasets covering multiple cohorts. This restricts the lessons we can confidently draw from previous scholarship. On the one hand, analyses based on (repeated) cross-sectional data (Tilley, 2005; Goerres, 2008; Tilley and Evans, 2014; Gethin et al., 2022) are problematic due to the linear dependency of age, cohort and period (Cheng et al., 2017; Fosse and Winship, 2019). On the other hand, analyses relying on longitudinal data covering only one cohort (Tilley, 2005; Tilley and Evans, 2014; Peterson et al., 2020) may have higher internal validity, but are likely to suffer from "the possibility of cohort-centric effects that threaten generalizability" (Stoker and Jennings, 2008, p. 621).

Our analysis contributes in three ways to the scholarly debate about the relation between age and vote choice (Peterson et al., 2020; Gethin et al., 2022). First, we have access to overlapping panels from the Norwegian Election Studies covering the 40-year period between 1977 and 2017. This dataset not only allows us to analyze repeated observations of the *same* individuals at two points in time (with four-year intervals), but also covers multiple cohorts – as well as age groups – for every election survey within our observation period. Such "longitudinal data on multiple cohorts over an extended period of time" is paramount

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[1] There exist several versions of this saying credited to different persons, including former US President John Adams (https://freakonomics.com/2011/08/25/john-adams-said-it-first).

[2] In two closely related literatures, scholars have also studied the impact of age on individuals' propensity to turn out on Election Day (assumed to be increasing with age) as well as on the strength of their partisan attachments (likewise assumed to be increasing with age) (for a review, see Dassonneville, 2017).

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to distinguish between age and period effects as well as to avoid the cohort-centric generalizability problem mentioned previously (Stoker and Jennings, 2008, p. 624; see also Fosse and Winship, 2019; Peterson et al., 2020).

Second, we identify life-cycle effects by using the first-difference properties of the vote choice function. This approach to addressing the linear dependency of age, cohort and period effects was originally proposed by Cheng et al. (2017) to study the 'midlife crisis' in human well-being, and has recently been applied in other settings by, among others, Geys et al. (2021). While this approach does *not* resolve the Age-Period-Cohort problem, it *does* offer a novel way towards the identification of specific *non-linear* shapes of a life-cycle effect while controlling for period and cohort effects (full details in section 3).[3] Note that this approach also implies that we theorize a curvilinear ageing effect, rather than the linear ageing effect generally assumed to exist in previous work. The main reason is that early political socialization of young voters is done by their parents, and older generations tend to be more conservative *within any given election period* (e.g., Tilley and Evans, 2014). Hence, children are more likely to update their initial partisan identity – as 'inherited' from their parents – towards the left "as a result of their own engagement with the political world" (Dinas, 2014, p. 827). Later in life, however, right-wing shifts may become more likely with ageing due the wide range of economic, family, social and psychological factors proposed in previous work (see below).

Third, extant research on the relation between age and vote choice has been predominantly concerned with establishing the presence and strength of any shifts with age. Yet, a multitude of potential mechanisms consistent with right-wing shifts in the political preferences and vote choice among (older) ageing voters have been proposed. These include changes over the life cycle in economic status (such as income level and retirement) and family status (such as marriage and having children), in people's reliance on public services (which is high for the young and old, but low for the middle-aged; Stortinget, 2021, p. 194), as well as in psychological traits such as self-discipline and openness to change (Tilley, 2005; Goerres, 2008; Stoker and Jennings, 2008; Tilley and Evans, 2014; Peterson et al., 2020). The richness of our data allow us to assess the explanatory power of several potential mechanisms – including income, retirement, children, political interest, and policy preferences – as well as to study heterogeneity in life-cycle effects across gender, education and income. As such, we address repeated calls for "more and continued research" into the mechanisms why ageing affects political behaviors (Dassonneville, 2017, p. 155; see also Stoker and Jennings, 2008; Tilley and Evans, 2014).

The next section presents the key characteristics of our dataset and the measurement of our dependent variable (i.e. individual-level vote choice). Then, in section 3, we discuss our empirical strategy to identify (non-linear) life-cycle effects in individuals' vote choice, and summarize our main findings. This section also evaluates several potential mechanisms brought forward – but rarely empirically evaluated – in previous studies. Finally, section 4 offers a concluding discussion.

2. Dataset and dependent variable

Our main source of data is the Norwegian Election Studies, which are conducted by Statistics Norway every four years in line with the national electoral cycle. Each individual survey covers a random sample of roughly 2000 respondents taken from the nationwide population register (representative of the Norwegian population between 17 and 79 years) and consistently obtains a response rate in excess of 50%. Important for our purposes, approximately half of the sample in each survey wave is interviewed again four years later. This creates high-quality rotating panels, which we can exploit to study repeated observations of the *same* individuals at distinct points in time. The eleven surveys conducted over the 1977–2017 period available to us cover a total of 22,001 observations, of which 12,496 observations are embedded in one of the eleven rotating panels contained in this 40-year timespan.

