NBER WORKING PAPER SERIES

CLIMATE POLARIZATION AND GREEN INVESTMENT

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Working Paper 32131
http://www.nber.org/papers/w32131

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
February 2024, revised December 2024

We thank Marcus Opp, Philipp Krueger, Laura Starks and seminar participants at the Stockholm School of Economics, University of Florida, Purdue University, Copenhagen Business School, Aarhus University, the ZEW conference on Aging and Sustainable Finance, the AFBC Sydney and the EFA 2024 conference in Bratislava for comments. We are grateful to Eline Jacobs and Ajitha Duvvuri for excellent research assistance and Vinnova, Mistra Financial Systems, the Nasdaq Nordic Foundation and the Jan Wallander and Tom Hedelius Foundation for research funding. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

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JEL No. G40,G51,G53,Q54

ABSTRACT

We study how political polarization influences individual responses to climate change and their subsequent financial decisions. Using a nationally representative panel of Swedish working-age adults, we link survey data on climate beliefs with retirement savings administrative records. Exploiting the 2018 heatwave and associated forest fires as a natural experiment, we show that fire-affected individuals become more concerned about climate change. However, this effect is moderated by political polarization: respondents in politically polarized communities exhibit diverging belief updates. Linking these belief changes to financial decisions, we find that heightened climate concerns predict increased adoption of fossil fuel exclusion funds, particularly among financially sophisticated individuals. Conversely, downward belief revisions do not translate into significant shifts away from green investments. Our findings reveal how political and demographic factors mediate the relationship between environmental salience and green portfolio choices, with implications for aggregate holdings of climate-friendly investment portfolios.

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1 Introduction

Climate change has become an increasingly polarizing topic, dividing political groups and shaping public discourse worldwide. On one end of the spectrum, institutions such as university endowments and pension funds face pressure to divest from fossil fuels; on the other, a vocal counter-movement fueled by climate skepticism opposes such shifts and has even passed legislation forbidding such investments. This polarization is especially relevant in the context of household finance, where individuals' investment decisions often reflect their underlying beliefs and socio-political influences (Starks (2023) provides an overview). Yet, the extent to which political polarization interacts with environmental beliefs to drive individual financial decision-making remains relatively unexplored.

This paper examines how political polarization shapes individuals' evolving views about climate change, and how this affects their subsequent financial decisions. Using a nationally representative panel of Swedish retirement savers, we combine survey data on climate beliefs with detailed administrative records of retirement portfolios. Our empirical framework leverages a unique natural experiment: the 2018 heatwave and accompanying forest fires in Sweden. By geolocating respondents relative to fire severity, we identify the causal impact of proximity to the shock on changes in climate beliefs. In line with a large body of empirical evidence, we see that participants who live in fire-affected areas are, on average, more likely to become more concerned about climate change.[1]

We show that this salience effect is highly contingent on the degree of political polarization in a respondent's community. In Sweden, the incumbent party (Social Democrats) lost ground to both left- and right-wing parties to varying degrees across the country in the 2018 election due to growing concerns around immigration, the environment, and other polarizing topics. Although the "forest fire" shock described above is strong in our data, it is completely absorbed by political variables: respondents in areas that move right are less likely to grow more concerned about climate change, while respondents in areas that moved left grew more concerned. This completely drowns out the direct effect of forest fires on climate change beliefs. More generally, beliefs about climate move in a manner consistent with the underlying demographics associated with the political shifts. Political polarization has a stronger effect on climate change beliefs among young, lower-income

[1] Borick and Rabe (2017) provide a review of early work in this area.

males living outside urban areas. Thus, inasmuch as weather shocks operate on climate beliefs by increasing the salience of climate change, that salience is heavily influenced by political perception and the demographics that drive political polarization. This interaction offers a novel perspective on the asymmetric ways in which shared environmental events influence beliefs and actions.

We connect changing climate beliefs to real-world financial actions by linking our survey to administrative data from the Swedish Premium Pension system, which provides detailed records of individual portfolio allocations, including the adoption of fossil fuel exclusion funds and funds' Morningstar climate risk scores. The data also distinguish between active portfolio rebalancing and passive fund reclassifications, enabling us to disentangle individual choice from structural shifts in fund offerings. Finally, by exploring heterogeneity across demographic and financial literacy groups, we reveal how belief-action dynamics vary by socioeconomic and political context.

In line with previous work, we find the strongest connections between environmental beliefs and financial decisions among more financially sophisticated respondents (Anderson and Robinson (2022)). We find no evidence for changing beliefs to cause people to rebalance—only characteristics related to financial sophistication matter. We then consider those outside of the default fund to see if they act upon their beliefs *when* they rebalance. We decompose portfolios into active and passive investments in order to separate active tilts originating from choices from passive tilts attributed to fund reclassifications. In general, respondents who become more convinced of climate change actively tilt their retirement portfolios towards fossil fuel exclusion funds and towards funds with lower Morningstar climate risk exposures. This behavior is only significant for those with higher financial knowledge. We do not find any evidence for downward revisions to be reflected in tilts away from green funds.

This asymmetry in response has implications for the aggregate quantity of green mutual funds held in retirement savings decisions as a function of belief revisions. Overall, about one-third of the total re-allocation to fossil fuel exclusion funds that occurred in the system in our sample between 2018 and 2021 comes from rebalancing; the remainder occurs through funds that reclassify themselves as fossil-fuel exclusion funds. Those who revise up hold a higher fraction of fossil fuel exclusion funds, of which the lion's

share come from active tilts. They also have larger retirement accounts. Those who are reluctant to adopt climate-friendly investment decisions have a much smaller impact on aggregate holdings because they predominantly reside in demographic categories with low financial literacy and aggregate wealth holdings. We note that the stark difference in "active greening" by wealthier compared to poorer households can potentially exacerbate the tensions along the very same political lines measured by political polarization.

In sum, our study makes three primary contributions. First, it provides novel evidence on the interaction between political polarization and environmental salience in shaping beliefs about climate change. Second, it bridges the gap between behavioral finance and ESG investing by linking belief updates to real-world financial decisions. Finally, it sheds light on the aggregate implications of these dynamics for the transition toward sustainable finance, offering insights for policymakers and financial institutions aiming to promote climate-friendly investments.

These findings contribute to several strands of literature. We extend research on climate salience by showing how political polarization modulates the effects of environmental shocks on belief formation.[2] Further, we build on studies of ESG investing (e.g., Hartzmark and Sussman, 2019; Riedl and Smeets, 2017) by connecting belief updates to green financial actions, highlighting the role of financial literacy in mediating these effects. Finally, by integrating political and demographic heterogeneities, we provide novel insights into the behavioral implications of polarization for sustainable finance. This builds on theoretical mechanisms developed and explored in Rabin and Schrag (1999), Andreoni and Mylovanov (2012), Glaeser and Sunstein (2014), and other papers.

The remainder of the paper is organized as follows. Section 2 discusses the institutional context and the political and environmental dynamics in Sweden. Section 3 describes the data and survey design, while Section 4 examines belief updating in response to climate shocks. Section 5 connects these findings to retirement portfolio choices, and Section 6 quantifies the aggregate impact of belief-driven investment shifts. Section 7 concludes with implications for policy and future research directions.

[2]See Joireman, Barnes Truelove, and Duell (2010), Zaval et al (2014) and Djourelova et al (2023) and references therein.

2 Politics, Polarization, and Climate Change in Sweden

Our paper makes use of regional voting data for the parties to the left and right of the center political spectrum. We combine this data with wild fire shocks that became unusually severe in many parts of the country due to a record-breaking heat wave that affected large parts of the country in the summer of 2018. We utilize these shocks to assess asymmetries in how beliefs and behavior change for people observing or experiencing the same basic phenomena.

In the following subsections, we describe the political environment, the wild fires and timing of events between our two surveys that explains the basic research design of our study. We also present aggregate evidence of the common socio-demographic characteristics that affect political polarization on the municipality level and its relation to the weather-induced shock.

2.1 Political Polarization in Sweden

Sweden is a constitutional monarchy with a parliamentary democracy, where the Riksdag (parliament) holds legislative power. The country's proportional representation system allows multiple parties to gain seats based on their share of the vote, fostering a multi-party landscape and coalition-based governance. Over recent decades, this political landscape has converged around eight political parties that alternate in forming center-right or center-left governments. Center-right coalitions are traditionally led by the Moderate Party, supported by the Center Party, the Liberals, and the Christian Democrats. Center-left coalitions, on the other hand, are typically led by the Social Democrats, often with additional backing from the Left Party and the Green Party.

The political landscape in Sweden has changed substantially over the past century.[3] In recent decades, smaller parties such as the Center Party, Left Party, Christian Democrats, Green Party, and Liberal Party have maintained a consistent but modest share of votes in parliamentary elections. In contrast, support for Sweden's historically dominant political party, the Social Democrats, has steadily declined over time. A recent shift in the political climate has been the diminishing popularity of left-center coalition parties and the rapid

[3]See Appendix A for an overview of voting outcomes in Swedish parliamentary elections from 1960 until 2022.

rise of the far-right Sweden Democrats as a significant political force.

Over the past two decades, the ruling coalition has alternated between the center-left and centre-right blocs. In 2014, a minority center-left coalition, comprising the Social Democrats and the Green Party, assumed power with a narrow majority in parliament. By 2018, this coalition suffered significant losses, retaining its majority only with additional support from the Center party and the Liberals. An important explanation for this development was the increased support for the Sweden Democrats that went from entering parliament in 2010 to becoming the third-largest party by 2018, but yet excluded from government negotiations by both blocs.

Our focus is on four political parties that represent shifts in the outer wings of the Swedish political spectrum.[4] On the right, the Sweden Democrats and the Christian Democrats are parties that, unlike the right-leaning Moderate Party, have generally not held government leadership positions for extended periods. On the left, the Green Party and the Left Party have typically acted as support parties for Social Democratic-led governments rather than leading governments themselves.

This paper utilizes the political divide between 2014 and 2018 to proxy for political polarization using detailed voting data across Sweden's 290 municipalities. We achieve this by aggregating votes for the political left (the Green Party and the Left Party) and for the political right (the Sweden Democrats and the Christian Democrats), then comparing these outcomes between 2018 and 2014. This approach provides a measure of political movement both to the right or left, as well as a general shift away from the centrist parties.

Figure 1

Figure 1 presents a scatter plot of the movement along the right and left dimension across municipalities. As described above, the general voting outcome was associated with a shift towards the right-wing parties and in particular the Sweden Democrats. This shift is visible along the horizontal axis of Figure 1. All municipalities recorded an increase in support for the two right-wing parties. A strict movement to the right is mechanically related to a decrease to the left, but about one-quarter of municipalities also showed increased support for the left. These observations are represented above zero on the vertical axis of Figure 1. In our analysis that follows, we will utilize the interaction of

[4]See Figure A.1 for detailed information on these political parties.

these movements in order to capture a greater political divide (also know as "centrifugal movement") as opposed to general shifts to the right or left.

2.2 The Heat Wave and Forest Fires in 2018

In the summer of 2018, Sweden was gripped by a record-setting heat wave. Temperatures measured 3-5 degrees Centigrade higher than normal in Sweden overall, and Stockholm experienced the highest average monthly temperature in its 262-year history of systematic temperature measurement. The heat wave coincided with several severe forest fires in July and August that did not only affect rural areas, but also many municipalities close to the main cities.[5]

We use the data from the Swedish Civil Contingencies Agency to measure the severity of forest fires as a shock to the saliency of global warming. More specifically, we define a dummy for areas that were most adversely affected, measured by the area destroyed. We opt to define treated areas around the top 10% of affected regions, which we find to be a reasonable threshold. A too wide threshold will make the proxy of a salient shock weaker. Defining it too narrow will reduce the number of people exposed to the shock, which is problematic when the most severe forest fires occurred in rural parts of Sweden which are sparsely populated.

Figure 2 plots the distribution of forest fires in Sweden in 2018 and over time. Figure 2A shows the full distribution of forest fires and the applied cut-off. Figure 2B plots the cut-off over a time window from 2014 to 2020, and shows by comparison that these fires were very unusual by Swedish standards. In alternative specifications we use the top 10% regression residuals obtained from predictive regressions on 2018 forest fires as a function of past fires to classify treated municipalities. The results are almost identical, and we conclude from this analysis that the forest fires in 2018 were unexpected and does not alter our chosen classification for treated municipalities.[6]

Figure 2

Even though both forest fires and extreme weather events may contain little informa-

[5]The wording "severe fires" is with respect to what is normal in Sweden given that 15% of its area rests above the Arctic circle.

[6]A detailed description of the data on forest fires and voting outcomes is provided in Appendix C.

tion about future global climate change, previous work suggest that people directly or indirectly react to them.[7] Moreover, the weather shock and wild fires coincided with national elections that took place in the early fall of 2018 just after the heat wave. Thus, the heat wave and wild fires themselves became a political flash point: it became both a tool for those advocating stronger measures to fight climate change, as well as an important source of pushback among climate skeptics. The media played an important role in this political pushback.

2.3 Climate Change in the Public Debate

As in many other countries, 2018 was the year in which the awareness and concern about climate change moved to the top of the political agenda in Sweden. To get an overview of how political opinion changed during the time of our surveys, we collect data on polls and media coverage. One of the most established polls is made by Demoskop who surveys voters about the ten most important topics monthly, where "Climate change" is one such topic. We also count articles with keywords "Climate change" and "Global warming" obtained from the Media and Climate Change Observatory.[8] Opposing views on climate change is proxied by similar article counts from far-right media obtained from Vowles and Hultman (2021).

Figure 3 here

Figure 3 presents a time series plot for these three data sources centered around a window for the two surveys which shows how climate change quickly grew to become an important topic on the political agenda. The shaded grey area shows that there is a first spike in interest in climate change among voters during the early fall in 2018 following the heat wave in July. The heat wave was followed by an intensified discussion about climate change which peaked in September (where Mainstream media coverage peaks in Figure 3). The Demoskop poll shows that "Climate change" replaced "Immigration" as the most important topic for Swedish voters at this time. The timing of events includes

[7] Weather-induced preference shocks have been explored in various settings before including car purchases: Busse et al (2015); real estate prices: Bernstein, Gustafson, and Lewis (2019); stock prices: Choi, Gao, and Jiang (2020); and pricing of options: Kruttli, Tran, and Watugala (2021).

[8] European Newspaper Coverage of Climate Change or Global Warming, Boykoff et al (2023).

Greta Thunberg's climate strikes in August 2018 and the IPCC report in October the same year. The Global Climate March in in the spring of 2019 and Greta Thunberg's speech to the UN in September later in the year were both important media events for the climate movement, when we also see that the far-right media was especially active. Jylhä, Rydgren, and Stripling (2020) and Vowles and Hultman (2021) give a detailed exposition of how climate news were distorted, and how Greta Thunberg was discredited in right-wing news media. The elevated interest in climate change from the right-wing media is a reaction to the increased coverage by mainstream media.

2.4 Analyzing Polarization at the Macro Level

In order to validate our choice of left and right voting outcomes displayed in Figure 1, we characterize voting outcomes as a function of key socio-economic variables on the municipality level. In particular, we obtain reported averages of income, income skewness (defined as the difference between median and mean), the proportion foreign born, proportion with university education and population density from Statistics Sweden. All characteristics are from 2014 and the movements in political views are measured between 2014 and 2018.[9] We include the dummy for areas highly affected by the forest fire in the summer of 2018, before the election.

Table I here

Table I presents the results of regressions where the dependent variable is movements to the right or left from the center on the political scale. Columns (1) and (2) show the results for moving left. Moving left is associated with municipalities with lower than average income, higher income skewness and is more prevalent in densely populated areas. Column (2) introduces the dummy areas most adversely affected by fires, and shows that these municipalities gained an additional half percent in support for the left, which is high relative to the mean of minus half of a percent. We repeat the analysis for moving right in columns (3) and (4). Here, we find income skewness and proportion foreign born to be associated with an increase to the right. Higher education and population density is

[9]Summary statistics of these variables are tabulated in Table A.1 in the appendix.

strongly negatively related to moving right. A municipality having been severely affected by fires did not affect changes in voter turnout for the political right.

In sum, income skewness pushes people to the extremes of the political scale. Voters moving to the left are more likely to live in bigger cities with lower average income. Those moving right are more likely to live in rural areas with lower education. Municipalities affected by wildfires were more likely to turn left on the political scale. This is consistent with forest fires having a causal effect on election outcomes. But for our purposes, and more important, it illustrates that there is a significant correlation between voting outcome changes and natural disasters that provides us with a source of geographic variation in climate views tied to the political environment in which people live. This variation is helpful in understanding the mechanism in which views of climate change correlates with some of the individual characteristics we obtain from our survey data.

3 Data and Empirical Setting

Our data consists of two sets of survey responses from the same individuals that are matched to detailed administrative data. The two surveys allow us to measure changes in beliefs about climate change before and after the heat wave, and how the changes in turn influence investment decisions.

Our empirical strategy can be described in three steps. First, in conjunction with Statistics Sweden (SCB), we administered a series of surveys, the first one in January and February 2018.[10] The first survey, which is documented in detail in Anderson and Robinson (2022), targeted 20,000 randomly selected individuals aged 18 to 65 who were provided instructions by mail on how to complete the survey online. After two reminders, we received 4,230 completed responses corresponding to a 21% response rate. We then administrated a follow-up survey to the same respondents in August and September 2019. Around 60% of the original respondents participated in the second survey, resulting in a total of 2,561 complete responses. Both surveys show high response rates and are in line with other surveys solicited by the SCB. By comparison, Giglio et al (2021) work with

[10]SCB is a government agency responsible for collecting and compiling nationwide statistics in Sweden, similar to the US Census Bureau. Details of the response statistics and the matching procedure is provided in Appendix B and Appendix D presents the survey questions.

survey data with around a 2.5-4% response rate for first contacts which is more typical of household surveys. Working with SCB also has the advantage that our sample demographics can be compared to the underlying population where we apply survey weights to make our analysis generalizable.

