A Breath of Change: Can Personal Exposures Drive Green Preferences?[*]

Steffen Andersen[†] Dmitry Chebotarev[‡] Fatima Zahra Filali-Adib[§]

Kasper Meisner Nielsen[¶]

May 19, 2024

Abstract

Are investors' preferences for responsible investing affected by their idiosyncratic personal experiences? Using a comprehensive dataset for hospital visits and the information on portfolio holdings by retail investors in Denmark, we show that when an investor's child is diagnosed with a respiratory disease, the investor decreases (increases) portfolio weights of "brown" ("green") stocks but does not alter their holdings of ESG funds. Consistent with parents attributing respiratory diseases to air pollution, we find no effects for non-respiratory diseases. The results are stronger for more severe diseases and are entirely driven by parents who live with their children.

JEL Classification: D91, G11, G41, Q51, Q53
Keywords: air pollution, health, green, brown, stock.

[*]We would like to thank seminar participants at Indiana University, Copenhagen Business School, and Vienna University of Economics and Business for their valuable comments and suggestions. Filali-Adib and Nielsen thank the Danish Finance Institute for financial support. Andersen and Filali-Adib gratefully acknowledge support from the Center for Big Data in Finance (grant no. DNRF167). The views expressed herein are those of the authors and do not necessarily reflect the official views of Danmarks Nationalbank. Any errors are our own.

[†]Danmarks Nationalbank. Email: sta@nationalbanken.dk.

[‡]Indiana University Kelley School of Business. Email: dmchebot@iu.edu.

[§]Copenhagen Business School. Email: fzfa.fi@cbs.dk.

[¶]Copenhagen Business School. Email: kmn.fi@cbs.dk.

Recent years have seen an unprecedented rise in the importance of Environmental (E), Social (S), and Governance (G) factors for investment decision-making. According to Morningstar, at the beginning of 2023, the assets under management of ESG funds reached \$2.5 trillion (Bioy et al. (2023)) showing a more than 150% growth over the past three years. As a survey of investors by BlackRock reports that 88% of investors cite the environment as the primary focus in ESG investing (BlackRock (2020)), it is important to understand how investors form preferences towards the E-factor and whether these preferences can change due to personal experiences. While a growing body of research documents the importance of non-precuniary consideration driven by ethical or green values for ESG investment, evidence on the factors that determine individuals' attitudes towards responsible investing remains scant.

In this study, we examine whether significant life events alter investors' preference for responsible investing. Using administrative data from Denmark, we show that when investors' children get admitted to hospitals with respiratory diseases, they decrease the weight of "brown" stocks in their portfolios and increase the portfolio weight of "green" stocks. The degree of portfolio rebalancing is economically significant: After the shock, investors decrease their holdings of "brown" stocks by 9% to 12% of the pre-treatment mean, while the weight on "green" stocks increases by 2% of the pre-treatment mean (relative to the control group). This effect is stronger for more serious medical conditions and is driven by parents who are living with their children at the time of the incident. We find similar changes, albeit of smaller magnitude, for the extended family — including grandparents, aunts and uncles of the diagnosed child. Our findings suggest that investors' experiences of idiosyncratic health shocks related to air pollution affect their allocation to sustainable assets, and, as a result, the relative fraction of "green" versus "brown" stocks in their portfolios.

Our interpretation of the results is the following. The connection between air pollution and respiratory diseases, which has been long established by the medical literature, is getting more salient with the global rise in ecological awareness. When a child is diagnosed with a respiratory disease, parents (as well as the extended family) experience a shock they might plausibly associate with the effect of air pollution. This perceived exposure to air pollution can influence investors' stock selection. Since personal affection and loyalty to the company are important factors for individual stockholders (e.g., Fama and French (2007), Cohen (2009), and Keloharju et al. (2012)), an increase in the "green" sentiment coming from personal experience undermines the investor's loyalty towards "brown" stocks that she holds. While revising the investment portfolio may not be the parent's immediate response, when later rebalancing their holdings, the parent pays more attention to the "greenness" of the stocks, carefully evaluating new selections and being more likely to sell previously held "brown" stocks. In line with this interpretation, we find that the treatment effect is not immediate but is rather spread over time, consistent with retail investors slowly revising their portfolios.

Our identification strategy exploits idiosyncratic health shocks to children to isolate the effect of individual experiences from household wealth shocks. Our focus on health shocks to a non-working member of the household in a setting with free universal healthcare (Denmark), ensures that the shock does not tighten the budget constraint, but exposes the family members to a personal experience. We then test our main hypothesis that personal exposures to respiratory diseases alter family members' attitude towards green investing. Importantly, our health shocks are relatively rare (i.e., relatively few investors are treated simultaneously) and idiosyncratic, which makes them plausibly unrelated to any systematic events that could potentially affect current or future stock prices. Our key identifying assumption is that the timing of the health shock is random relative to the timing of investment decisions.

To rule out the possibility that the treatment effect is driven by unobservable factors that might correlate with the likelihood of getting a disease, such as lifestyle, social connections, living conditions, or informational environment, we conduct our analysis in a (staggered) difference-in-differences setting, following the approach of Sun and Abraham (2021). We match treatment and control groups on a range of personal characteristics such as age, number of children, geography, wealth, etc. One possible concern with our use of health shocks is that it is difficult to rule out the possibility that differences between the treatment and control groups are affected by confounding factors, such as health (in general), lifestyle, or the investor's personal experience of having a child admitted to a hospital. To address these concerns, we conduct placebo tests using other diseases. The results of the placebo tests confirm that our findings are specific to respiratory diseases. This further supports our conjecture that the salience of the connection between respiratory diseases and air pollution is important for our results.

We then turn to studying whether the effect of shocks to investors' personal experiences is limited to stocks or whether it is also present for other asset categories. Looking at individuals' investment in mutual funds, we find no effect on the probability of holding an ESG fund or the weight of ESG funds in the portfolio after the treatment. One potential explanation is that the investors view "green" and "brown" stock holdings as assets directly related to addressing air pollution, while ESG is a broader term and may be rather associated with global warming, social impact, or governance standards.

In further tests we show that the effect on portfolio allocation depends on the severity of the child's medical condition. If personal exposures drive green preferences, then the strength of the effect should be related to how serious the child's medical condition is, as well as to how much the parent is personally affected by this experience. Consistent with this hypothesis, we find that the effect is stronger for a) children who are hospitalized with a respiratory diagnosis for a longer time period, b) children with multiple respiratory diagnoses, and c) children with multiple hospital visits due to respiratory diseases.

We also examine the effect of personal exposures among other members of the family. We find that the response is strongest for parents, but that it is also statistically and economically significant for extended family members, namely the child's aunts, uncles, and grandparents. Moreover, the effect for parents is mainly driven by the parents who are living with the child that is diagnosed with a respiratory disease. Further studying the cross-sectional variation of the effect, we document that while the results are stronger for the sample of more educated individuals, we find little evidence that the investor's age, gender, or geographical location influences the treatment effect.

By examining the impact of health shocks on "green" investing in a country with moderate levels of air pollution, such as Denmark, we demonstrate that the salience of pollution is more important than its absolute level. Within our sample period, the decreasing level of air pollution in Denmark is accompanied by an increase in social interest towards environmental problems. In line with this trend, we document stronger results post-2015 compared to earlier periods. We conclude that the perceived importance of the pollution problem has a stronger effect on individuals' investment decisions than the absolute level of pollution.

Our main contribution is to show that idiosyncratic experiences can change investors' environmental preferences. We contribute to the literature on the determinants of ESG preferences. Prior studies document that the increased allocation to sustainable investments is driven by investors with green or ethical values (Bauer and Smeets (2015); Riedl and Smeets (2017); Briere and Ramelli (2020); Bauer et al. (2021);Barber et al. (2021); Bonnefon et al. (2022); Hong and Shore (2023); Degryse et al. (2023); Giglio et al. (2023); and Andersen et al. (2023)), high financial literacy (Anderson and Robinson, 2022; Degryse et al., 2023), high wealth (Andersen et al. (2023)) and high subjective beliefs about returns to responsible investments (Giglio et al. (2023). A closely related study to ours is Fisman et al. (2023) who document that installation of air monitoring stations in India leads to a negative correlation between the air quality and investors' holdings of "brown" stocks. In comparison to these studies, we focus on an idiosyncratic health shock related to air pollution that is uninformative about current or future stock prices, which ensures that investors are reacting to their personal experience rather than market movements. Our setting also ensures that the change in portfolio allocation is not caused by confounding government policies or general time trends in investors' allocation to responsible assets. In addition, our focus on investors in Denmark highlights that the effect of ecological problems on investors' holdings as documented in Fisman et al. (2023), also manifests itself in regions with high air quality.

We also contribute to the literature on the effect of health and expected lifetime on financial decisions (Rosen and Wu (2004), Døskeland and Kvaerner (2022), Kvaerner (2023), and Kárpáti (2022)). An important finding in these studies is that health shocks might lead to changes in individuals' portfolio allocation due to two distinct channels: The effect of health on expected wealth, as well as the effect of health on expected lifetime. To convincingly identify the effect of personal experiences on green preferences, we analyze how family members react to health shocks to children. By focusing on parents' (and other family members') reactions rather than their own health shocks, we address the concern that changes in the individuals' portfolio allocations are confounded by changes to expected wealth and/or expected lifetime. Thus, we contribute to the literature on the effect of health on financial decision by documenting that shocks to investors' "green" sentiment through personal exposure to respiratory diseases cause strong effects on environmental preferences.

Our paper is also related to the vast and growing literature on the effects of personal experiences the decision to invest in an IPO (Kaustia and Knüpfer (2008)), on risk taking (Malmendier and Nagel (2011), Malmendier and Nagel (2016), Koudijs and Voth (2016), Knüpfer et al. (2017), Andersen et al. (2019), and Malmendier et al. (2021)), on decisions to buy a house (Happel et al. (2022)), or to default (Kalda (2020) and Kleiner et al. (2021)). A common theme in these studies is that people tend to overweight own experiences, as suggested by Kaustia and Knüpfer (2008), consistent with reinforcement learning. We add to this literature by studying the effect of idiosyncratic experiences on investors' environmental preferences.

Our final contribution is to the literature on non-financial determinants of individuals' stock holdings. Well-documented facts about individuals' portfolio allocations such as home bias (French and Poterba (1991)), political bias (Hong and Kostovetsky (2012)), and over-investment in local stocks (Coval and Moskowitz (1999)), own employers' stock (Massa and Simonov (2006), Cohen (2009)), stocks of companies one frequents as a customer (Keloharju et al. (2012)) and socially responsible stocks (Hong and Kacperczyk (2009), Geczy et al.

(2021)) stress that the assumption that investment assets share no common properties with consumption goods is unrealistic (Fama and French (2007)). We add to the literature on non-financial determinants of individuals' stock holdings by showing that idiosyncratic exposures to health problems associated with air pollution affect their environmental preferences, ultimately changing their portfolio compositions.

The paper proceeds as follows. Section 1 discusses the relationship between air quality and respiratory diseases; Section 2 describes the data; Section 3 introduces our main results; Section 4 shows the heterogeneity of results across different groups of investors and different health outcomes; Section 5 shows the effects of investors' own respiratory diseases on their stock holdings; Section 6 concludes.

1 Air quality and respiratory diseases

The link between air pollution and respiratory diseases has long been established by the medical literature. A large body of evidence documents the connection between air pollution, associated diseases and mortality, for Denmark as well as globally.

To provide an overview of the evidence we start by discussing the studies that outline the effect of air pollution on respiratory diseases. We then provide evidence suggesting that although the level of air pollution in Denmark has been declining during our sample period, there is a notable increase in concerns related to air quality by the general population. As such these observations suggest an increasing salience of the link between air pollution and respiratory diseases.[1].

1.1 General evidence

The connection between air pollution and cardiopulmonary diseases (an aggregate category comprised of cardiovascular and respiratory diseases) has been generally accepted by medical

[1] The Online Appendix A2 provides additional information about the types of substances that are considered to cause negative health effects.

scholars since the 1970-1980s (Pope III and Dockery (2006)). The early evidence provided detailed case studies of the increased mortality rates associated with severe pollution episodes from Meuse Valley (Belgium), Donora (PA), and London. These studies highlighted a relation between air pollution and cardiovascular and respiratory diseases. A more recent study of the effects of air pollution in six US cities shows that air pollution increases mortality and morbidity from cardiopulmonary diseases, but not from other disease types (Dockery et al. (1993)).[2] Later studies managed to separate the two causes and to demonstrate that both respiratory and cardiovascular diseases are related to air pollution.[3]

Importantly, multiple studies detect significant effects of unexpectedly low concentration levels of particle omissions on daily mortality rates (e.g., Schwartz and Marcus (1990) and Schwartz (1991)). Since 2009, the Environmental Protection Agency (EPA) estimates the connection between PM pollution and respiratory mortality and morbidity as *"likely to be causal"*, highlighting the "strong evidence for a relationship between short-term $PM_{2.5}$ exposure and several respiratory-related endpoints" (EPA (2019)).[4] The health effects of PM pollution pointed out by the EPA "range from inflammation and changes in lung function to respiratory-related ED visits and hospital admissions."

General morbidity is positively associated with respiratory diseases for different age categories, including children and young adults (MacIntyre et al. (2014), Chen et al. (2015), EPA (2019)).[5] Overall, the medical literature provides substantial evidence on the link between air pollution and respiratory diseases, and thus, confirms an important premise of our study.[6]

[2]As cross-coding difficulties and diagnoses misspecification often obscured the exact cause of death, the two types of disease, cardiovascular and respiratory, were often aggregated in earlier studies (Pope III and Dockery (2006)).

[3]See Table 1 in Pope III and Dockery (2006) for a review of different studies. A more recent synthesis is presented in EPA (2019).

[4]The difficulty of proving the causal relationship partially comes from the effect of the gaseous co-pollutants. Interestingly, the EPA estimates the relationship between $PM_{2.5}$ and cardiovascular mortality and morbidity as *"causal"*.

[5]Williams et al. (2002) document that acute respiratory infections are among the leading causes of childhood mortality. The authors estimate that around 1.9 million. children died from acute respiratory infections in 2000, 70% of which were in Africa and Southeast Asia.

[6]See Schüepp and Sly (2012) for an overview of the possible reasons making children especially vulnerable

1.2 Pollution and awareness in Denmark

The institutional setting in Denmark might be counterintuitive for a study of the link between respiratory diseases and green preferences, given that Denmark is a country with low to moderate levels of air pollution, combined with the fact that air pollution has declined since 2010 (see Figure 1).

