

Exposure to the COVID-19 Stock Market Crash and its Effect on Household Expectations*

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We survey a representative sample of US households to study how exposure to the COVID-19 stock market crash affects expectations and planned behavior. Wealth shocks are associated with upward adjustments of expectations about retirement age, desired working hours, and household debt, but have only small effects on expected spending. We provide correlational and experimental evidence that beliefs about the duration of the stock market recovery shape households' expectations about their own wealth and their planned investment decisions and labor market activity. Our findings shed light on the implications of household exposure to stock market crashes for expectation formation.

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1 Introduction

A major part of household wealth in the US and other industrialized countries is invested in the stock market. While historically investing in stocks has provided a premium over the long run, it exposes households' savings to volatility and to the risk of market crashes. Most recently, the spread of the COVID-19 pandemic and the policy measures put in place to contain the virus have sent major stock markets around the world plummeting, with the S&P500 losing an unprecedented third of its value during the sharp drop of stock prices in February and March 2020. How do households adjust their plans about spending, investments, and labor supply in response to wealth losses during such a crash? And how do beliefs about the stock market recovery affect individuals' expectations about their own wealth and plans? Answering these questions is crucial for understanding the implications of households' exposure to stock market crashes for the vulnerability of different socioeconomic groups and for the formation of household expectations, which are central to economic models and important determinants of household behavior.

In this paper we shed light on these issues using a survey of more than 8,000 US households, representative in terms of age, gender, income, and region, conducted in April 2020. We elicit the value of participants' wealth holdings in retirement accounts and in other financial accounts as of January 2020, as well as the capital losses they incurred in those accounts as a result of the drop in stock prices. We then measure respondents' expectations about the stock market and their own financial prospects, and elicit their planned decisions with respect to stock investments, spending and labor supply. The survey includes an experimental section, in which random subsets of respondents receive information on the duration of the recovery in the case of a historical stock market crash (the Black Monday crash in 1987, the burst of the Dot-com bubble in 2000, or the Financial Crisis 2007-2009). These treatments generate exogenous variation in respondents' expectations about the recovery of the stock market from the COVID-19 crash. Our survey allows us to study how exposed households adjust their plans about investment, spending, debt and labor supply in response to a stock market crash, and how beliefs about the recovery causally shape these plans and individual's expectations about their

own wealth.¹ At the same time, our survey offers a comprehensive real-time snapshot of household finances and expectations during the early stages of the COVID-19 pandemic in the US.

We start by quantifying the exposure of different groups to the February/March 2020 stock market crash. US households report median financial wealth losses of \$1,750 and mean losses of \$30,415 at the time of our survey in early April 2020, much larger than the average income shock during the first quarter of \$844. Moreover, percentage losses of financial wealth strongly increase in net wealth and income, and are strongest for those in middle age. Thus, wealth shocks tend to be negatively correlated with household income shocks experienced during the early stages of the pandemic, which are strongest among the poorest and younger households.

How did households adjust their decisions and plans regarding investment, spending, household debt and medium-term labor supply in response to the pandemic more generally and to wealth shocks in particular? About 50 percent of households who participated in the stock market at the onset of the crisis made active adjustments to their stock investments since then, with about equal shares of respondents increasing and decreasing their overall risky portfolio share. Moreover, 36 percent of our respondents report that the coronavirus crisis increases their expectations about household debt at the end of 2020 and 44 and 53 percent report that the crisis increases their expectations about their retirement age and desired working hours over the coming years, respectively.

Shocks to stock wealth inside and outside of retirement accounts are strongly correlated with upward adjustments in expected desired working hours and retirement age. This suggests that households plan to make up for losses experienced during a crash by increasing labor supply, in line with a key mechanism in portfolio choice models with human capital (Bodie et al., 1992; Gollier, 2002). Households reduce their expected spending in the year 2020 by \$0.02 for every \$1 shock to retirement financial wealth, and by \$0.45

¹ Even though the stock market recovered to pre-crisis levels in August 2020, the immediate time after the crash provides a laboratory to study how households' long-term plans are affected by large perceived wealth losses during a crash.

for each \$1 reduction in income. This is consistent with the views that retirement wealth holdings are illiquid and less used to finance current spending, and that households hit by wealth shocks are likely well-insured through high savings and easy access to credit

We next turn to the role of households' beliefs about the further development of the stock market. Respondents who personally experienced losses during past crashes, Democrats, and women expect the stock market to take more time to recover to pre-crisis levels and expect significantly lower returns over the next 12 months.²

Finally, we exploit the information experiment embedded in our survey to examine the causal effects of individual's expectations about the stock market recovery on their economic outlook for their household and their planned decisions. When respondents are provided with information on the duration of a longer (shorter) historical stock market crash, this causes them to be more pessimistic (optimistic) about the development of the stock market in the coming years compared to respondents in control groups who have not received information. This suggests that households had not been fully informed about historical facts they consider relevant for the further development of the stock market, pointing to a role for information frictions in households' stock market expectations (Abel et al., 2007; Alvarez et al., 2012). More importantly, respondents update their expectations about their own wealth, their investment plans, and their long-term labor market activity in response to the information. We also find strong correlations between expected recovery duration and these outcomes in OLS regressions. Our experimental setting therefore provides novel causal evidence that, in addition to incurred wealth shocks, expectations about the future development of the stock market play an important role in shaping households' plans for their wealth allocation and labor supply.

We contribute to a literature studying the formation of households' subjective stock market expectations and their association with economic choices (Ameriks et al., 2019; Dominitz and Manski, 2007; Giglio et al., 2020a; Greenwood and Shleifer, 2014; Malmendier and Nagel, 2011; Vissing-Jorgensen, 2003). Giglio et al. (2020b) document that

² This is in line with literature highlighting the importance of these factors in tranquil times (D'Acunto et al., 2020; Kuchler and Zafar, 2019; Malmendier and Nagel, 2011).

investor beliefs about the 1-year ahead stock market return declined following the February/March 2020 stock market crash, while expectations over the 10-year horizon remained stable. Guiso et al. (2018) and Weber et al. (2013) study the development of beliefs and risk-taking following the Financial Crisis 2007-2009. We contribute to this literature by providing evidence on how stock market expectations affect individuals' economic outlook and plans in both financial and non-financial domains following a crash. Methodologically, we add to the literature on subjective stock market expectations by applying an information experiment. Such experiments have previously been used to study household expectations about inflation (Armantier et al., 2016; Binder and Rodrigue, 2018; Cavallo et al., 2017; Coibion et al., 2020a, 2019b, 2018), house prices (Armona et al., 2018; Fuster et al., 2019) and GDP growth (Roth and Wohlfart, 2019).³ To the best of our knowledge, our results provide the first direct *causal* evidence on the role of subjective return expectations in shaping individuals' planned stock investment behavior in a real-world setting, and the first evidence on the role of financial market expectations in shaping households' long-term plans about labor market activity.