In a second step, Statistics Sweden matches the survey responses to administrative data obtained from various sources, including the Swedish Tax Authority. This step allows us to combine the environmental views that we elicited in our surveys with a large set of demographic and wealth characteristics. We also know in which of the 290 municipalities the respondent lives in Sweden, which allows us to match on local voting outcomes and exposure to natural disasters.

Because we are specifically interested in understanding the link between environmental views and investment decisions, we add the complete transaction histories from the Swedish Pension Agency (SPA) in the third step. Since the SPA provides retirement savings accounts for the whole working Swedish population, we can obtain mutual fund choices for virtually every individual in our sample. The data include the timing and fund composition of any rebalances as well as the year-end portfolio balances. From the SPA, we also obtain fund characteristics, which allows us to classify the funds the same way they are presented at the SPA website. Data on monthly fossil fuel exclusion are available from April 2019, but we hand-collect yearly data for all funds back to 2017 — before the survey.[11]

In the remainder of this section, we explain the Swedish pension system and the measures of green funds that we apply. We then explain the survey instrument and show how our responses relate to demographics.

3.1 The Swedish Pension System

The Swedish Pension system currently operates two types of accounts for each individual contributing to the system.[12] One is a defined contribution account funded on a pay-as-you-go basis based on a contribution rate of 16% of labor income, analogous to Social

[11]The hand-collected data is obtained from the mutual fund companies annual reports, in which we classify exclusion based on a threshold of 5% restriction of fossil fuel investments.

[12]The Swedish pension system underwent a dramatic transformation in the 1990s. A full account of this transition is beyond the scope of this paper; details are discussed at length in Palme, Sunden, and Söderlind (2007) and Palmer (1998).

Security in the United States. A second account is based on an additional 2.5% of labor income. This operates in a manner similar to a 401(k) plan in the United States, but as part of the state pension, rather than an as an employer-sponsored plan. Individuals are allowed to control how this account is invested by allocating this portion of their account across as many as five different funds. A reallocation is made by stating percentage allocations to a newly chosen portfolio, which triggers a liquidation of the old portfolio and a complete rebalancing into the new one with the desired weights. The simplified rebalancing procedure is different from many private savings schemes, where people often just choose allocations for new inflows, or alternatively, are required to reallocate by selling previous holdings before buying new funds. Inflows to the pension accounts are distributed annually according to the weighting scheme in November. The pension system is therefore a very suitable laboratory to test questions related to beliefs and investments because it involves the whole working population and the amounts are proportional to income.

Investors who do not make a choice automatically fall into the default fund. The default fund is managed by a government controlled company, called AP7, and offers a low-fee, well-diversified fund that employs screening of individual companies in order to take socially responsible investing considerations into account. Since the fund is a broad index fund, it has minimum restrictions of its investment universe, but does exclude manufacturers of biological, nuclear and cluster weapons.[13] More importantly, it does not exclude companies operating in the fossil fuel sector.

The default fund is not part of the general fund offering available for selection, but is by far the most common choice for first entrants in the system since the launch in 2000. As has been widely documented in the literature, default fund investors are generally less financially sophisticated investors with lower income and financial literacy; inertia characterizes many individual's choices. The individual pension data contains the full history of allocations ("rebalances"), in which the share of default fund investors are close to the overall fraction of 40% of all people in the pension system. At the end of 2021, the total assets under management (AUM) were just over SEK 2 Tn (USD 200 Bn) and covered six million people, a number which is close to the weighted sample in ages 18-65 that we

[13] As of December 2021 the AP7 maintains a list of 97 "blacklisted" firms that are individually screened and excluded from investment, most of them due to breach of UN principles of human rights.

apply. After only twenty years since inception, the system is still under consolidation and is expected to level out at approximately twice the size measured by AUM, placing it among the ten largest pension funds in the world.

At its launch in 2000, there were 254 funds to select from; this number quickly grew to include almost 900 funds by 2018. There were historically only a minimum set of requirements (such as following the UCITS directive) for a fund to enter an agreement with the SPA and become eligible for participation in the system. In the debate that followed a few scandals where investors had been defrauded and a more broader discussion about improving governance and choice architecture, the SPA were given new guidelines in 2018.[14] In December 2018, the SPA formally terminated all agreements with its current fund companies to be renewed only if funds could comply with a new set of rules, in which the most substantive change was a minimum cap for its AUM. Another requirement was for the fund company to subscribe to the UN Principles for Responsible Investments, but representatives from the SPA tell us that this restriction was not binding. The new requirements decreased funds available for selection from over 800 in 2018 to less than 500 in 2021. The dotted line in Figure 4 shows a stark decrease in the total number of funds offered in 2019 and 2020, where delistings were done in batches. Holders of delisted funds received an information letter from the SPA with information about the change and instructions on how to choose a substitute fund. Non-choosers were diverted to the default fund. From April 2019 and onwards, all funds are classified with respect to sustainability objectively (by exclusions and Morningstar ratings) in much more detail than previously.

3.2 Green Investment Options in the Swedish Pension System

We collect historical monthly fund characteristics from the SPA website to match with individual holdings. A green ESG label was introduced in 2004 to allow companies label their funds as incorporating social (ethical) or environmental aspects in their investment processes. This procedure did not stipulate any standards or minimum requirements by

[14] Anderson and Robinson (2018) show the negative relation between choice and financial literacy. Dahlquist, Martinez, and Söderlind (2017) documents inertia also for those who initially chose a portfolio of funds in the pension system and Cronqvist, Thaler, and Yu (2018) show that the fraction of new entrants in the system making fund choices decreases.

the SPA. Historically, funds were therefore likely to differ in scope in which they adhere to green investments and other aspects of corporate social responsibility (Anderson and Robinson (2022) give a detailed overview). It is also a clear possibility that some reclassifications were made as a strategic response to increased consumer demand, as in Cooper, Dimitrov, and Rau (2001).

In 2019, the SPA launched more extensive online tools for investors to assess the environmental performance of funds. The online tool enables investors to screen and sort funds according to specific strategies as well as fund fees across category, type of funds and geographic regions. Three additional characteristics were introduced. First, funds could now classify themselves into three broad categories separately based on sustainable stewardship: Environmental, Social and Governance. Around 94% of funds reported that they in some way adhere to all these principles at the end of 2021. The new decomposed ESG label is like the former version not subject to external validation and will likely encompass a lot of variation in the degree to which they comply with ESG standards.

Second, the Morningstar climate risk metric is reported, ranging from "Negligible" (0-10) to "Severe" (40 and higher). The scale aims to capture, in absolute terms, to what extent funds are exposed to financial risks related to climate change. Although the Morningstar climate risk metric is a universal assessment of "expected green" performance, such measures are subject to noise and lack consistency across providers (Dimson, Marsh, and Staunton (2020)). At the end of 2021, there were 34 funds without a Morningstar Climate Risk score, including the default fund. The sample average (median) of funds available is 23 (22), the minimum 8 and maximum 41. Our sample closely matches the distribution of the overall holdings in the pension system.[15]

Finally, funds report up to 13 exclusion strategies (so-called *negative selection* funds as in Hong and Kacperczyk (2009)).[16] We focus on fossil fuel exclusions as they naturally appear to be the most relevant strategy for investors aiming to steer their portfolios away from carbon emitting firms. Choosing exclusions is also likely the most salient way for investors to reveal their preferences over investment mandates. From the annual reports

[15]See Appendix E: Figure E.1 presents a screen print of the web tool and Figure E.2 plots the full Morningstar climate risk score distribution across funds and portfolios.

[16]The exclusions categories are: Fossil fuel, Coal, Uranium, Gene modification, Arms, Nuclear weapons, Cluster bombs, Biological/Chemical weapons, Alcohol, Tobacco, Pornography, Gambling, and breach of UN human rights conventions.

of fund companies, we complement the PPA data by hand-collecting fossil fuel exclusions on the fund-level for 2017 and 2018 which enables us to trace holdings of these funds over time.

There is an obvious link between climate risk and fossil fuel exclusions. The fossil fuel industry is exposed to risks related to carbon regulations, decreasing demand for its products and increasing costs related to the implementation of emission reduction technologies. Fossil fuel exclusion is a narrow measure that captures a reluctance to avoid a particular high carbon dioxide-emitting sector today. The correlation between the two measures is -0.3 across funds and our empirical analysis shows that the results are quite similar for both measures of green investments.

We match the aggregate AUM of all funds to the fossil fuel exclusion classification to characterize the development of the Swedish pension system from January 2017 to December 2021 when the sample ends.

Figure 4 here

The grey area in Figure 4 shows the capital allocated to the default fund (light grey) and all other funds available for selection (dark grey). The green area shows the capital allocated to fossil fuel exclusion funds from 2017 and 2021. Exclusion funds were quite rare in 2017 (the solid black line shows that the fraction of about 10% of the number of available funds), but quickly grew to become a substantial share of the pension fund space in 2021. About half of the funds available in the Swedish system exclude fossil fuel at the end of our sample. This represents around 44% of the total pension wealth. Text boxes indicate the approximate timing of our two surveys.

Is the growth of exclusion funds in Figure 4 a result of investors' increased awareness of climate change? We use the weighted portfolio average of fossil fuel exclusions along with Morningstar climate risk assessments as measures of investment tilts when we analyze portfolio choice as a function of changing global temperature beliefs in Section 5. We measure the portfolios in 2021, allowing investors to rebalance their portfolios from when they took the survey to the end of the sample. To which extent is the change driven by passive investment and funds changing their investment mandate? We introduce a measure of *active fossil fuel exclusion* by using rebalances in the time series from the day they took the first survey in 2018 up until the end of 2021. The total fossil fuel exclusion

weight in 2021 can be decomposed into a component attributed to rebalances (actively re-weighting the portfolio) and a passive part which is attributed to reclassification of the fund, measured at the day the individual took the first survey to the end of the sample period. An individual who did not make any rebalancing decisions will have a passive weight identical to the total exclusion weight. An individual who made a decision will have an active weight equal to the total exclusion weight as long as the fund classification remains unchanged, but can have both an active and passive part if a fund in the portfolio change their classification after the rebalancing decision.

The decomposition has a distinct advantage over a simple difference in weights between two time periods as it explicitly addresses the issue of reclassification, which is a substantial part of the overall change in exclusions. In a way, the decomposition into an active and passive component can be thought of as portfolio changes attributed to demand (rebalances) and supply (reclassifications). It gives us the opportunity to verify that measured beliefs relates to active choices, but it also allows us to obtain an approximation of how much of the increased total allocation to exclusion funds are attributed to active choices and how much is due to a change in the offering of funds on the aggregate level for the studied time period.

3.3 Survey Questions

Our first survey includes basic questions about financial literacy, green preferences and climate beliefs. The questions and responses to the environmental and financial literacy tests are analyzed in detail in Anderson and Robinson (2022). In the second survey, we repeat one question from the first survey. We ask:

- "Over the next 20 years, how likely do you find the following scenario?"
  - "The average temperature on earth will rise by more than one degree Centigrade"

The 20-year timeframe was chosen so that individuals were being asked to look forward over their own lifetimes, rather than over longer future periods that they will not experience personally. A one centigrade rise within such a short time frame as 20 years

is quite unlikely compared to current scientific consensus (although this is being continuously revised). According to the United Nations and the Intergovernmental Panel of Climate Changes (IPCC), the increase in global average temperature is just above one Centigrade since the beginning of industrialization, even if the pace in which occurs is increasing. The historical pace is around 0.17 Centigrade per decade. A further one degree increase within only twenty years would imply that the target for the Paris agreement to keep world's temperature increase well below two Centigrades before year 2100 would be missed by a wide margin.

Table II here

Table II presents a transition matrix of the responses across the two surveys. Table II groups responses in those "Convinced" (reporting "Likely" or "Very Likely") and "Unconvinced" (reporting "Unlikely or "Very Unlikely"). In 2018, the vast majority of individuals (80%) was convinced of the fact that the average temperature on earth will rise by more than one degree Centigrade in the next 20 years. In 2019, this fraction of respondents convinced of this scenario remained largely unchanged. However, between the two surveys, around half of the respondents changed their opinion on the likelihood of this scenario occurring.

Table II shows that while 1,264 people did not revise their expectations, 684 revised up and 613 revised down the probability of a sharp global temperature increase. In other words, there is substantial variability in individuals' perceptions of how a temperature increase will play out within the next two decades, which partly may be explained by the large uncertainty associated with these assessments (see Giglio, Kelly, and Stroebel (2021)). In our analysis that follows, we use the off-diagonal elements of Table II to construct temperature revisions ("Revised up" for the upper diagonal elements and "Revised down" for the lower diagonal elements). We use the 2018 categories for "Convinced" and "Unconvinced" as controls in our analysis when analyzing changes in temperature assessments.

Table III here

Table III provides a more detailed demographic breakdown of the respondents. Response rates for younger, lower-income individuals with lower education are generally

lower. Since the second survey is conditioned on having responded to the first, this difference is accentuated. Individuals responding to both surveys are on average older, have higher income and education relative to the overall Swedish population. More than half of the individuals in our sample went to college and 35% of our respondents are 55 or older, while only 19% of the Swedish working age population is in this age range. Statistics Sweden compute survey weights for us based on age and gender in order to achieve a closer representation of the underlying population.

Columns marked "Temperature change" in Table III shows the fraction of people responding to the one centigrade temperature increase question in the first survey as well as how they update measured by the revisions in the second survey. Most respondents found a sharp increase in global temperature within the next 20 years likely or very likely. The fractions are relatively similar across the sample partitions, but higher for the young and those with lower income. We note that the fraction of unconvinced are highest for men and among the middle-aged.

Turning to revisions, most individuals revised their expectation upwards (27% up compared to 24% down). The weighted averages across the two surveys diminishes the gap but is similar. Looking at the difference in upgrades and downgrades, we find that younger people in general become more convinced about climate change. This could reflect generational shifts in attitudes toward the environment, or it could be a manifestation of the increased pessimism documented in Heimer, Myrseth, and Schoenle (2019). We also find that the oldest group are catching up with younger respondents. Men are less likely to revise up and more likely to revise down their assessment compared to women. Shifting to higher climate concerns are associated with higher education and income. People living in cities are generally less likely to revise down compared to those living in rural areas.

Table III also reports the changing voting outcomes in the regions where respondents live. McCartney, Orellana-Li, and Zhang (2024) show that household real estate decisions are influenced by party affiliation, in a manner that increases spatial polarization along party lines. This implies that household characteristics are becoming increasingly correlated with geography. We tabulate shifts in the political movements to the right and left along sample characteristics. The two first rows of the two last columns display the over-

all unweighted and population weighted means which shows that the average move to the left was about -0.19% and to the right was 6.28%.

To make the differences easier to read in Table III, we subtract the average across sub-categories across sample splits. Male respondents are somewhat more likely to live in areas moving to the right, although there is very little difference in gender composition in geography. Older people are more likely to live in regions that have shifted to the right, and less so to the left. The same holds for income brackets, except for those with the highest income, who are more likely to diverge in opinions. Unconditionally, higher education is associated to a shift to the left, but we find the largest difference in political views comparing those living in cities compared to rural areas. City dwellers shift to the left and people in rural areas clearly move to the right.

In our analysis of environmental concerns, we will use both the regional shifts in policy support as well as individual characteristics to explain revisions to climate change expectations.

In order to verify that differences in beliefs about a global temperature increase indeed are associated with general climate awareness and concerns, we asked our respondents in the second survey to which extent they would agree or disagree with four statements concerning climate-related concerns asked in the 2019 survey, but also a question related to social beliefs asked in the first survey in 2018. The questions are as follows:

- *Notice GW*: "I have already noticed the effects of climate change in Sweden"
- *Worry GW*: "I'm worried about climate change and what it means for myself and my family"
- *Government Action*: "The government should do more to fight climate change"
- *Higher Taxes*: "I am willing to pay higher taxes to increase Sweden's aid to poor countries"

The responses fall on a five-point Likert scale from from "Strongly Disagree" to "Strongly Agree".[17] The overall fraction of respondents strongly agreeing that they have noticed the effects of climate change where they live is 58%, 24% agree and only 7% disagree to some

[17]Table D.2 in Appendix D provides a full tabulation of these results.

extent. More women than men, more young compared to old, but less people living in rural areas report to have noticed this change. A smaller fraction is worried about climate change. Around 23% (46%) strongly agree (agree) to this statement. Over half of the respondents strongly agrees that the government should do more to fight climate change.

There is much less agreement over the last questions related to social values and higher taxes, where there is a larger fraction (39%) disagreeing than agreeing (31%). Only 9% state a strong willingness to pay higher taxes to increase foreign aid to poor countries.

Overall, the average responses show a high concern for environmental issues and willingness to take action. The correlation within the environmental questions and between foreign aid is high. We analyze how these more general differences in perceptions and call for action relate to revisions of temperature changes at the end of the next section.

4 Changing Beliefs About the Severity of Climate Change

We begin our analysis by first exploring how temperature revisions relate to individual characteristics, weather shocks and political movements on the right and left scale. Then we show how temperature revisions and political movements relate to our measures of environmental attitudes.

To understand the mechanisms for changing beliefs about climate change, we utilize the extreme forest fires that occurred between the two surveys during the summer of 2018. We do this for two reasons. First, to showcase that a saliency shock affects peoples climate expectations which has been found in many other previous studies. Second, by introducing of our political variables makes it possible to analyze to which extent the saliency shock is absorbed by contemporaneous movements in the political surroundings of the survey respondent.

First, we specify OLS regressions where the dependent variable is either the perceived likelihood of climate change or upward revisions between the two surveys.[18] The dependent variable captures whether an individual is convinced of the fact that the average temperature on earth will rise by more than one degree Centigrade in the next 20 years in the 2018 (before the fire shock) and 2019 survey (after the fire shock). Formally, this is a

[18]We opt to use OLS instead of Probit models due to the interaction terms. Marginal probabilities in a Probit setting without interactions are very close to those obtained by OLS.

dummy that takes the value of one if the individual reports "Likely" or "Very Likely" to the question presented in Table II.