Despite the relatively low level of air pollution, studies from Denmark show that long-term exposure even to low levels of air pollutants is associated with elevated levels of mortality in the Danish population (Raaschou-Nielsen et al. (2023)). A recent nationwide study by Kaspersen et al. (2023) documents that exposure to air pollution is associated with a higher probability of getting a respiratory tract infection. Thus, although the number of deaths caused by air pollution in Denmark is declining (Figure 1), the estimated total average annual external health-related costs for Denmark during 2014-2016 amounted to 3.9 billion EUR (Ellermann et al. (2016)), equivalent to around 13.8% of the total health expenditures.

These large numbers are reflected in the growing interest towards ecological problems as evidenced by the growing number of Google searches of "air quality" (Figure 1). Similarly, Panel A of Figure 2 shows that the news coverage of issues related to air quality and greenhouse gases (such as CO_2) substantially increased since 2011. Interestingly, as suggested by the decrease in the number of deaths associated with air pollution, the trend for the public interest towards air quality is not grounded in worsening health. Panel B of Figure 2 shows that if anything, the number of articles covering such common respiratory diseases as Chronic Obstructive Pulmonary Disease (COPD) and asthma has decreased since 2010. This surprising disconnect between pollution levels and public concern suggests that the dynamics of the actual pollution and its health consequences are poor predictors of the public interest in environmental problems.

to PM pollution.

2 Institutional details, data, and methodology

We assemble a dataset of individual investors aged over 21 with detailed information on wealth, income, demographic variables, and their holdings of stocks and mutual funds. We also use information on their children aged 18 and below. The dataset is constructed based on different administrative registries made available by Statistics Denmark, as we describe below.

Income, wealth, and portfolio holdings are from the official records of the Danish tax authorities (SKAT). These records include personal identification numbers (CPR), which are equivalent to the US social security numbers, and are recorded at the yearly level. SKAT obtains the data on wealth and income from relevant sources: Employers provide statements about the wages paid to their employees, while financial institutions similarly provide information on amounts of deposits, interests, and dividends received, as well as interests paid.

Similarly, SKAT receives the portfolio holdings directly from financial institutions (e.g., brokerage houses and banks) at an individual asset level, which allows us to observe the International Securities Identification Numbers (ISINs) of individual securities in investors' portfolios. We later use these ISIN codes to identify "green" and "brown" assets as we describe further.

Our data on income and wealth covers the time period from 2011 to 2021. Unless stated otherwise, all monetary values are in 2015 Danish kroner (DKK).[7]

Educational records are from the Ministry of Education of Denmark. All completed years of education, both formal and informal, as well as degrees' fields, are recorded and made available through Statistics Denmark.

Individual and family data are from the Danish Civil Registration System. These records contain CPRs, gender, dates of birth, CPR numbers of nuclear family members (parents, children, and siblings), as well as the marital history (the marital status, the CPR

[7] One euro equals 7.45 Danish kroner.

of the spouse) and address ID. In addition to providing useful demographic control variables, this dataset helps us link investors to their children in order to study the effect of pediatric health shocks on parents' portfolio holdings.

Individual health data are from the National Patient Registry at the Danish National Board of Health (Sundhedsstyrelsen). This registry records interactions with the Danish hospital system either for an examination or for a treatment. The part of the registry available to us through Statistics Denmark covers both outpatient and inpatient hospitalizations from 1995 to the first quarter of 2019. We observe the time of the hospital visit, the CPR number, as well as the detailed diagnosis made according to the 10th addition of the International Classification of Diseases (ICD-10), which is the medical classification list provided and updated by the World Health Organisation.

Most of the data described above is assembled for the purpose of individual tax collection (as well as statistics and medical and social science research) and is therefore of very high quality.[8] In addition to the registry data from Statistics Denmark, we use Morningstar and Nasdaq Nordic to identify the mutual fund names and characteristics. We obtain industry codes for stocks from MSCI.

2.1 Classification of stocks

Following Andersen et al. (2023), we take a conservative approach to stock classification and define "green" stocks as those related to alternative energy production (i.e., wind and solar). Similarly, we label a stock "brown" if it belongs to an industry directly related to traditional energy production (such as extraction and processing of fossil fuels: coal, oil, and gas). This partitioning is mutually exclusive but not collectively exhaustive, leaving the vast majority of stocks unlabeled.

The advantage of this approach is in its intuitiveness to retail investors, whose behavior

[8] The data on wealth, income, and portfolio holdings is comparable to that of other Nordic countries: Sweden (Calvet et al. (2007), Calvet et al. (2009a), Calvet et al. (2009b)), Finland (Grinblatt and Keloharju (2001), Grinblatt et al. (2012)), and Norway (Hvide and Östberg (2015), Døskeland and Hvide (2011)).

we study. While the attribution of broader industries to "green" or "brown" categories depends on the informativeness of a specific investor and may therefore be imprecise, the connection between combustion of fossil fuels and air pollution is well-known to the general audience.[9]

To identify "brown" stocks, we zoom in on the energy sector and look at such industries as oil and gas extraction, petroleum refining, gas production and distribution, electric and gas and other utility (SIC codes 13, 29, 492, and 493). We manually check the business scope of each stock to ensure that its business activity corresponds to the assigned classification. To ascertain that we identify "brown" and "green" stocks outside the industry codes listed above, we search for such keywords as "green", "solar", or "wind" in the company names. Again, we manually verify the business activity of each company to ensure that we correctly classify the stock. Overall, we identify 108 unique "green" stocks and 75 "brown" stocks. Note that our "green–brown" classification is mutually exclusive but not collectively exhaustive.

2.2 Classification of mutual funds

Following the existing literature, we classify ESG mutual funds by names (Gaspar et al. (2006), Lapanan (2018), Hellström et al. (2020), Curtis et al. (2021), Michaely et al. (2021), Li et al. (2021)). To identify ESG funds, we use historical fund names from Morningstar and Nasdaq Nordic. We take the keywords list from Michaely et al. (2021) (such as "sustain," "social," "impact," "ESG," "green," etc) and translate these keywords in Danish since local investors tend to hold most of their money in Danish funds.[10] We further augment this list with typical Danish keywords related to responsible investment.[11]

[9] As an alternative, one could use an ESG rating such as the one provided by MSCI ESG (former KLD). The coverage of Danish stocks by MSCI ESG ratings over the sample years is scant. In 2021, when the MSCI coverage was the highest within our sample, the average MSCI environmental pillar was 4.82 for the "brown" stocks we classify compared to 6.96 for "green" stocks. By contrast, the average score for an unclassified stock is 5.74.

[10] Approximately 95% of all mutual fund holdings in our dataset are kept in Danish funds.

[11] Alternatively, one could use Morningstar Sustainability Rating (MSR), which is only available starting 2018. In 2021, when the coverage is the highest, the average MSR for funds classified as socially responsible

Overall, out of 7490 unique funds, we label 561 funds, that is, 7.6% as ESG at some point in time. This label is time-varying, as funds' names can change. Indeed, 76 out of 561 funds are labeled as ESG after a renaming.

2.3 Sample formation

We start by finding all hospital visits by all patients under the age of 18 from 1995 to 2019 with a ICD-10 diagnosis codes DJ00-DJ99 (respiratory diseases). For each patient, we find their first case of getting admitted to a hospital with a respiratory diagnosis. We merge the patients to both of their parents by using the family links. For "treated" parents, we identify the first time that one of their children is admitted to the hospital. We then connect the sample of parents with the demographic data and their financial portfolios in the year before their child is admitted to a hospital, retaining only those parents who hold financial assets, stocks or mutual funds. If both parents participate in the financial market, we keep them both in the dataset as separate observations.

Figure 3 shows the distribution of respiratory cases in the final sample across years. Our sample ends in the beginning of 2019, which is reflected by the low number of observations in the last year. The jump in the number of cases in 2014 is driven by the changing rules of treatment for emergency cases. Before 2014, general care practitioners provided out-of-hours primary medical services for acute cases either as home visits or in centralized clinics. Since 2014, patients started to get directed to emergency departments in local hospitals (Fløjstrup et al. (2020)), which explains the increase in the number of patients in our data.

2.4 Summary statistics

The summary statistics for the population of stock market participants in Denmark together with the sample of investors whose children got respiratory diseases is given in Table 1.

by our name-based measure was 0.95 as compared to 0.18 for funds that were not classified as socially responsible.

Panel A presents the summary statistics of individual characteristics for the entire sample of investors (column 1) and the treated sample (column 2). By construction, as our focus is on parents with children under the age of 18, treated investors are younger than the typical Danish investor who is, on average, 53 years old. Similarly, more investors in the treatment group are male, married, have longer education, and more children living at home. It is important to mention that the number reported in Panel A is the number of children in the current household, not the number of children that the individual investor had over her lifespan. Finally, we note that treated investors have higher income than the average investor but smaller financial wealth.

Panel B shows the summary statistics for the portfolio characteristics. Remarkably, investors in the treated sample have comparable portfolio weights of "brown" stocks and more "green" stocks than the average investor. Similarly, the average investor holds less money in ESG funds than investors from the treated sample.

2.5 Methodology

We conduct staggered difference-in-differences analysis. For each treatment unit, we choose a matching "control" unit and estimate the change in the differences between the treatment and the control groups.

As is documented in the econometric literature, staggered difference in differences can produce biased estimates under heterogeneous treatment effects (Goodman-Bacon (2021)). Following the recommendation of Baker et al. (2022), we use the dynamic difference-in-differences estimator designed by Sun and Abraham (2021). We estimate the coefficients of the model

$$Y_{i,t} = \alpha_i + \lambda_t + \sum_{m=-K}^{-2} \mu_m D_{i,t}^m + \sum_{m=0}^{L} \mu_m D_{i,t}^m + \nu_{i,t}, \tag{1}$$

where $Y_{i,t}$ measures responsible investments of individual i at time t. The specification includes individual fixed effects α_i to control for time-invariant individual hetrogeneity like lifestyles or investment style, time fixed effects, λ_t, to control for time trends and marcoeconomic conditions. The variables of interest , $D_{j,s}$, are indicator variables such that $D_{j,s} = 1$ if $i = j$ and $t = s$, otherwise $D_{j,s} = 0$. We use an estimation window of five years in event time relative to the treatment, that is, $K = L = 5$ while year t-1 is the year of reference. The Average Treatment effect for the Treated (ATT) is defined as the average of the post-treatment coefficients: $ATT = \left(\sum_{m=1}^{K} \mu_m\right)/K$.

The matching is done at the year preceding the treatment. To obtain the matching sample, for each treatment investor we find a set of controls with the same age, gender, marital status, and number of children in the household, who live in the same municipality, and have the same education level. Similar to the treatment group, potential controls are also required to hold financial assets, either stocks or mutual funds. In this set of potential controls, we select the investor who has the closest level of total wealth to the treatment investor.

3 Respiratory diseases and investors' portfolios

In this section we present our main results. We start by studying the change in investors' holdings of "brown" and "green" stocks after her child gets diagnosed with a respiratory disease. We then introduce our measure of "green minus brown" as a way to summarize our findings, and we further use it for comparisons of different specifications. We accompany our findings with results for placebo groups, that is, other diseases that have comparable numbers of treated patients. We conclude this section by presenting the results related to another asset type: mutual fund holdings.

3.1 "Brown" stocks

If our hypothesis is correct, we expect the investors to decrease their holdings of brown stocks (relative to the control group) after their children get diagnosed with a respiratory disease. We begin our analysis by estimating the treatment effect on two variables: (i) the weight of “brown” stocks in the investor’s portfolio and (ii) the indicator that the investor holds a “brown” stock. The change in the portfolio weight can signalize that the investor is adjusting her portfolio at the intensive margin, while the indicator captures the changes at the extensive margin.

The results of estimating model 1 for both variables are presented in Table 2. Significant negative ATTs indicate that both variables decrease after the treatment. The effect on the portfolio weight becomes statistically significant in the first year after the treatment, while the indicator reacts with a time lag of one year, consistent with a gradual liquidation of “brown” stocks as opposed to a quick selling. The evolution of the treatment effects over time is shown in Figure 4. Both panels A and B show no pre-trend. The treatment effect is lasting, surviving for over 5 years after the investor gets the first-time experience.

The largest single-year effect on the portfolio weight is -27 bps in year 4, while the average effect is -19 bps. Given the average pre-treatment level of 220 bps, the treatment effect ranges from 9% to 12% of the pre-treatment mean, which is economically significant. Similarly, the effect on the probability of holding a “brown” stock ranges from -42 bps to -58 bps, which — compared to the pre-treatment average of 610 bps — gives an estimate of the effect from 7% to 10% relative to the mean.

For a correct interpretation of the results, it is necessary to remember that the estimates of the treatment effect are obtained relative to matched controls. One potential interpretation of the results is that investors actively sell off “brown” stocks in response to the children’s diagnoses. Alternatively, some part of the effect can be explained by the treatment group decreasing the probability of buying new “brown” stocks compared to the control group. Each of the two stories is consistent with our general hypothesis that treated investors change their approach to portfolio formation after receiving shocks to their individual experiences. However, the exact way in which investors adjust their portfolios compared to the control group is of separate interest. To further study this question, in Figure 5 we plot the raw averages of the portfolio weight on the "brown" stock and the indicator of holding a "brown" stock for the treated and control groups separately. Panel A shows that while the overall weight on "brown" stocks in the portfolios of the control group is constant or mildly decreasing, the treatment group has a stronger negative trend. While this result is consistent with treated investors actively selling "brown" stocks, it can also be a result of the time trend in "brown" stock prices or the treated investors' tendency to buy more "non-brown" stocks post treatment. To correctly interpret our finding, we repeat the graph in Panel A using constant stock prices throughout the sample.[12] Figure A-1 shows the results. Both groups increase their fractions of "brown" stock holdings measured in fixed prices, but the trend in the treated investors' holdings becomes flat after the treatment. The comparison of the two graphs suggests that since the portfolio weight of "brown" stocks decreases post treatment, either the treated investors decrease their purchase of new "brown" stocks as a group or some fraction of treated investors actively decreases their portfolio weights on "brown" stocks.[13]

Panel B of Figure 5 shows that both treatment and control groups experience a common trend in the probability of holding a "brown" stock. After the shock, the slope of the time trend for the treated group decreases compared to the control group but remains positive. Taken together with Panel A, this evidence suggests that over time more people choose to hold "brown" stocks, for example, for diversification purposes. Then after receiving the treatment, parents of children suffering from respiratory conditions, are more aware of their holdings and are less likely to diversify into "brown" stocks, ultimately decreasing their portfolio weight on "brown" stocks either due to their active decision or to the time trend in prices.

The change in the investment approach after the treatment is surprising given the retail investors' inertia documented in previous studies (e.g., Calvet et al. (2009a), Bilias et al.