Each survey includes detailed information about respondents (including year of birth, age at the time of the survey, education, household income, and retirement status) as well as their answers on a range of questions covering the elections (including vote choice) and political attitudes (including political interest and policy preferences). Our key question of interest relates to individuals' vote choice in the most recent parliamentary elections: "Which party did you vote for in this year's parliamentary elections?" Respondents can choose any of Norway's nine main political parties, or fill in the name of any 'other' party running in a given election.[4]

Changes over time within the *same* individuals' responses to this question constitute our main dependent variable. We operationalize this variable in two steps. First, we rank all Norwegian political parties on a left-right ideological dimension. The most left-wing party (the Red Party) is given the lowest rank whereas the most right-wing party (the Progress Party) is given the highest rank. The full ranking is reported in Appendix Table A.1, and is based in part on how voters of the respective parties place themselves on a 10-point left-right scale (displayed in Appendix Fig. A.1) as well as our own understanding of the policies and ideologies of the Norwegian parties. As the relative positions of some parties on the left-right dimension are arguably indistinguishable, we give them the same rank. This is the case for the Green Party and Socialist Left Party (both at rank 2) as well as a set of centrist parties at rank 4 (i.e. the Christian Democratic Party, the Liberal Party, and the Center Party). A smaller set of 'other parties' is ranked together with the centrist parties as this concerns mostly one-issue parties with a general policy gravitating towards the center. The same ranking is imposed for the entire period under analysis since parties' *relative* positions on the left-right dimension have been very stable over this 40-year period. That is, the lines indicating the left-right positions of the different parties in Fig. A.1 in the Online Appendix only very rarely cross over time, such that parties' relative left-right position is remarkably stable over time (for confirmation of the same observation using party manifesto data and expert surveys, see Bruinsma and Gemenis, 2020).[5]

Second, we check whether the vote choice across consecutive elections *of the same individual* involves a shift between parties of a different rank on our left-right ideological spectrum. The resulting variable – henceforth denoted *dVote* – can take on values -1, 0, or $+1$. A shift to the right – say, from the Labour Party to one of the centrist parties – is coded as $+1$, whereas shifts to the left – say, from the Progress Party to the Red Party – are coded as -1 (note that we take into account the extent of an individual's shift in a robustness check). The survey also asks about respondents' vote choice in the previous parliamentary elections four years ago. We use this information in two ways. First, it allows us to verify the accuracy of vote choice recall among individuals within the rotating panels. Second, it allows us to evaluate changes in vote choice also for respondents not included in the rotating panels. Although our main results include these additional observations to maximize the

[3] More specifically, as discussed below, period effects are removed by detrending the data, while cohort effects are controlled for by analyzing the change in, rather than level of, individuals' political behaviour (which relies on the fact that individuals remain part of the same birth cohort over time).

[4] Those that did not vote are asked which party they 'considered' voting for. We include this information in our main analysis to maximize the number of available observations, but excluding these respondents leaves our findings unaffected (see below).

[5] Naturally, we verify the robustness of our findings to alternative operationalizations of this ranking. First, we give the centrist parties separate ranks and drop the 'other parties' group. Second, we use the average (self-reported) position of voters on a 10-point left-right scale as the rank position for the respective parties. Both alternatives leaves our findings unaffected (see below).

number of available data points, excluding them leaves our findings unaffected (see below). Summary statistics for *dVote* and its constitutive elements (i.e. vote shifts to the left, vote shifts to the right, and no vote shifts) are provided in the top panel of Appendix Table A.2.

Fig. 1 provides a first look into the relation between respondents' age and vote choice. We display changes in vote choice in consecutive elections for respondents aged 22 years or more, which reflects the age-eligibility restriction at 18 years in Norway and the fact that elections take place every four years. Fig. 1 shows the share of respondents shifting to the left (red dots), shifting to the right (blue dots) or having a stable vote choice (green dots). This indicates that 50–80% of respondents document *no* shift in their vote choice over the four-year interval between two consecutive elections. Nonetheless, a considerable minority does change their vote choice, ranging from approximately 35-40% of individuals in their twenties and early thirties to roughly 20% of respondents in their sixties and seventies. Finally, the hollow circles (and corresponding linear regression line) shows the average value of *dVote* for every one-year age group. This provides initial and suggestive evidence that older individuals are somewhat more likely to shift towards the right of the political spectrum between consecutive elections, whereas the reverse appears to hold for younger voters. Still, the results in Fig. 1 obviously conflate age and time-period effects. In the next section, we therefore set out how we can identify any life-cycle effects in vote choice *independent of cohort and time effects*.