Columns (1) and (2) of Table IV tabulates the results. Climate concerns in 2018 is higher for women and the young, although this difference is increasing in gender and decreasing in age when comparing the coefficient loadings in columns (1) and (2). In column (1), we find that the severe forest fires in the summer of 2018, which occur after the first survey in 2018, are insignificant in explaining the propensity to find temperature concerning. Column (2) adopts the same measure of climate concerns in 2019, but is observed after the occurrence of the 2018 forest fires. We find that people living in areas affected by the forest fires grew more convinced of the likelihood and severity of climate change in the next 20 years.

Table IV here

The last three columns of Table IV presents the corresponding results for temperature revisions as the dependent variable. Again, forest fires can explain an increased perceived likelihood of climate change in the next 20 years. Column (4) runs a regression with only the regional political variables and shows that people living in areas moving right (left) are less (more) likely to revise up, and the interaction term shows that this difference is even more pronounced in areas which are politically diverging from the center. Re-introducing forest fires in column (5) dilutes the political effect, but importantly shows that the saliency of the weather shock disappears once we control for the political environment.

Our results thus far suggest that the saliency shock of natural disasters to climate concerns weakens once we account for the political environment. This finding aligns with our earlier observation that natural disasters tend to be associated with a leftward shift in the political landscape. Consequently, it is difficult to fully disentangle the saliency of an extreme event in the context of changing political support. Saliency is ultimately a function of perception, and perceptions are deeply influenced by political views.

The cross-sectional variation across political movements in Table I and Table III suggest that responses to climate concerns are asymmetric in respondents characteristics that are attributed to political leaning. Table V presents sample partitions of the same regressions as presented in Table IV. We break the sample based on income (into the two highest

income brackets reported in Table III), gender, age (above and below 50 years old) and urban vs. rural. This allows us to identify which respondents revise their views upward due to the political environment.

Columns (1) and (2) of Table V shows that political shifts are only significant for revisions among low-income respondents. Among these respondents, right shifts in the political environment are negatively associated with upward revisions, or an increase in respondents' perceived likelihood of climate change. This effect is exacerbated by the interaction term, making upward revisions even less common among respondents in areas where there is a greater political divergence.

Columns (3) to (8) of Table V repeat this analysis on gender, age and urban dwellers. Consistently throughout, political shifts to explain the likelihood of climate revisions for men, the young and people living in rural areas, but not for women, the old, or urban dwellers. Political shifts to the right and political divergence are all negatively associated with upward revisions along these lines. Political shifts to the left work in the opposite direction, but for the very same demographics.

We conclude that the political environment explains the propensity to revise up climate expectations, but they can be attributed to certain demographics. These demographics share the same characteristics as those driving political polarization.

Table V here

To check whether our temperature revision variable captures general concerns about climate change, we test how well it can be associated with increasing awareness, fears and the willingness to take action against climate change.

Table VI presents the results from OLS regressions where the dependent variable takes the value of one for strongly agreeing to the four statements presented in Section 3.3 (Notice GW, Worry GW, Government Action and Higher Taxes). Among the independent variables, we include separate dummy variables for up and down revisions and the political shifts of the area where a respondent lives. We include a set of characteristics as controls: a dummy if the respondent is male, have university education, the log of income and age (divided by 10). We use two specifications for each questions: one in which we only include the shifts in regional political support to the left and right, and another

in which we also include the temperature revisions and controls for the 2018 temperature assessments.

Column (1) of Table VI shows that the political geography does not explain an individual's propensity to have noticed the effects of climate change in their area. Men and older people are less likely to be in agreement with this question, those with higher education more so. The loadings on the characteristics explaining green views are consistent with what is found in previous work.[19] Column (2) introduces revisions about expectations of temperature change and shows that people who revise up (down) have a higher (lower) propensity to agree with the statement and somewhat absorbs the difference in gender and age.

Table VI here

Columns (3) and (4) of Table VI repeats the analysis where the dependent variable takes the value of one for those who report being very worried about climate change, and zero otherwise. Column (3) shows that worry about climate change is significantly related to both left and right movements on the political scale. The negative effect of moving to the right is also exacerbated by respondents living in areas where there is political divergence. Men and older people are less worried. Worry is strongly related to revising up or down. Interpreting the coefficients as probabilities, there is a 9% higher probability to be more worried among those who revise up, but almost an 18% less probability to worry for those who revise down. The results are similar for the questions whether the government should take action against climate change. The political variables are somewhat weaker after controlling for climate revisions. Young people are unconditionally more prone to think that the government should do more, but this is crowded out once controlling for the climate revisions.

Finally, columns (7) and (8) of Table VI present the results where the dependent variable takes the value of one for agreeing with the statement that one is willing to pay higher taxes for helping third-world countries; zero otherwise. There is a stronger tendency for respondents in left-moving municipalities to agree with this statement. The interaction term suggests that it is weaker in diverging areas. When introducing revi-

[19] See Falk et al (2018) and Dechezleprêtre et al (2023)

sions, we find them only negatively related to downward revisions, and insignificant for those who revising up.

The timing of this last question is different from the other three questions, because it was asked in 2018, before the outcome of the revisions. The causality is therefore reversed, because it suggests that those who are less in favor of paying higher taxes to help the third world are more likely to revise down. We nevertheless include it in our analysis, because we believe it is another manifestation of the political channel confounding the climate change revisions.

The results so far show that temperature revisions provide a meaningful measure of green beliefs and attitudes. We find that the saliency of natural disasters can explain changing beliefs, but that political environment clouds this relation. Additionally, the political environment matters more for some than for others in shaping climate change beliefs. In particular, political surroundings are more important for the young, for men, those with lower income and those living in rural areas. We find climate revisions to be helpful in explaining more general green attitudes and beliefs, which goes beyond the political geography and individual characteristics.

The next section analyzes how these findings interact when examining financial decisions within the context of the Swedish Pension system.

5 Climate Change Revisions and Portfolio Choices

In this section we connect revisions to beliefs about climate change to the rebalancing of retirement portfolios. As shown in Cronqvist, Thaler, and Yu (2018), the propensity to make an active fund choice has been falling since the inception of the system in 2000 and a substantial amount of investors fall into the "non-choice" default fund. Inertia in the system is closely related to financial sophistication. To address this, we use a modified "Big 5" financial literacy test solicited in the first survey in 2018. The financial literacy score ranges from 0 to 5, where we group respondents with a score of 4 or higher in the high financial literacy group and the remaining in the low group.[20]

Of the total 2,561 respondents in our sample, 2,521 owned a retirement account in

[20]The financial literacy test and its results is presented in Anderson and Robinson (2022).

2021. Choices are made by investors rebalancing their portfolio, i.e. they choose a weighting scheme consisting of up to five funds. The fraction of investors in the default fund in the sample is 43% at the end of 2021 and very similar to the population average of 40%. We find that 28% of the investors (711 respondents) in our sample trade at some point during the three years after the first survey in 2018 up until the end of 2021.

We present our results as follows. We begin by estimating the propensity to stay in the default fund. We then focus on the individuals who have opted out of the default fund with the idea that they are likely to be more attentive to their portfolios (they already at some point made a rebalancing decision) to analyze if changing climate beliefs predict rebalancing for those not in default. Realizing that portfolio changes are rare and sticky, we assess portfolio changes up until the end of 2021 to capture the effect of temperature revisions. We use two measures of how portfolios align with concerns about climate change: we use the Morningstar Climate Risk measure and fossil fuel exclusions. Both measures are available to investors when selecting funds at the PPA website. Finally, we construct a measure of actively traded tilts towards fossil fuel exclusion funds from the date of the first survey until the end of 2021. We do this for two reasons. First, it is a way of validating the cross-sectional results of portfolios in 2021 and that they indeed can be attributed to those actually changing their portfolios. Second, the decomposition allows us estimate how much of the AUM moved into exclusion funds are attributed to choices and how much is by passive reclassification made by the funds themselves.

5.1 Financial Knowledge and Engagement

Table VII presents the results from OLS regressions where the dependent variable in column (1) an (2) is a dummy variable that takes the value of one if the investor was in the default fund as of 2021. We use financial literacy among the independent variables along with individual controls that include gender, income, age, education and a dummy taking the value of one if the investor belong to the cohort entering the system in 2000.[21]

Table VII here

Column (1) in Table VII shows that default investors are more likely to be female, younger, having lower income and less likely to have higher eduction. Those who came

[21] Allowing for fixed effects for all cohorts does not change any of the results in Table VII.

into the system in 2000 are around 34% less likely to sit in the default fund. Column (2) introduces financial literacy and shows that being passive to be strongly associated with low financial literacy. Controlling for financial knowledge crowds out the effect of gender and education dummies. Column (3) shows that changing climate concerns do not affect the propensity to sit in the default fund.

Columns (4) through (6) in Table VII consider only those 1,436 investors who were out of default, in which the dependent variable takes the value of one if the investor made an active choice. Financial literacy drives the propensity to rebalance the retirement portfolio. Temperature revisions, as well as political political surroundings have virtually zero explanatory power in determining this relation. In unreported results, we do not find any evidence for climate concerns to matter for the timing of the rebalances, i.e. if upward revisions would be associated with earlier rebalances. Neither is there evidence for climate revisions to pull people out of the default fund between 2018 and 2021.

In conclusion, the decision to actively choose portfolios in the pension system is mainly driven by variables associated with financial sophistication. Further, this is also the case for those not in the default fund that were active after having taken the surveys. Changes in climate concerns and voting outcomes do not predict the propensity to trade. This implies that the political geography we found to be important for explaining changes in beliefs are unrelated to characteristics that drive investment behavior. In the next section, we analyze whether revisions changed the way investors tilted their portfolios when they did trade.

5.2 Temperature Revisions and Portfolio Holdings in 2021

In this section, we focus on the investors outside the default fund. These investors have by definition made at least one rebalancing choice at some point since inception of the system in 2000. We explore the cumulative effect of rebalancing decisions and investigate whether investors' portfolio holdings at the end of 2021 are affected by the climate change revisions that we measure between 2018 and 2019.

In the following analysis, we use an extensive set of controls in order to be able to compare portfolios in the cross-section. The controls include the fraction invested in each type of fund category (Stock, Bond, Mixed and Target funds), portfolio-weighted past

one-year return and standard deviation, fund fee and the exposure to local retail networks (consisting of the four main banks in Sweden). In addition, we dummy out the initial individual temperature assessment in groups of convinced or unconvinced (labeled "TA controls") in 2018 such that the temperature change measure indicates movements from the temperature assessments investors made before taking the second survey.

We begin by analyzing the results from the Morningstar climate risk scale for mutual funds. We weight fund portfolios according to the Morningstar climate risk scale for available funds. The default fund and 33 other funds do not have data for the Morningstar Climate Risk measure. After removing 27 investors that were not in default but held funds with missing data, we arrive at a sample of 1,409 investor portfolios.

Table VIII presents the results from an OLS regression where the dependent variable is the portfolio weighted Morningstar climate risk rating. Column (1) shows that upward temperature revisions are strongly correlated with lower climate risk exposures as measured by Morningstar. We find that women and older investors hold portfolios with less climate risk. Columns (2) and (3) split the sample in high and low financial literacy. We find that the general result of upward revisions leading to lower climate risk exposure are significantly larger for high literacy individuals. Income and higher education are unrelated to the level of climate risk over and above the temperature assessment controls. Interpreting magnitudes, the average measured effects from upward revisions are relatively small. A coefficient of -0.29 in column (1) for those who revise up is to be evaluated against an overall portfolio climate risk mean of around 23.

Table VIII here

Columns (4) through (6) repeats the analysis with the portfolio fossil fuel exclusion weight as the dependent variable. The coefficient for upward revisions is strongly significant and implies that those who revise up have a positive tilt to fossil fuel exclusion funds of around 5%. This tilt is mainly coming from the high financial literacy group who hold portfolios with about 8% higher weight to exclusion funds. Those who revise up in the low financial literacy group do not differ from the average in their portfolio tilts. Here, we also note that older financially literate investors on average hold portfolios with higher exclusion weights.

In summary, the results so far broadly suggest that revisions to beliefs about global warming indeed are reflected in portfolio holdings measured by climate risk and fossil fuel exclusions. The results are however asymmetric: we only find support for this among those who revise up. When sorting investors on financial literacy, it becomes clear that revisions are only reflected in the portfolios of the financially literate, or in other words, those who can more easily translate their beliefs into financial action. The results imply that there is a disconnect between beliefs and choices, which draws a wedge between characteristics associated with climate concern and financial sophistication.

Table IX here

Table IX extends the analysis of Table VIII but sorts individuals on the same characteristics as in Table V and suppresses the coefficients for characteristics. Column (1) reports the same regression for the full sample as in column (4) in Table VIII for comparisons. Columns (2) and (3) breaks the sample on high and low income, columns (4) and (5) on gender, columns (6) and (7) on age and (8) and (9) on urban versus rural respondents. We find that responses to upward revisions are related to having higher income, being male, older and living in cities. Besides gender, these characteristics stand in stark contrast to characteristics found to be associated with polarization in Table V.

The results so far attempts to explain portfolio holdings in 2021 with survey responses and characteristics collected in 2018 and 2019, but this does not explicitly explain how investors arrived to these positions. By collecting data on exclusions, we can combine data on portfolio choices from 2018 to 2021 with a classification on active choices. We refine the dependent variable of fossil fuel exclusions by decomposing it into an active and passive part:

$$\text{Total Portfolio Amount}_i = \underbrace{\text{Exclusion Funds}_i}_{\text{Active + Passive}} + \text{Other Funds}_i \tag{1}$$

An allocation to exclusion funds is labeled active when a portfolio choice is made. The active portfolio is adjusted over time if allocations were affected by passive changes in the classification of the fund. Passive changes occur when funds change their investment mandate, and thus "become green" without investors actively choosing the fund.

Table X presents the result for a repeated analysis where the dependent variable is

the active component of fossil fuel exclusions and is a function of having made an active portfolio decision.[22]

The general results are similar compared to Table IX. Again, upward revisions are associated with active portfolio tilts. The loading on downward revisions are in general negative, but all insignificant. Most importantly, we find strong evidence for the active part of the portfolio to be significantly related to changes in climate beliefs. Even if a large fraction of funds change their investment mandate to exclude fossil fuel, there is no evidence for these reclassifications to be systematically related to investor climate beliefs. On the contrary, as shown in the appendix, we find that passive reclassifications are mostly related to the same characteristics that proxy for inertia and default fund holdings in the dimensions of education, gender and age.

Table X here

To summarize, we find ample evidence that climate revisions among investors translate into portfolios with lower carbon emission intensities. This effect is exclusively coming from upward revisions. Financial sophistication and participation are important components in understanding the mechanism in which revisions in beliefs translate into action. Revisions translate into action for specific demographic groups: more so for men than for women, for high versus low income earners, for the old but not the young and for those living in cities but not outside. Although climate revisions themselves are important in understanding financial action, there is a layer of financial sophistication that mute the link between preferences and choices along the lines of climate concerns.

6 Implications for Aggregate Holdings

The results thus far are developed at the individual level, allowing us to see how individual's beliefs affect their portfolio holdings. The final step in our analysis is to aggregate these individual results up to the aggregate level to quantify how individual preferences affect the overall transition towards green investment in the pension system. To do

[22]For completeness, we include the regression results for passive exclusions in Appendix F, which shows that the documented link between temperature revisions and portfolio holdings are exclusively related to active rebalancing.

this, we divide investors into three groups based on whether they have grown more concerned, less concerned, or did not changed their views about the environment. Then we measure average pension holdings for these groups, separately capturing changes that have come through active rebalancing versus simply being allocated to funds which reclassified themselves as fossil fuel exclusion funds, or which voluntarily adopted fossil fuel exclusions. This allows us to account for the widespread inertia in the system, especially among less financially sophisticated investors, and to compare to which extent the shift towards pro-ESG funds in the retirement is driven by investor demand considerations or changing investment mandates by funds.[23]

Figure 5 here

For ease of exposition, this analysis is plotted in Figure 5. The reported averages are based on regressions presented in Table E.2 in the appendix. We use sample weights to compute the means to reflect the choices of almost six million people in the underlying retirement population.

Figure 5A shows that the average portfolio value of the average person in the system is around 410,000 Swedish crowns (SEK), but around 10% higher for those revising up. Approximately SEK 184,000, or 45% of the wealth on average, was allocated toward fossil fuel exclusion funds (obtained by summing "Active Green"; 13% and "Passive Green"; 32%).[24] Nevertheless, for the neutral group most of these holdings arise through passive reallocation, not active rebalancing toward green funds. Of the 184,000 crowns on average dedicated to fossil fuel exclusion funds, less than one-third, or SEK 52,000 (13%), was actively allocated in green funds by the individual. The remaining SEK 131,000 (32%) arose because the individual was already allocated to a fund that now excludes fossil fuels but previously did not. In other words, the choice was made by the investment manager, not the mutual fund investor.

The fact that investors passively accepted a considerable green tilt could simply be a reflection of inertia or inattention, or it could capture the fact that the fund's investment adopted fossil fuel exclusions in anticipation of a potential investor backlash. Our data

[23]Hong and Kostovetsky (2012) and Kempf and Tsoutsoura (2021) document politically motivated investment decisions on the institutional level.

[24]These numbers combined closely matches the aggregate fraction of fossil fuel excluded AUM in the overall pension system of 44% shown in Figure 4.

are silent on this distinction, but we do not find any evidence that fund managers target more environmentally concerned investors. An important observation to make here is that the passive reclassifications of fund holdings are stable at around 31% across sample partitions. As shown in the regression in the appendix, the differences in passive holdings between those who revised up or down are insignificant which is exactly what we would expect if reclassifications occur randomly across funds and investors.