[12] For each stock, we find the average end-of-year price at the beginning of the sample and use it to compute the portfolio value and the fraction of "brown" stocks for each investor-year combination.

[13] Note that retail investors are likely to rebalance their holdings using contemporary prices as weights as opposed to constant historical prices. Therefore, treated investors likely perceive the change in the fraction of "brown" stocks in their portfolio as a result of their (active) decision.

(2010)). One potential explanation for the decrease in brown stock holdings is a liquidity shock. If the medical bills are not fully covered by the social security scheme or if parents incur some additional health-related costs, this may induce them to liquidate some of their stock holdings. When divesting the stock portfolio due to a liquidity shock, "brown" stocks may be a natural starting point given the intuitive association between health, pollution, and "brown" companies.

Although theoretically plausible, this explanation, however, is unlikely to be the main driver for the divestment of "brown" stocks since the social security coverage in Denmark is very generous.[14] Prescription medicines in Denmark are also substantially subsidized.[15] However, parents may incur additional costs that go beyond the necessary medical expenses. For example, they may adjust their consumption and take additional costs to best accommodate their children's needs. In this case, even after the social security coverage, health shocks may cause liquidity shortages.

If pediatric health shocks cause liquidity shocks, parents will first deplete their most liquid source of funds, which is the bank account. Figure 6 shows the difference-in-differences analysis for the investors' bank deposits. There is no economically significant change in deposit amounts after the treatment, suggesting that the treated group does not experience liquidity shortage. Similarly, we find no evidence that treatment induces investors to divest stocks in general. Figure 7 shows that the risky asset share (proportion of stocks and funds in the investor's financial wealth) does not decrease after the investor's child gets a respiratory disease.[16] This evidence suggests that in response to the treatment, parents adjust their

[14]For children and adolescents under the age of 18, healthcare services are entirely free, which covers general practitioner (GP) visits, hospital stays, and any treatments, including those for chronic and acute diseases. Pediatric care is comprehensive and fully funded by the state.

[15]Prescription medicines in Denmark are subsidized to varying degrees based on a progressive self-payment structure, where the subsidy increases as one's annual expenditure on prescribed medicines rises. For children, many prescribed medications are either free or available at a very low cost, further reducing the financial burden on families for the treatment of children's diseases.

[16]Furthermore, Figures A-2, A-3, and A-4, respectively, show that the treated investors do not become less wealthy, do not decrease their working income, and are relatively less likely to move to a new residence after the treatment. This evidence is inconsistent with treatment constituting a wealth shock or a significant liquidity shock. The corresponding coefficients are provided in Table A-2.

preferences across different types of risky assets rather than redirect their investment focus towards relatively safer assets.

3.2 "Green" stocks

Similarly to "brown" stocks, investors' holdings of "green" stocks may be adjusted following the treatment. The results for the proportion of "green" stocks and the probability of holding a "green" stock are displayed in Table 3. The probability of holding a green stock does not change post-treatment, while the proportion of "green" stocks slightly increases after the shock. The ATT for the proportion is significant and amounts to 2% of the pre-treatment mean.

It is important to contrast the results for the "brown" and "green" stocks. First, the effect on the "brown" stock fraction is strong and immediate as compared to the "green" stocks, suggesting that investors are more concerned about contributing to the air pollution than about failing to support the "green" energy industry. The treatment effect on the "green" stock holding is building up over time, potentially driven by diseases that continue to develop over time. Second, comparing the results for the portfolio weight and the indicator of holding "green," we conclude that the effect is present at the intensive margin, that is, possibly driven by those who already hold "green" stocks. Finally, even though the probability of holding "green" stocks does not increase post-treatment, it is perhaps even more important that it does not decrease. The absence of the effect means that our results for "brown" stocks are not driven by investors simply divesting all energy stocks, switching the investment industry or consolidating their holdings in a smaller number of stocks.

3.3 "Green" minus "brown"

Although the results for the "brown" and "green" stocks are of separate interest, it is more convenient to use the difference between the "green" and "brown" stock holding measures as a representation of the tilt in the investors' portfolios towards ecologically sustainable stock investing. We can then use the difference of (i) portfolio weights and (ii) indicators of holding "green" and "brown" stocks to compare the results across different groups of diseases, health conditions, and investors. Figure 9 shows the diff-in-diff results for the difference between the "green" and "brown" stocks for the portfolio weights (Panel A) and the indicator of holding (Panel B) for the investors whose children visit a hospital with a respiratory disease.

3.4 Placebo tests

An alternative explanation of our findings is that the parents' reaction is not specific to respiratory diseases as the category most saliently connected to air pollution. Several studies find that ESG investment is related to the warm-glow effect (Riedl and Smeets (2017), Andersen et al. (2023)). Consistent with this effect, if a visit to the hospital and a first-hand exposure to any pediatric disease creates the desire to personally contribute to the public good via charitable donations or investment in sustainable assets, one will see an increase in "green" and a decrease in "brown" investment not only for respiratory diseases, but for other diseases as well.

To check to what extent our findings extrapolate to other groups of diseases, we repeat the same procedure for other (well-classified) groups of diseases.[17] Table 4 shows the results. Among all 19 groups of diseases, only the respiratory group demonstrates positive and statistically significant results. This observation suggests that the salience of the connection between respiratory diseases and air pollution is important for the investors.

In Section 1, we describe the effect of air pollution on the frequency of cardiopulmonary diseases, the group comprised of cardiovascular and respiratory diseases. The connection between air pollution and cardiovascular hospitalizations is well-known in medicine but not as salient to people without a medical degree. The absence of the treatment effect for circulatory system diseases as well as for blood diseases suggests that investors are more

[17] Table A-1 provides the full list of disease categories with their ICD-10 codes. We do not study the group "Abnormal findings IKA" as its interpretation and contents are unclear and may involve potential misclassifications.

likely to make intuitive connections between the air quality and the illnesses related to breathing.

3.5 Mutual fund holdings

We now turn to looking at a different class of assets — mutual funds. If investors' environmental concerns extend beyond individual stocks, we expect them to increase their holdings of ESG funds after the treatment. Alternatively, if investors do not consider ESG funds as a means of decreasing air pollution but rather associate them with addressing global warming and the improvement of S- and G-related factors, we will not see a positive effect.

Analysing the results for mutual funds presented in Table 5, we find that investors with children suffering from a respiratory disease do not increase their holdings of ESG funds neither at the intensive, nor at the extensive margin, relative to a control group. This evidence suggests that investors do not associate ESG funds with decreasing air pollution. It also speaks against the warm glow explanation of our findings, as research shows that investing in ESG funds is often value-driven (Riedl and Smeets (2017), Giglio et al. (2023)), and identifies the effect of warm glow on ESG fund holdings (Riedl and Smeets (2017), Andersen et al. (2023)). We conclude that the effect is strongest for such assets as "brown" and "green" stocks, which are most directly related to the factor potentially driving the experience (i.e., air pollution).

4 Heterogenous treatment effects

In this section, we start by describing how the severity of the health condition affects the results. Then we show to what extent our results vary with investors' characteristics.

4.1 Severity of disease

In our study, parents, whose children get admitted into a hospital with a respiratory disease, experience a shock that affects their preferences for green investing. If this interpretation is correct, the result should be stronger for those patients whose condition at the moment of the hospital visit is more serious or who have respiratory diagnoses with long-lasting health consequences and the potential to return to an acute stage.

As proxies for the seriousness of health condition, we use the number of days the patient has to spend in the hospital, the forward-looking measures of the number of hospital visits for the patient, and the number of respiratory diagnoses, and the indicator whether the patient was admitted into the hospital with a chronic initial diagnosis. For each of these measures, we separate the data in two subsamples and estimate the results separately. If our interpretation is correct, we expect to see stronger treatment effects for more serious conditions (that is, higher numbers of hospital visits and respiratory diagnoses, and more days spent in the hospital). We expect that parents of children admitted with chronic diagnoses will have a stronger reaction as chronic conditions may have long-term effect on patients' lives. At the same time, if a patient is hospitalized with a chronic diagnosis, it is possible that this diagnosis is a known pre-existent condition of the patient, which has developed prior to the hospitalization. In this case, the effect of the "chronic" subsample will be obscured by the uncertain time of the treatment.

Table 6 shows the results. The effects are stronger for the non-chronic diseases, consistent with chronic patients knowing their conditions prior to the hospital visit. Most patients in our sample come to the hospital with acute respiratory tract infections (mostly of the upper respiratory tract). These cases can be early signs of other respiratory diseases or aggravations of pre-existing conditions. Since our data does not track the entire medical history for each patient but only records hospital visits, we do not observe whether a patient has a respiratory diagnosis established by a general practitioner prior to the hospital visit. However, since the response of the sample that is admitted with a chronic diagnosis is weaker, it is possible that they are aware of their pre-existing respiratory condition, which means that the actual time of treatment happened before the first hospital visit we observe.

Columns 3 to 8 of Table 6 show that the results are stronger for parents of patients who make several hospital visits in our data sample and those who get several respiratory diagnoses. Splitting the sample by the number of days spent in the hospital, we see that those who spent more than one day during the year of the fist respiratory visit demonstrate a stronger effect than the rest of the sample. Overall, the results are consistent with more severe cases causing stronger reactions.

4.2 Investors' characteristics

We proceed to testing whether investors' characteristics influence our results. Table 7 shows a stronger effect for more educated investors consistent with more educated investors perceiving themselves as more competent, and thus trading more often and putting more weight on their own information and views (Graham et al. (2009)).

We find little evidence that investors' age and location affect our results: The outcome is similar for younger and older and for investors living in and outside of big (that is, top-10) Danish cities. Separating the sample into mothers and fathers, we see a somewhat stronger result at the intensive margins for fathers. However, the interpretation of this finding is obscured by the possibility that only one partner is investing on behalf of the entire family. Meanwhile, the extensive margin outcomes for both samples are very close.

4.3 Family Ties

We continue by studying the influence of family ties on the magnitudes of the treatment effect in Table 8. Interestingly, our results are entirely driven by parents who live with their children (i.e., have the same living address) at the moment when the sickness happens. This finding can be consistent with the first-hand experience being necessary for the reaction to the child's disease on the stock holdings to be pronounced. Alternatively, it may be that parents who do not live with their children do not maintain tight connections with their families and will not be the first people with whom the important health news will be shared. In that case, what matters more is the tightness of social connections.

To distinguish between these two explanations, we test the treatment effect for other family members. The results in column 3 of Table 8 show that grandparents display a significant treatment effect, although roughly 50% smaller than of parents. At the same time, comparing the effect for parents and aunts/uncles in column 4, we see that the latter are as likely to increase the probability of holding at least one green stock (decrease the probability of holding at least one brown stock) but are less likely to substantially adjust their portfolio in response to the shock. These findings suggest that the exposure to the news about the child's sickness is easily transmitted through social channels and affects other people's holdings. Therefore, what matters most is not the first-hand experience but rather the tightness of social connection.

4.4 Time effect

In Section 1.2, we show that despite the improvement of the ecological situation in Denmark, the population is becoming more interested in the news about air quality and global warming. If the strength of the treatment effect on the holding of "green" minus "brown" stocks depends on the actual level of pollution and the associated health effects, we would expect the treatment effect to be stronger in the first part of the sample (for children who fell sick before 2015). However, if the driving power of the effect is the social interest, we expect to see stronger results in the later part of the sample (that is, after 2015).

Upon testing these two hypotheses, as shown in Table 9, we find that investors exhibit a stronger reaction in the later part of the sample. This trend is more consistent with social interest in environmental issues (rather than pollution itself) playing a key role in investors' responses to pollution-related problems. This finding is crucial for interpreting pollution-related studies, including ours, suggesting that the dynamics of the documented effects are likely to strengthen in response to increasing public demand for higher living standards.

5 Shocks to investors' own health

Up until this point, we focused exclusively on the shocks that are unrelated to the health of the investor herself or any of the working family members. In doing so, our motivation is to explore a strong shock to preferences that is unrelated to the investor's budget constraint and/or liquidity needs. However, even taking into account potential identification issues, it is useful to know whether investors' own health shocks induce a comparable effect on their holdings.

To estimate this effect, we start by forming the sample of investprs' own respiratory health shocks in the same way as we did for the children. The limitation here is that we do not observe the entire history of hospital visits for grown-ups as our dataset starts in 1995. We proceed assuming that by 2010 the effect of investors' experiences from hospital visits prior to 1995 on their stock holdings becomes negligibly small.

Table 10 shows the results. The ATT is insignificant for all four variables, as well as for the differences between "green" and "brown" holdings (unreported). We conclude that investors do not significantly react to their own health shocks.

This has several potential explanations. First, our assumptions about the irrelevance of the medical history prior to 1995 may be wrong. Second, grown-up investors know much more about their own health, which makes a "surprise" hospital visit less likely. Third, grown-up individuals are potentially more likely to attribute their conditions to their own actions (such as smoking, which we do not observe). Finally, if investors perceive their own health shock as impacting their budget constraint, they will consider themselves less wealthy. If "green" investing is a luxury good as suggested by Andersen et al. (2023), this may give rise to an effect of the opposite sign, which can cancel out the influence of own health shock.

6 Conclusion

In this paper, we establish that individual experiences affect investors' preferences for responsible investing. When a child gets admitted to a hospital with a respiratory disease, her parents decrease (increase) the portfolio weights of "brown" ("green") stocks, and are more likely to completely stop investing in "brown" stocks. The effect stems from both an active divestment in "brown" stocks and a reduced likelihood of selecting a "brown" stock after the treatment. Consistent with the conjecture that parents associate pediatric respiratory diseases with air pollution we find no such effects for non-respiratory diseases.

The tightness of social connections is important for the results. We show that although our findings are strongest for the parents, the results also hold for uncles and aunts and for grandparents of the sick children. The effect on the parents is entirely driven by those who are living with their children at the moment of the hospital visit.

We find stronger effects for more severe health conditions: Parents of children with higher numbers of respiratory diagnoses and longer hospital stays display stronger results. Looking at investors' own health outcomes, we find no significant effect on stock holdings.

Regarding the effects for other asset types, we document no effect of the shocks on the investors' holdings of ESG funds, which can mean that individuals do not perceive investment in ESG funds as a way to address air pollution.

By examining the impact of health shocks on "green" investing in Denmark — a country with moderate levels of air pollution — we demonstrate that the salience of pollution is more influential than its absolute level. While air pollution in Denmark decreases, social interest in environmental problems increases. This trend aligns with the significant role that public interest, rather than the relative severity of environmental issues, plays in shaping outcomes. Our findings reveal a stronger effect post-2015 compared to earlier periods. Consequently, we conclude that preferences for responsible investing are increasingly important in shaping investors' portfolios, regardless of the absolute levels of pollution.