Our paper also adds to previous work studying households' responses to changes in stock wealth. Several studies document that households do not actively rebalance their portfolios to counteract passive changes to their portfolio allocation (Brunnermeier and Nagel, 2008; Calvet et al., 2009), and have small marginal propensities to consume (MPC) out of passive changes in their stock wealth (Di Maggio et al., 2019; Nagel et al., 2007).⁴ We provide real-time evidence on how stock wealth losses during a crash affect plans about trading, spending, debt as well as long-term labor market activity.

³ Macroeconomic expectations are also studied by Andre et al. (2019); Bachmann et al. (2015); Bailey et al. (2017); Coibion et al. (2019a, 2020b); D'Acunto et al. (2019a); D'Acunto et al. (2019d); Goldfayn-Frank and Wohlfart (2019); Kuchler and Zafar (2019); Roth et al. (2020).

⁴ We also relate to a literature making use of survey data on subjective beliefs to study the consumption response to changes in economic resources more generally (Christelis et al., 2019; Fuster et al., 2020; Jappelli and Padula, 2015).

Finally, we contribute to a rapidly expanding literature on the economic and financial consequences of the spread of the coronavirus. Several papers study the effect of the corona crisis on macroeconomic expectations (Coibion et al., 2020b; Dietrich et al., 2020; Fetzner et al., 2020), including the role of policy communication (Binder, 2020; Coibion et al., 2020c). Others study the impact of the coronavirus shock on risk taking (Bu et al., 2020), labor markets (Adams-Prassl et al., 2020; Bick and Blandin, 2020; Coibion et al., 2020e) and consumer spending (Andersen et al., 2020; Baker et al., 2020b; Cox et al., 2020). We contribute to this literature by providing the first evidence on how financial wealth shocks during the coronavirus crisis affect households' expectations and decisions.

2 Survey design and data

In this section we provide details on the structure and administration of our survey, as well as the characteristics of our sample.⁵

2.1 Survey design

Questions Our survey starts with questions on demographics. Respondents then answer questions on the value of i) their retirement accounts and ii) all financial assets outside of their retirement accounts at the end of January 2020. We ask them explicitly to think of the value before the start of the current crisis. To ease cognitive strain we ask them to indicate the brackets into which the values of their assets fell instead of asking for exact estimates. Respondents then report the equity portfolio shares for their retirement accounts and for financial assets they held in other accounts as of end of January. Finally, they estimate by what percent the value of their retirement accounts and the value of their other financial accounts changed as a result of the stock market developments since the beginning of the crisis until the day of the survey. The survey continues with questions on whether respondents lost their job since the beginning of the year, and whether their net household income in the first quarter of 2020 was higher or lower than they had expected before the crisis, and by what percent it was higher or lower.

Respondents then proceed to the short experimental part of the survey. They are

⁵ The survey is available at <https://sites.google.com/site/tobinhanspal/survey>

randomly allocated into one of seven groups. Respondents in arms *FinCrisisInfo* and *FinCrisisControl* are asked to estimate the number of years it took the stock market to recover from the drop during the Financial Crisis 2007-2009. Only respondents in arm *FinCrisisInfo* are then provided with the actual number of years it took the stock market to reach its pre-crisis peak (5.5 years). Similarly, respondents in arms *DotComInfo* and *DotComControl* and in arms *BlackMondayInfo* and *BlackMondayControl* report prior estimates and respondents in the respective treatment arm receive information on the recovery duration from the burst of the Dot-com bubble in 2000 (7 years) and the Black Monday stock market crash in 1987 (2 years), respectively.⁶ Although asking respondents to estimate the number of years instead of e.g. months could have framing effects, such effects would likely occur with any specific elicitation method, and should be common across treatment arms. Finally, respondents in the *PureControl* arm are not shown any questions on priors or information and immediately proceed to the next part of the survey. Online appendix Table A1 provides an overview of the treatment and control arms.

Next, all respondents report their beliefs about the current recovery of the US stock market. They report the calendar year in which they expect the stock market to recover to its January 2020 level, as well as their agreement on three qualitative statements on the severity of the recent drop in stock prices on 7-point scales.⁷ Respondents are also asked in which year they expect their own household's net wealth to recover to its pre-crisis level, including an option that their net wealth will never recover. Finally, respondents allocate probabilities across eight intervals into which the US stock market return over the next 12 months might fall, which are mutually exclusive and collectively exhaustive.⁸

⁶ The information treatments included a dynamic figure contrasting the respondent's prior belief with the information. Online appendix Figure A1 plots an example survey screen for the *FinCrisisInfo* information treatment.

⁷ We ask respondents for their agreement with the following statements: "The outbreak of the coronavirus will keep US stock prices below their January 2020 levels for many years."; "The outbreak of the coronavirus has set the level of the stock market back by many years."; "The US stock market will have recovered by the end of the year 2020."

⁸ Respondents assign subjective probabilities to each of the following brackets of aggre-

The survey continues with a set of questions on respondents' expectations about their own economic and financial situation as well as their decisions. Specifically, respondents answer a qualitative question on the financial prospects of their household, and questions on whether they expect the total spending and the total net income of their household to be higher or lower in 2020 as compared to 2019, and by what percent they expect it to be higher or lower. Those who report an expected reduction in their household income also forecast the year in which they expect their household income to have recovered. Respondents then answer qualitative questions on whether the current crisis affects their expectations about their retirement age, their desired working hours in the next years, as well as their outstanding household debt at the end of 2020. Finally, those who held any equity in the beginning of 2020 are asked whether they have made any active adjustments to the share of their financial assets invested in stocks or stock mutual funds, and whether they plan to do so over the next weeks. The survey ends with additional background questions on topics such as stock investment experience or the value of real estate and debt holdings at the beginning of the year.

Discussion Our design with seven arms has important advantages. On the one hand, we can study the causal effect of information about past stock market recoveries on expectations and planned behaviors. To do so we compare individuals who have reported prior estimates of the recovery duration in the case of a historical stock market decline and subsequently received information on the actual recovery duration to individuals who only provided priors (e.g. comparing the *FinCrisisInfo* and *FinCrisisControl* arms). On the other hand, we can use the pure control group, who has not answered questions or received information on past crashes, to provide descriptive evidence on survey items elicited after the experimental stage which is unaffected by drawing attention to past downturns. Throughout, all descriptive figures on questions asked after the experimental stage are restricted to the pure control group. All non-experimental regressions using such questions as outcomes restrict the sample to the four control arms to increase power. In

gate stock returns: less than -30 percent, -30 to -15 percent, -15 to -5 percent, -5 to 0 percent, 0 to 5 percent, 5 to 15 percent, 15 to 30 percent, greater than 30 percent.

the appendix we provide versions of these tables using only the pure control group.

One concern could be that our survey measures of incurred income and wealth shocks and expected spending over the year 2020 are noisy due to imperfect recall (see e.g. Bound et al., 2001). This concern is arguably mitigated by the fact that pension plan providers usually send out quarterly wealth statements to clients, so respondents should have received at least one such statement in the weeks prior to the survey at the beginning of April. In addition, if such measurement error is unsystematic it should not affect descriptive evidence such as means and should not bias results when these variables are used as dependent variables. By contrast, classical measurement error could lead to attenuation bias when shocks to income and wealth are used as independent variables. However, *perceived* income and wealth shocks should arguably be more relevant in shaping beliefs and choices than the exact values, which are potentially unknown to the respondent (Choi and Robertson, 2020). This highlights a potential advantage of using survey data instead of administrative data in studying household decisions.