The net effect for individuals who grew less concerned is not different than the neutral group. They hold a statistically insignificant SEK 16,026 more in their portfolios on average, and if anything, they hold slightly less in fossil-fuel mutual funds than the neutral group. This effect is a mix of a mild reallocation towards fossil-fuel exclusion funds offset by slightly smaller positions in funds that reclassified. But these differences from the neutral group are all statistically insignificant and small in magnitude.

In contrast, Figure 5A shows that results are considerably different for the group that grows more concerned about climate change. They have larger portfolios on average worth around 450,000) and hold SEK 32,923 more in fossil fuel exclusion funds, representing a statistically significant 18% fraction of their portfolio.

Yearly installments make income one of the most important determinants for the allocation of aggregate retirement portfolio. Our results so far points to that revising up is both associated with higher portfolio values and green tilts. Figure 5B plots the average portfolio composition for low and high income pension savers. Low income earners' portfolios constitute just above one-third of the high income earners. The overall green tilt of low income earners is around 42% compared to the high income earners where it is 47%. These results are a mix of financial sophistication and active choices. To a large part, the lower green tilt for low income is attributed to inertia and sticking with the default fund. Even so, the average active tilt is considerably lower than for the high income group with only 11%. The high income group allocates 16% actively to green fossil fuel exclusion funds.

In sum, the results indicate that investors who grew more concerned about climate change were more likely to allocate their wealth towards fossil fuel exclusion funds, while the effect of downward revisions was muted. This illustrates the importance of financial sophistication as a mediator connecting climate beliefs to financial actions. On average,

financial sophistication is higher for those who grew more concerned about the climate. They actively rebalance about 50% more of their retirement savings wealth than the neutral group, and almost ten times more than the group that revises downward. In contrast, the group of individuals who revise downward look more or less identical to the neutral group in terms of their rebalancing behavior.

The aggregate results point to that changing views indeed materialize in meaningful tilts toward exclusion funds, but the effect is small relative to the substantial reorientation of capital towards fossil fuel exclusions by the funds themselves through the choices of investment managers. Relatively large discrepancies in the value of fund holdings paired with the amount of capital devoted to cleaner firms may be a source of tension that can further exacerbate the political tension between less or more brokered groups in society.

7 Conclusion

This paper offers a novel empirical framework for understanding how political polarization shapes the relationship between the salience of environmental issues and household investment behavior. Using the 2018 heatwave and forest fires in Sweden as an exogenous shock, we show that geographic proximity to these events significantly increased concern about climate change. However, this effect was heavily moderated by political polarization, with individuals in politically polarized communities exhibiting asymmetric belief updates. These findings challenge the standard assumption that climate salience shocks uniformly affect public attitudes, highlighting instead the critical role of political and demographic contexts.

By linking these belief updates to detailed pension data, we show how climate concerns translate—or fail to translate—into green investment behavior. While heightened climate concerns predict increased adoption of fossil fuel exclusion funds, these effects are concentrated among financially sophisticated individuals and in less polarized communities. This heterogeneity underscores the importance of both financial literacy and political environment in shaping sustainable investment decisions. Importantly, our decomposition of green portfolio shifts into active rebalancing and passive fund reclassifications reveals that institutional changes play a significant role in driving aggregate trends

toward ESG investing, independent of individual behavior.

Our empirical framework offers several innovations that extend previous work. First, the integration of political polarization into the analysis of climate salience provides a new lens to understand belief formation. Second, by leveraging high-quality longitudinal survey and administrative data, we bridge the gap between behavioral finance and ESG investing, providing direct evidence of how belief updates affect real-world financial decisions. Finally, the interplay between financial literacy, political polarization, aggregate wealth and financial decision-making raises the possibility of a feedback loop, whereby the increasing green tilt of the retirement savings system further adds to the political polarization that is already a defining feature of many economies. This sheds light on the political pushback towards the adoption of ESG investment criteria that is emerging across the globe.

References

Anderson, Anders, and David T. Robinson, 2018, Who feels the nudge? Knowledge, self-awareness and retirement savings decisions, Swedish House of Finance working paper No. 17-15.

——— , 2022, Financial literacy in the age of green investment, *Review of Finance* 26, 1551–1584.

Andreoni, James, and Tymofiy Mylovanov, 2012, Diverging opinions, *American Economic Journal: Microeconomics* 4, 209–32.

Bernstein, A., M. T. Gustafson, and R. Lewis, 2019, Disaster on the horizon: The price effect of sea level rise, *Journal of Financial Economics* 134, 253–272.

Borick, Christopher P., and Barry G. Rabe, 2017, Personal experience, extreme weather events, and perceptions of climate change, Oxford University Press.

Boykoff, M., M. Benham, A.and Daly, R. Fernández-Reyes, L. McAllister, M. McNatt, A. Nacu-Schmidt, D. Oonk, J. Osborne-Gowey, O. Pearman, A.H. Simonsen, and A. Ytterstad, 2023, European newspaper coverage of climate change or global warming, 2004-2023. media and climate change observatory data sets, Cooperative Institute for Research in Environmental Sciences, University of Colorado.

Busse, Meghan R., Devin Pope, Jaren Pope, and Jorge Silva-Risso, 2015, The psychological effect of weather on car purchases, *Quarterly Journal of Economics* 130, 371–414.

Choi, Darwin, Zhenyu Gao, and Wenxi Jiang, 2020, Attention to Global Warming, *The Review of Financial Studies* 33, 1112–1145.

Cooper, Michael J., Orlin Dimitrov, and P. Raghavendra Rau, 2001, A rose.com by any other name, *The Journal of Finance* 56, 2371–2388.

Cronqvist, Henrik, Richard H. Thaler, and Frank Yu, 2018, When nudges are forever: Inertia in the swedish premium pension plan, *AEA Papers and Proceedings* 108, 153–58.

Dahlquist, Magnus, José Martinez, and Paul Söderlind, 2017, Individual investor activity and performance, *Review of Financial Studies* 30, 866–899.

Dechezleprêtre, Antoine, Adrien Fabre, Tobias Kruse, Bluebery Planterose, Ana Sanchez Chico, and Stefanie Stantcheva, 2023, Fighting climate change: International attitudes toward climate policies, NBER Working Paper no. 30265.

Dimson, Elroy, Paul Marsh, and Mike Staunton, 2020, Divergent ESG ratings, *The Journal of Portfolio Management* 47, 75–87.

Djourelova, Milena, Ruben Durante, Elliot Motte, and Eleonora Pattacchini, 2024, Experience, narratives, and climate change beliefs, Working paper, Cornell University.

Falk, Armin, Anke Becker, Thomas Dohmen, Benjamin Enke, David Huffman, and Uwe Sunde, 2018, Global evidence on economic preferences, *The Quarterly Journal of Economics* 133, 1645–1692.

Giglio, Stefano, Bryan Kelly, and Johannes Stroebel, 2021, Climate finance, *Annual Review of Financial Economics* 13, 15–36.

Glaeser, Edward, and Cass R. Sunstein, 2014, Does more speech correct falsehoods?, *The Journal of Legal Studies* 43, 65–93.

Hartzmark, Samuel M., and Abigail B. Sussman, 2019, Do investors value sustainability? A natural experiment examining ranking and fund flows, *Journal of Finance* 74, 2789–2837.

Heimer, Rawley Z., Kristian Ove R. Myrseth, and Raphael S. Schoenle, 2019, Yolo: Mortality beliefs and household finance puzzles, *Journal of Finance* 74, 2957–2996.

Hong, Harrison, and Marcin Kacperczyk, 2009, The price of sin: The effects of social norms on markets, *Journal of Financial Economics* 93, 15–36.

Hong, Harrison, and Leonard Kostovetsky, 2012, Red and blue investing: Values and finance, *Journal of Financial Economics* 103, 1–19.

Joireman, Jeff, Heather Barnes Truelove, and Blythe Duell, 2010, Effect of outdoor temperature, heat primes and anchoring on belief in global warming, *Journal of Environmental Psychology* 30, 358–367.

Jylhä, Kirsti, Jens Rydgren, and Pontus Stripling, 2018, Sverigedemokraternas väljare. Vilka är de, var kommer de ifrån och vart är de på väg?, Institutet för Framtidsstudier, Working Paper 2018/12.

——— , 2020, Climate change denial among radical right-wing supporters, *Sustainability* 12, 10226.

Kempf, Elisabeth, and Margarita Tsoutsoura, 2021, Partisan professionals: Evidence from credit rating analysts, *Journal of Finance* 76, 2805–2856.

Kruttli, Mathias S., Brigitte Roth Tran, and Sumudu W. Watugala, 2021, Pricing poseidon: Extreme weather uncertainty and firm return dynamics, Finance and Economics Discussion Series 2019-054. Washington: Board of Governors of the Federal Reserve System.

McCartney, W. Ben, John Orellana-Li, and Calvin Zhang, 2024, Political polarization affects households' financial decisions: Evidence from home sales, *The Journal of Finance* 79, 795–841.

Palme, Mårten, Annika Sunden, and Paul Söderlind, 2007, How do individual accounts work in the Swedish pension system?, *Journal of the European Economic Association* 5, 636–646.

Palmer, Edward, 1998, The Swedish pension reform model: Framework and issues, Stockholm: National Social Insurance Board.

Rabin, Matthew, and Joel L. Schrag, 1999, First impressions matter: A model of confirmatory bias, *The Quarterly Journal of Economics* 114, 37–82.

Riedl, Arno, and Paul Smeets, 2017, Why do investors hold socially responsible mutual funds?, *Journal of Finance* 72, 2505–2550.

Starks, Laura T., 2023, Presidential address: Sustainable finance and ESG issues—Value versus values, *Journal of Finance* 78, 1837–1872.

Vowles, Kjell, and Martin Hultman, 2021, Scare-quoting climate: The rapid rise of climate denial in the Swedish far-right media ecosystem, *Nordic Journal of Media Studies* 3, 79–95.

Zaval, Lisa, Elizabeth A. Keenan, Eric J. Johnson, and Elke U. Weber, 2014, How warm days increase belief in global warming, *Nature Climate Change* 4, 143–147.

Table I: Regional Shifts in Voting Outcomes

This table presents OLS regressions where the dependent variables "Moved left/right" represent the change in voter turnout for two parties on the political left (Green party and Left party) and right (Christian Democrats and the Sweden Democrats) between the elections in 2018 and 2014. Independent variables include average income, income skew (the difference between mean and median income), the share of foreign born, the share of individuals with a university degree or higher, and the population density (million inhabitants per square kilometer). Columns (2) and (4) include a dummy that takes the value of one for the top decile of municipalities affected by forest fires in 2018; zero otherwise. Robust standard errors in parentheses, and one, two and three asterisks denote significance at the 10, 5, and 1% level, respectively. The sample covers all 290 municipalities in Sweden. The voting data is obtained from the Swedish Electoral Authority, fires from the Swedish Civil Contingencies Agency and demographics from Statistics Sweden.

	Moved left		**Moved right**	
VARIABLES	(1)	(2)	(3)	(4)
Fire		0.513**		0.025
		(0.257)		(0.307)
Income	-0.016***	-0.017***	0.008	0.008
	(0.003)	(0.003)	(0.006)	(0.006)
Income Skew	0.023***	0.022***	0.033**	0.033**
	(0.005)	(0.005)	(0.016)	(0.016)
Foreign born	-0.042***	-0.044***	0.059***	0.058***
	(0.009)	(0.010)	(0.022)	(0.023)
Higher education	0.011	0.014	-0.261***	-0.261***
	(0.016)	(0.016)	(0.035)	(0.035)
Population density	0.522***	0.485***	-0.529***	-0.531***
	(0.126)	(0.104)	(0.178)	(0.179)
Constant	3.654***	3.629***	7.420***	7.419***
	(0.654)	(0.636)	(1.213)	(1.216)
Observations	290	290	290	290
R-squared	0.143	0.170	0.220	0.220

Table II: Changing Beliefs About Future Temperature Increases

This table tabulates the answers to the question "Within the next twenty years, how likely is a global temperature increase by more than one Centigrade". Responses include "Highly Unlikely", "Unlikely", "Neutral", "Likely", and "Highly Likely" grouped in categories "Convinced" and "Unconvinced". The responses come from a survey administrated to the same people: the first survey in the spring of 2018 and the second in the fall of 2019. There are 2,561 respondents in the sample where 613 revised their estimates down, 684 up and 1,264 remained unchanged between the two surveys.

		Temp Forecast 2019					
	Temp	Unconvinced			Convinced		
	Forecast	Highly		Neither/		Highly	
	2018	Unlikely	Unlikely	nor	Likely	Likely	Total
Uncon-	Highly Unlikely	13	6	7	19	15	60
vinced	Unlikely	7	20	22	50	22	121
	Neither/nor	9	33	102	131	53	328
Con-	Likely	23	45	142	496	359	1,065
vinced	Highly Likely	16	23	51	264	633	987
	Total	68	127	324	960	1,082	2,561

Table III: Sample Characteristics, Temperature Change and Political Environment

This table presents means for our key survey questions among the 2,561 respondents who took the survey in 2018 and 2019 across demographics. The first two columns report the sample fractions and population averages. The first two rows report the overall actual and survey weighted means. The columns labeled "Temperature change" report responses to question "Within the next twenty years, how likely is a global temperature increase by more than one Centigrade". See Table II for tabulation of responses. The columns labeled "Belief 2018" report the fraction of respondents who answer this question positively (Convinced) or negatively (Unconvinced) in 2018. The columns labeled "Belief Revision" report the fraction of respondents revising their beliefs up or down between 2018 and 2019. Columns labeled "Voting outcomes" report municipal averages of voting outcomes for subsets of respondents. "Moved left/right" represent the change in voter turnout in the municipality of respondents between the 2014 and 2018 elections using the data presented in Table I and Appendix Table A.1. There are 2,561 respondents in the sample.

			Temperature Change				**Political Environment**	
	Sample	Pop.	Belief 2018		Belief Revision		Moved	
	prop.	prop.	Convinced	Unconvinced	Up	Down	Left	Right
Overall	1.00	1.00	0.80	0.07	0.27	0.24	-0.19	6.28
Pop. Wtd.	.	.	0.82	0.07	0.26	0.25	-0.17	6.19
Gender								
Men	0.50	0.51	0.80	0.08	0.24	0.28	0.00	+0.06
Women	0.50	0.49	0.81	0.06	0.30	0.20	-0.01	-0.06
Age								
18-24	0.08	0.15	0.87	0.04	0.26	0.23	+0.02	-0.09
25-34	0.15	0.23	0.90	0.04	0.21	0.27	+0.10	-0.44
35-44	0.17	0.21	0.80	0.10	0.27	0.25	+0.12	-0.31
45-54	0.25	0.22	0.80	0.07	0.27	0.26	-0.12	+0.18
55-65	0.35	0.19	0.76	0.09	0.28	0.21	-0.03	+0.20
Income								
0-111	0.11	0.25	0.83	0.07	0.25	0.25	+0.02	-0.02
111-287	0.37	0.25	0.80	0.06	0.28	0.25	-0.07	+0.09
287-399	0.32	0.25	0.81	0.08	0.26	0.23	-0.05	+0.10
399+	0.20	0.25	0.78	0.08	0.26	0.24	+0.17	+0.31
Education								
Some school	0.09	0.17	0.80	0.07	0.25	0.26	-0.14	+0.46
High school	0.35	0.44	0.80	0.06	0.27	0.24	-0.17	+0.32
University	0.56	0.39	0.80	0.08	0.27	0.24	+0.13	-0.27
Urban								
Yes	0.42	.	0.80	0.08	0.27	0.22	+0.63	-1.30
No	0.58	.	0.80	0.06	0.27	0.25	-0.46	+0.94

Table IV: Future Temperature Increases, Saliency and Political Polarization

This table presents OLS regressions where the dependent variables are based on the response to the survey question: "Within the next twenty years, how likely is a global temperature increase by more than one Centigrade". Convinced 2018 and 2019 are dummy variables for responding "Highly Likely" or "Likely" to this question on the 2018 or 2019 survey. "Revised up" is a dummy variable that takes the value of one for an upward revision in comparison to the response in 2018 (the upper diagonal of the matrix in Table II). Independent variable "Fire" is a dummy taking the value of one for areas highly affected by forest fires (more than 0.03% of area destroyed); zero otherwise. "Moved left" and "Moved right" denote the changing voter turnout for left and right parties between 2018 and 2014 in the municipalities where respondents live. "Left × Right" denotes the interaction term. Controls include log of disposable income, gender, age in decades, and a dummy for higher education. Columns (1) and (2) presents the results for survey responses in 2018 and 2019. Columns (3) through (5) for upward revisions across the two surveys. There are 2,561 respondents in the sample where 613 revised their estimates down, 684 up and 1,264 remained unchanged between the two surveys. Survey weights are used in all regressions and the constant is excluded from the presentation. Standard errors in parentheses, and one, two and three asterisks denote significance at the 10, 5, and 1% level, respectively.