References

Andersen, S., Chebotarev, D., Filali-Adib, F. Z., and Nielsen, K. M. (2023). Rich and responsible: Is ESG a luxury good? *Working paper*.

Andersen, S., Hanspal, T., and Nielsen, K. M. (2019). Once bitten, twice shy: The power of personal experiences in risk taking. *Journal of Financial Economics*, 132(3):97–117.

Baker, A. C., Larcker, D. F., and Wang, C. C. (2022). How much should we trust staggered difference-in-differences estimates? *Journal of Financial Economics*, 144(2):370–395.

Barber, B. M., Morse, A., and Yasuda, A. (2021). Impact investing. *Journal of Financial Economics*, 139(1):162–185.

Bauer, R., Ruof, T., and Smeets, P. (2021). Get real! Individuals prefer more sustainable investments. *The Review of Financial Studies*, 34(8):3976–4043.

Bauer, R. and Smeets, P. (2015). Social identification and investment decisions. *Journal of Economic Behavior & Organization*, 117:121–134.

Bilias, Y., Georgarakos, D., and Haliassos, M. (2010). Portfolio inertia and stock market fluctuations. *Journal of Money, Credit and Banking*, 42(4):715–742.

Bioy, H., Wang, B., Pettit, A., Stankiewicz, A., Mohamed, A., Hall, E., Sato, H., Jung, A. S., and Beaudoin, H. (2023). Global sustainable fund flows: Q4 2022 in review. Technical report, Technical Report, Morningstar.

BlackRock (2020). Global sustainable investing survey. Technical report.

Bonnefon, J.-F., Landier, A., Sastry, P. R., and Thesmar, D. (2022). The moral preferences of investors: Experimental evidence. Technical report, National Bureau of Economic Research.

Briere, M. and Ramelli, S. (2020). *Personal values, responsible investing and stock allocation*. Netspar, Network for Studies on Pensions, Aging and Retirement.

Calvet, L. E., Campbell, J. Y., and Sodini, P. (2007). Down or out: Assessing the welfare costs of household investment mistakes. *Journal of Political Economy*, 115(5):707–747.

Calvet, L. E., Campbell, J. Y., and Sodini, P. (2009a). Fight or flight? Portfolio rebalancing by individual investors. *The Quarterly Journal of Economics*, 124(1):301–348.

Calvet, L. E., Campbell, J. Y., and Sodini, P. (2009b). Measuring the financial sophistication of households. *American Economic Review*, 99(2):393–398.

Chen, C.-H., Chan, C.-C., Chen, B.-Y., Cheng, T.-J., and Guo, Y. L. (2015). Effects of particulate air pollution and ozone on lung function in non-asthmatic children. *Environmental Research*, 137:40–48.

Clean Air Act (1971). *33 United States Code*, 1241 Et Esq.

Cohen, L. (2009). Loyalty-based portfolio choice. *The Review of Financial Studies*, 22(3):1213–1245.

Coval, J. D. and Moskowitz, T. J. (1999). Home bias at home: Local equity preference in domestic portfolios. *The Journal of Finance*, 54(6):2045–2073.

Curtis, Q., Fisch, J., and Robertson, A. Z. (2021). Do ESG mutual funds deliver on their promises? *Michigan Law Review*, 120:393.

Degryse, H., Di Giuli, A., Sekerci, N., and Stradi, F. (2023). Sustainable investments: One for the money, two for the show. *Available at SSRN*.

Dockery, D. W., Pope, C. A., Xu, X., Spengler, J. D., Ware, J. H., Fay, M. E., Ferris Jr, B. G., and Speizer, F. E. (1993). An association between air pollution and mortality in six US cities. *New England Journal of Medicine*, 329(24):1753–1759.

Donaldson, K., Stone, V., Clouter, A., Renwick, L., and MacNee, W. (2001). Ultrafine particles. *Occupational and Environmental Medicine*, 58(3):211–216.

Døskeland, T. and Kvaerner, J. S. (2022). Cancer and portfolio choice: Evidence from norwegian register data. *Review of Finance*, 26(2):407–442.

Døskeland, T. M. and Hvide, H. K. (2011). Do individual investors have asymmetric information based on work experience? *The Journal of Finance*, 66(3):1011–1041.

Ellermann, T., Nygaard, J., Klenoe Noejgaard, J., Nordstrøm, C., Brandt, J., Christensen, J., Ketzel, M., Massling, A., Bossi, R., and Solvang Jensen, S. (2016). The Danish air quality monitoring programme. Annual summary for 2016.

EPA (2019). Integrated science assessment for particulate matter.

Fama, E. F. and French, K. R. (2007). Disagreement, tastes, and asset prices. *Journal of Financial Economics*, 83(3):667–689.

Fisman, R., Ghosh, P., Sarkar, A., and Zhang, J. (2023). Dirty air and green investments: The impact of pollution information on portfolio allocations. Technical report, National Bureau of Economic Research.

Fløjstrup, M., Bogh, S. B., Henriksen, D. P., Bech, M., Johnsen, S. P., and Brabrand, M. (2020). Increasing emergency hospital activity in Denmark, 2005–2016: A nationwide descriptive study. *BMJ open*, 10(2):e031409.

French, K. R. and Poterba, J. (1991). Investor diversification and international equity markets.

Gaspar, J.-M., Massa, M., and Matos, P. (2006). Favoritism in mutual fund families? Evidence on strategic cross-fund subsidization. *The Journal of Finance*, 61(1):73–104.

Geczy, C. C., Stambaugh, R. F., and Levin, D. (2021). Investing in socially responsible mutual funds. *The Review of Asset Pricing Studies*, 11(2):309–351.

Giglio, S., Maggiori, M., Stroebel, J., Tan, Z., Utkus, S., and Xu, X. (2023). Four facts about ESG beliefs and investor portfolios. Technical report, National Bureau of Economic Research.

Goodman-Bacon, A. (2021). Difference-in-differences with variation in treatment timing. *Journal of Econometrics*, 225(2):254–277.

Graham, J. R., Harvey, C. R., and Huang, H. (2009). Investor competence, trading frequency, and home bias. *Management Science*, 55(7):1094–1106.

Grinblatt, M. and Keloharju, M. (2001). What makes investors trade? *The Journal of Finance*, 56(2):589–616.

Grinblatt, M., Keloharju, M., and Linnainmaa, J. T. (2012). IQ, trading behavior, and performance. *Journal of Financial Economics*, 104(2):339–362.

Happel, J., Karabulut, Y., Schäfer, L., and Tuzel, S. (2022). *Shattered Housing*. Centre for Economic Policy Research.

Hellström, J., Lapanan, N., and Olsson, R. (2020). Socially responsible investments among parents and adult children. *European Economic Review*, 121:103328.

Hong, H. and Kacperczyk, M. (2009). The price of sin: The effects of social norms on markets. *Journal of Financial Economics*, 93(1):15–36.

Hong, H. and Kostovetsky, L. (2012). Red and blue investing: Values and finance. *Journal of Financial Economics*, 103(1):1–19.

Hong, H. and Shore, E. (2023). Corporate social responsibility. *Annual Review of Financial Economics*, 15:327–350.

Hvide, H. K. and Östberg, P. (2015). Social interaction at work. *Journal of Financial Economics*, 117(3):628–652.

Kalda, A. (2020). Peer financial distress and individual leverage. *The Review of Financial Studies*, 33(7):3348–3390.

Kárpáti, D. (2022). Household finance and life-cycle economic decisions under the shadow of cancer. Technical report, Working paper.

Kaspersen, K. A., Antonsen, S., Horsdal, H. T., Kjerulff, B., Brandt, J., Geels, C., Christensen, J. H., Frohn, L. M., Sabel, C. E., Dinh, K. M., et al. (2023). Exposure to air pollution and risk of respiratory tract infections in the adult Danish population — a nationwide study. *Clinical Microbiology and Infection*.

Kaustia, M. and Knüpfer, S. (2008). Do investors overweight personal experience? Evidence from IPO subscriptions. *The Journal of Finance*, 63(6):2679–2702.

Keloharju, M., Knüpfer, S., and Linnainmaa, J. (2012). Do investors buy what they know? Product market choices and investment decisions. *The Review of Financial Studies*, 25(10):2921–2958.

Kleiner, K., Stoffman, N., and Yonker, S. E. (2021). Friends with bankruptcy protection benefits. *Journal of Financial Economics*, 139(2):578–605.

Knüpfer, S., Rantapuska, E., and Sarvimäki, M. (2017). Formative experiences and portfolio choice: Evidence from the Finnish great depression. *The Journal of Finance*, 72(1):133–166.

Koudijs, P. and Voth, H.-J. (2016). Leverage and beliefs: personal experience and risk-taking in margin lending. *American Economic Review*, 106(11):3367–3400.

Kvaerner, J. S. (2023). How large are bequest motives? Estimates based on health shocks. *The Review of Financial Studies*, 36(8):3382–3422.

Lapanan, N. (2018). The investment behavior of socially responsible individual investors. *The Quarterly Review of Economics and Finance*, 70:214–226.

Li, T., Naaraayanan, S. L., and Sachdeva, K. (2021). Conflicting objectives of esg funds: Evidence from proxy voting. *Available at SSRN 3760753*.

MacIntyre, E. A., Gehring, U., Mölter, A., Fuertes, E., Klümper, C., Krämer, U., Quass, U., Hoffmann, B., Gascon, M., Brunekreef, B., et al. (2014). Air pollution and respiratory infections during early childhood: an analysis of 10 European birth cohorts within the ESCAPE project. *Environmental Health Perspectives*, 122(1):107–113.

Malmendier, U. and Nagel, S. (2011). Depression babies: Do macroeconomic experiences affect risk taking? *The Quarterly Journal of Economics*, 126(1):373–416.

Malmendier, U. and Nagel, S. (2016). Learning from inflation experiences. *The Quarterly Journal of Economics*, 131(1):53–87.

Malmendier, U., Nagel, S., and Yan, Z. (2021). The making of hawks and doves. *Journal of Monetary Economics*, 117:19–42.

Massa, M. and Simonov, A. (2006). Hedging, familiarity and portfolio choice. *The Review of Financial Studies*, 19(2):633–685.

Michaely, R., Ordonez-Calafi, G., and Rubio, S. (2021). Mutual funds' strategic voting on environmental and social issues. *European Corporate Governance Institute–Finance Working Paper*, (774).

Pope III, C. A. and Dockery, D. W. (2006). Health effects of fine particulate air pollution: lines that connect. *Journal of the Air & Waste Management Association*, 56(6):709–742.

Raaschou-Nielsen, O., Antonsen, S., Agerbo, E., Hvidtfeldt, U. A., Geels, C., Frohn, L. M., Christensen, J. H., Sigsgaard, T., Brandt, J., and Pedersen, C. B. (2023). Pm2. 5 air pollution components and mortality in Denmark. *Environment International*, 171:107685.

Riedl, A. and Smeets, P. (2017). Why do investors hold socially responsible mutual funds? *The Journal of Finance*, 72(6):2505–2550.

Rosen, H. S. and Wu, S. (2004). Portfolio choice and health status. *Journal of Financial Economics*, 72(3):457–484.

Schüepp, K. and Sly, P. D. (2012). The developing respiratory tract and its specific needs in regard to ultrafine particulate matter exposure. *Paediatric Respiratory Reviews*, 13(2):95–99.

Schwartz, J. (1991). Particulate air pollution and daily mortality in Detroit. *Environmental Research*, 56(2):204–213.

Schwartz, J. and Marcus, A. (1990). Mortality and air pollution in London: a time series analysis. *American Journal of Epidemiology*, 131(1):185–194.

Suh, H. H., Bahadori, T., Vallarino, J., and Spengler, J. D. (2000). Criteria air pollutants and toxic air pollutants. *Environmental Health Perspectives*, 108(suppl 4):625–633.

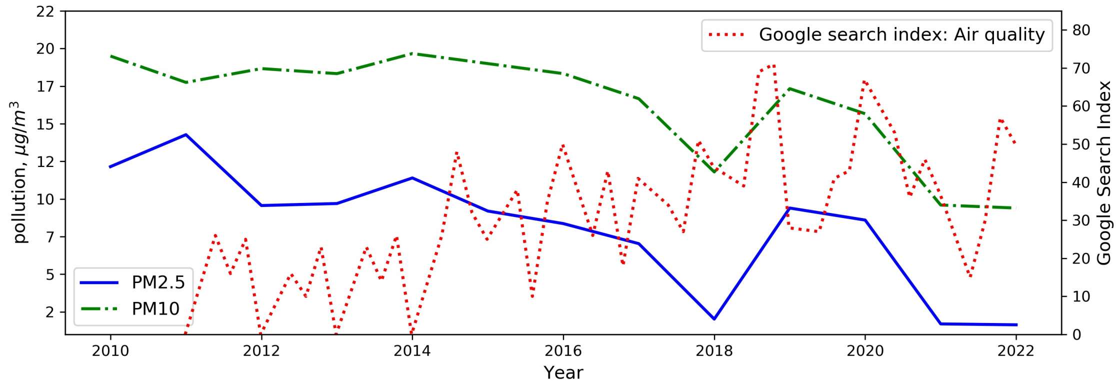
Sun, L. and Abraham, S. (2021). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of Econometrics*, 225(2):175–199.

Williams, B. G., Gouws, E., Boschi-Pinto, C., Bryce, J., and Dye, C. (2002). Estimates of world-wide distribution of child deaths from acute respiratory infections. *The Lancet Infectious Diseases*, 2(1):25–32.

Figure 1: Air pollution

Panel A: PM pollution and public interest to air quality

This graph shows yearly average PM pollution levels in Denmark (in $\mu g/m^3$) across all measurement stations (left axis, source: Aarhus University Air Quality Measurement Database) and the Google search "Interest over time" index for "air quality" (righ axis).



Panel B: Social costs of air pollution

This graph shows the number of deaths attributable to air pollution in Denmark from 2010 to 2019. Source: Health Effects Institute, State of Global Air 2020. Data source: Global Burden of Disease Study 2019.