2.2 Data

Survey administration We collaborated with the survey company Lucid, which is widely used in economics. The survey was conducted from April 6th-13th 2020. The US stock market had partially recovered at the time of the survey, but still showed drastic losses of close to 20 percent compared to its pre-crisis level, and the number of initial jobless claims had escalated (Figure A2). Participants were recruited from the provider's online panel and then completed the survey on our own platform. They proceeded to the main survey after initial screening according to demographics in order to achieve representativeness in terms of observables. In total, 8,156 respondents completed our survey. We drop 162 respondents in the top and bottom percentiles of the response time, as very short or very long response time may indicate inattention to the survey. We also remove 547 respondents who refused to answer any of our questions on financial wealth holdings, as these questions are used extensively throughout the analysis. This leaves us with a sample of 7,447 respondents, who completed the survey within 16.6 minutes on average (13.7 minutes at the median).

Sample characteristics Table A2 shows summary statistics including a comparison with the 2018 American Community Survey (ACS). Our sample is similar to the general population in terms of gender (52 percent females vs 51 percent in the ACS), mean age (48.3 years compared to 47.6 years in the ACS) and median gross household income in the previous year (\$62,500 vs \$65,700 in the ACS), as well as Census region of residence. As is common in online samples, we have a slightly larger fraction of individuals with a Bachelor’s degree (38 percent) compared to the general population (31 percent).

Integrity of the randomization Our sample is well-balanced across the seven experimental arms for key characteristics (see Table A3). To rule out any concerns, we include control variables not only in non-experimental but also in experimental estimations.

Variable definitions The survey elicits levels of household income, assets and liabilities by asking respondents to indicate the respective value bin. Shocks to households’ financial wealth and net income during the first quarter of 2020 as well as expected differences in household net income and spending in 2020 compared to 2019 are elicited as numerical entries in percentage terms. To reduce the impact of outliers, for each variable, we set the top and bottom 2 percent of the distribution to missing. We calculate dollar changes in financial wealth components and income by multiplying reported percentage changes and base levels, and then trim top and bottom 2 percent of the resulting dollar distribution.⁹ Finally, all dummy outcomes in our regressions are coded as either 0 or 100 in order to bring them on the same scale as independent variables referring to percent changes.

3 Effects of the COVID-19 stock market crash on behavior, expectations and plans

Our survey offers a real-time snapshot of the financial situation of US households during the early stages of the pandemic. We therefore start with providing descriptive evidence on how wealth shocks from the COVID-19 stock market crash are distributed, which is discussed in greater detail in appendix section A.1. We then turn to our main findings on how households adjust their plans about investment, spending, debt and labor

⁹ Our results are robust to alternative cutoffs.

supply in response to the pandemic in general, and to wealth shocks in particular.

3.1 Wealth and income shocks across groups

Figure 1 displays losses in total financial wealth (light gray) and net income in the first quarter of 2020 (dark gray) across quintiles of net wealth (left) and net income (middle), and age groups (right), both in percent (top row) and in US dollars (bottom row). We focus on average unconditional changes in household financial wealth, and code those with no financial assets as having experienced zero losses. We calculate income shocks based on a question asking respondents by what percent their household net income in the first quarter was higher or lower than they had expected before the crisis.

Two observations stand out: first, percent losses in income and wealth early in the pandemic tend to be negatively correlated across groups. While percent wealth losses due to the stock market crash are strongly increasing in the pre-crisis net wealth and net income distributions, percent income shocks exhibit the opposite pattern. For instance, overall financial losses amount to 4 percent of pre-crisis financial wealth in the lowest quintile and to about 17 percent in the highest quintile. By contrast, income shocks amount to 7 percent in the bottom quintile and are close to zero in the highest quintile. Moreover, percent wealth losses peak in middle age, while income shocks are strongest among the young. As discussed in detail in appendix section A.1, one driver of smaller wealth shocks among older households seems to be investment in stocks that were less exposed to the crash. Many retirement products such as target date funds (TDFs) automatically reduce exposure of portfolios to risks such as stock market crashes over their clients' working life (Balduzzi and Reuter, 2018; Mitchell and Utkus, 2012). Overall, households' exposure to stock market crashes seems to be concentrated among groups who tend to be less affected by income shocks during recessions (Hoynes et al., 2012).

Second, financial wealth shocks in dollar terms, measured on the left axis, are two orders of magnitude larger than absolute income shocks, which are measured on the right axis with a ten times smaller scale. In particular, wealth losses amount to \$30,415 at the mean and \$1,750 at the median, and average \$1,311 in the lowest and \$107,275 in the highest net wealth quintile. These findings are consistent with Coibion et al. (2020b),

who find mean wealth losses of \$33,482 among households in the Nielsen homescan panel in April 2020. By contrast, respondents report average net income losses of \$844 over the first quarter 2020, and \$877 in the lowest and \$809 in the highest net wealth quintile.

Result 1. *Percent wealth losses from the COVID-19 stock market crash are negatively correlated with percent income shocks across groups. In dollar terms, wealth shocks are two orders of magnitude larger than income shocks on average.*

3.2 Changes in risk-taking across groups

Which groups make adjustments to the share of financial assets invested in stocks or stock mutual funds during the crash? Our survey asks all respondents who report positive stockholdings as of January 2020 whether they have actively increased or decreased their overall portfolio share invested in equities (combining retirement and other accounts) since the onset of the crisis, and whether they plan to make active adjustments in the weeks following the survey. The wording of these questions is such that respondents should abstract from passive changes in the equity share due to changes in market prices.

Figure A3 plots the fractions of stockholders who have actively adjusted their portfolio equity share as a result of the coronavirus crisis across demographic groups (top row). Approximately 50 percent of pre-crisis stockholders have made no active portfolio adjustments since the onset of the crisis, in line with earlier evidence on inertia in households' investment decisions (Brunnermeier and Nagel, 2008; Calvet et al., 2009).¹⁰ The remaining stockholders were slightly more likely to actively increase (27.9 percent) than to decrease (22.8 percent) their equity share. Households from lower wealth and income quintiles and those in older age groups are less likely to have made active adjustments. Interestingly, while the tendency to realize sales was rather uniform across groups, households higher up in the income distribution and those in younger age cohorts were more likely to actively increase their exposure to the stock market. The bottom row of Figure

¹⁰ A large share of retirement wealth is invested in products that automatically maintain fixed equity shares for different age groups, such as TDFs, limiting active portfolio adjustments (Balduzzi and Reuter, 2018; Mitchell and Utkus, 2012).

A3 shows that *planned* active changes in risk-taking over the next few weeks exhibit very similar patterns as realized adjustments in risk-taking.