	Convinced 2018	**Convinced 2019**	**Revised up**		
VARIABLES	(1)	(2)	(3)	(4)	(5)
Fire	0.009	0.067***	0.049**		0.028
	(0.020)	(0.019)	(0.024)		(0.028)
Moved right				-0.016***	-0.014**
				(0.006)	(0.006)
Moved left				0.046*	0.034
				(0.027)	(0.029)
Right × Left				-0.009**	-0.007
				(0.005)	(0.005)
Log Income	0.003	0.006	0.010	0.011	0.010
	(0.009)	(0.007)	(0.010)	(0.010)	(0.010)
Men	-0.028*	-0.098***	-0.052***	-0.051***	-0.051***
	(0.016)	(0.017)	(0.019)	(0.019)	(0.019)
Age	-0.028***	-0.018***	0.012	0.014*	0.013*
	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)
University	0.018	-0.018	-0.013	-0.019	-0.019
	(0.016)	(0.017)	(0.019)	(0.019)	(0.019)
Observations	2,561	2,561	2,561	2,561	2,561
R-squared	0.012	0.024	0.008	0.010	0.010

Table V: Temperature Revisions and Political Polarization: Sample Partitions

This table presents OLS regressions where the dependent variables "Revised up" is a dummy variable for positive temperature revisions which are derived from changing the reported likelihood of a more than one Centigrade global temperature rise within 20 years between the two surveys in 2018 and 2019. Independent variables include "Moved left" and "Moved right" denoting the changing voter turnout for left and right parties between 2018 and 2014 in the municipalities where respondents live. "Left × Right" denotes the interaction term. Columns (1) and (2) partition the sample of disposable income where high denotes an income over 287,000 SEK per year, columns (3) and (4) partition over gender, columns (5) and (6) partition over age where young are those aged below 50; and columns (7) and (8) partition over urban versus rural areas as in Table III. Controls include characteristics like log of disposable income, age in decades, and dummy variables for gender and higher education. There are 2,561 respondents in the sample where 613 revised their estimates down, 684 up and 1,264 remained unchanged between the two surveys. Survey weights are used in all regressions and the constant is excluded from the presentation. Standard errors in parentheses, and one, two and three asterisks denote significance at the 10, 5, and 1% level, respectively.

	Revised up							
	Income		Gender		Age		Urban	
	Low	High	Men	Women	Young	Old	No	Yes
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Moved right	-0.027***	-0.001	-0.020***	-0.011	-0.022***	-0.007	-0.023***	-0.015
	(0.008)	(0.008)	(0.007)	(0.009)	(0.008)	(0.007)	(0.008)	(0.016)
Moved left	0.063	0.021	0.075**	0.013	0.064*	0.012	0.124*	0.009
	(0.038)	(0.036)	(0.036)	(0.038)	(0.035)	(0.035)	(0.066)	(0.043)
Right × Left	-0.013**	-0.003	-0.013**	-0.004	-0.014**	-0.001	-0.020**	-0.001
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.009)	(0.009)
Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,239	1,322	1,285	1,276	1,230	1,331	1,487	1,074
R-squared	0.016	0.008	0.010	0.008	0.011	0.008	0.018	0.006

Table VI: Temperature Revisions and ESG Concerns

This table presents OLS regressions where the dependent variables takes the value of one for reporting "Strongly Agree" to the following questions for environmental concerns: "I have already noticed the effects of climate change in Sweden" (column 1) "I'm worried about climate change"; (column 2); "The government should do more to fight climate change" (column 3); and "I am willing to pay higher taxes to increase Sweden's aid to poor countries" (column 4); all zero otherwise. All questions were asked in the 2019 (question 4 in the 2018) survey only. The dummy variables "Revised up/down" are derived from changing the reported likelihood of a more than one Centigrade global temperature rise within 20 years between the two surveys in 2018 and 2019. "Moved left" and "Moved right" denoting the changing voter turnout for left and right parties between 2018 and 2014 in the municipalities where respondents live. "Left × Right" denotes the interaction term. Controls include characteristics like log of disposable income, age in decades, and dummy variables for gender and higher education. Temperature Assessments (TA) controls are dummy variables for each response category for the dependent variable in the 2018 survey. Survey weights are used in all regressions and the constant is excluded from the presentation. Standard errors in parenthesis, and one, two and three asterisks denote significance at the 10, 5, and 1% level, respectively.

	Notice GW		**Worry GW**		**Government Action**		**Higher Taxes**	
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Revised up		0.224***		0.089***		0.477***		0.013
		(0.028)		(0.025)		(0.056)		(0.018)
Revised down		-0.175***		-0.179***		-0.536***		-0.050***
		(0.025)		(0.021)		(0.056)		(0.017)
Moved right	-0.004	0.000	-0.013**	-0.011**	-0.032**	-0.023*	-0.005	-0.004
	(0.007)	(0.006)	(0.006)	(0.005)	(0.014)	(0.013)	(0.004)	(0.004)
Moved left	0.033	0.016	0.085***	0.074***	0.140**	0.106*	0.073***	0.068***
	(0.029)	(0.027)	(0.025)	(0.024)	(0.065)	(0.060)	(0.019)	(0.019)
Right × Left	-0.003	-0.000	-0.011***	-0.009**	-0.019	-0.012	-0.008***	-0.007**
	(0.005)	(0.005)	(0.004)	(0.004)	(0.012)	(0.011)	(0.003)	(0.003)
Men	-0.127***	-0.086***	-0.127***	-0.099***	-0.416***	-0.307***	-0.033**	-0.028*
	(0.021)	(0.020)	(0.019)	(0.019)	(0.043)	(0.039)	(0.014)	(0.014)
Age	-0.026***	-0.011	-0.033***	-0.023***	-0.043***	-0.012	-0.028***	-0.025***
	(0.008)	(0.008)	(0.007)	(0.007)	(0.016)	(0.015)	(0.005)	(0.005)
Log Income	-0.004	-0.004	0.000	0.001	-0.011	-0.013	-0.008	-0.007
	(0.009)	(0.008)	(0.009)	(0.009)	(0.016)	(0.015)	(0.007)	(0.007)
University	0.068***	0.062***	0.059***	0.056***	0.145***	0.131***	0.041***	0.041***
	(0.022)	(0.020)	(0.019)	(0.019)	(0.045)	(0.041)	(0.014)	(0.014)
TA controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	2,561	2,561	2,561	2,561	2,541	2,541	2,561	2,561
R-squared	0.032	0.133	0.057	0.127	0.067	0.204	0.048	0.071

Table VII: Financial Knowledge and Engagement

This table reports the results of OLS regressions where the dependent variable measures propensities to be active in the Swedish Premium Pension System. The dependent variable in columns (1) through (3) is a dummy variable taking the value of one if the respondent was in the default fund in 2021; zero otherwise. The sample contains 2,521 people registered in the system at that time. The sample in columns (4) through (6) contains the 1,436 investors who were not in the default at the same time. The dependent variable is a dummy variable taking the value of one for the 711 investors who rebalanced their portfolio at some point between taking the first survey and the end of 2021. Independent variables "Revised up/ down" are derived from changing the reported likelihood of a more than one Centigrade global temperature rise within 20 years between the two surveys in 2018 and 2019. "Moved left" and "Moved right" denote the changing voter turnout for left and right parties between 2018 and 2014 in the municipalities where respondents live. "Left × Right" denotes the interaction term. Financial literacy denote the score ranging from 0 to 5 on a modified "Big 5" test solicited in the first survey. Controls include characteristics like log of disposable income, gender, age in decades, a dummy for higher education and a dummy if the respondent was in the first cohort in the year 2000 when the system was started. Survey weights are used in all regressions and the constant is excluded from the presentation. Standard errors in parenthesis, and one, two and three asterisks denote significance at the 10, 5, and 1% level, respectively.

		Default			**Rebalanced**	
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Fin. Lit.		-0.026***	-0.026***	0.040***	0.041***	0.040***
		(0.009)	(0.009)	(0.013)	(0.013)	(0.013)
Revised up			0.006		-0.011	
			(0.023)		(0.034)	
Revised down			-0.002		-0.020	
			(0.024)		(0.035)	
Moved left						0.031
						(0.040)
Moved right						-0.009
						(0.009)
Right × Left						-0.007
						(0.007)
Men	-0.033*	-0.014	-0.014	0.093***	0.094***	0.094***
	(0.019)	(0.020)	(0.020)	(0.030)	(0.030)	(0.030)
Age	-0.045***	-0.045***	-0.045***	-0.009	-0.009	-0.008
	(0.011)	(0.011)	(0.011)	(0.015)	(0.015)	(0.015)
Log Income	-0.027***	-0.024***	-0.024***	0.020	0.020	0.019
	(0.008)	(0.007)	(0.007)	(0.016)	(0.016)	(0.016)
University	-0.050***	-0.031	-0.031	0.084***	0.084***	0.080***
	(0.019)	(0.020)	(0.020)	(0.031)	(0.031)	(0.031)
In 2000	-0.335***	-0.332***	-0.333***			
	(0.034)	(0.034)	(0.034)			
Observations	2,521	2,521	2,521	1,436	1,436	1,436
R-squared	0.211	0.214	0.214	0.036	0.036	0.037

Table VIII: Temperature Revisions, Climate Risk Exposure and Fossil Fuel Exclusion Fund Holdings in 2021

This table reports the results of OLS regressions where the dependent variables is the portfolio weighted Morningstar Climate Risk score (columns (1) through (3)) or the weight in fossil fuel exclusion funds (columns (4) through (6)) of respondent's pension holdings at the end of 2021. The dummy variables "Revised up" and "Revised down" are derived from changing the reported likelihood of a more than one Centigrade global temperature rise within 20 years between the two surveys in 2018 and 2019. Column (1) uses the full sample in the estimation; columns (2) and (3) partition the sample on score from a standard five-point financial literacy test solicited in the 2018 survey. The group "High" scored 4 or 5, the group "Low" scored below 4 on test. Controls include characteristics like log of disposable income, age, and a dummies for gender and higher education. TA controls denote dummies for the temperature assessments made in 2018. Fund controls include portfolio fractions for fund category, exposure to retail networks, one year past return, portfolio weighted standard deviation and fee. Survey weights are used in all regressions and the constant is excluded from the presentation. Standard errors in parentheses, and one, two and three asterisks denote significance at the 10, 5, and 1% level, respectively.

	MS Climate risk			**Fossil fuel exclusions**		
		Financial literacy			Financial literacy	
	All	High	Low	All	High	Low
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Revised up	-0.228***	-0.317**	-0.178**	0.045**	0.068**	0.024
	(0.082)	(0.141)	(0.088)	(0.018)	(0.028)	(0.023)
Revised down	0.117	0.151	0.072	-0.003	-0.015	0.010
	(0.093)	(0.155)	(0.104)	(0.018)	(0.026)	(0.025)
Log Income	-0.041	-0.046	-0.021	0.003	0.002	0.001
	(0.050)	(0.067)	(0.056)	(0.009)	(0.010)	(0.016)
Men	0.193***	0.196*	0.150*	-0.037**	-0.028	-0.042*
	(0.064)	(0.106)	(0.084)	(0.015)	(0.021)	(0.022)
Age	-0.158***	-0.198***	-0.121***	0.017**	0.034***	0.004
	(0.032)	(0.052)	(0.041)	(0.007)	(0.010)	(0.010)
University	0.053	-0.014	0.047	-0.005	0.023	-0.015
	(0.068)	(0.125)	(0.076)	(0.015)	(0.023)	(0.021)
Constant	20.536***	20.726***	20.231***	0.219*	0.055	0.372*
	(0.672)	(0.932)	(0.808)	(0.124)	(0.146)	(0.223)
TA controls	Yes	Yes	Yes	Yes	Yes	Yes
Fund controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,409	660	749	1,436	675	761
R-squared	0.474	0.491	0.441	0.490	0.509	0.467

Table IX: Temperature Revisions and Fossil Fuel Exclusion Fund Holdings in 2021

This table reports the results of OLS regressions where the dependent variables is the weighted Morningstar Climate Risk score of respondent's pension holdings at the end of 2021. The dummy variables "Revised up" and "Revised down" are derived from changing the reported likelihood of a more than one Centigrade global temperature rise within 20 years between the two surveys in 2018 and 2019. Column (1) uses the full sample in the estimation; columns (2) and (3) partition on low and high income were high is a disposable income over 287,000 SEK; columns (4) and (5) partition on gender; columns (6) and (7) partition on age where old is those older than 50 years; columns (8) and (9) partition over urban versus rural areas as in Table III. Controls include characteristics like include log of disposable income, age, and a dummies for gender and higher education. TA controls denote dummies for the temperature assessments made in 2018. Fund controls include portfolio fractions for fund category, exposure to retail networks, one year past return, portfolio weighted standard deviation and fee. Survey weights are used in all regressions and the constant is excluded from the presentation. Standard errors in parentheses, and one, two and three asterisks denote significance at the 10, 5, and 1% level, respectively.

	Fossil fuel exclusions								
		Income		Gender		Age		Urban	
	All	Low	High	Men	Women	Young	Old	No	Yes
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Revised up	0.045**	0.028	0.061**	0.055**	0.031	0.043	0.043*	0.011	0.079**
	(0.018)	(0.027)	(0.025)	(0.028)	(0.024)	(0.029)	(0.023)	(0.022)	(0.031)
Revised down	-0.003	-0.009	0.004	-0.001	-0.015	0.007	-0.011	-0.036	0.036
	(0.018)	(0.030)	(0.023)	(0.025)	(0.026)	(0.027)	(0.024)	(0.023)	(0.029)
Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TA controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,436	550	886	727	709	549	887	877	559
R-squared	0.490	0.524	0.470	0.502	0.476	0.581	0.394	0.472	0.526

Table X: Temperature Revisions and Active Investments into Fossil Fuel Exclusion Funds

This table reports the results of OLS regressions where the dependent variables is the active portfolio weight in fossil fuel exclusion funds of respondent's pension holdings at the end of 2021. The dummy variables "Revised up" and "Revised down" are derived from changing the reported likelihood of a more than one Centigrade global temperature rise within 20 years between the two surveys in 2018 and 2019. Column (1) uses the full sample in the estimation; columns (2) and (3) partition on low and high income were high is a disposable income over 287,000 SEK; columns (4) and (5) partition on gender; columns (6) and (7) partition on age where old is those older than 50 years; columns (8) and (9) partition over urban versus rural areas as in Table III. Characteristics include log of disposable income, age, and a dummies for gender and higher education. TA controls denote dummies for the temperature assessments made in 2018. Fund controls include portfolio fractions for fund category, exposure to retail networks, one year past return, portfolio weighted standard deviation and fee. Survey weights are used in all regressions and the constant is excluded from the presentation. Standard errors in parentheses, and one, two and three asterisks denote significance at the 10, 5, and 1% level, respectively.

	Active fossil fuel exclusions								
		Income		Gender		Age		Urban	
	All	Low	High	Men	Women	Young	Old	No	Yes
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Revised up	0.064**	0.040	0.088***	0.083**	0.049	0.055	0.068**	0.059*	0.083**
	(0.025)	(0.039)	(0.032)	(0.036)	(0.035)	(0.040)	(0.030)	(0.031)	(0.040)
Revised down	-0.017	-0.018	-0.010	-0.015	-0.025	-0.031	-0.000	-0.035	0.012
	(0.021)	(0.034)	(0.027)	(0.030)	(0.028)	(0.032)	(0.027)	(0.026)	(0.035)
Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TA controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,436	550	886	727	709	549	887	877	559
R-squared	0.065	0.113	0.062	0.073	0.073	0.072	0.071	0.056	0.107

Figure 1: Changes in Right vs. Left Voting Outcomes between 2014 and 2018

This figure present a scatter plot of the the changes in voting outcomes for Left (Green Party and Left Party) versus Right (Christian Democrats and Social Democrats) between elections in 2018 compared to 2014 across the 290 regional municipalities in Sweden. 71 municipalities moved both to the right and left during this period, and so diverged from the political center. The average of Moved right is 7.8% and Moved left is -0.5%. The voting data is obtained from the Swedish Electoral Authority.

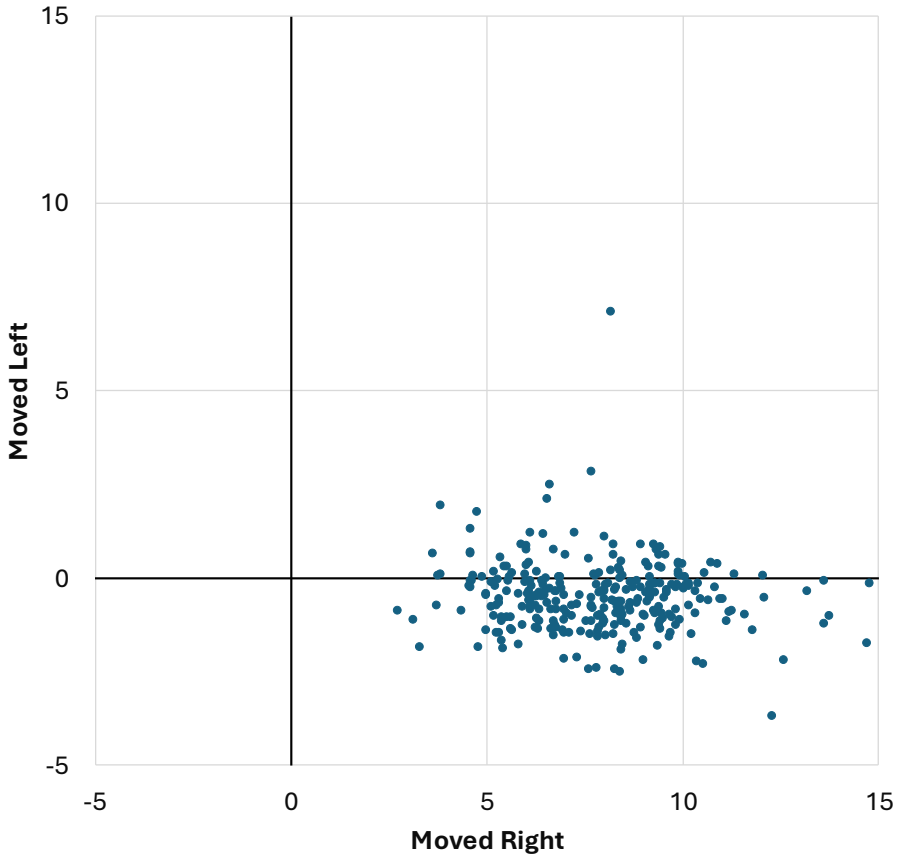


Figure 2: Forest Fires in Sweden during 2018

This figure displays the severity of forest fires across municipalities in 2018 and over time. The definition of severity is measured by the relative area destroyed for each region, where we select the 90th percentile across municipalities as our cut-off. Figure 2A shows that the fraction of municipalities with an area burnt exceeding .03% was around 11% in 2018. Figure 2B shows that 2018 was exceptional, marking a record number of municipalities adversely affected by forest fires. There are 290 municipalities in Sweden. Data is obtained from the Swedish Civil Contingencies Agency.