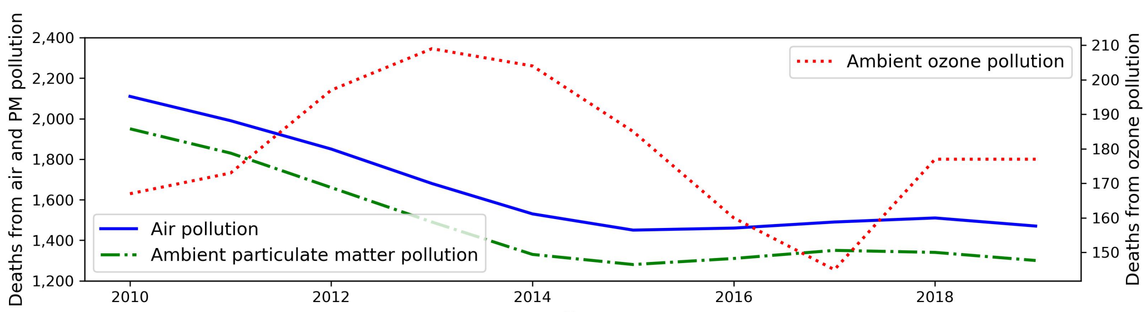
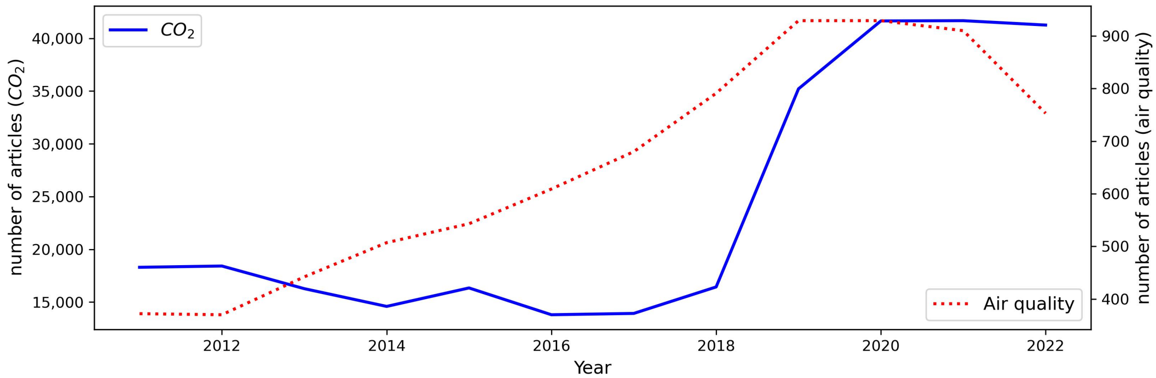


Figure 2: News coverage

Panel A: CO_2 and air quality

This graph shows the number of articles in Danish media covering CO_2 and "Air quality." Source: www.infomedia.org.



Panel B: Asthma and COPD

This graph shows the number of articles in Danish media covering Chronic obstructive pulmonary disease (COPD), asthma, and "Clean air" or "Cleaner air." Source: www.infomedia.org.

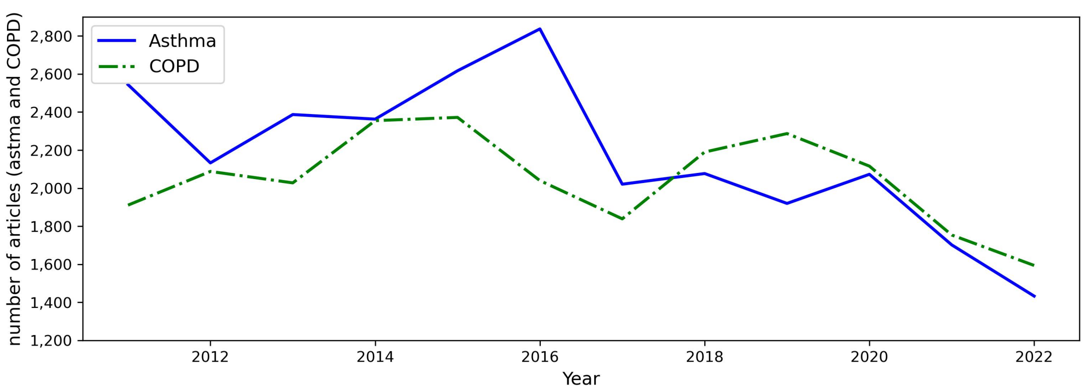


Figure 3: Pediatric hospital admittance with respiratory diseases in Denmark
This figure shows the distribution of the number of children admitted to hospitals in Denmark with respiratory diseases from 2011 to 2019 (in the treated sample). Since 2014, patients started to get directed to emergency departments in local hospitals as opposed to home visits and centralized clinics, which explains the increase in the number of patients in our data (see Fløjstrup et al. (2020) for details). The sample ends in the beginning of 2019, decreasing the number of observations in 2019 relative to other years.

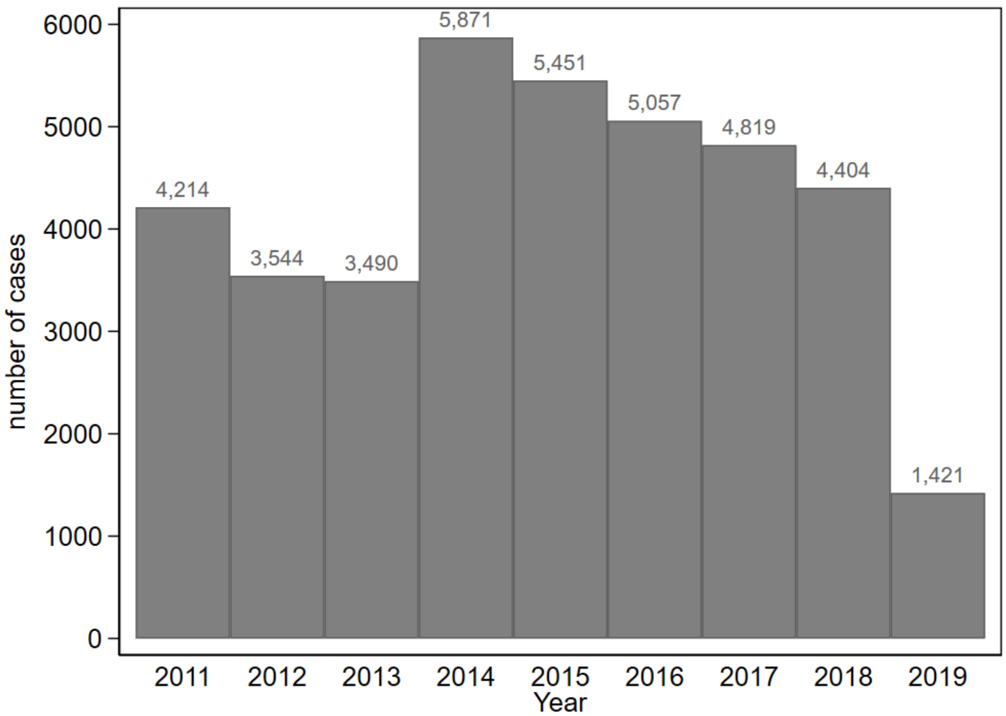
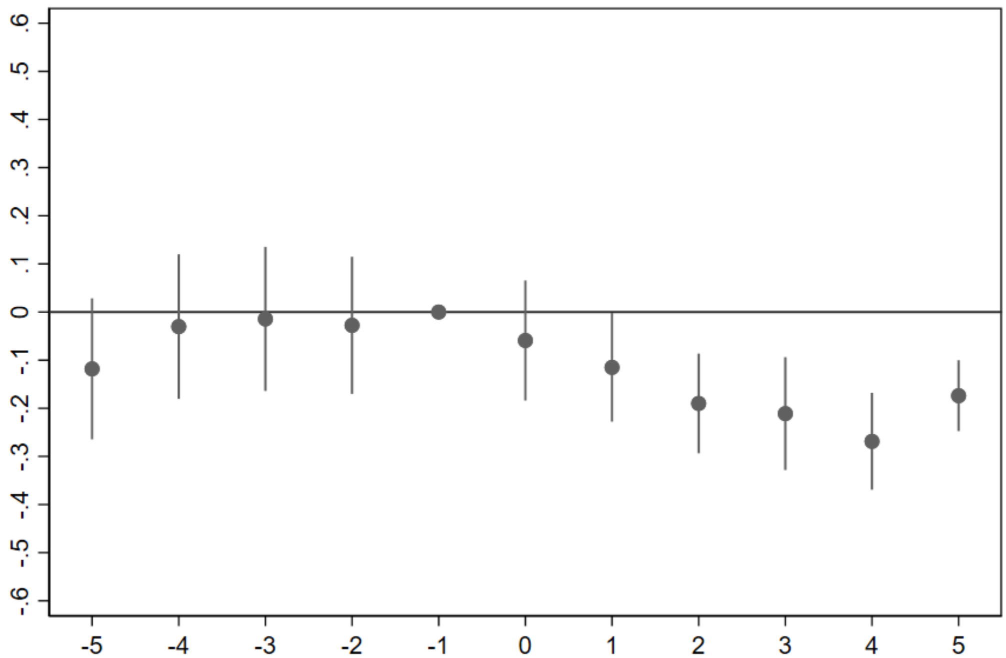


Figure 4: "Brown" stock holdings

This figure shows diff-in-diff results for the portfolio weight and the probability of holding "brown" stocks for traders, whose children get diagnosed with a respiratory disease. 95% two-sided confidence intervals are plotted using standard errors clustered at the municipality level.

Panel A: Portfolio weight of "brown" stock.



Panel B: Indicator of holding a "brown" stock.

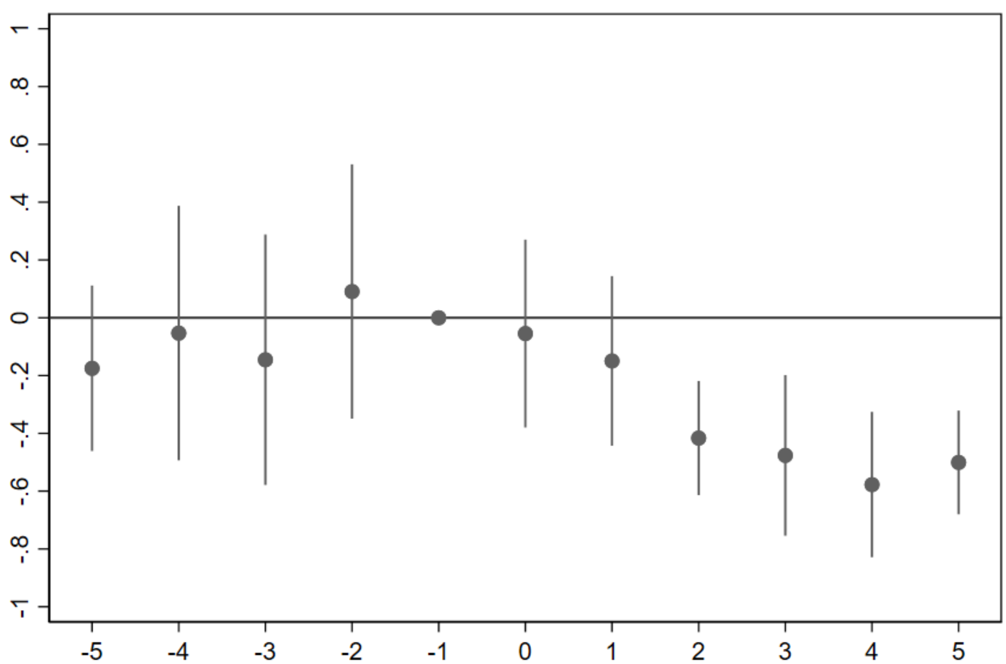
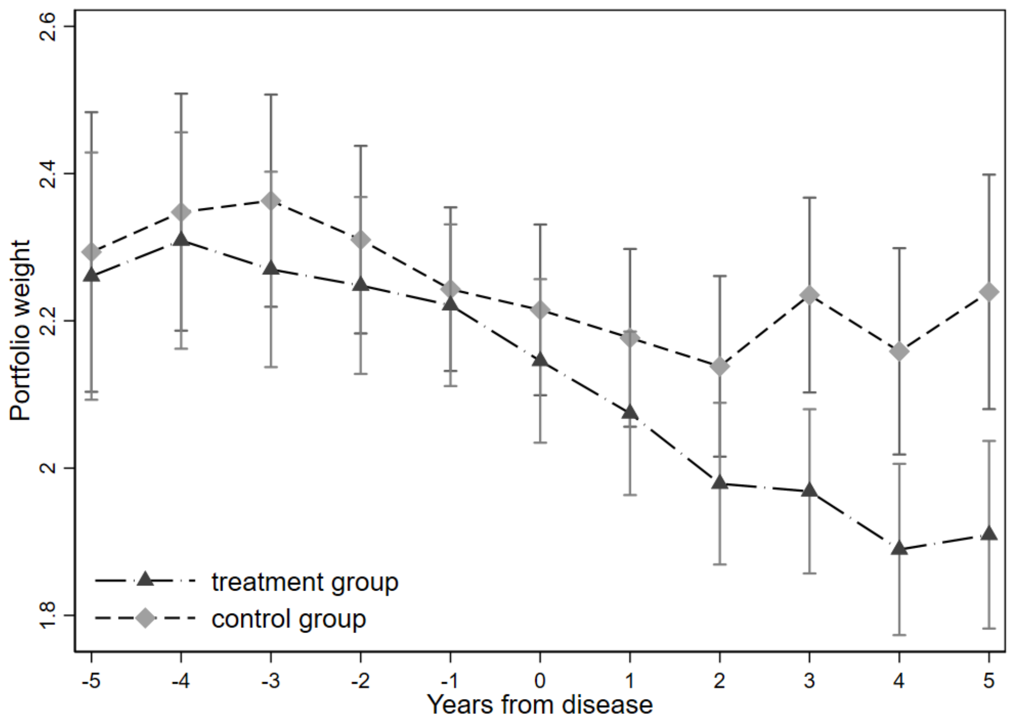


Figure 5: Unadjusted sample averages ("brown" stocks)
This figure shows sample averages for the portfolio weight and the probability of holding "brown" stocks for traders in the treatment and control samples separately.

Panel A: Portfolio weight of "brown" stock.



Panel B: Indicator of holding a "brown" stock.