3. Empirical analysis

3.1. Identification of the life-cycle effect

As mentioned, the strict linear dependency between age, time and cohort (i.e. Age = Time – Cohort) makes it extremely challenging to identify the effects of these three elements independently (Tilley, 2005; Cheng et al., 2017; Fosse and Winship, 2019). Our approach to address this identification problem lies in exploiting the first-derivative properties of the vote choice function, which allows us to focus on *non*-linear life-cycle effects in individuals' vote choice. This builds on a theoretical proposition that young and old people are likely to shift their vote choice *in different directions* as they age (i.e. towards the left among the younger and towards the right among the older). For young voters, we argue that moving towards the left is more likely than moving towards the right (see also Dinas, 2014). The reason is that children most often "develop a partisan identity as they learn about politics from the parents' point of view" (Dinas, 2014, p. 827), and thereby rarely stray far from the party to which their parents are loyal (e.g., Zuckerman et al., 2007). Since older generations at any point in time tend to be more conservative than younger generations (e.g., Tilley and Evans, 2014), this makes that children would be "especially likely to shift to the left during their early adult years" (Dinas, 2014, p. 841). For older voters, however, higher income levels, changing family status, shifting policy preferences, as well as increasing levels of authoritarianism, prejudice, and cognitive inflexibility make moves towards the right more likely than moves towards the left (Tilley, 2005; Goerres, 2008; Stoker and Jennings, 2008; Tilley and Evans, 2014; Peterson et al., 2020).

To test these predictions, we follow Cheng et al. (2017) and Geys et al. (2021) in using a two-stage approach. First, we eliminate cohort effects by first-differencing the data (i.e. looking at the *change* in vote choice rather than vote choice itself; *dVote*). Since the same individual naturally remains in the same birth cohort at all points in time, studying the first difference removes all cohort effects from our analysis. While this makes us unable to identify potential cohort effects, this is a price we are willing to pay to identify life-cycle effects.

Second, time-specific effects may still remain present after first-differencing the data since everyone is exactly four years older when four years have passed. Cheng et al. (2017) and Geys et al. (2021) address this by de-trending the first-differenced data. This involves running a first-stage regression with the within-person change in vote choice as the dependent variable, and a full set of time dummies as independent variables. The residuals from this regression – which reflect individuals' de-trended change in vote choice – are subsequently used as the dependent variable in a second-stage regression with age as the independent variable. More formally, with subscripts *i* and *t* for individuals and time, respectively, the first-stage regression is given by:

$$dVote_{it} = \beta_0 + \beta_t time\ dummies + \varepsilon_{it} \tag{1}$$

where $dVote_{it}$ is the within-person change in vote choice, and *time dummies* is a full set of year dummies (one for each wave of the survey). The residual $\widehat{\varepsilon}_{it}$ from the estimation of equation (1) represents individual *i*'s estimated deviation from the election-year average shift in electoral behavior. That is, it yields a 'detrended' *dVote* variable where a positive (negative) value of $\widehat{\varepsilon}_{it}$ equals a shift to a more right-wing (left-wing) party *over and above any average election-year effects.*[6] This residual then becomes the response variable in the following second-stage regression model:

$$\widehat{\varepsilon}_{it} = \alpha_0 + \alpha_1 Age_{it} + \mu_{it}, \tag{2}$$

where Age_{it} is respondents' age at the time of the second survey. What α_1 then identifies is the effect of a change in age – over and above the average time and age effects within a period – on the change in vote choice *independent of any cohort effects*. In terms of interpretation, $\alpha_1 \neq 0$ implies the presence of *non*-linear life-cycle effects in vote choice. More specifically, given our coding of vote choice changes $\alpha_0 < 0$ and $\alpha_1 > 0$ would be consistent with a higher likelihood of shifts towards the left (right) among younger (older) voters.

The key findings from estimating equations (1) and (2) are summarized in Fig. 2 (and Appendix Table A.3). The upward sloping line in Fig. 2 ($\alpha_1 > 0$) indicates a positive relationship between the (de-trended) change in vote choice and individuals' age. Further, we find the first-difference (*dVote*) to be statistically significantly negative at young ages (under 40 years; $\alpha_0 < 0$) and statistically significantly positive at older ages (over 55 years). As argued above, these results provide evidence of a U-shaped life-cycle effect in vote choice whereby (younger) older voters are more likely to shift towards the (left) right between consecutive elections. In terms of effect size, remember that our analysis looks at the survey-to-survey rate of change in vote choices (with four-year intervals between consecutive surveys). As such, the dots in Fig. 2 reflect the average change in vote choice between two consecutive elections among all respondents of a specific age included in the sample.

Before we assess the robustness of, and potential mechanisms behind, our main results, remember that the two-step procedure washes out any average election-year influences affecting *dVote*. This facilitates estimation of the intercept α_0 in equation (2), and allows us to calculate the age at which the average citizen is *least* likely to support a right-wing political party. This is technically defined by the point in the life-cycle where the U-shaped vote choice curve is at a minimum, and thus also corresponds to the intersection of the regression line with the horizontal axis in Fig. 2. Using the estimates presented in column 1 of Appendix Table A.3, we find that this minimum point occurs at 48.3 years ($-\widehat{\alpha}_0/\widehat{\alpha}_1 = --0.07396/0.00153 = 48.3$). Estimating the 95% confidence interval around this minimum age using a boot-strapping procedure, we find an age interval of 42.6–53.9 years.

Further to aid in the interpretation of our main result and its estimated effect size, Fig. 3 depicts the share of respondents voting in favour of right-wing parties (Progress Party, Conservative Party) minus the

[6] Note that the time dummies in equation (1) take out any common effects across individuals within a period. This average change can be attributed to *either* an average age effect in a period *or* a time effect, given that these two effects are inseparable in the data. In other words, β_t includes any average age effects.