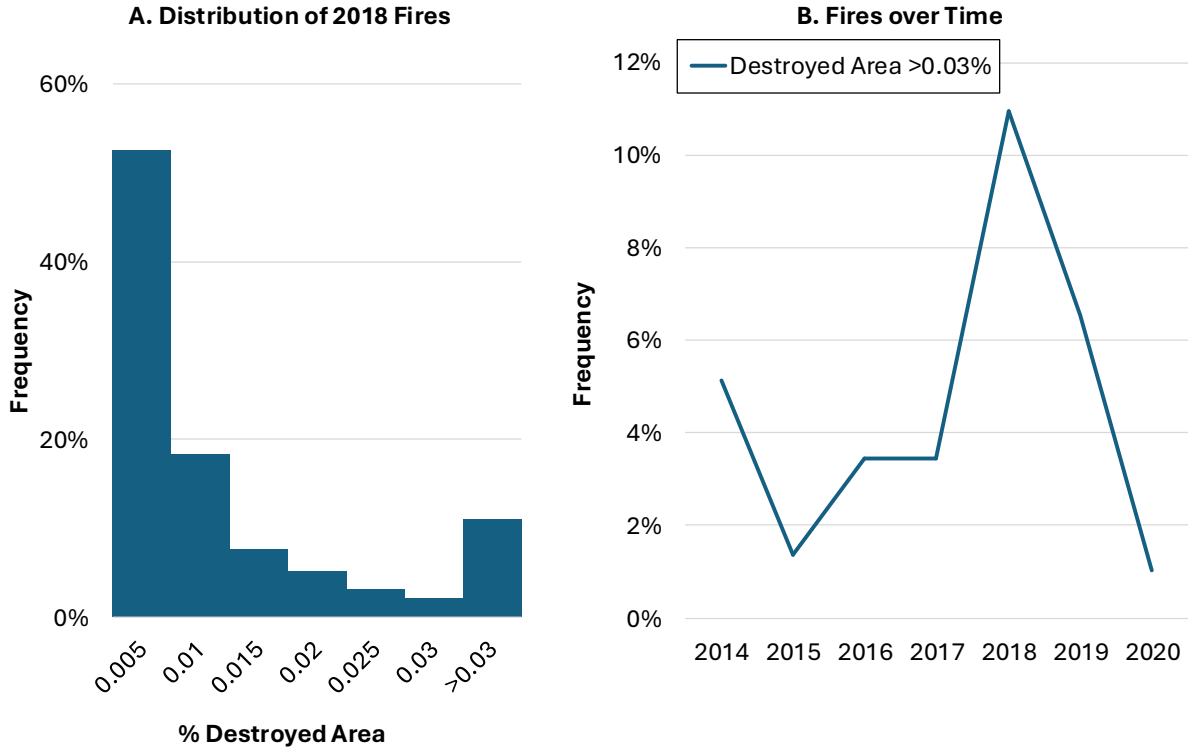


Figure 3: Climate Change Opinion and Media Coverage

This figure plots the time series from three data sources around the window between the two surveys in February 2018 through August 2019 (highlighted by the grey box). The upper panel shows the media coverage over time. The solid navy and dotted burgundy lines show the number of published articles about "Climate change" or "Global warming" in mainstream versus right-wing media. The lower panel traces the proportion of polled voters ranking "Climate change" as the most important topic. The poll data comes from Demoskop, mainstream media from the Media and Climate Change Observatory, and the right-wing media obtained from Vowles and Hultman (2021).

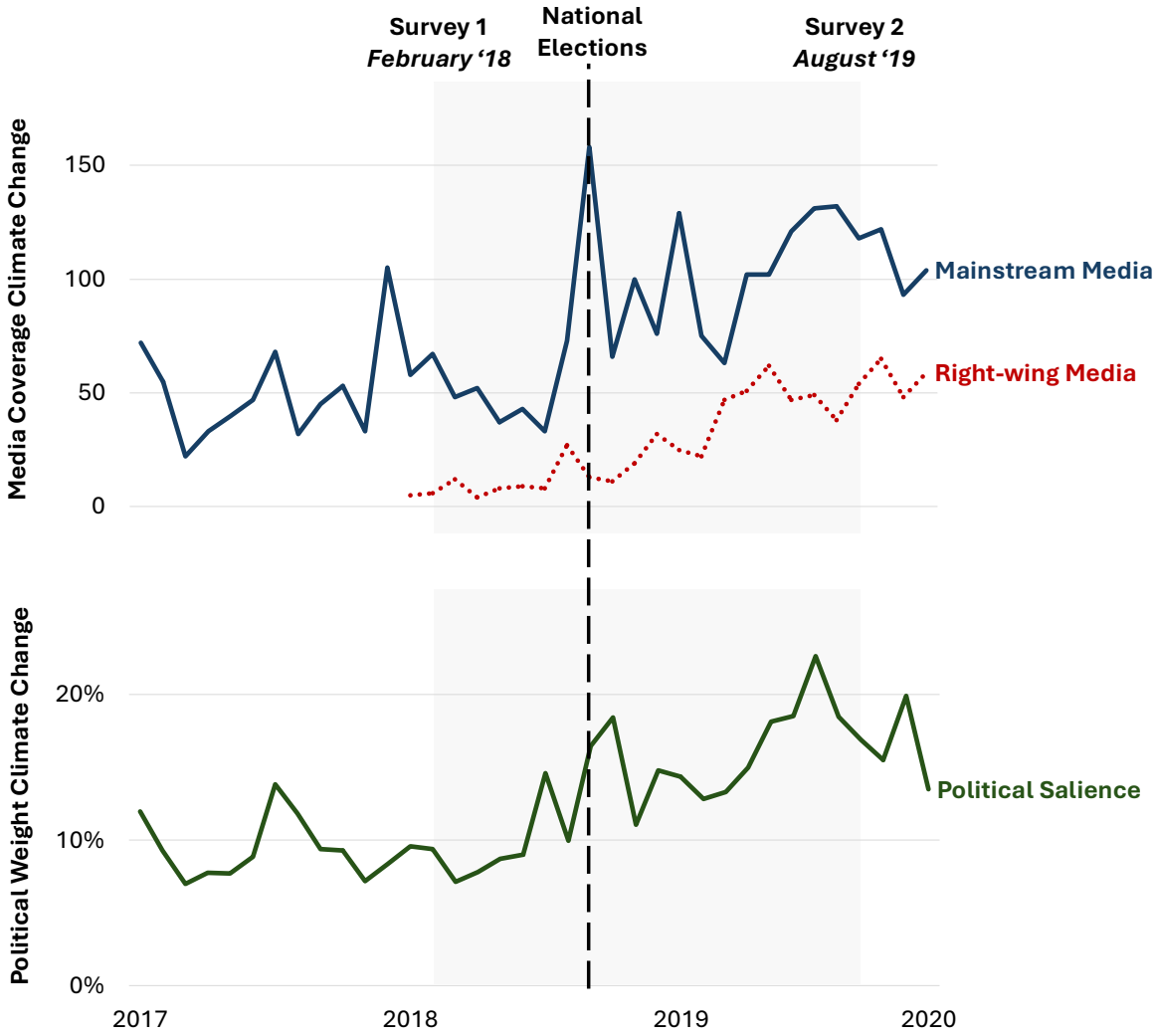


Figure 4: The Swedish Pension System and Fossil Fuel Exclusion Funds

This figure shows the assets under management (AUM) in the Swedish Premium Pension System from January 2017 to December 2021 (shaded area, left scale). The top green area traces out the amount allocated to fossil fuel exclusion funds, the dark grey area to all other funds available for selections, and the light grey area the default fund which does not exclude fossil fuel. The solid line traces out the fraction of fossil fuel exclusion funds (right scale) and the dotted line the number of funds available for selection (left scale). The window between the two surveys in February 2018 through August 2019 is highlighted by the light grey box. The data for investments are collected from the Swedish Pension Authority webpage.

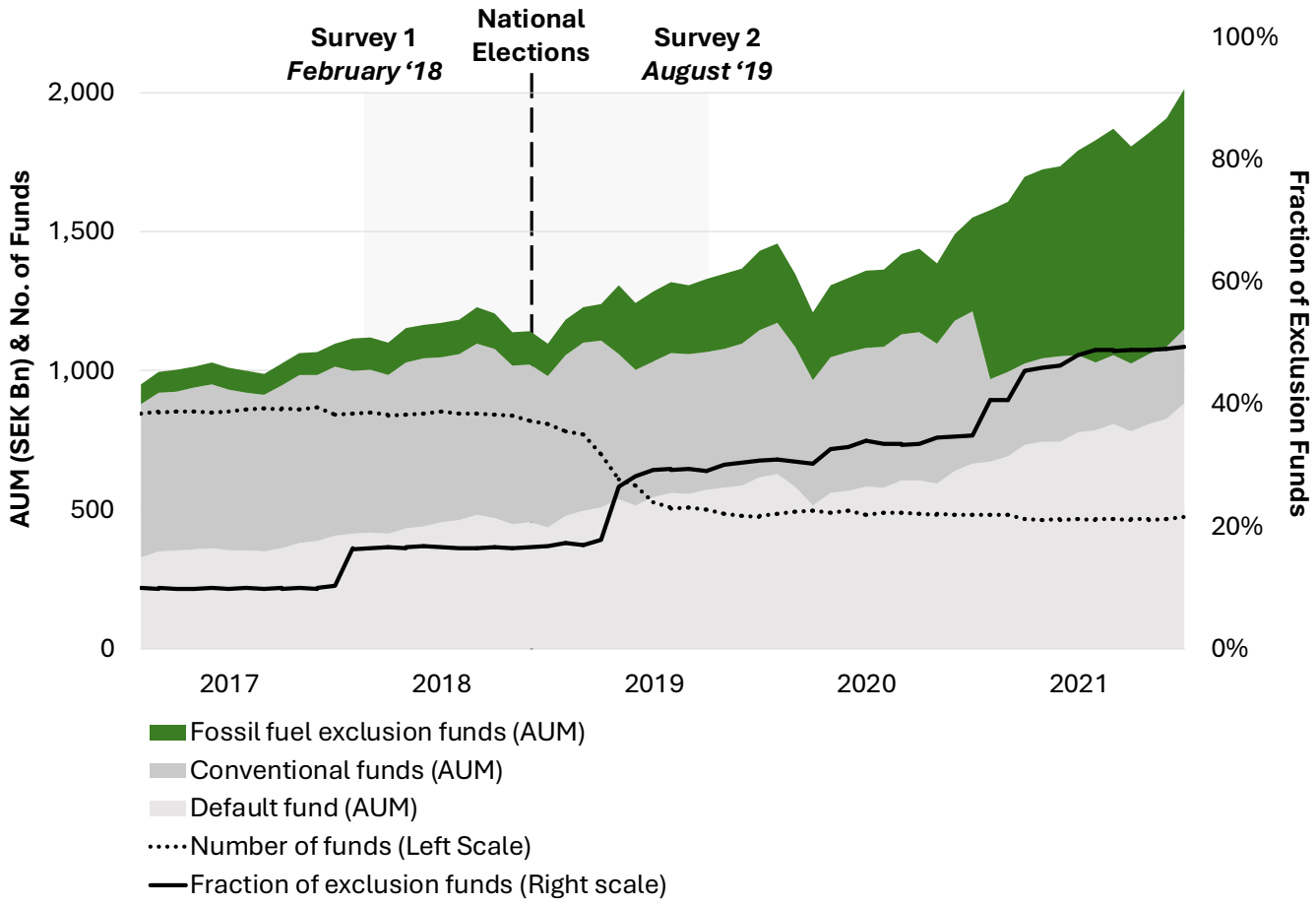
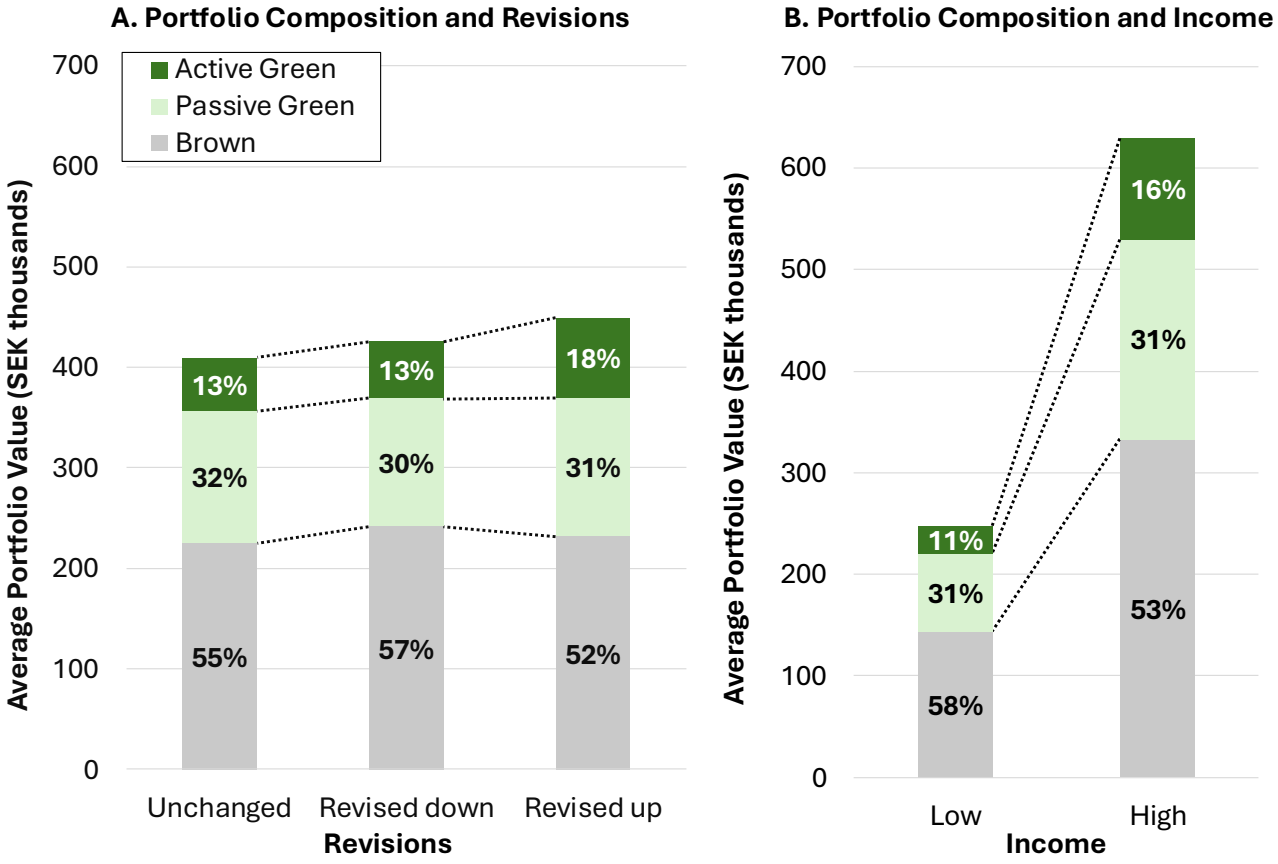


Figure 5: Average Portfolio Holdings

This figure displays the average portfolio holdings in addition to the average composition. Green holdings are defined as the value in fossil fuel exclusion funds at the end of 2021. The active share (dark green bars) is derived from choices made from when taking the first survey to the end of 2021 and excludes passive reclassifications. The passive share (light green bars) is the remainder of green holdings. Brown holdings are all funds that are not fossil fuel exclusion funds (grey bars), which may include default fund holdings. Figure 5A shows the holdings and composition over revisions, while Figure 5B shows holdings and composition over income. Revised up or down are derived from changing the reported likelihood of a more than one Centigrade global temperature rise within 20 years between the two surveys in 2018 and 2019. High income is defined as a disposable income over 287,000 SEK.



A Voting Outcomes

This appendix describes voting outcomes for parliamentary elections in Sweden. Voting outcome data is retrieved from the Swedish Electoral Authority. The Swedish parliamentary system is a constitutional monarchy with a parliamentary democracy. Sweden's proportional representation allows multiple parties to gain seats based on the share of the vote. This system promotes a multi-party landscape and coalition governments, but has over the last decades converged to a group of eight parties which take turns in forming governments to the center-right or center-left.

The Swedish Democrats (SD) and the Christian Democrats are both right-wing parties in Sweden that have historically been excluded from government leadership positions for extended periods, unlike the right-leaning Moderate Party, which has a longer history of leading or participating in governments.

The Christian Democrats is a right-wing political party that is rooted in Christian ideology and was founded as a response to secular trend in Swedish society. The party has historically focussed on promoting Christian ideology in education. Traditional family structures and support of families are at the core of the party's ideology.

Sweden Democrats (SD) is a party that has grown in popularity over recent years in the wake of increased distrust in the political system as in many other European countries.[25] SD was formed in the 1980's with close ties to the nationalistic movement mainly focusing on immigration, but has since formulated their own political agenda around other topics that opposes mainstream policies, such as EU membership, gay rights and climate control. SD votes are higher in rural areas with lower education, greater income disparity and higher immigration. The anti-immigration and climate sceptic policies makes the party less attractive to women. Men make up around 70% of SD voters (Jylhä, Rydgren, and Stripling (2018)).

Both the Green Party and the Left Party are and have been on the left side of the political spectrum in Swedish politics. These parties have typically acted as support parties for Social Democratic-led governments rather than leading governments themselves.

The Left Party is a self-proclaimed socialist, feminist and green party that has its historical roots in the Communist Party, on the very left of the political scale. The party was originally founded in opposition to the Social Democrats. While the party has never been part of coalitions, it has sporadically supported left-of-center coalitions led by the Social Democrats.