What drives households' tendency to make adjustments to their equity portfolio share in the context of a crash? In Table 1 we regress dummies indicating realized or planned active changes in risk-taking on a set of covariates.¹¹ Stronger negative income shocks are associated with a stronger tendency to reduce stock investments, potentially due to liquidity needs. By contrast, larger financial losses are associated with a greater likelihood to plan to increase the portfolio equity share, consistent with portfolio rebalancing (Calvet et al., 2009).¹² Respondents who held a higher share of their wealth inside retirement accounts as of January 2020 are less likely to adjust their risk-taking, in line with stronger inertia in retirement accounts (Agnew et al., 2003; Biliias et al., 2010; Madrian

¹¹ Our baseline covariates include gender, age category dummies, dummies for being married, separated or divorced, or widowed (single being the omitted category), dummies for highest educational attainment of highschool, some college or associate degree, or college degree or higher (below highschool being omitted), dummies for being self-employed, retired, unemployed or other labor market status (in paid employment omitted), a dummy for being the main earner in the household, a z-scored measure of the extent to which the respondent is involved in financial decision-making in the household, dummies for Republicans and for other party affiliation (Democrat being omitted), the logs of net household income, of financial wealth in and outside of retirement accounts, of all real estate wealth, and of total household debt, a z-scored measure of perceived borrowing constraints, the share of financial wealth invested in stocks and stock mutual funds, a dummy for stock market participation, stock investment experience in years, as well as dummies for Census region and survey date. Table 1 uses only respondents in the four control groups, who have not received any information. Table A4 replicates the table using only respondents in the pure control group.

¹² We cannot study the effect of financial shocks on *realized* adjustments to risk-taking due to potential reverse causality. Specifically, earlier or later realization of losses directly affects the capital losses households incurred during the pandemic.

and Shea, 2001) and automatic rebalancing by target-date funds (Balduzzi and Reuter, 2018; Mitchell and Utkus, 2012). Having lost stock wealth during the Financial Crisis 2007-2009 is associated with a substantially higher tendency to plan and realize sales during the February/March 2020 crash, and a lower tendency to plan and realize purchases. The patterns are less pronounced for experiences during the earlier stock market crashes following the burst of the Dot-com bubble in 2000 or the Black Monday in 1987. These findings are in line with recency bias documented by the literature on the role of experiences in financial risk-taking (Andersen et al., 2019; Laudenbach et al., 2020; Malmendier and Nagel, 2011), and suggest that losing wealth during a stock market crash may have the negative long-run consequence of a greater tendency to sell stocks following downturns. Finally, men are more likely to make adjustments to their portfolios, but there are no patterns according to education or political affiliation.

Overall, we find that investors were equally likely to reduce or increase their exposure to the stock market, although there is significant variation across groups. This is consistent with Giglio et al. (2020b), who document that wealthy Vanguard clients on average downward revised their short-run expectations about stock returns and GDP growth during the crash, but remained optimistic about the long-run outlook, and that disagreement across investors increased over the crash. They also document that majorities of Vanguard clients did not actively change their portfolio allocation during the crash. In section 4 we explore our respondents' expectations about the future performance of the stock market and their role in driving decisions.

Result 2. *About half of investors actively adjust their risky portfolio share during the COVID-19 crisis, with about equal fractions increasing and decreasing their risky share.*

3.3 Effects of shocks on planned spending, debt and labor supply

How do US households adjust their expectations about spending, debt, and labor market activity in response to wealth shocks during the pandemic?

3.3.1 Expected spending growth

The top row of Figure A4 plots different groups' expected nominal spending growth for the entire year 2020 compared to 2019. All groups on average report negative expected

spending growth for 2020. It is most negative in the lowest net wealth quintile and in the middle of the income distribution, at about -7 percent. Age groups between 45 and 54, and between 55 and 64 report the strongest expected reduction in spending of about -10 and -8 percent, respectively. A large part of the average drop in spending is plausibly due to the shutdown of wide parts of society and the economy and the associated reduced consumption possibilities (Coibion et al., 2020b; Cox et al., 2020).¹³

What are the roles of financial wealth and income shocks for expected spending growth? Table 2 column 1 regresses expected percent spending growth on percent shocks to retirement and non-retirement financial wealth and percent income shocks in the first quarter of 2020, as well as the baseline set of controls.¹⁴ To facilitate the interpretation of magnitudes, columns 2 and 3 translate all variables into dollar changes. Column 2 uses the realized shock to household income during the first quarter, while column 3 uses the dollar shock to expected annual household income for 2020 using a 2SLS procedure in order to bring outcome and independent variable to the same scale.¹⁵ Across regressions,

¹³ Overall, 24 percent of respondents expect positive spending growth over the year 2020.

Given that positive nominal spending growth should be the baseline for most households during normal times, this contains i) those who expected positive spending growth which was not reduced due to the pandemic, but also ii) those where expected growth was reduced but remained non-negative; and iii) those where it switched from negative to positive, for instance due to expected health expenditures related to the pandemic.

¹⁴ Our controls include several sources of variation in the exact size of wealth shocks. We find similar results when using less conservative sets of controls (unreported). Table 2 uses respondents in the four control groups, who have not received any information. Table A5 replicates the table using only respondents in the pure control group.

¹⁵ The dollar changes in financial wealth are calculated from questions on levels and percent changes. The quarterly income change in column 2 is calculated from the question on the unexpected percent shock to household income in the first quarter and total 2019 household income, assuming that the respondent had expected its household to earn a quarter of its total 2019 income in the first quarter of 2020. For the dollar shock to annual income in column 3 we use the first quarter dollar income shock to

wealth shocks have only small effects on expected spending, with a precisely estimated expected MPC of 2 cents for a one dollar shock to retirement assets (columns 2 and 3), while shocks to other financial wealth have no significant effect. We find an MPC of 45 cents for each dollar shock to annual income. Given the difference between stocks and flows, the differential MPCs should be interpreted cautiously.¹⁶ Figure A5 uses binned scatter plots based on the specification in column 2 to illustrate the estimated relationships between wealth shocks and income shocks and expected spending growth.

In Figure A7 we examine heterogeneity in the expected MPC out of wealth shocks.¹⁷ Among others, a \$1 shock to retirement wealth is associated with a \$0.04 reduction in expected spending among retired individuals, likely as these households consume or plan instrument the total expected dollar change in 2020 household income compared to 2019, which is calculated from questions on the expected percent change and the level in 2019. The expected dollar change in annual household spending is calculated from questions on expected percent change in spending from 2019 to 2020 and CEX estimates on the levels of annual spending of different groups to proxy spending in 2019.

¹⁶ We have no exact information on the dollar change in overall lifetime expected resources associated with the shock to expected household income in 2020, which would enable us to directly compare the magnitudes. About two thirds of sample households hit by income shocks expect that it will take at least until 2022 for their incomes to recover. The changes in expected lifetime resources associated with the shocks should therefore be larger than income reductions during the year 2020. Our estimated MPCs out of income shocks would be lower if scaled by the change in expected lifetime economic resources, and should be interpreted in this way. Accordingly, we find stronger MPCs out of income shocks among those who expect their incomes never to recover (see Figure A6). In addition, one concern could be differential measurement error in the two variables leading to differential attenuation bias of coefficient estimates, as respondents might have a more precise idea about incurred income shocks than about incurred wealth shocks. As discussed in section 2.1, this concern is mitigated by the fact that households should make decisions based on *perceived* income and wealth shocks.