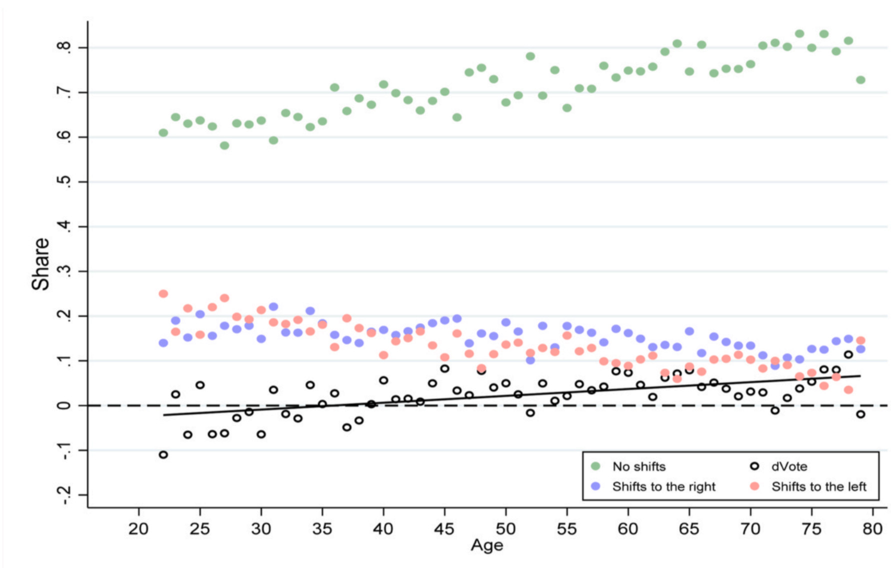

Fig. 1. Cross-sectional change in left-right party support.
Notes: The figure depicts the relation between respondents' age and vote choices in consecutive elections. Data cover respondents aged 22 or more over the 40-year period from 1977 to 2017. We include the share of respondents shifting to the left (red dots), shifting to the right (blue dots) or having a stable vote choice (green dots). The hollow circles (and the corresponding linear regression line) show the relation between age and the change in vote choice (*dVote*). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

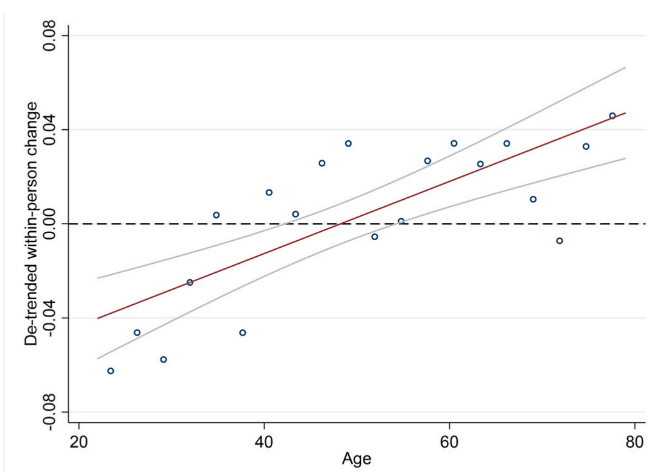

Fig. 2. Gradient of change in left-right vote choice by age.
Note: The vertical axis depicts the de-trended within-person shift in vote choice (i.e. detrended *dVote*), while the horizontal axis depicts respondents' age. Dots reflect averages in twenty three-year age bins, while the line is a linear function fitted through the underlying data (with 95% confidence intervals). Data cover all available respondents aged 22 or more over the 40-year period from 1977 to 2017.

share of respondents voting in favour of left-wing parties (Labour Party, Socialist Left Party, Red Party). Each dot in Fig. 3 shows this left-right difference for each age-group using one-year bins averaged over the entire sample period. The dotted line reflects a simple quadratic line fitted through the data (with 95% confidence intervals). This figure confirms that right-wing support initially exceeds left-wing support at very young ages. Yet, this difference declines up to age equal to roughly 50 years and then increases again. As such, there is evidence of a clear U-shaped life-cycle effect as discussed above.

3.2. Robustness tests

This section describes four tests to verify the robustness of our results in Fig. 2. First, Appendix Table A.3 highlights that our results persist when we restrict the analysis to respondents included in the rotating panels – thereby excluding respondents for whom we rely on a recall question to measure party shifts – or include only respondents where official register data confirm that they showed up at the polling station during the relevant election(s). In both cases, our analysis corroborates the pattern of a negative and statistically significant intercept and a positive and statistically significant age effect as displayed in Fig. 2.

Second, our main response variable $dVote_{it}$ is measured on a three-point scale (-1, 0, $+1$), and the detrending procedure in equation (1) clearly cannot alleviate the issue of non-normal errors this coding entails (see the distribution of $\widehat{\varepsilon}_{it}$ in Appendix Fig. A.3). To assess whether this violation of the assumptions underlying linear regression models affects our findings, we collapse the dataset into one-year age groups and election years. This provides information on the share of individuals of a given age in a given election year that shifts to the right, to the left or does not shift. We can then define our main response variable as the difference between shares shifting to the right and the left. This *net* vote change within a given age group in a given election year has a straightforward interpretation and a nice, symmetrical distribution (see left panel of Appendix Fig. A.4). Using the same two-stage estimation procedure as before (though using the number of observations in each age-year cell as estimation weights), the results again corroborate the statistically significant negative intercept and positive age coefficient from Fig. 2 (see right panel of Appendix Fig. A.4). Moreover, the point estimate and confidence intervals for the age at which the average citizen is *least* likely to support a right-wing political party are very similar to our baseline estimates in Fig. 2.