The Green Party was formed in 1981 with an agenda focused on environmental sustainability, climate change, and renewable energy. They advocate for strong environmental regulations and social justice, often aligning with the Social Democrats on progressive social issues. According to Novus, women make up around 60% of their voting base, the support is stronger among those with higher education and among city dwellers. The Green Party first entered Parliament in 1988 with less than 6% of votes and their support have since then fluctuated between around 4% to 7% in later years.

The 2014 elections resulted in a minority Center-Left government led by the Social Democrats and the Green Party. The years that followed saw an increased dispersion the political landscape, pulling voters away from the traditional center parties. The 2018 election outcome left the parliament deeply divided, with less support for the political

[25] See Pew Research Center, https://pewrsr.ch/3CDu5Pp.

middle and increased support for both the left right side of politics. Even if the Sweden Democrats gained strong support, neither block wanted to officially include them in a coalition. After months of negotiations and failed attempts, a compromise was reached in January 2019. This arrangement became known as the January Agreement, a deal where the Center and Liberal parties agreed to support a Social Democrat-led government while pushing for reforms typically associated with the center-right, such as labor market reforms.

Figure A.1 plots the voting outcomes for Swedish parliamentary elections between 1960 and 2022. Table A.1 shows the summary statistics of voting outcomes to the right or left between elections in 2014 and 2018. Right votes are obtained by summing votes for Christian and Sweden Democrats, left votes for the Left and Green Party. Movements are computed by taking the difference between the 2018 and 2014 election outcomes.
Figure A.2 plots the fire areas and the shifts in voting outcomes movements.

Figure A.1: Historical Voting Outcomes
This figure presents the voting shares across the eight largest political parties over time for parliamentary elections in Sweden between 1960 and 2022. Data is retrieved from the Swedish Electoral Authority.

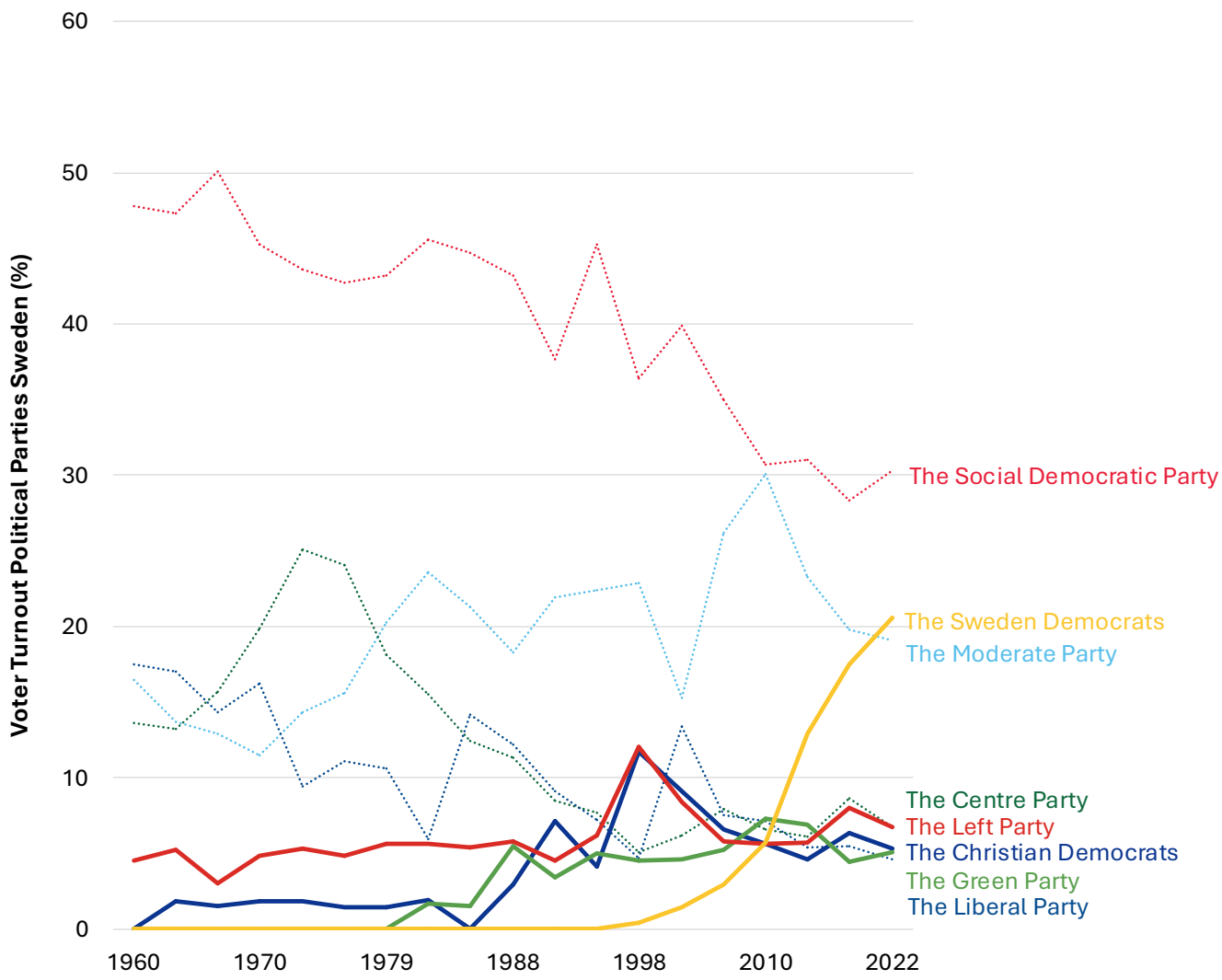


Figure A.2: Political Shifts and Forest Fires

This figure presents a map of Sweden along with shifts in political support for left and right parties between the 2018 and 2014 elections along with extreme forest fires. Figure A.2A plots the quartiles of the distribution in support for left-wing parties (the Left and Green Party). Figure A.2B plots the quartiles of the distribution in support for right-wing parties (the Christian and Sweden Democrats). Figure A.2C plots the areas most affected by the 2018 forest fires (area destroyed larger than 0.03% in the top decile of affected municipalities).

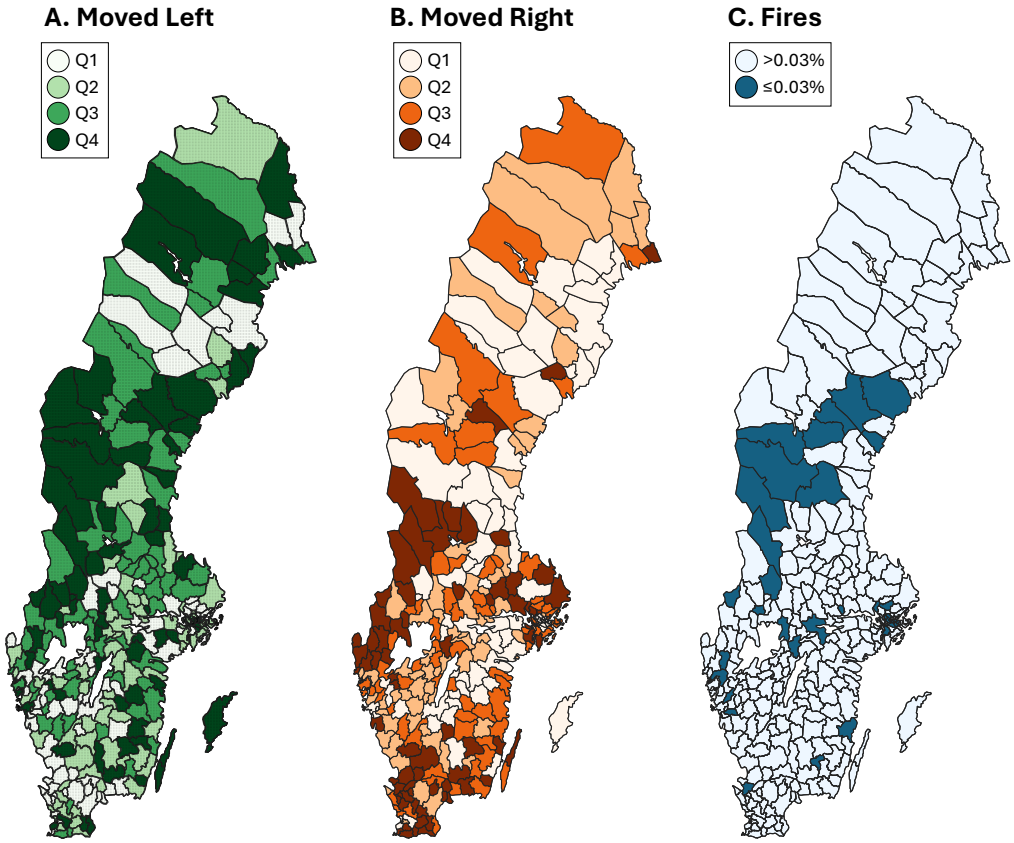


Table A.1: Regional Shifts in Voting Outcomes

This table presents summary statistics for the regressions in table:muni . "Moved left/right" represent the change in voter turnout for two parties on the political left (Green party and Left party) and right (Christian Democrats and the Sweden Democrats) between the elections in 2018 and 2014. Fire is a dummy variable taking the value of one for the top decile of municipalities affected by forest fires in 2018; zero otherwise. Other variables include average income, income skew (the difference between mean and median income), the share of foreign born, the share of individuals with a university degree or higher, and the population density (million inhabitants per square kilometer). The sample covers all 290 municipalities in Sweden. The voting data is obtained from the Swedish Electoral Authority, fires from the Swedish Civil Contingencies Agency and demographics from Statistics Sweden.

Variable	**Mean**	**Std. Dev.**	**Min**	**Max**
Moved left	-0.48	0.96	-3.68	7.13
Moved right	7.80	2.11	2.72	14.75
Fires	0.11	0.31	0.00	1.00
Population density	0.15	0.52	0.00	5.07
Income	254.69	31.98	214.90	480.70
Income skew	17.46	13.21	0.30	159.20
Foreign born	12.69	5.77	4.33	40.16
Higher education	11.46	4.73	5.83	34.40

B Sampling procedure

This appendix presents the data collection and matching procedure in detail. In early 2018, Statistics Sweden (SCB) mailed out 19,977 invitations to a random sample of Swedes aged 18-65. The invitation contained information about the survey and how to log on to the response website at SCB, what registry data that was going to be used and matched to the survey responses if the respondent agreed to participate, and contact details to SCB and one of the authors in case of questions. On behalf of the authors, SCB also collected and matched pension data to the survey which was supplied by the Swedish Pension Agency (SPA). All identities are scrambled and the analysis was conducted through the mainframe computer situated at the SCB from which the authors only can retrieve and keep aggregated results.

The procedure followed all standards applied by SCB and the project has been approved by the Swedish Ethical Review Authority. SCB calibrated the sample to an underlying population of 6,097,316 Swedes in the ages 18-65 as of the end of 2017 using gender and age (details of the exact survey weight methodology and mailer is available upon request).

Panel A and B of Table B.1 presents details of the sampling procedure. Panel C of Table B.1 summarizes the matching of survey responses with retirement accounts. From the total sample of 2,561 respondents 2,521 also owned retirement accounts at the SPA at the end of 2021. Fund holdings is matched to monthly fund characteristics obtained from the SPA website that excludes the default fund. Exclusion fund exposure is obtained for the retirement sample from their selection of 499 available mutual funds and the default fund at the end of 2021 and is calculated as a portfolio weight. There were 1,436 investors with an active portfolio choice as of 2021. The default fund and 33 other funds have missing data for the Morningstar Climate Risk measure. 1,112 investors (1,085 in default and 27 investors in open funds) were invested in missing funds and so are dropped from the regression leaving 1,409 observations. The distribution of Morningstar Climate Risk scores is presented in Figure E.2.

Table B.1: Sample Selection

This table display details of the sample construction across the two surveys conducted in the spring of 2018 and fall of 2019. In 2018, 19,977 randomly selected individuals in the ages 18-65 were invited to take the first survey, of which 4,257 responded. In the fall of 2019, the 4,244 people who remained in the Statistics Sweden (SCB) registry where contacted again to take a second survey. Panel A displays details about the survey invitations, responses and deletions due to missing data. Panel B displays details of the overall responses and final sample in the 2019 survey across three survey waves from first invite to second reminder. Panel C shows the number of observations remaining when matching the survey data to pension holdings from which we only have sustainability data for the privately managed funds, excluding the stock and bond default fund. Panel D of Table B.1 presents the survey weights obtained by Statistics Sweden which are computed using the age and gender profile of survey respondents compared to the underlying sample presented in Table III.

Panel A:	**Survey invitations**			
Note	Responses	% of Total	Removed	Remark
Survey 1 invitations	19,977	100.0	0	Survey 1 open February 7, 2018
Survey 1 total responses	4,257	21.3	15,720	Survey 1 closed April 5, 2018
Survey 1 final responses	4,230	21.2	27	Missing location data
Survey 2 invitations	4,244	100.0	13	Survey 2 open August 22, 2019
Survey 2 total responses	2,596	61.2	1,648	Survey 2 closed October 8, 2019
Deletion 1	2,582	60.8	14	Missing SCB registry data
Deletion 2	2,561	58.1	21	Missing Survey 1 responses

Panel B:	**2019 responses**			
Note	Responses	% of Total	Sample	Date
First invitation (Wave 1)	1,347	31.7	1,334	August 22, 2019
Reminder 1 (Wave 2)	775	18.3	766	September 5, 2019
Reminder 2 (Wave 3)	474	11.2	461	September 19, 2019
Responses	2,596	61.2	2,561	Survey 2 closed October 8, 2019
Deletions	0	0.0	35	From Panel A
No response	1,582	37.3	1,582	
Returned mail	18	0.0	18	
Declined	46	1.1	46	
Blank	2	0.0	2	

Panel C:	**SPA Fund Matching**			
Note	Responses	SPA	Choice	Rebalanced
Full sample	2,561	2,521	1,436	711

Panel D:	**Survey weights**			
Strata	Weight	Freq.	% of Total	Population
1	1207.513	451	17.61	544,588
2	1337.449	454	17.73	607,702
3	1996.194	325	12.69	648,763
4	2126.129	325	12.69	690,992
5	2710.985	204	7.97	553,041
6	2840.921	252	9.84	715,912
7	3926.926	194	7.58	761,824
8	4056.861	156	6.09	632,870
9	4646.952	102	3.98	473,989
10	4776.887	98	3.83	468,135

C Forest Fires

This appendix describes the fire data. Affected fire areas have been obtained from the Swedish Civil Contingencies Agency. Sweden is around the same size as the state of California with a distance of 1,572 kilometers from north to south. About 15% of its area rests over the arctic circle. The country is divided into 21 counties and 290 municipalities.

Figure C.1 shows the distribution of forest fires during the summer of 2018 and marks the cut-off around the 90th percentile with an area destroyed amounting to more than 0.03% of the total municipal area.
Table C.1 tabulates all the affected areas in accordance with this definition along with the area destroyed.

Figure C.1: Distribution of Destroyed Area
This figure presents a cumulative plot of destroyed area as a result of the 2018 wildfires for across all 290 municipalities in Sweden. The chosen cut-off is indicated by a solid line at 0.03%, or the 90th percentile. The vertical axis presents the log-transformed relative share of destroyed area and the horizontal axis represents municipalities sorted from most to least affected.

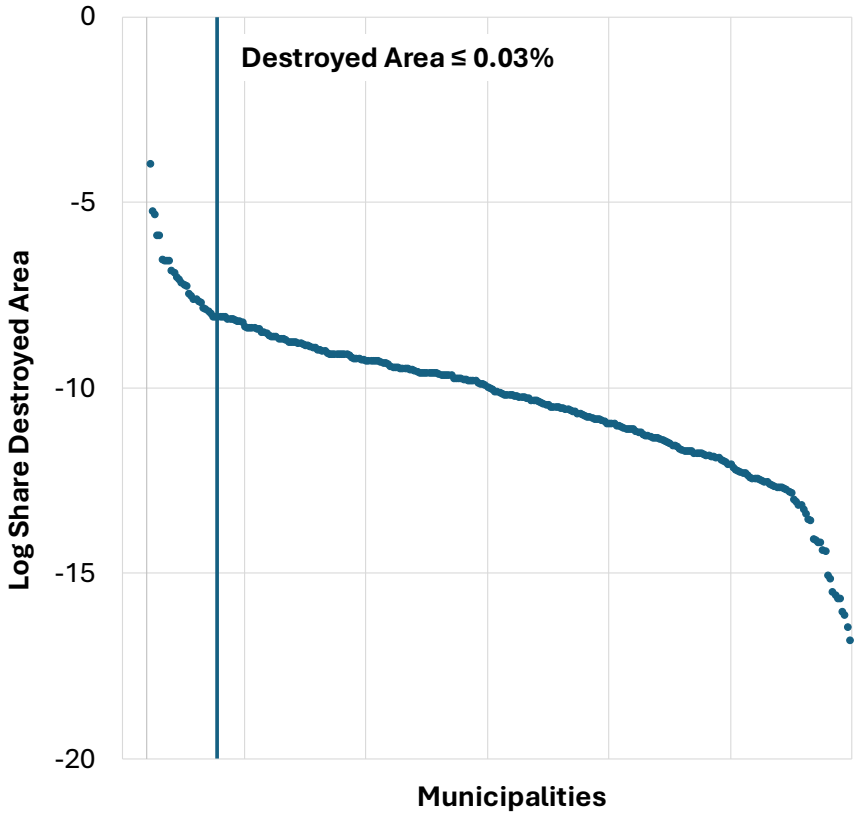


Table C.1: List of Municipalities Highly Affected Fires 2018

This table presents the counties that were highly affected by the forest fires in the summer of 2018. For these counties more than 0.03% (the 90th percentile) of the total share of land was burnt. Municipalities are ordered from lowest to highest relative area destroyed. Data is retrieved from Swedish Civil Contingencies Agency. There are 290 municipalities and 21 counties in Sweden.