¹⁷ In appendix section A.2 we discuss heterogeneity in the MPC out of income shocks.

to consume from retirement assets. Overall, the small magnitudes are in line with previous literature documenting smaller MPCs out of changes in stock wealth (Bräuer et al., 2020; Di Maggio et al., 2019; Nagel et al., 2007). These findings are consistent with the view that for many households retirement wealth is illiquid and therefore unlikely to be used to finance spending. In addition, shocks to financial wealth are most pronounced among households with access to liquidity and credit, contributing to muted spending responses.

How do these patterns relate to other findings on the consumption responses to the COVID-19 pandemic? The average reduction in expected percent spending growth in our sample is lower than the cuts documented in other work (Andersen et al., 2020; Baker et al., 2020b; Coibion et al., 2020b). While these studies examine immediate spending cuts at the onset of the pandemic, we provide evidence on expected spending growth over the entire year 2020. One plausible explanation for smaller effects on expected spending growth over the entire year is that on March 27th – shortly before we conducted our survey – the US administration had announced direct cash transfers to a large fraction of households to support their spending in the context of the CARES act, which were discussed heavily in the media during the week of the survey (April 6th-13th). In addition, households may have expected the economic effects of the pandemic to become less severe over the course of the year compared to the initial weeks. Indeed, the transfers were at least partially successful in supporting household spending (Baker et al., 2020a; Coibion et al., 2020d), and there was a rebound of spending levels during May (Cox et al., 2020).

3.3.2 Expected household debt

Overall, 36 percent of our respondents report that they expect their household to have more debt outstanding by the end of 2020 as a result of the COVID-19 crisis, while 11 percent say they expect lower debt. The fractions expecting higher debt are substantial across groups, but most pronounced among those with lower net wealth, income, or those in younger age groups (see bottom row of Figure A4).

Both wealth and income shocks are associated with a significantly higher tendency to report upward adjustments in expected outstanding household debt at the end of 2020 (Table 2 column 4). This suggests that households tend to smooth shocks during the

pandemic by taking out more debt or by postponing the repayment of debt.¹⁸ Income shocks are associated with upward adjustments in expected debt particularly among those with lower incomes or higher age (see the top row of Figure A9). We find no significant heterogeneity in the effect of wealth shocks on expectations about debt. Another potential driver of increases in expected household debt could be a higher perceived likelihood of large health expenditures due to the coronavirus.

3.3.3 Expected labor supply

In addition, 53 percent and 45 percent of employed respondents as of January report that the coronavirus crisis increases their desired working hours in the next years or their expected retirement age, respectively. As shown in Figure A8, upward adjustments in expected labor supply are pronounced across groups. However, those in lower net wealth or income quintiles or in younger age groups are more likely to increase their expectations about desired working hours, while increases in expected retirement age are more frequent in the middle of the wealth and income distributions and among older respondents. Naturally, younger households have more time to make up for lost wealth and income and may therefore be less likely to adjust their retirement expectations. To the extent that these losses are not recovered, these findings indicate that there may be an increase in labor supply in the US in the coming years.

Coibion et al. (2020b) document that many workers who lost their job in early 2020 dropped out of the labor force by retiring *early*, particularly older individuals. Consistent with their findings, some of our respondents report *downward* adjustments to their

¹⁸ Households may choose to take out a loan in order to make ends meet after being hit by income shocks, consistent with the less than one-to-one reduction in spending in response to income shocks (Table 2 column 3). Wealth shocks could have a direct effect on debt if households postpone the repayment of mortgages or long-term student debt, or if they expect to make smaller down payments on planned major purchases. Alternatively, wealth shocks could make people more pessimistic about the overall situation of their household going forward through experiential learning (Kuchler and Zafar (2019); Malmendier and Nagel (2011); see Table 3).

expected retirement age due to the crisis, and the propensity to do so is higher for those who lost their job (6 percent vs 3 percent), and highest for newly unemployed aged 55 and higher (Figure A12). In appendix section A.3 we explore changes in expected retirement age across groups, and compare them with the findings in Coibion et al. (2020b).

Moreover, both wealth and income shocks are associated with a significantly higher tendency to report upward revisions of expected desired working hours in the next years and expected retirement age (Table 2 columns 5 and 6). For instance, a one percentage point larger retirement wealth shock is associated with a 0.40 percentage point higher likelihood of upward adjusting expected retirement age, while a one percentage point larger income shock during the first quarter has an effect of 0.22 percentage points. Figure A11 displays these regressions as binned scatter plots, highlighting that our findings are not driven by outliers. As illustrated in Figures A9 and Figure A10, we find no systematic heterogeneity in the effect of shocks on expected labor supply. Overall, these findings indicate that households plan to make up for lost wealth and income by working more in the coming years. Moreover, the pronounced effects of wealth shocks suggest that household exposure to the stock market can lead to swings in labor supply in response to stock market fluctuations, supporting a key mechanism in models of portfolio choice with human capital (Bodie et al., 1992; Boerma and Heathcote, 2019; Gollier, 2002).

Result 3. *Households plan to make up for lost income and wealth by increasing their desired working hours over the coming years and by increasing their retirement age. Wealth shocks affect expectations about household debt but not about spending, while income shocks strongly affect both expected spending and debt.*

3.3.4 Robustness

Omitted variables One concern could be that unobserved household characteristics are driving both the size of incurred wealth losses and adjustment of expectations about spending, debt or labor market outcomes. First, households who were more or less optimistic might have incurred differential wealth losses due to active trading. While we cannot fully rule out this concern, it is mitigated by the fact that many retirement products such as TDFs automatically maintain a fixed risky share (conditional on age group),

leaving less room for active portfolio adjustments (Balduzzi and Reuter, 2018; Mitchell and Utkus, 2012). Indeed, as shown in section 3.2, the majority of our respondents did not actively adjust their portfolios, and there was no tendency to systematically rebalance portfolios in any specific direction among our respondents. Our results remain unaltered if we restrict our sample to those investors who did not make active changes to their equity share (unreported for brevity). Second, the degree of exposure to the stock market crash of respondents' portfolios could be correlated with investor characteristics that also affect changes in beliefs. However, in all our regressions we control for a wide range of individual-level characteristics. In addition, many respondents in our sample will have chosen the portfolio allocation in their retirement plans years before the corona shock.¹⁹

Macroeconomic environment during the survey During the time of our survey, the stock market was 20 percent below its peak from before the crash on average, having partially recovered the losses of 34 percent from its low on March 23rd. In addition, the S&P500 index increased by 7.1 percent from market open on April 6th (survey launch) to close on the 13th (completed data collection), or 3.7 percent from close to close. How did these changes in the stock market affect responses to our survey? As we targeted different groups of the population over the field period in order to achieve a representative sample, differences in responses to our survey by date should be interpreted cautiously. That said, appendix Figures A13 and A14 show that reported wealth losses due to the crash across groups are similar during the first half (April 6th-8th) and the second half (April 9th-13th) of our data collection. Moreover, the heterogeneity in changes in expected investment, spending, debt and labor market outcomes across the population is comparable across the two subsamples (unreported).²⁰ These points suggest that the stock market developments over the survey period should not materially affect our findings.