Thirdly, we implement a robustness check using a multinomial logistic model with *dVote* as the dependent variable and a linear effect of age as the main explanatory variable. While this alternative specification is appropriate given the three-point scale of our dependent variable, it precludes the use of our detrending procedure (since detrended *dVote* variable is no longer a three-point scale; see Appendix Fig. A.3). Extending the model with a full set of election year fixed effects allows us nonetheless to obtain valid estimates of the age parameter, though the intercept term of this model will lack a clear interpretation. The predicted probabilities deriving from this model once again confirm our main findings (see Appendix Fig. A.5).

Finally, as mentioned before, we use two alternative rankings of the political parties along the left-right ideological dimension to operationalize our main dependent variable (*dVote*). On the one hand, we adjusted our original ranking by separating the three centrist parties and removing the 'other parties' group. On the other hand, we ranked parties based on voters' average left-right placement of political parties (see Appendix Fig. A.1), and calculated individual-level vote changes as the

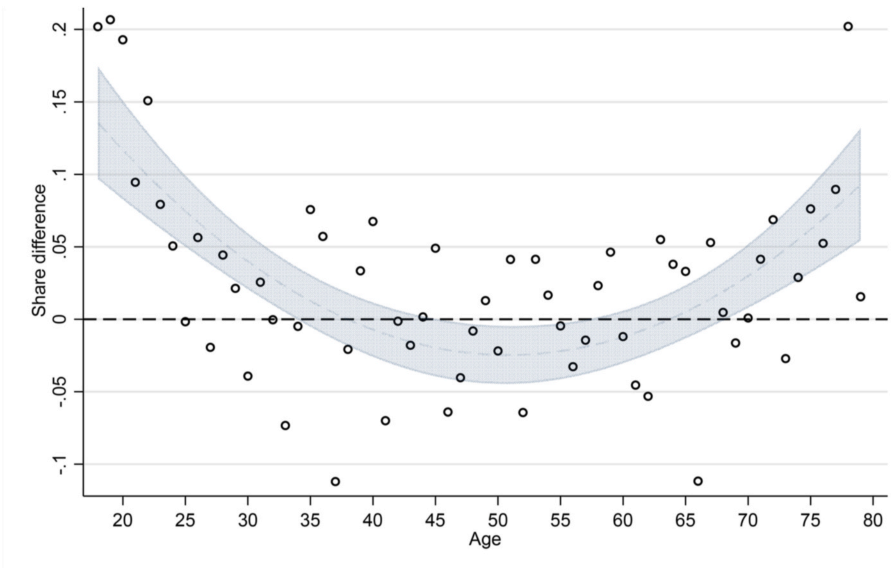

Fig. 3. Level of party support by age.
Notes: The figure depicts the share of respondents voting in favour of the right-wing parties (Progress Party, Conservative Party) minus the share voting in favour of the left-wing parties (Labour Party, Socialist Left Party, Red Party) for each age-group (one-year bins) averaged over the entire sample period. Data cover all available respondents aged 18 or more over the 40-year period from 1977 to 2017. (Note that we include 18–22 year olds here as we look at vote choices rather than the *change in* vote choice.). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

difference in supported parties' positions on the left-right axis in two consecutive elections. For example, a shift from the Labour Party (value 4.2 on the 10-point left-right axis) to the Conservative Party (value 7.4 on the 10-point left-right axis) would imply a right-wing shift of 3.2 points. Note that the latter approach also takes into the account the *extent* of individuals' change along the left-right dimension (and not just the fact that they change as in our operationalization in the main analysis). Using the same two-stage estimation procedure as in our baseline specification, Appendix Figs. A.6 and A.7 illustrate that both alternatives leave our findings qualitatively unaffected.

3.3. Mechanisms and heterogeneity

The approach and results in sections 3.1 and 3.2 confirm the presence of non-linear life-cycle effects in individuals' vote choice independent from any cohort and time-period effects (which we cannot identify using our approach). While the direction of our findings among older respondents is in line with folk wisdom, the results presented thus far cannot say much about the potential mechanisms behind the observed shifts in individual-level vote choice. In this section, we aim to shed more light on such mechanisms by *i)* including variables that change over the life-cycle (such as income, having children or retiring), and *ii)* including controls for policy preferences that may change over the life-cycle. We finally also look into heterogeneous effects across different voter groups based on gender, education and income.