Municipality	County	Destroyed Area
Ängelholm	Skåne	0.03%
Sigtuna	Stockholm	0.03%
Lidingö	Stockholm	0.03%
Stockholm	Stockholm	0.03%
Sollefteå	Västernorrland	0.03%
Sollentuna	Stockholm	0.03%
Uddevalla	Västra Götaland	0.03%
Hallstahammar	Västmanland	0.04%
Färgelanda	Västra Götaland	0.04%
Härryda	Västra Götaland	0.04%
Berg	Jämtland	0.05%
Örebro	Örebro	0.05%
Kil	Värmland	0.05%
Lessebo	Kronobergs	0.05%
Eda	Värmland	0.05%
Ale	Västra Götaland	0.06%
Laxå	Örebro	0.07%
Järfälla	Stockholm	0.07%
Härnösand	Västernorrland	0.08%
Håbo	Uppsala	0.09%
Örnsköldsvik	Västernorrland	0.09%
Oskarshamn	Kalmar	0.10%
Ragunda	Jämtland	0.11%
Hagfors	Värmland	0.14%
Bräcke	Jämtland	0.14%
Malung-Sälen	Dalarnas	0.14%
Nacka	Stockholm	0.15%
Botkyrka	Stockholm	0.28%
Kristinehamn	Värmland	0.28%
Härjedalen	Jämtland	0.49%
Älvdalen	Dalarnas	0.53%
Ljusdal	Gävleborg	1.90%

D Survey instrument

This appendix presents the five modified financial literacy questions solicited in the first survey in 2018 along with the four questions used for soliciting environmental beliefs in the 2019 survey.

Table D.1: Five modified financial literacy questions

This table presents the five ("Big-5") financial literacy questions used in the study and corresponding frequency responses on each item. Correct answers are highlighted in boldface. The category of incorrect answers also includes missing responses. The questions have been translated from Swedish into English. There are 2,561 observations.

1. *Compounding*. Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow? Please select one.
   (a) **More than $102 (2,340, 91.7%)**
   (b) Exactly $102 (42, 1.7%)
   (c) Less than $102 (63, 2.5%)
   (d) Don't know (76, 3.0%)
   (e) Prefer not to say (31, 1.2%)

2. *Inflation*. Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account? Please select one.
   (a) More than today (123, 4.8%)
   (b) **Less than today (2,021, 79.0%)**
   (c) Exactly the same as today (93, 3.6%)
   (d) Don't know (281, 11.0%)
   (e) Prefer not to say (39, 1.5%)

3. *Diversification*. Buying a single company's stock usually provides a safer return than a stock mutual fund. Please select one.
   (a) True (147, 5.8%)
   (b) **False (2,120, 83.0%)**
   (c) Don't know (255, 10.0%)
   (d) Prefer not to say (31, 1.2%)

4. *Long-Term Savings*. Suppose you were given $10,000 as a gift and wanted to double the amount by saving the money ten years without having to touch it. What interest rate would you require to achieve this goal? Please select one.
   (a) About 15% annual interest rate (163, 6.4%)
   (b) About 10% annual interest rate (966, 37.8%)
   (c) **About 7% annual interest rate (1,197, 46.8%)**
   (d) Don't know (191, 7.5%)
   (e) Prefer not to say (41, 1.6%)

5. *Bond Pricing*. If interest rates fall, what should happen to bond prices? Please select one.
   (a) **They will rise (437, 17.1%)**
   (b) They will fall (540, 21.1%)
   (c) They will stay the same (1,089, 42.6%)
   (d) Don't know (451, 17.7%)
   (e) Prefer not to say (38, 1.5%)

Table D.2: Environmental Beliefs

This table reports the responses to four statements regarding climate change asked in the survey. Questions 1 through 3 were asked in the second survey in 2019 and the last question in the first survey. Boldface indicates how responses have been coded to dummies. The statements have been translated from Swedish into English.

1. "I have already noticed the effects of climate change in Sweden"
   (a) Stongly disagree (109, 4.3%)
   (b) Disgree (63, 2.5%)
   (c) Don't Agree nor Disagree (301, 11.8%)
   (d) Agree (604, 23.6%)
   (e) **Strongly Agree (1,481, 57.9%)**
2. "I'm worried about climate change and what it means for myself and my family"
   (a) Stongly disagree (20, 0.8%)
   (b) Disgree (129, 5.1%)
   (c) Don't agree nor disagree (641, 25.1%)
   (d) Agree (1,154, 45.7%)
   (e) **Strongly Agree (595, 23.3%)**
3. "The government should do more to fight climate change"
   (a) Stongly disagree (77, 3.0%)
   (b) Disgree (83, 3.3%)
   (c) Don't agree nor disagree (375, 14.8%)
   (d) Agree (687, 27.0%)
   (e) **Strongly Agree (1,319, 51.9%)**
4. "I am willing to pay higher taxes to increase Sweden's aid to poor countries"
   (a) Stongly disagree (517, 20.4%)
   (b) Disgree (460, 18.0%)
   (c) Don't agree nor disagree (782, 30.8%)
   (d) Agree (552, 21.7%)
   (e) **Strongly Agree (230, 9.0%)**

E Fund Selection at the Swedish Pension Authority

This appendix give details about rebalancing retirement accounts at the Swedish Pension Authority (SPA). Figure E.1 shows a screen print of the web tool for choosing funds at the Swedish Pension Authority (SPA) which was launched during 2019. Figure E.2 plots the frequency distribution of Morningstar Climate Risk scores for the active funds in the pension system at the end of 2021.

Figure E.1: SPA Fund Choice Interface

This figure shows a screen print of the SPA web tool for searching, filtering and ranking funds based on Fund type (e.g. industry, geographic area), Fund category (e.g. stocks, bonds, mixed, target), Fund company, Risk level (from very low to very high) and Exclusions. The tool allows for choosing actively managed or index funds as well as sustainable funds and funds with the Morningstar low carbon indicator. Funds can be sorted by category, fee, Morningstar climate risk, financial risk and past returns. Website http://pensionsmyndigheten.se/mina-tjänster/fondtorg/sok accessed on January 25, 2023.

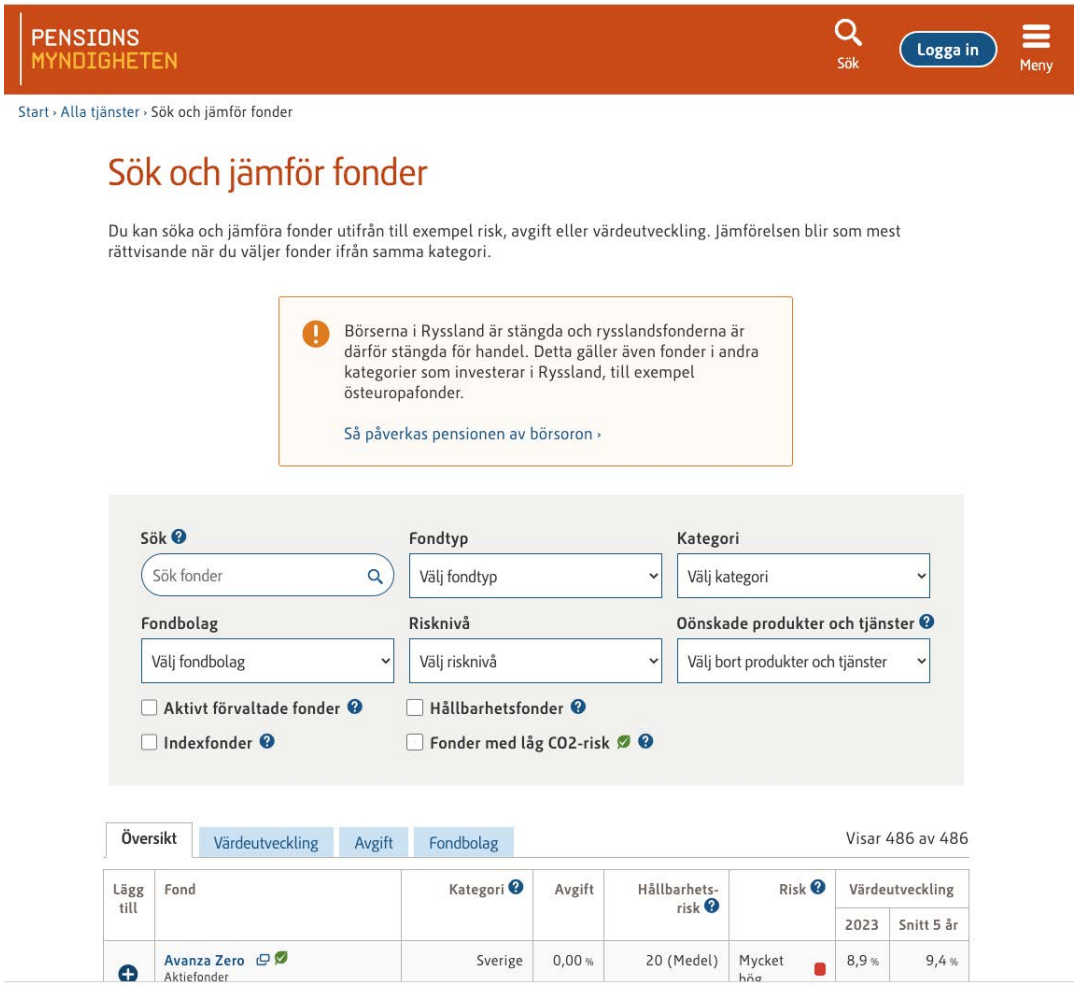
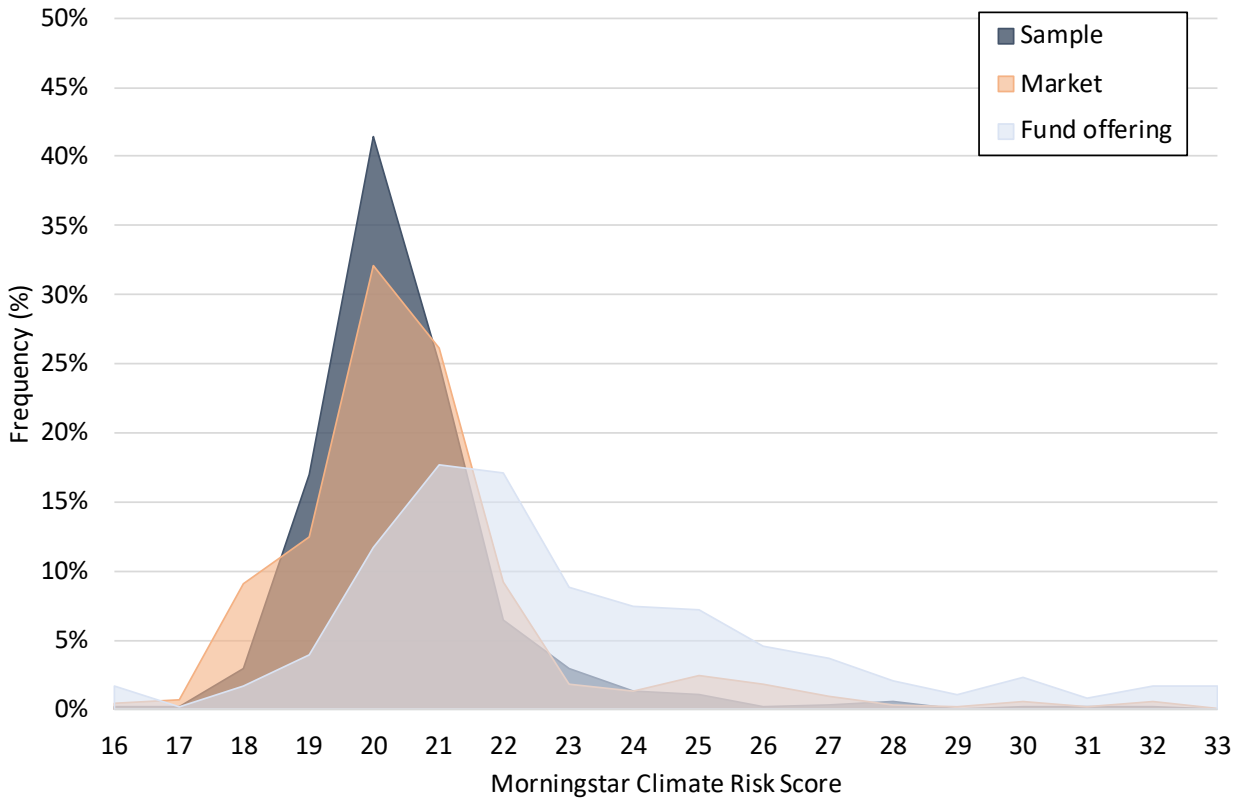


Figure E.2: Morningstar Climate Risk Scores

This figure presents the frequency distribution of Morningstar Climate Risk score for the sample of 466 funds (out of a total of 499) available in the pension system as of 2021 ("Fund offering" marked in light grey). Dark grey shows the weighted score for the sample of individuals ("Sample"). The orange area shows the weighted score distribution for all individuals in the Swedish pension system. The Morningstar Climate Risk score data is collected from the Swedish Pension Authority website.



F Fossil Fuel Exclusion Allocations

This appendix presents additional cross-sectional regressions of passive weights to fossil fuel exclusion funds for the period 2017 to 2021 (presented in Table E.1).

We decompose average portfolio values in 2021 conditional on revising up or down which is presented in Table E.2. To compute means, we make use of regressions of the form:

$$\text{Portfolio Amount}_i = \alpha + \beta_1 \text{Revised up}_i + \beta_2 \text{Revised down}_i + \epsilon_i,$$

where Revised up and Revised down denote dummy variables for whether an individual revised their beliefs about temperature increases up or down, and where subscript i denotes the type of portfolio holding based on the decomposition in Equation 1, which in column (2) is the overall portfolio. The holdings of the average respondent in the neutral group is captured by α. The regression is the repeated for fossil fuel exclusion portfolio amounts, which is also done separately for active and the passive part of the portfolio. The active and passive amounts in columns (4) and (5) therefore sum to the total exclusion position in column (3).

Table E.1: Temperature Revisions and Passive Investments into Fossil Fuel Exclusion Funds

This table reports the results of OLS regressions where the dependent variables is the passive portfolio weight in fossil fuel exclusion funds of respondent's pension holdings at the end of 2021. The dummy variables "Revised up" and "Revised down" are derived from changing the reported likelihood of a more than one Centigrade global temperature rise within 20 years between the two surveys in 2018 and 2019. Column (1) uses the full sample in the estimation; columns (2) and (3) partition on low and high income were high is a disposable income over 287,000 SEK; columns (4) and (5) partition on gender; columns (6) and (7) partition on age where old is those older than 50 years; columns (8) and (9) partition over urban versus rural areas as in Table III. Characteristics include log of disposable income, age (divided by 10), and a dummies for gender and higher education. TA controls denote dummies for the temperature assessments made in 2018. Fund controls include portfolio fractions for fund category, exposure to retail networks, one year past return, portfolio weighted standard deviation and fee. Survey weights are used in all regressions and the constant is excluded from the presentation. Standard errors in parentheses, and one, two and three asterisks denote significance at the 10, 5, and 1% level, respectively.

	Passive fossil fuel exclusions								
		Income		Gender		Age		Urban	
	All	Low	High	Men	Women	Young	Old	No	Yes
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Revised up	-0.019	-0.012	-0.027	-0.027	-0.019	-0.012	-0.025	-0.048	-0.004
	(0.028)	(0.043)	(0.037)	(0.038)	(0.040)	(0.045)	(0.033)	(0.034)	(0.042)
Revised down	0.013	0.008	0.014	0.014	0.010	0.038	-0.010	-0.002	0.024
	(0.024)	(0.039)	(0.029)	(0.032)	(0.035)	(0.035)	(0.031)	(0.031)	(0.037)
Log Income	-0.015			-0.011	-0.020*	-0.017	0.001	-0.010	-0.021*
	(0.009)			(0.020)	(0.010)	(0.012)	(0.016)	(0.017)	(0.011)
Men	-0.077***	-0.060*	-0.086***			-0.077**	-0.080***	-0.105***	-0.050
	(0.021)	(0.036)	(0.027)			(0.032)	(0.026)	(0.027)	(0.032)
Age	0.022*	0.037**	0.005	0.030**	0.013			0.002	0.045***
	(0.012)	(0.017)	(0.015)	(0.014)	(0.020)			(0.015)	(0.017)
University	-0.077***	-0.047	-0.097***	-0.076***	-0.076**	-0.066*	-0.095***	-0.040	-0.095***
	(0.021)	(0.034)	(0.028)	(0.029)	(0.031)	(0.034)	(0.026)	(0.026)	(0.033)
TA controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,436	550	886	727	709	549	887	877	559
R-squared	0.350	0.386	0.328	0.370	0.309	0.426	0.270	0.335	0.397

Table E.2: Temperature Revisions and Aggregate Redistributions of Wealth

This table reports the reports underlying population proxied by the sample weights (in thousands) in Column (1) and average portfolio values in columns (2) through (5). The average portfolio is obtained by regressing the individual portfolio value on dummies for revisions such that the constant denote the neutral (omitted) group. Column (1) presents the overall retirement portfolio and column (2) the value invested in fossil fuel exclusion funds. Columns (4) and (5) decompose the exclusion investments from column (3) in active and passive investments where active investment is attributed to a change in the portfolio during the time period 2018 to 2021. There are 2,521 retirement accounts in the calculation reflecting 5,949,329 people in the underlying population.

	Population	Portfolio	Fossil Fuel exclusions		
	000′	Total	Total	Active	Passive
VARIABLES	(1)	(2)	(3)	(4)	(5)
Revised up	1,527	39,171**	32,923**	25,641**	7,282
		(19,285)	(15,017)	(8,817)	(12,458)
Revised down	1,471	16,026	-400	2,970	-3,370
		(19,573)	(14,823)	(8,185)	(12,495)
Constant	2,951	409,751***	183,343***	52,215**	131,128**
		(11,352)	(8,917)	(4,128)	(7,969)
Population / Sample	5,949	2,521	2,521	2,521	2,521