¹⁹ In addition, with TDFs becoming more prevalent, asset allocations are becoming more similar conditional on age (Balduzzi and Reuter, 2018; Mitchell and Utkus, 2012).

²⁰ In addition, 75 percent of respondents answered on the first four of the eight total field days, and were therefore exposed to an even more similar environment.

External validity In our paper we aim to shed light on the effect of exposure to a stock market crash on household expectations and plans. While the COVID-19 crash is arguably special in the sense that it was caused by a pandemic, given that crashes are rare events, any individual downturn that could be used to study our research question will have special features (Giglio et al., 2020b). In addition, as highlighted in sections 3.1 and A.1, heterogeneity in wealth and income losses during the COVID-19 crash are broadly in line with the patterns during other downturns. While we cannot speak to the effects of wealth shocks incurred outside a stock market crash, our finding of a small (planned) MPC out of wealth shocks is in line with findings from other environments. Exploring the effects of wealth shocks incurred during more tranquil times on expectations and plans could be a fruitful avenue for future research.

4 Effects of expected stock market recovery duration on expectations and plans

In the previous section we have explored how wealth losses during the crash affect households' expectations about their medium-term economic outcomes. In this section we study the formation of expectations about the stock market recovery, and how these expectations causally shape households' outlook for their own wealth and plans.

4.1 Descriptive evidence on beliefs about recovery

The survey asks respondents in which calendar year they expect the US stock market to have recovered to its pre-crisis level. Respondents who report wealth or income losses also report the calendar year in which they expect their own wealth or income to have recovered, including options that they expect their wealth or income never to recover. The wording of the questions is agnostic about whether respondents expect further decreases in the stock market or their own wealth or whether they believe those outcomes to be on an increasing path at the time of the survey.

Respondents who have made financial losses estimate that it will take 1.68 years for the stock market and 1.58 years for their own household wealth to recover to pre-crisis levels, and these patterns are fairly uniform across groups, aside from younger respon-

dents expecting a longer stock market recovery duration (left column of Figure A15).²¹ Households who incurred income shocks expect their incomes to take 1.74 years to recover on average, with the lowest income, youngest, and oldest groups predicting a longer income recovery duration. The fraction of respondents expecting their own financial wealth never to recover is highest among those with low net wealth or low net income, as well as among older respondents (right column of Figure A15).

4.2 Determinants of stock market and own wealth expectations

What is driving households' expectations about the stock market and the development of their own wealth after a crash? Table 3 explores the role of different factors previous literature has identified as playing a crucial role in expectation formation.²²

We start with the role of personal experiences, which have been shown to be an important determinant of expectations about the stock market (Malmendier and Nagel, 2011), focusing first on recent experiences. Individuals who have experienced more negative income shocks expect the stock market to take more time to recover (column 1), expect lower stock returns (column 2), and perceive a higher probability of extremely negative stock market returns of below -30 percent (column 4) and a lower probability of very high stock returns (column 5). These patterns are somewhat weaker for financial wealth losses incurred during the recent crash. Naturally, individuals who were hit harder expect a longer recovery duration for their own financial situation (columns 6-7). However, they are also more likely to expect a further worsening of their household's financial situation over the next year (column 8).

We continue with the role of more distant personal experiences during historic crashes. Having lost stock wealth during the Financial Crisis 2007-2009 is associated with more

²¹ Respondents who expect their wealth or income never to recover are excluded from the left column. The figure is based on respondents in the *PureControl* arm, who were not asked about nor received any information on the recovery duration in a previous crash.

²² Table 3 reports multivariate regressions of these expectations on covariates, using only respondents in the four control groups, who have not received information. Table A6 replicates the table using only respondents in the pure control group.

pessimistic expectations about the stock market and own wealth, while the patterns are less consistent for losses incurred in earlier crashes such as the burst of the Dot-com bubble or the Black Monday. This is in line with the previously documented recency bias in the role of personal experiences in macroeconomic expectation formation (Kuchler and Zafar, 2019; Malmendier and Nagel, 2011). These findings highlight that personal experience seems to be an important driver of individuals' expectations in the time following a crash. Moreover, this evidence offers an explanation for the more pronounced tendency to reduce stock investments among those who lost wealth during past crashes (see section 3.2).

Men predict shorter recovery durations of the market and of their own wealth and are significantly more optimistic about their household's financial prospects, in line with previously documented gender gaps in macroeconomic expectations (D'Acunto, 2020a; D'Acunto et al., 2020). Moreover, Republicans expect the recovery to be 0.7 years shorter compared to Democrats, they predict a six percentage point higher stock return, and are more optimistic about their own household's financial situation. Given the pronounced heterogeneity in expectations according to political affiliation, and given evidence pointing to partisan differences in compliance with stay-at-home orders, spending decisions, health care insurance uptake, and other behaviors during the pandemic (e.g. Allcott et al., 2020; Barrios and Hochberg, 2020), it seems surprising that we mostly do not detect significant differences between Republicans and Democrats in active adjustments to risk-taking in section 3.2 and Table 1. There are several potential explanations. First, given that partisanship might be measured with error, its effects could be absorbed by other, more precisely measured covariates such as gender. Indeed, in our sample females are 4 percentage points less likely to identify as Republican, in line with previous evidence (D'Acunto, 2020b). However, the effects of partisanship on portfolio adjustments remain unchanged when we exclude the gender dummy in unreported regressions. Second, the fact that a large fraction of retirement wealth holdings is invested in target-date funds (TDFs) may not only reduce the average elasticity of investment choices to beliefs, but may also limit the pass-through of differential changes in beliefs across groups to portfolio decisions. Finally, related work has shown that the strong changes in economic expecta-

tions by partisanship around elections do not affect spending decisions (Mian et al., 2018), and have only small effects on portfolio allocations in retirement accounts (Meeuwis et al., 2019). This suggests that economic decisions might generally exhibit a low sensitivity to partisan differences in reported beliefs in surveys, perhaps because the corresponding survey responses are partially politically motivated (Prior et al., 2015).²³

Result 4. *Experienced losses in past crashes, gender and political affiliation are important determinants of beliefs about the recovery from the coronavirus stock market crash.*

4.3 Learning from information about past crashes

Our survey includes a short experimental section in which respondents report their prior beliefs about the duration of the recovery in the case of a historical stock market crash, and random subsets of respondents receive information on the actual recovery duration. We use this experimental setup i) to shed light on the role of beliefs about past crashes in shaping respondents' expectations following the COVID-19 crash; and ii) to provide causal evidence on the role of stock market expectations in shaping respondents' outlook for their own situation and their planned economic behavior.

Stock market crashes are rare events, with a variety of potential origins, ranging from corrections to the value of firms or industries to problems in the housing market or shocks to the real economy. Given the unprecedented speed and strength of the COVID-19 crash, and given its origin in the first world-wide pandemic for more than 100 years, the historical database for predicting the further development of the stock market is arguably limited. Do households believe that the coronavirus crash is “unique”, or do they consider facts about historical downturns to be still relevant?