3.3.1. Life-cycle dimensions

One common explanation for the relation between age and vote choice is that most people go through certain experiences at specific points in their life-cycle (Stoker and Jennings, 2008; Tilley and Evans, 2014; Peterson et al., 2020). Tilley (2005) refers to such life-cycle changes in economic status (such as increasing income levels or retirement) and family status (such as having children) as 'social ageing'. Appendix Fig. A.8 confirms that these events are indeed largely age-specific in our Norwegian setting. Such 'social ageing' may explain at least part of the effect of age on shifts in vote choice because these life-cycle events affect individuals' public sector dependence: e.g., having children increases reliance on child care and education services, while passing retirement age increases reliance on pensions and health care services.[7] Similarly, Scott (2022, p. 1) highlights a "change in political values that occurs within individuals who graduate from university". Interestingly, Prior (2010) points out that basic political attitudes likewise mature at specific points in the life-cycle, which we might refer to as 'political ageing'. Individuals' level of political interest, for instance, is developed – or not – in adolescence and early adulthood, and remains relatively fixed after that (Prior, 2010; Appendix Fig. A.8).

We can assess the importance of social and political ageing by extending our baseline model with control variables that measure total household income, number of children (aged 16 or less), a dummy for receiving public pension payments, and individuals' level of political interest. If these variables explain some of the relation between age and vote choice, their coefficients should be statistically significant in his extended model and the coefficient of age should substantially weaken (Baron and Kenny, 1986; Acharya et al., 2016). Column (2) in Table 1 indicates that this is not the case for our three measures of 'social ageing', while Column (3) indicates the same for our measure of 'political ageing'. Since none of their coefficients is statistically significant and they have no substantively meaningful effect on our baseline estimate for age (column (1)), our findings offer no support for the notion that social and political ageing account for individuals' tendency to shift their vote choice to towards the right of the political spectrum as they age – at least not using the indicators we have available.

3.3.2. Policy preferences

Party preferences correlate strongly with policy preferences. Previous research indicates that this is likely to derive from a bi-directional relationship with "voters adopting a left-right identification that matches their issue attitude, but also by voters reversely adjusting their issue attitudes to their left-right identification" (Rekker, 2016, p. 125; Stoker and Jennings, 2008). As a result, voters supporting right-wing rather than left-wing parties tend to, for instance, prioritize lower taxes, support more restrictive immigration policies, or oppose

[7] This dependence is documented by Statistics Norway in a figure reproduced in Appendix Fig. A.9 (Stortinget, 2021, p. 194). Assuming that higher reliance on public services induces voters to support left-wing parties, this would imply a partisan life-cycle where the young and elderly support left-wing political parties whereas middle-aged voters rather support right-wing parties.

Table 1
Life-cycle dimensions.

	(1) Baseline	(2) Social ageing	(3) Political ageing
Intercept	−0.0740***	−0.0781***	−0.108***
	(0.0152)	(0.0224)	(0.0415)
Age	0.00153***	0.00155***	0.00161***
	(0.000285)	(0.000446)	(0.000450)
Income		0.000156	0.000174
		(0.00123)	(0.00124)
Retired		−0.00490	−0.00412
		(0.0150)	(0.0151)
Children (<16 years)		0.00565	0.00688
		(0.00563)	(0.00565)
Political Interest (low)			0.0346
			(0.0364)
Political Interest (medium)			0.0256
			(0.0360)
Political Interest (high)			0.00878
			(0.0380)
Observations	15,418	12,755	12,635
R-squared	0.002	0.001	0.002

Notes. The table displays regression estimates using the detrended *dVote* as response variable. We show the baseline estimates in column (1). In column (2), we include controls for household income (in 100.000 NOK), number of children (<16 years) and retirement status. In column (3), we also include control for levels of political interest. Political interest is measured on a four-point scale (none, low, medium and high). We display robust standard errors in parentheses: ***p < 0.01, **p < 0.05, *p < 0.1.

ambitious environmental programs (Knutsen, 1995; De Vries et al., 2013). To the extent that such policy preferences change when people grow older, shifting policy preferences may account for (at least part of) the relation between age and vote choice uncovered in section 3.1. We assess this possibility using a similar approach as in section 3.3.1 above. That is, we extend our baseline model with control variables that capture respondents' self-professed position regarding four public policies included in at least six survey waves in our dataset: i.e. fiscal policy, immigration policy, environmental policy, and support for remote and rural areas (known as '*distriktspolitikk*' or 'district policy' in Norway; Teigen, 2012; Skinner, 2013).[8,9] The first three policy areas were covered in eight election survey waves in the period 1989–2017, while the fourth policy area was included in six surveys in the period 1997–2017.

Table 2 shows that our estimated life-cycle effect is unaffected by controlling for fiscal policy preferences, but weakens considerably when directly controlling for immigration, environmental and district policy preferences. While the coefficient of age retains statistical significance at conventional levels in all but one of the models in Table 2, these findings suggest that at least part of the ageing effect in vote choice is determined by ageing effects in respondents' policy preferences. Naturally, given the bi-directional relationship between policy preferences and voting (see above), it is inappropriate to draw strong causal inferences at this point. Nonetheless, it is clear that shifting policy preferences as people grow older and shifting vote choice over the life-cycle are closely inter-related phenomena.