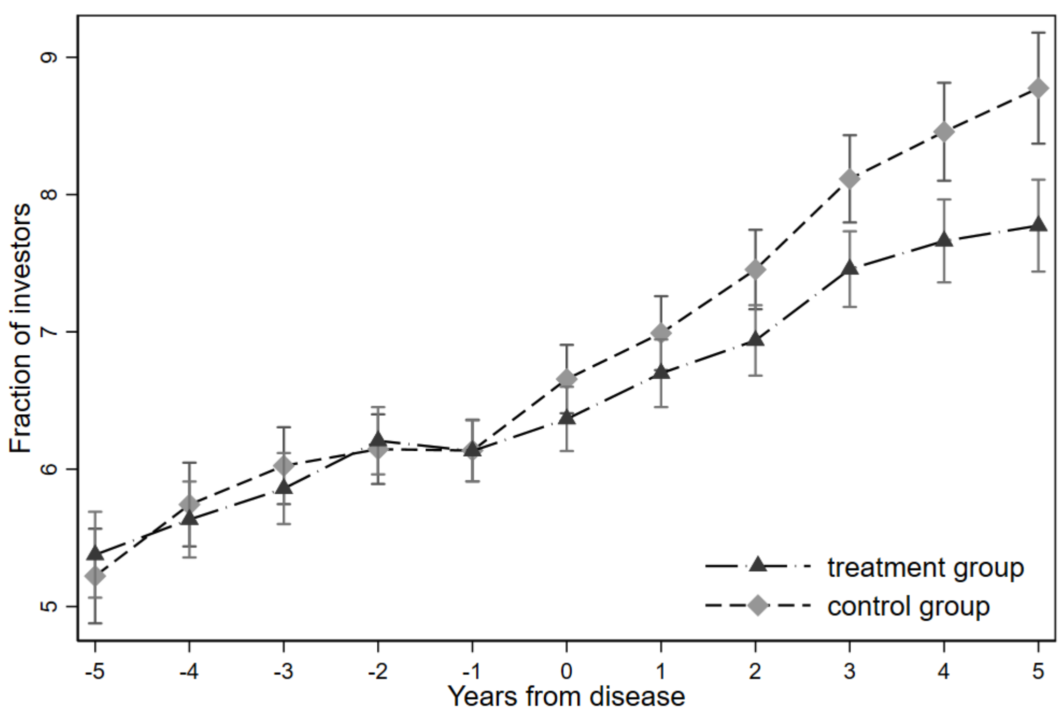


Figure 6: Bank account holdings
This figure shows the diff-in-diff results for the amount of investors' bank deposits in th. DKK. 95% two-sided confidence intervals are plotted using standard errors clustered at the municipality level.

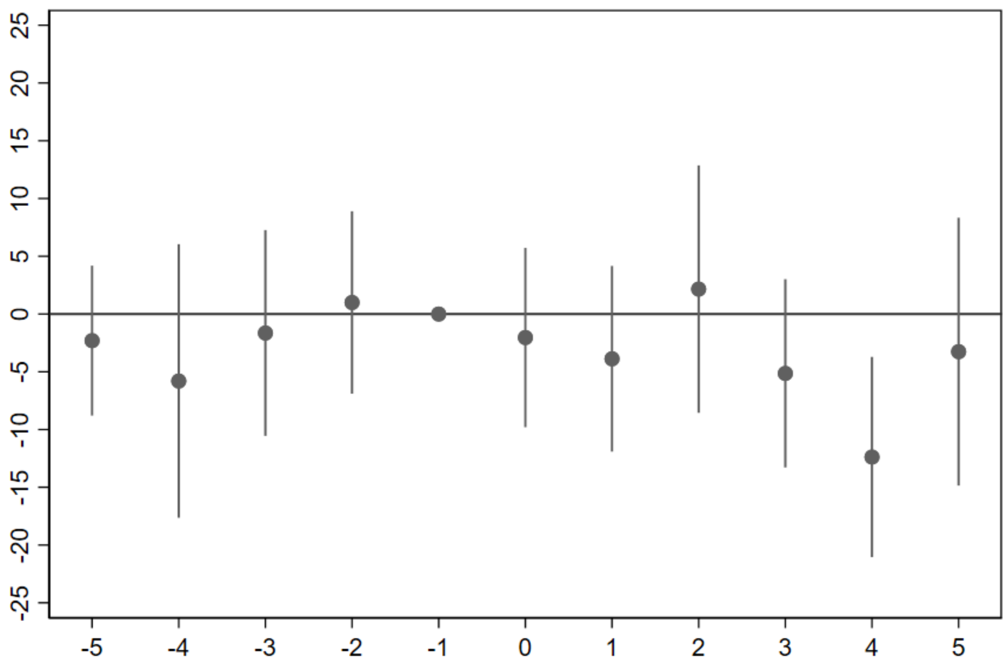


Figure 7: Risky assets share
This figure shows the diff-in-diff results for the share of risky assets (stocks and mutual funds) to financial wealth. 95% two-sided confidence intervals are plotted using standard errors clustered at the municipality level.

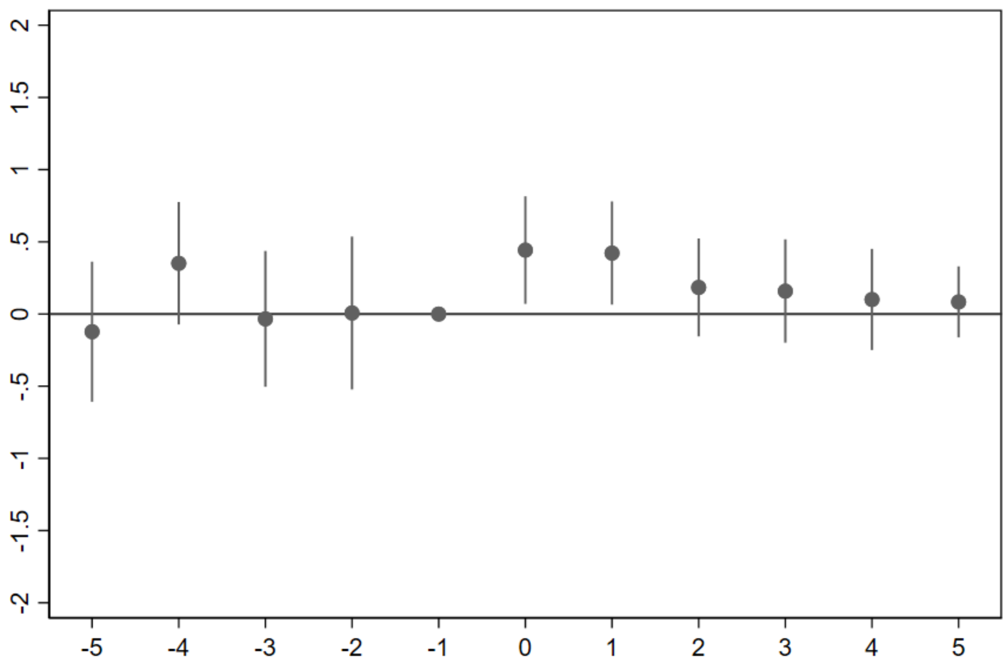
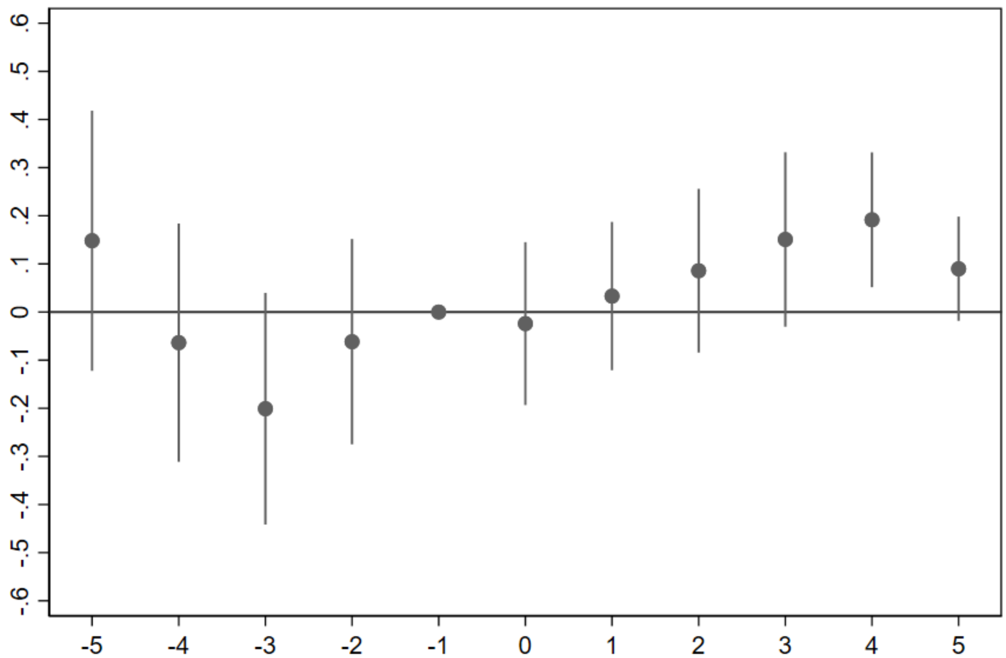


Figure 8: "Green" stock holdings

This figure shows diff-in-diff results for the portfolio weight and the probability of holding "green" stocks for traders, whose children get diagnosed with a respiratory disease. 95% two-sided confidence intervals are plotted using standard errors clustered at the municipality level.

Panel A: Portfolio weight of "green" stock.



Panel B: Indicator of holding a "green" stock.

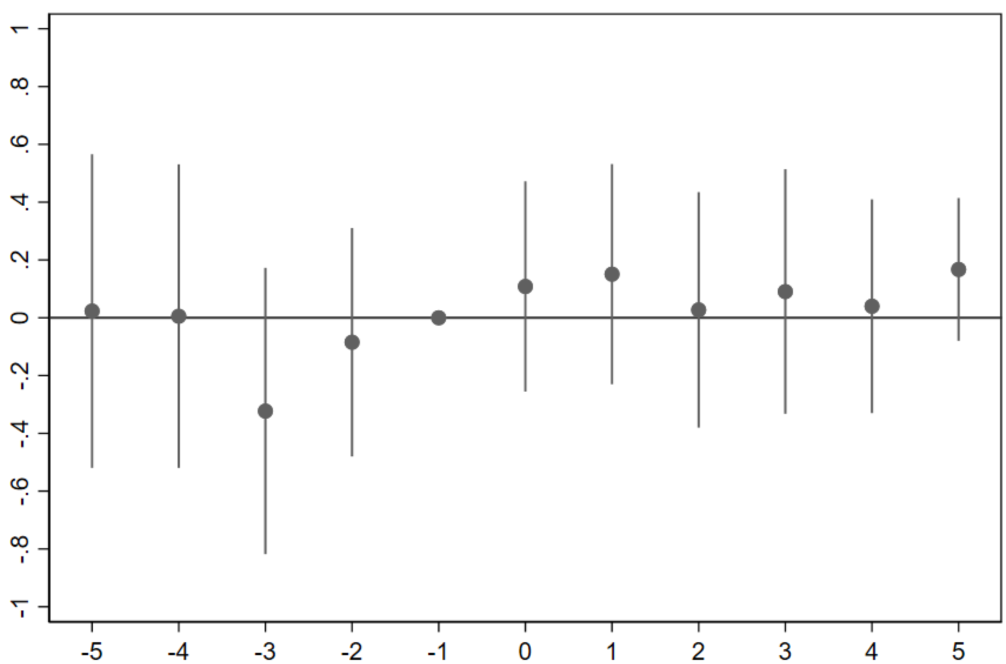
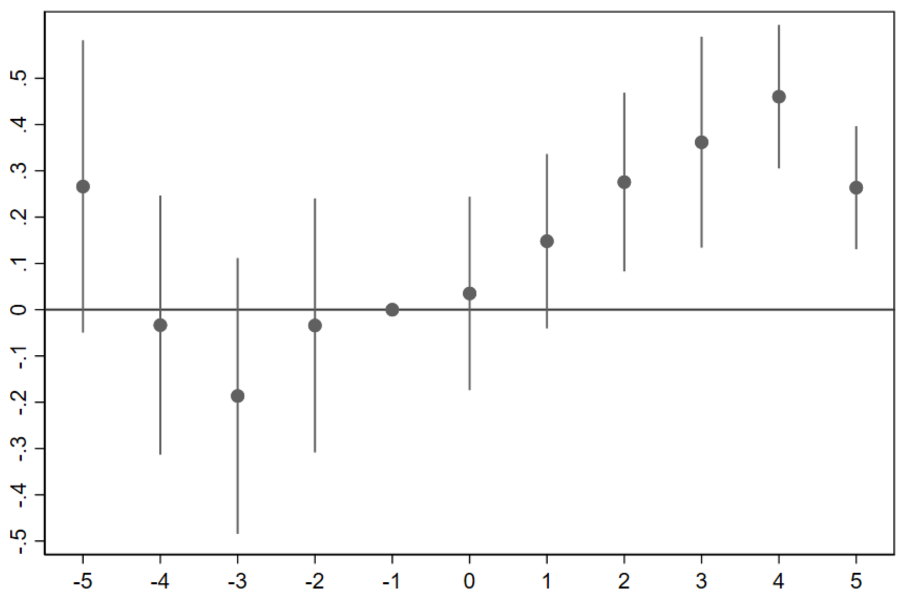


Figure 9: Holdings or "green" minus "brown" stocks
This figure shows the diff-in-diff results for the differences in the proportion and probability of holding "green" and "brown" stocks. 95% two-sided confidence intervals are plotted using standard errors clustered at the municipality level.

Panel A: Portfolio weight of "green" stocks minus the portfolio weight of "brown" stocks



Panel B: Indicator of holding a "green" stock minus the indicator of holding a "brown" stock.

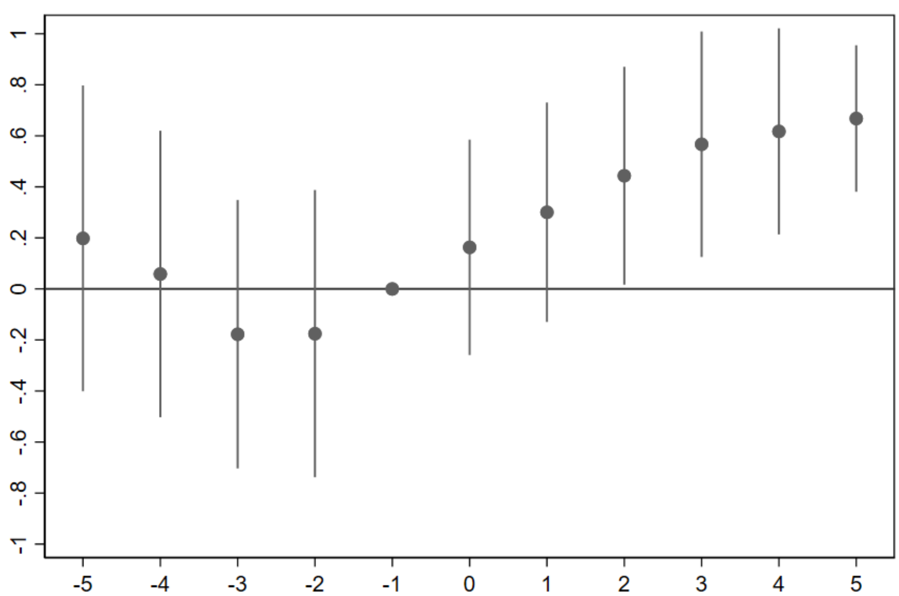


Table 1: Summary statistics
This table shows summary statistics for (column 1) all traders who hold risky assets (stocks or mutual funds) from 2010 to 2018 and (column 2) for the treated sample in the year before the treatment (that is, from 2010 to 2018). All amounts are in 1,000 year-2015 Danish kroner (DKK). One euro equals 7.45 DKK. Standard deviations are in the parenthesis.