²³ 37 percent and 39 percent of the respondents to our survey self-identify as Republicans and Democrats, respectively, comparable to the 34 and 45 percent in the 2018 wave of the General Social Survey (GSS). The remaining respondents identify as Independents or refuse to answer the question on partisanship. In our regressions we also include dummies for Independents and item non-response. Our results are very similar if we instead code Independents as Republicans or as Democrats.

Figure A16 displays beliefs about the recovery duration from the current crash and from past crashes using respondents in the relevant survey arms. 65.8 percent underestimate the duration of recovery in the case of the Financial Crisis 2007-2009 (5 1/2 years, top-right) and 63.2 percent do so for the Dot-com bubble in 2000 (7 years, bottom-left), but a majority of 79.4 percent overestimate the duration of recovery from the Black Monday crash 1987 (2 years, bottom-right). Respondents in the pure control group, who have not received any questions or information on past crises, predict a recovery duration of 1.8 years for the current crash. However, given differences in the scales on which these beliefs are elicited, one should interpret these differences with caution.²⁴

Given these patterns in priors, the information random subsets of respondents receive can be seen as pessimistic (in the cases of the longer recovery from the Financial Crisis 2007-2009 or the Dot-com bubble in 2000) or as optimistic (in case of the shorter recovery following the Black Monday crash). How do respondents change their beliefs about the current situation when provided with information? In Table 4 we regress respondents' post-treatment expectations about the stock market on dummy variables indicating whether they have received information. Panels A, D and G use all respondents in the relevant arms. Panels B, E and H restrict the analysis to respondents who underestimate actual historic recovery durations in the case of the “pessimistic” Financial Crisis and Dot-com bubble treatments, or to respondents who overestimate the time until recovery in the “optimistic” Black Monday treatment. Panels C, F and I use only over- or underestimators who report positive stockholdings as of January 2020. The “pessimistic” treatments providing information on the Financial Crisis or the Dot-com bubble increase respondents' expected recovery duration by between 1.3 and 2.3 years, while the “optimistic” treatment providing information on the Black Monday crash reduces the expected recovery duration by about one year (column 1). Given a standard deviation of expected

²⁴ Specifically, beliefs about historical crashes are elicited asking for number of years, while beliefs about the current situation are elicited asking for calendar year. The different elicitation scales have important advantages for our experimental analysis, as they mitigate concerns related to numerical anchoring.

recovery beliefs of 3.2 years, the economic magnitude of these effects is substantial.

The treatments also lead to shifts between 0.1 and 0.3 standard deviations in respondents' extent of agreement to verbal statements describing the severity of the current crash (columns 2-4).²⁵ The Financial Crisis and the Black Monday treatments move respondents' expected stock returns by up to -3 and up to 2 percentage points, respectively (column 5), and change the subjective probabilities assigned to extreme return realizations accordingly (columns 7-8). The size of these effects amounts to about half of the strong partisan gap in expectations documented in Table 3. Most of the coefficient estimates increase in absolute size when restricting the sample to over- or under-estimators, although we lack the power to meaningfully explore differences in effect sizes across groups.²⁶

Taken together, the strong effects of information on respondents' expectations about the stock market highlight that households continue to form expectations based on their beliefs about stock market developments in the past, even in very unique and unprecedented situations. Moreover, these findings imply that information about historical stock market developments had not been fully incorporated into respondents' prior expectations, pointing to an important role of information frictions in the formation of households' stock market expectations. This is consistent with models in which information is costly to acquire or to process (Abel et al., 2007; Alvarez et al., 2012), which may result in a lack of preparation particularly for rare events (Maćkowiak and Wiederholt, 2018).

²⁵ Specifically, the treatments change respondents' agreement on 7-point categorical scales (which we z-score using the mean and standard deviation in our sample) with the following statements: "The outbreak of the coronavirus will keep US stock prices below their January 2020 levels for many years." (column 2); "The outbreak of the coronavirus has set the level of the stock market back by many years." (column 3); "The US stock market will have recovered by the end of the year 2020." (column 4).

²⁶ The experimental findings on the effect of beliefs about past crashes are mirrored in correlations between priors about historical recovery durations and current stock market expectations among respondents in the control groups (see Table A7).

4.4 Expected stock market recovery and own outlook and plans

Do expectations about the further development of the stock market have similar effects on households' plans as wealth losses already incurred during the crash (see section 3)? Our randomized provision of information about past crashes generates exogenous variation in respondents' recovery expectations. We exploit this setting to shed light on the causal effects of households' stock market expectations on their outlook regarding their own wealth and their plans about investment, spending, debt and labor supply.

In Table 5 we regress different outcomes on respondents' expected recovery duration of the stock market and our baseline controls. First, the table shows OLS estimations using all control groups, who have not received any information (Panels A and B). Second, the table shows 2SLS estimations, where the respondents' expected recovery duration is instrumented with the dummy for the relevant information treatment assignment, as well as the corresponding OLS estimates in the relevant subsamples (Panels C-H). Panels B-H restrict the sample to stockholders as of January 2020, and Panels C-H are restricted to the majorities of respondents who over-estimated (Panels C-F) or who underestimated (Panels G-H) the recovery duration from the corresponding historical crash.²⁷ In addition, Table A9 displays OLS estimates for different subgroups using all control groups.²⁸

Expectations about own wealth Respondents' beliefs about the recovery duration of the stock market are strongly correlated with their expectations about their own wealth (Table 5 column 1). Among stockholders, a one year longer expected stock market recovery translates into a 0.45 years longer expected recovery of their own wealth and a 0.09 standard deviations reduction in their financial prospects for their household (column 2). For comparison, already incurred financial wealth losses of 11 percent (the mean losses in

²⁷ This increases the strength of our first stage estimates and ensures that the monotonicity assumption (that the first stage shifts all respondents' beliefs in the same direction) holds. Table A8 presents reduced form estimates of the effects of the information treatments on wealth expectations and plans.

²⁸ We are not powered to conduct IV estimations on subsamples due to the smaller sample available for each instrument.

our sample), are associated with a longer expected recovery of own wealth by 0.39 years and a reduction in household's financial prospects by 0.06 of a standard deviation (see Table 3). The 2SLS estimates exploiting the experimental variation are mostly highly significant and of similar size as the OLS estimates. Table A9 columns 1-2 show that stock market recovery expectations play a significantly larger role for the wealth expectations of older stockholders, those with lower net wealth and men. These findings indicate that beliefs about the further development of the stock market play a substantial causal role in shaping households' wealth expectations, particularly among those who have less time during their working life to make up for wealth losses.