3.3.3. Heterogeneous effects

Finally, we verify the extent to which the observed life-cycle effects in individuals' vote choices observed in Fig. 2 vary across voter groups differentiated by gender, education and income level. A common observation is that women have historically often voted for right-wing parties, but in more recent years have become increasingly likely to support left-wing parties in a wide range of countries (Inglehart and Norris, 2003; Giger, 2009; Harteveld et al., 2019). A similar shift has been observed for education in many Western democracies since "highly educated professionals (…) have become a key constituency of left-wing parties in many countries" (Attewell, 2021, p. 3; see also Häusermann et al., 2012; Gethin et al., 2022). Both developments are most often attributed to generational or cohort effects, based on the idea that the socialization of men and women as well as access to education have undergone dramatic changes across generations (Norris, 1996; Gethin et al., 2022). Yet, when the effect of ageing on vote choice differs substantially by gender, education and/or income – and, more specifically, is more pronounced among women, the less educated and/or the less well-off – these developments might also have an important life-cycle component.

There may be a number of reasons why gender, education and income affect the development of political preferences and vote choice across the life cycle. One argument may be that different social groups may be more or less prone to using public services (e.g., childcare, healthcare) at certain times of their lives. Young women, for instance, may be more likely than young men to recognize the value of high-quality public childcare services as they start a family, which could induce a differential impact of ageing on female and male voters' vote choice. Individuals with higher education (and income) levels also tend to have more crystallized opinions that thereby become less susceptible to change. Jon Krosnick and co-authors, for instance, illustrate that individuals with lower education levels are more prone to a range of response effects (including response and question order effects as well as the presence/absence of no-opinion options), suggesting that their opinions may be less firmly established (Narayan and Krosnick, 1996; Krosnick et al., 2002). Lower education levels have also been associated with a higher probability of being opinion 'followers' rather than opinion 'leaders' (e.g., Chu et al., 2019). In our setting, this could make individuals with lower education (and income) levels more likely to change their political preferences and vote choice over the life cycle, and thus display stronger life-cycle effects compared to individuals with higher education (and income) levels.

We test for such heterogeneous effects by estimating equations (1) and (2) separately for subsamples consisting of men or women, for respondents with primary (or less), secondary or higher education, and for respondents located in four income quartiles based on their household income. The results are displayed in Table 3.

Columns (1) and (2) in Table 3 indicate that the estimated life-cycle effect is nearly exactly equivalent across male and female respondents. In sharp contrast, Columns (3)–(5) highlight a strong age effect for the least educated, but a statistically and substantively much weaker effect for the highly educated. Similarly, Columns (6)–(9) show that the age effect is strong for lower income groups, but largely absent in the top

[8] The respondents were asked to state their opinion on these statements: a) "It is more important to develop public services than to cut taxes." (recoded on a five-point scale from disagree completely (0) to agree completely (5)); b) "How would you place yourself on a scale from 0 to 10 where 0 means that we should let up immigrants' access to Norway, and 10 implies that number of immigrants to Norway should be more restricted than to day?"; c) "How would you place yourself on a scale from 0 to 10 where 0 means that environmental protection should not reduce our standard of living, and 10 implies that we should enhance environmental protection even if it implies a lower living standard for all, including yourself?"; d) "How would you place yourself on a scale from 0 to 10 where 0 means that central authorities do not pay sufficient attention to rural districts in Norway, and 10 implies that central government cater too much for rural districts?". Spearman rank correlations confirm that right-wing respondents tend to prefer tax cuts to service improvement, support more restrictive immigration policies and less ambitious environmental policies, and show less concern for remote and rural areas. Online Appendix Figs. A.2.a – A.2.d display the main Norwegian parties' relative positions – as perceived by their voters – on each of these four policies.

[9] Regional or 'district' policy is a very important issue in Norwegian politics, to the extent that 'distriktspolitikk' as a term has become well-established in Norwegian political and academic vocabulary over the past 50 years (e.g., Teigen, 2012; Skinner, 2013). As a policy, it enjoys "very high levels of support among politicians (especially on the left and in the centre) and the population at large" (Skinner, 2013, p. 132).

Table 2
Policy preferences.

	(1) Baseline	(2) Tax	(3) Immigration	(4) Environment	(5) District	(6) All policies
Intercept	−0.0740***	−0.0455**	−0.110***	−0.00931	−0.0260	−0.00570
	(0.0152)	(0.0196)	(0.0209)	(0.0217)	(0.0241)	(0.0394)
Age	0.00153***	0.00171***	0.000824**	0.000990***	0.000649	0.000944**
	(0.000285)	(0.000325)	(0.000332)	(0.000332)	(0.000400)	(0.000441)
Tax		−0.0138***				−0.0189***
		(0.00374)				(0.00520)
Immigration			0.0108***			0.00972***
			(0.00207)			(0.00281)
Environment				−0.00698***		−0.00628**
				(0.00217)		(0.00306)
District					−0.00164	−0.00336
					(0.00260)	(0.00286)
Observations	15,418	11,948	11,930	11,872	8678	7225
R-squared	0.002	0.003	0.003	0.002	0.000	0.007

Notes. The table displays regression estimates using the detrended *dVote* as response variable. We show the baseline estimates in column (1). In columns (2)–(5), we include controls for the following four policy preferences one by one: Public services versus taxes, Immigration, Environmental, District politics. Column (6) includes all policy preferences as controls. We display robust standard errors in parentheses: ***p < 0.01, **p < 0.05, *p < 0.1.