Panel A: Individual characteristics.

	All	Sample
Age (years)	51.5	37.4
	(21.2)	(7.8)
Gender (% male)	52.8	58.6
	(49.9)	(49.3)
Married (%)	50.8	59.4
	(50.0)	(49.1)
Education (years)	13.7	15.5
	(3.1)	(2.2)
Number of children	0.5	1.3
	(0.9)	(0.9)
Income (1,000 DKK)	336.6	513.4
	(624.8)	(637.7)
Financial wealth (1,000 DKK)	560.1	367.6
	(1394.7)	(1138.9)
N	11,442,067	50,065

Panel B: Portfolio characteristics.

	All	Sample
Market value of risky assets (1,000 DKK)	162.3	167.7
	(14,281.3)	(7,289.4)
Risky asset share (%)	34.8	32.1
	(68.9)	(45.1)
Invest in brown stocks (%)	5.8	6.1
	(23.3)	(23.9)
Portfolio weight on brown stocks (%)	2.1	2.2
	(11.5)	(11.8)
Invest in green stocks (%)	9.7	13.1
	(29.7)	(33.7)
Portfolio weight on green stocks (%)	3.7	5.2
	(15.7)	(18.6)
Invest in ESG fund (%)	2.4	2.8
	(15.4)	(16.6)
Portfolio weight in ESG funds (%)	0.6	0.9
	(5.8)	(7.8)
N	11,442,067	50,065

Table 2: "Brown" stock holdings

This table shows the results for the diff-in-diff estimation of the portfolio weight and the probability of holding "brown" stocks for the investors, whose children got diagnosed with a respiratory disease. The table provides treatment estimates in event time relative to the treatment as well as the overall ATT. The category indicator $\mathbb{1}\{x\} = 1$ if the investor holds at least one stock of category x in her portfolio, otherwise $\mathbb{1}\{x\} = 0$. Standard errors clustered at municipality level are given in parentheses.

Event time	Portf. weight	$\mathbb{1}$\{holds "brown"\}
t+5	-0.174***	-0.501***
	(0.038)	(0.091)
t+4	-0.269***	-0.577***
	(0.051)	(0.128)
t+3	-0.211***	-0.476***
	(0.060)	(0.142)
t+2	-0.190***	-0.416***
	(0.053)	(0.101)
t+1	-0.115**	-0.149
	(0.058)	(0.150)
t	-0.059	-0.055
	(0.064)	(0.166)
t−2	-0.028	0.091
	(0.073)	(0.224)
ATT, p.p.	-0.192***	-0.424***
	(0.042)	(0.096)
Num. obs.	758,697	758,697
Num. treated	46,184	46,184

Table 3: "Green" stock holdings

This table shows the results for the diff-in-diff estimation of the portfolio weight and the probability of holding "green" stocks for the investors, whose children got diagnosed with a respiratory disease. The table provides treatment estimates in event time relative to the treatment as well as the overall ATT. The category indicator $\mathbb{1}\{x\} = 1$ if the investor holds at least one stock of category x in her portfolio, otherwise $\mathbb{1}\{x\} = 0$. Standard errors clustered at municipality level are given in parentheses.

Event time	Portf. weight	$\mathbb{1}\{$holds "green"$\}$
t+5	0.90	0.167
	(0.055)	(0.126)
t+4	0.092**	0.040
	(0.071)	(0.189)
t+3	0.151	0.091
	(0.092)	(0.216)
t+2	0.086	-0.027
	(0.087)	(0.208)
t+1	0.033	0.151
	(0.079)	(0.194)
t	-0.024	0.108
	(0.086)	(0.186)
t−2	-0.062	-0.085
	(0.109)	(0.202)
ATT, p.p.	0.110*	0.095
	(0.061)	(0.157)
Num. obs.	758,697	758,697
Num. treated	46,184	46,184

Table 4: Results for different categories of diseases
This table compares the treatment results for different groups of diseases. *Difference in weight* is computed as the difference in portfolio weights of "green" and "brown" stocks in the investor's portfolio, and *difference in indicators* is defined as $\mathbb{1}\{\text{"green"}\}-\mathbb{1}\{\text{"brown"}\}$. Standard errors clustered at municipality level are given in parentheses.

Disease gr.	Diff. weight	Diff. indic.	num. obs.	num. treated
Lesions, poisonings, etc.	-0.007	0.138	1,193,877	73,313
	(0.080)	(0.146)		
Respiratory	0.302***	0.519***	758,697	46,184
	(0.072)	(0.165)		
Bones, muscles, and connective tissue	-0.045	0.238	658,805	38,853
	(0.093)	(0.186)		
Digestive organs	0.001	0.265	546,507	32,363
	(0.123)	(0.223)		
Infectious and parasitic	0.031	-0.208	476,210	28,986
	(0.097)	(0.201)		
Urinary and genital organs	-0.126	-0.137	373,095	22,255
	(0.143)	(0.325)		
Congenital and chromosomal	-0.037	0.208	357,480	21,601
	(0.114)	(0.262)		
Skin and subcutaneous tissue	0.143	0.006	331,864	19,749
	(0.116)	(0.338)		
Ear and mastoid process	0.170	0.012	263,365	15,952
	(0.184)	(0.322)		
Endocrine, nutritional, and metabolic	-0.043	-0.219	261,290	15,604
	(0.18)	(0.403)		
Eye	0.288	-0.210	225,412	13,449
	(0.176)	(0.33)		
Nervous system	0.163	-0.018	171,817	10,261
	(0.215)	(0.397)		
Mental and behavioral disorders	-0.283	-0.017	149,967	9,029
	(0.197)	(0.421)		
Neoplasms	-0.044	0.475	127,929	7,548
	(0.215)	(0.388)		
Circulatory organs	-0.189	0.066	78,586	4,713
	(0.245)	(0.594)		
Diseases in the perinatal period	0.003	-0.287	60,416	3,828
	(0.364)	(0.698)		
Blood and blood-forming organs	0.174	-0.001	52,737	3,123
	(0.369)	(0.807)		
Pregnancy, childbirth, and maternity	-0.577	-0.588	40,435	2,521
	(0.363)	(0.656)		
External causes of injury	-0.316	1.145	1,550	102
	(2.274)	(3.347)		

Table 5: ESG fund holdings

This table shows the results for the diff-in-diff estimation of the portfolio weight and the probability of holding ESG funds for the investors, whose children got diagnosed with a respiratory disease. The table provides treatment estimates separately for in event time relative to the treatment as well as the overall ATT. The category indicator $\mathbb{1}\{x\} = 1$ if the investor holds at least one stock of category x in her portfolio, otherwise $\mathbb{1}\{x\} = 0$. Standard errors clustered at municipality level are given in parentheses.

Event time	Portf. weight	$\mathbb{1}\{\text{holds ESG fund}\}$
t+5	0.132	-0.365
	(0.160)	(0.382)
t+4	-0.023	-0.630
	(0.214)	(0.485)
t+3	-0.008	-0.987*
	(0.262)	(0.531)
t+2	0.043	-0.548
	(0.252)	(0.491)
t+1	-0.017	-0.231
	(0.232)	(0.427)
t	0.028	0.162
	(0.252)	(0.463)
t−2	-0.116	-0.098
	(0.290)	(0.580)
ATT, p.p.	0.025	-0.557
	(0.187)	(0.377)
Num. obs.	236,126	236,126
Num. treated	20,137	20,137

Table 6: Health conditions

This table shows the results for the diff-in-diff estimations (by medical condition) of the differences in portfolio weights of "green" and "brown" stocks and the probabilities of holding "green" and "brown" stocks for the investors, whose children got diagnosed with a respiratory disease. The category indicator $\mathbb{1}\{x\} = 1$ if the investor holds at least one stock of category x in her portfolio, otherwise $\mathbb{1}\{x\} = 0$. Standard errors clustered at municipality level are given in parentheses.

	Chronic		Num. hosp. visits		Num. diag		Bed days	
ATT	no	yes	1	> 1	1	> 1	≤1	> 1
Portf. weight diff.	0.347***	0.119	0.282***	0.345*	0.243**	0.363***	0.200*	0.421***
	(0.084)	(0.166)	(0.1)	(0.19)	(0.12)	(0.113)	(0.102)	(0.145)
$\mathbb{1}\{$"green"$\}$-$\mathbb{1}\{$"brown"$\}$	0.534***	0.308	0.433*	0.712**	0.310	0.706***	0.356	0.674***
	(0.19)	(0.325)	(0.224)	(0.333)	(0.258)	(0.214)	(0.250)	(0.265)
Num. obs.	534,047	224,650	543,811	214,886	356,414	402,283	443,641	315,056
Num. treated	32,534	13,650	32,922	13,262	21,463	24,721	26,904	19,280

Table 7: Parents' characteristics.

This table shows the results for the diff-in-diff estimations (by investor's category) of the differences in portfolio weights of "green" and "brown" stocks and the probabilities of holding "green" and "brown" stocks for the investors, whose children got diagnosed with a respiratory disease. The category indicator $\mathbb{1}\{x\} = 1$ if the investor holds at least one stock of category x in her portfolio, otherwise $\mathbb{1}\{x\} = 0$. Standard errors clustered at municipality level are given in parentheses.

	Educ. length		Parent		Big city		Parent's age	
ATT	< 15.5 years	> 15.5 years	father	mother	no	yes	≤36	>36
Portf. weight diff.	0.114	0.291**	0.395***	0.176	0.290***	0.311**	0.227**	0.338***
	(0.109)	(0.142)	(0.089)	(0.108)	(0.098)	(0.141)	(0.113)	(0.110)
$\mathbb{1}\{$"green"$\}$-$\mathbb{1}\{$"brown"$\}$	0.111	0.484*	0.502**	0.565**	0.396*	0.489	0.573**	0.360
	(0.253)	(0.276)	(0.214)	(0.234)	(0.204)	(0.328)	(0.28)	(0.252)
Num. obs.	417,360	341,337	452,217	306,480	495,017	259,160	400,431	358,266
Num. treated	26,006	20,178	27,682	18,502	33,525	20,499	25,509	20,675

Table 8: Family relationships
This table shows the results for the diff-in-diff estimations of the differences in portfolio weights of "green" and "brown" stocks and the probabilities of holding "green" and "brown" stocks for the investors, whose children got diagnosed with a respiratory disease as well as for their "extended family" members. The category indicator $\mathbb{1}\{x\} = 1$ if the investor holds at least one stock of category x in her portfolio, otherwise $\mathbb{1}\{x\} = 0$. Standard errors clustered at municipality level are given in parentheses.

	Live together		Other relatives	
ATT	no	yes	grandparents	aunts/uncles
Portf. weight diff.	-0.620*	0.390***	0.115**	0.157*
	(0.370)	(0.089)	(0.051)	(0.092)
$\mathbb{1}\{$"green"$\}$-$\mathbb{1}\{$"brown"$\}$	-0.4511	0.628***	0.189*	0.583***
	(0.773)	(0.188)	(0.114)	(0.203)
Num. obs.	73,108	685,589	736,770	607,792
Num. treated	5,975	40,209	81,389	37,169

Table 9: Time subsamples
This table shows the results for the diff-in-diff estimations of the differences in portfolio weights of "green" and "brown" stocks and the probabilities of holding "green" and "brown" stocks for the investors, whose children got diagnosed with a respiratory disease for two time periods. The category indicator $\mathbb{1}\{x\} = 1$ if the investor holds at least one stock of category x in her portfolio, otherwise $\mathbb{1}\{x\} = 0$. Standard errors clustered at municipality level are given in parentheses.

	Time period	
ATT	before 2015	after 2015
Portf. weight diff.	0.102	0.363**
	(0.134)	(0.136)
$\mathbb{1}\{$"green"$\}$-$\mathbb{1}\{$"brown"$\}$	0.550*	0.518
	(0.330)	(0.309)
Num. obs.	331,200	427,497
Num. treated	20,983	25,201

Table 10: Investors' own health

This table shows the results for the diff-in-diff estimation of the portfolio weight and the probability of holding "brown" and "green" stocks for the investors, who get diagnosed with a respiratory disease. The table provides treatment estimates in event time relative to the treatment as well as the overall ATT. The category indicator $\mathbb{1}\{x\} = 1$ if the investor holds at least one stock of category x in her portfolio, otherwise $\mathbb{1}\{x\} = 0$. Standard errors clustered at municipality level are given in parentheses.

	"Brown" stocks		"Green" stocks	
Event time	Portf. weight	$\mathbb{1}$\{holds category\}	Portf. weight	$\mathbb{1}$\{holds category\}
t+5	-0.027	-0.084	0.088	0.065
	(0.033)	(0.075)	(0.054)	(0.107)
t+4	0.007	-0.063	0.102*	0.119
	(0.037)	(0.105)	(0.060)	(0.113)
t+3	0.014	0.002	0.105*	0.038
	(0.034)	(0.108)	(0.063)	(0.01)
t+2	-0.033	-0.078	0.085	0.103
	(0.039)	(0.108)	(0.055)	(0.119)
t+1	-0.015	-0.109	-0.004	-0.029
	(0.045)	(0.094)	(0.058)	(0.132)
t	0.009	-0.094	-0.001	-0.008
	(0.052)	(0.103)	(0.062)	(0.127)
t−2	0.036	-0.005	0.006	0.030
	(0.051)	(0.106)	(0.072)	(0.166)
ATT, p.p.	-0.011	-0.066	0.075	0.059
	(0.031)	(0.081)	(0.049)	(0.092)
Num. obs.	1,286,231	1,286,231	1,286,231	1,286,231
Num. treated	90,370	90,370	90,370	90,370

Appendix

A-1 Additional tables and figures

Figure A-1: Unadjusted sample average portfolio weights of "brown" stocks (using constant stock prices)
This figure shows sample averages for the portfolio weight of "brown" stocks for traders in the treatment and control samples separately. Portfolio weights are computed using constant stock prices (fixed at the average price level over the sample period).