Table 3
Heterogeneous effects.

	(1) Male	(2) Female	(3) Primary education	(4) Secondary education	(5) Higher education
Intercept	−0.0779***	−0.0700***	−0.0881***	−0.0600**	−0.0628**
	(0.0213)	(0.0216)	(0.0328)	(0.0239)	(0.0263)
Age	0.00150***	0.00158***	0.00197***	0.00135***	0.000945*
	(0.000403)	(0.000402)	(0.000558)	(0.000457)	(0.000540)
Observations	7999	7419	3786	6240	5310
R-squared	0.002	0.002	0.004	0.001	0.001
	(6) Bottom income quartile	(7) Second income quartile	(8) Third income quartile	(9) Top income quartile	
Intercept	−0.133***	−0.0886***	−0.0404	−0.0418	
	(0.0355)	(0.0319)	(0.0342)	(0.0272)	
Age	0.00255***	0.00177***	0.000768	0.000927*	
	(0.000583)	(0.000567)	(0.000694)	(0.000544)	
Observations	2417	3530	3654	5817	
R-squared	0.009	0.003	0.000	0.000	

Notes. The table displays regression estimates using the detrended *dVote* as response variable. Columns (1) and (2) provide separate analyses for men and women, Columns (3)–(5) for respondents with different levels of education, and Columns (6)–(9) for respondents with different levels of income. Robust standard errors are presented in parentheses: ***p < 0.01, **p < 0.05, *p < 0.1.

half of the income distribution. The negative intercept for all gender, education and income groups indicates that people are always more likely to shift towards the left when they are young – independent of their gender, education and income. Yet, those with higher education and higher incomes appear much less likely to shift towards the right of the political spectrum as they age (compared to those with less education and income). Looking at where the slope of the regression line crosses the horizontal axis at 0, we therefore also observe that the lowest likelihood to support right-wing parties is reached at (much) higher ages for the highly educated and those with higher incomes. These results should, however, be interpreted with due caution since Table A.4 to the Online Appendix indicates that the estimated differences between gender, education and income groups never reach statistical significance at conventional levels (with two-sided p-values equal to 0.88, 0.41, and 0.13, for age, education and income, respectively).

4. Conclusion

Up to the 1960s, party choice was generally viewed as a result of stable party identifications and social class ("Michigan school"). Party preferences and political attitudes were assumed to be shaped during an individual's 'formative' or 'impressionable' years in adolescence and early adulthood, and to remain highly stable thereafter. Subsequent literature has criticized this view based on the recognition that citizens may well change their partisan preferences and ideological positioning over the life cycle. Consistent with the latter view, our analysis shows that people shift to more left-leaning parties up to midlife and then become more likely to swing back towards rightist political parties. These results are obtained using four decades of high-quality Norwegian Election Studies, which feature individual-level rotating panels that allow us to track party shifts over a fixed four-year election cycle.

While our analysis rests on a methodological innovation that allows identifying (non-linear) age effects while controlling for cohort and period effects, it naturally remains a challenge to track the exact mechanisms underlying this result. Nonetheless, our findings by and large reject the notion that social and political ageing can account for much of individuals' tendency to shift towards the right of the political spectrum as they age. This also implies that shifts in party choices over the life cycle are unlikely to be due to differences in individuals' reliance on public sector transfers and services that accompany such social and political ageing. An alternative mechanism is that party choices can shift over the life-cycle due to changing perspectives on national identify and cultural values. Our evidence here provides partial support. While we find no evidence that fiscal policy preferences affect our estimated age affect, immigration, environmental and rural policy preferences do appear to account for a significant part of the observed ageing effect in vote choices.

Unfortunately, our data do not allow us to explore the role that changes over the life-cycle in individuals' psychological traits may have on the ageing effects observed in our analysis. Previous research, however, has found some evidence suggestive of age-related psychological and personality changes. For instance, ageing has been linked to increasing levels of conservatism, authoritarianism, prejudice, and self-discipline, as well as lower levels of openness to change and cognitive flexibility (for reviews, see Tilley and Evans, 2014; Peterson et al., 2020). Evaluating whether – and, if so, to what extent – such psychological changes can account for the observed ageing effect would require direct measures of psychological traits at multiple points across the life-cycle. While these are not included in our dataset, we consider the further empirical verification of such psychological mechanisms an important avenue for future research.

Finally, we show that life-cycle effects in individuals' vote choice are somewhat stronger among individuals with lower income levels. Hence, while the average aging effect observed within our overall sample is unaffected when controlling for income, different income groups within our sample display distinct (subgroup-average) age effects. This suggests that the increasing tendency among well-earning professionals to support left-wing parties in recent decades (e.g., Häusermann et al., 2012; Attewell, 2021; Gethin et al., 2022) need not exclusively derive from generational replacement or cohort effects – as recently argued by, among others, Gethin et al. (2022).

Data availability

The data that has been used is confidential.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.electstud.2022.102485.

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