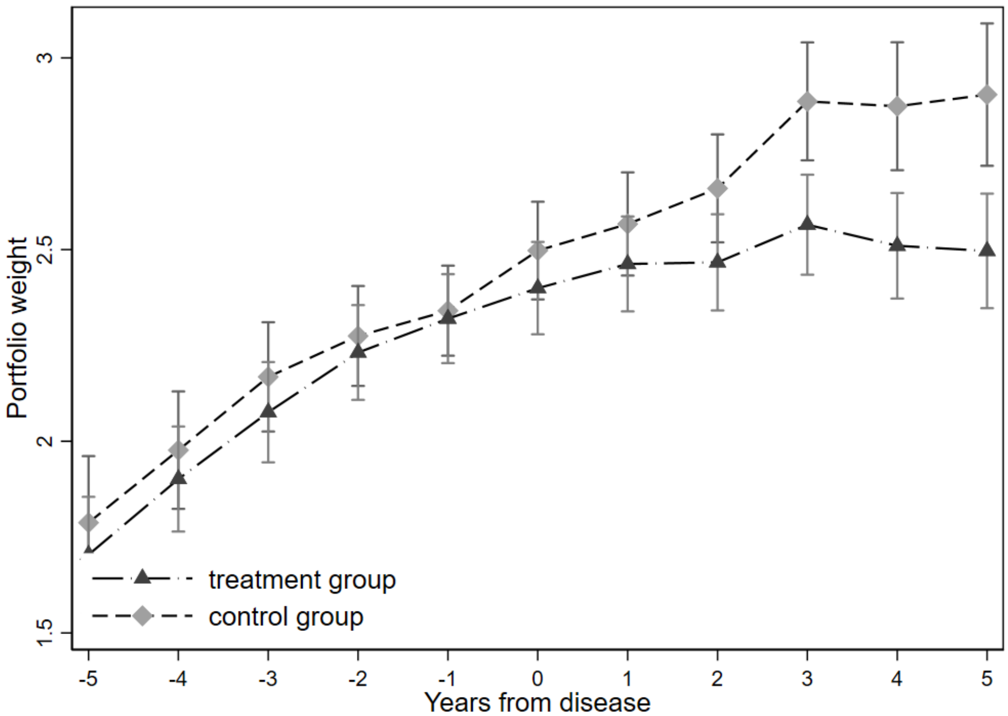


Figure A-2: Total assets
This figure shows the diff-in-diff results for the investors' total assets in th. DKK. 95% two-sided confidence intervals are plotted using standard errors clustered at the municipality level.

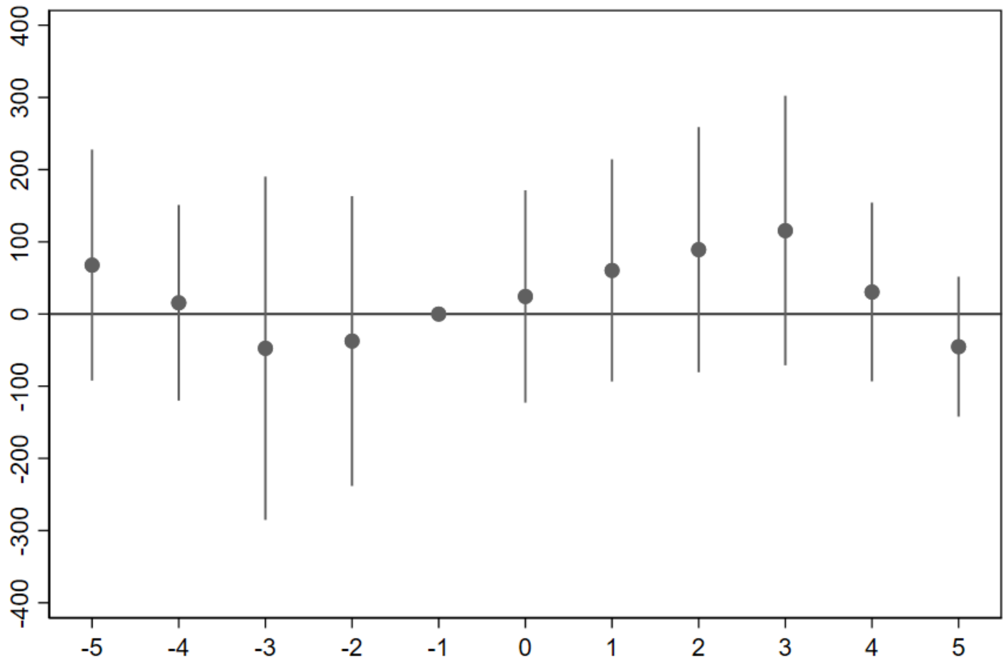


Figure A-3: Working income
This figure shows the diff-in-diff results for the investors' working income in th. DKK. 95% two-sided confidence intervals are plotted using standard errors clustered at the municipality level.

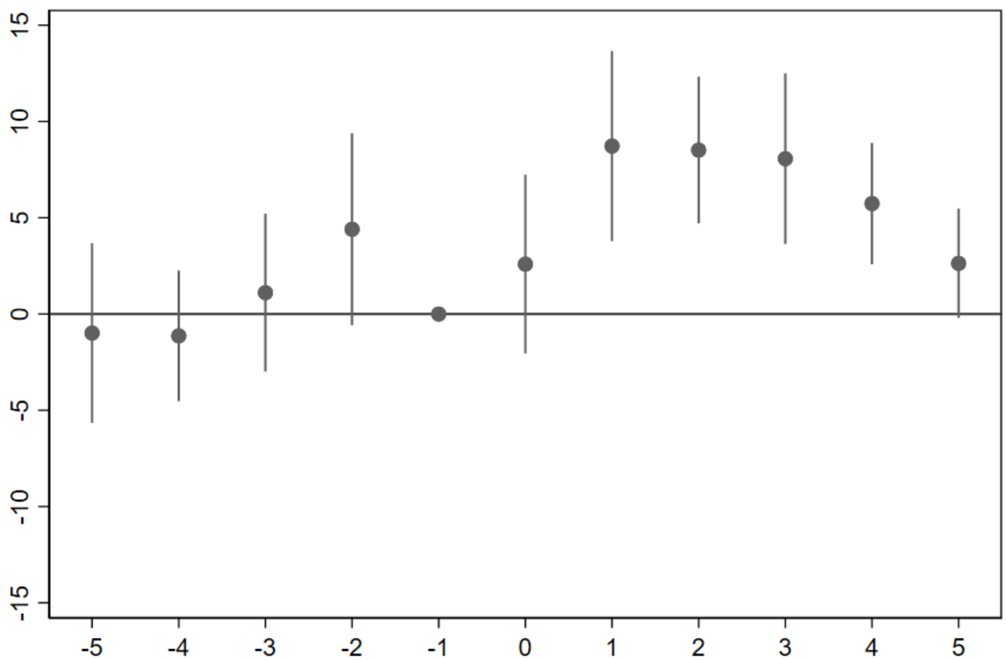


Figure A-4: Probability of moving to a new residence
This figure shows the diff-in-diff results for the investors' relocating to a new house or apartment. 95% two-sided confidence intervals are plotted using standard errors clustered at the municipality level.

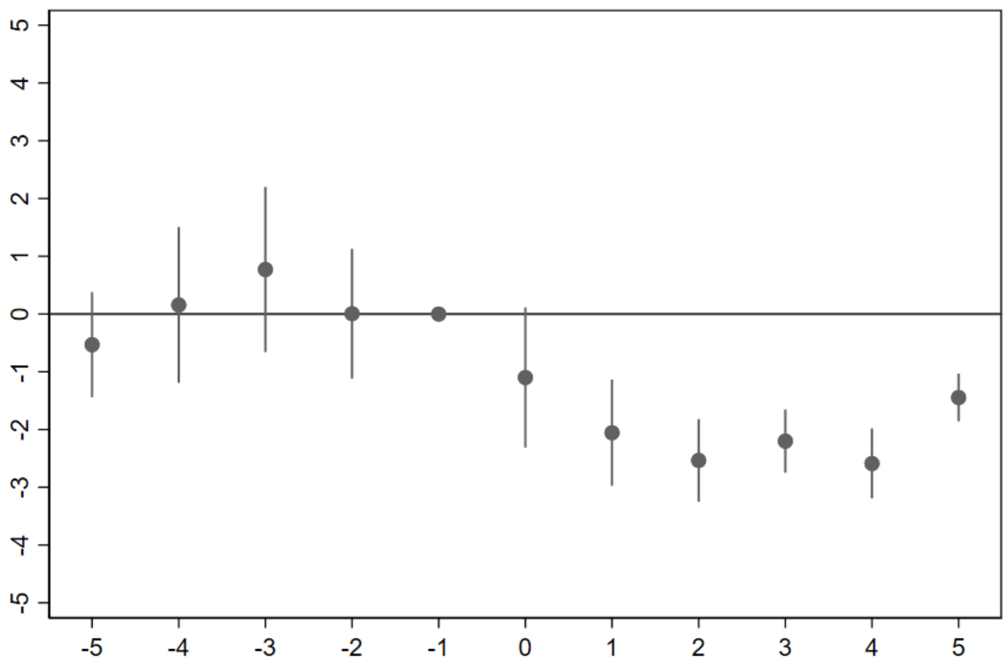


Table A-1: ICD-10 codes of disease groups

This table lists disease groups classified according to ICD-10, along with the average annual number of hospital visits for patients aged 18 years and older, and those aged below 18 years. The number of cases is averaged over the period 2011-1018 (excluding 2019 since the data for this year is incomplete).

Disease gr.	ICD-10 code	Cases (age>18)	Cases (age>18)
Lesions, poisonings, etc.	DS00-DT98	630,613	224,189
Respiratory	DJ00-DJ99	189,152	53,226
Bones, muscles, and connective tissue	DM00-DM99	411,620	27,788
Digestive organs	DK00-DK93	268,948	23,982
Congenital and chromosomal	DQ00-DQ99	17,088	20,882
Infectious and parasitic	DA00-DB99	74,271	20,376
Urinary and genital organs	DN00-DN99	224,321	16,306
Ear and mastoid process	DH60-DH95	66,147	13,453
Nervous system	DG00-DG99	118,868	13,066
Endocrine, nutritional, and metabolic	DE00-DE90	123,221	12,897
Skin and subcutaneous tissue	DL00-DL99	70,432	12,458
Neoplasms	DC00-DD48	279,841	9,019
Eye	DH00-DH59	104,581	8,913
Mental and behavioral disorders	DF00-DF99	33,991	5,175
Blood and blood-forming organs	DD55-DD89	32,569	3,492
Circulatory organs	DI00-DI99	317,875	2,688
Diseases in the perinatal period	DP00-DP96	14,630	2,269
Pregnancy, childbirth, and maternity	DO00-DO99	114,618	1,260
External causes of injury	DX60-DY09	274	47

Table A-2: Wealth and liquidity
This table shows the results of the diff-in-diff estimation of (i) the amount of bank deposits, th. DKK; (ii) the portion of an individual's financial wealth allocated to risky assets (funds and stocks), p.p.; (iii) the amount of total assets, th. DKK; (iv) the amount of yearly working income, th. DKK; and the probability of moving to a new residence (in p.p.) after the treatment. The table provides treatment estimates in event time relative to the treatment as well as the overall ATT. Standard errors clustered at municipality level are given in parentheses.

Event time	Bank depos.	% of risky assets	Tot. assets	Work. income	Prob. of moving
t+5	2.698	0.084	-45.243	2.632*	-1.445***
	(1.788)	(0.126)	(49.421)	(1.449)	(0.211)
t+4	1.516	0.101	30.507	5.738***	-2.588***
	(2.165)	(0.179)	(63.133)	(1.607)	(0.309)
t+3	-0.022	0.159	115.561	8.068***	-2.200***
	(1.529)	(0.183)	(95.235)	(2.263)	(0.28)
t+2	-3.544	0.184	89.178	8.518***	-2.535***
	(3.733)	(0.173)	(86.676)	(1.943)	(0.365)
t+1	-3.816	0.422**	60.391	8.726***	-2.055***
	(4.728)	(0.182)	(78.525)	(2.519)	(0.47)
t	0.856	0.443**	24.333	2.591	-1.099*
	(2.347)	(0.19)	(75.053)	(2.371)	(0.62)
t-2	0.975	0.008	-37.418	4.407*	0.006
	(3.269)	(0.27)	(102.416)	(2.546)	(0.573)
ATT	-0.634	0.190	50.079	6.736***	-2.165***
Num. obs.	848,601	849,709	849,814	849,964	849,970
Num. treated	46,184	46,184	46,184	46,184	46,184

A-2 Criteria air pollutants

Since air pollution is subject to monitoring and regulation by the government in most countries, we turn to regulatory documents for the classification of relevant pollutants. The US Clean Air Act describes the so-called "criteria pollutants" that are known or suspected to influence human mortality and/or morbidity or negatively affect the environment (Clean Air Act (1971)). This group includes five elements: particulalte matter (PM), ozone, sulfur dioxide, nitrogen dioxide, carbon monoxide, and lead. The concentration of each of each of these pollutants in the air is monitored and compared to the safe amounts stated in the National Ambient Air Quality Standards (NAAQS).[18]

Regulatory standards and guidelines often focus on particulate matter due to its well-documented health effects and its association with visible pollution. Moreover, monitoring and measuring gaseous pollutants can be more complex and expensive compared to measuring particulate matter. However, gaseous pollutants such as nitrogen dioxide (NO_2), sulfur dioxide (SO_2), ozone (O_3), carbon monoxide (CO), and volatile organic compounds (VOCs) also pose significant health and environmental risks (EPA (2019)).

Particulate Matter (PM) refers to air-suspended mixture of solid and liquid particles that appear due to the emission of combustion proceeds, condensation of liquid pollutants, or from the suspension of dust, seas salt, soil, and other firm substances in the air. These particles vary by origin, air concentration, size, shape, and composition. The common classification distinguishes coarse particles (with an aerodynamic diameter greater than 2.5 μm), fine particles (diameter between 0.1 μm and 2.5 μm), and ultrafine particles (diameter less than 0.1 μm)[19] The usual sampling convention relies on nested groups; for example, the category PM_{10} includes all particles with a diameter below 10 μm (even the ultrafine ones).

The efforts of regulators such as the EPA aim to reduce the pollution levels to protect public health and the environment by limiting exposure to harmful air pollutants. In the

[18] See Suh et al. (2000) for a detailed comparison between criteria air pollutants with other toxic substances.
[19] See, for example, Pope III and Dockery (2006) and Donaldson et al. (2001) for the classification.

Integrated Science Assessment for Particulate Matter 2019, the EPA conducts a review of research articles by the pollutants that were found to be related to respiratory diseases (EPA (2019)). The majority of these studies focused on the role of nitrate, sulfate, organic carbon, elemental carbon, and black carbon. Although most of them come to the form of PM pollution from combustion-related processes, some can appear as products of chemical reactions in the atmosphere or due to biogenic emission.