Investment plans Do people's expectations about the further development of the stock market affect their planned investment behavior? A substantial literature has studied correlations between subjective expectations and stock market participation or the equity portfolio share (Ameriks et al., 2019; Dominitz and Manski, 2007; Giglio et al., 2020a; Hudomiet et al., 2011). While our survey only contains self-reported investment plans, the randomized information provision allows us to provide, to the best of our knowledge, the first causal evidence on the role of subjective return expectations in (planned) investment decisions. Respondents who expect a one year longer recovery are 0.58 percentage points less likely to plan increasing their equity share and 0.53 percentage points more likely to plan a reduction (Table 5 columns 3 and 4). The IV results using the "pessimistic" Financial Crisis and Dot-com instruments are insignificant. However, we estimate significant causal effects of the expected recovery duration of -4.3 and 3.7 percentages points, respectively, on the probabilities to plan increases or decreases using the "optimistic" Black Monday instrument. Overall, 28 and 23 percent of respondents plan increases or decreases, respectively, highlighting that expectations play an important causal role in investment decisions following a crash. Table A9 columns 3-4 show that the association of expectations and investment plans seems to be fairly uniform across groups. Our experimental findings are complementary to evidence that groups of Vanguard clients who became more pessimistic over the crash sold the most equity (Giglio et al., 2020b).

Expected spending and debt How do people’s expectations about the stock market recovery affect their plans in other domains? Expectations about the recovery duration are negatively correlated with respondents’ expected spending growth (Table 5 column 5). However, none of the causal estimates from the 2SLS regressions are significant. This is in line with our earlier finding that financial wealth shocks incurred during the crash do not seem to affect expected spending growth (see section 3.3 and Figure A5). More pessimistic expectations about the stock market are associated with a significantly higher tendency to report upward adjustments in expected household debt for the end of 2020 (column 6). However, this correlation turns insignificant once we restrict the sample to stockholders. Among the causal estimates only the Black Monday treatment dummy enters marginally significantly. We interpret this as mixed evidence for an effect of stock market expectations on expectations about household debt.

Expected labor market activity Portfolio choice models including human capital predict that households adjust their labor supply in response to wealth fluctuations (Bodie et al., 1992; Boerma and Heathcote, 2019; Gollier, 2002). Among stockholders, a one year increase in expected stock market recovery duration is associated with 2 percentage point increases in the tendencies to upward adjust expectations about desired working hours over the next years (Table 5 column 7) and about retirement age (column 8). Moreover, using the “pessimistic” Financial Crisis instrument we find significant causal effects of about 5 percentage points on the tendency to upward adjust these expectations.²⁹ The magnitude of these effects is substantial, corresponding to the effects of having experienced a shock to retirement financial wealth of 21 or 13 percentage points, respectively. Table A9 columns 7-8 highlight that the effects of stock market expectations on planned labor market activity are particularly pronounced among those with lower net wealth, suggesting that these households’ long-term plans did not include a buffer for the case of large losses during a crash. To the best of our knowledge our experimental findings are the first direct causal evidence on the role of expectations about financial markets in

²⁹ While we find no significant effects using the other instruments, we note that also the OLS estimates in the relevant arms are insignificant.

shaping people's long-term plans regarding work. This highlights that rising stock market exposure among households can have important consequences for households' long-term planning and for labor markets. In addition, the changes in households' long-term outlook about labor supply in response to information suggest that re-optimization or adjustment costs do not seem to lead to inertia of these expectations.³⁰

Taken together, these results suggest that not only wealth shocks incurred during the crash, but also beliefs about the performance of the stock market in the next years play an important role in shaping US households' expectations about their own economic situation and plans. Our fifth main result is the following:

Result 5. *Households' beliefs about the duration of the stock market recovery are strongly correlated with expectations about their own wealth, their planned investment behavior and their long-term expectations about labor market activity. Results from IV estimations exploiting randomized information provision suggest that part of these effects are causal.*

4.5 Robustness

The results from our information provision experiment are subject to some potential criticisms, which we briefly discuss in this subsection. For a more detailed discussion see the review paper by Haaland et al. (2020).

Cross-learning Respondents update their expectations about their own wealth and their economic plans in response to the provided information, plausibly through direct effects working through their stock market expectations. Alternatively, there could be cross-learning in the sense that respondents may update their beliefs about overall GDP growth and labor markets in response to the information. We view such cross-learning as a natural by-product of changes in expectations induced by randomized information provision. For instance, changes in stock return expectations in panel data from existing surveys tend to be associated with changes in GDP growth expectations (Giglio et al.,

³⁰ This low degree of stickiness suggests that changes in expected retirement age due to wealth losses in the coronavirus stock market crash may have reverted back in response to the recovery of the stock market during the summer of 2020.

2020a), raising the question whether it would be a meaningful exercise to change people's expectations about stock returns while holding fixed their expectations about growth. However, we do not believe that cross-learning about GDP growth or labor markets is the main driver behind our findings. First, we find mostly insignificant treatment effects when we restrict our sample to non-stockholders. Second, we find only minor effects on respondents' income expectations due to our information treatments. These results are unreported for brevity but available upon request.

Numerical anchoring One concern about our findings could be unconscious numerical anchoring on the provided information (Cavallo et al., 2017; Coibion et al., 2019b). This concern is arguably mitigated by our use of different response scales in the post-treatment questions compared to the provided information (calendar year, 7-point agreement scale, or density distribution instead of number of years). Moreover, previous studies have found only small changes of reported expectations in response to the provision of irrelevant numerical anchors (Coibion et al., 2019b; Roth and Wohlfart, 2019).

Experimenter demand effects Relatedly, our experimental findings could be driven by subjects guessing the experimental hypothesis and trying to conform with it. We think that demand effects are unlikely to be important for three reasons: i) our study is fully based on a between-subject design, where no question is asked twice in the survey (i.e. both before and after the treatment, as in within-subject designs); ii) at the end of our survey we explicitly asked our respondents to report their beliefs about the purpose of the study, and less than 10 respondents suspected the survey to contain some form of experimental treatment (Table A10); iii) demand effects have been shown to be of limited importance in comparable online surveys (de Quidt et al., 2018).

Changes in real world behavior Changes in stock market expectations induced through our treatments significantly affect respondents' planned investment behavior and their expectations about their long-term labor market outcomes. One concern could be that these effects are not informative about actual changes in behavior. While we do not observe actual decisions of our respondents following our experiment, we are confident that the effects on our outcome measures are meaningful proxies for changes in

real-world behavior for two reasons. First, as documented in Table 5 Panel A, respondents' expected recovery duration is strongly correlated with expected investment and labor market outcomes in the pure control group. Second, recent work has documented significant pass-through of changes in beliefs induced through comparable information treatments to actual economic decisions, such as for pricing and employment decisions of firms (Coibion et al., 2018, 2020f), as well as spending behavior (Coibion et al., 2019a) and high-stakes home sale decisions (Bottan and Perez-Truglia, 2020) among households.

5 Implications and conclusion

With increasing stock market participation, households around the world have become more exposed to stock market downturns. We have conducted a survey on a representative sample of more than 8,000 US households, which offers a snapshot of households' finances and expectations in the time following one such crash. We document that shocks to household wealth due to the COVID-19 stock market decline tend to be negatively correlated with income shocks experienced during the early stages of the pandemic. While about half of all stock owners made adjustments to their investments in the course of the crash, there was no systematic tendency to actively rebalance portfolios in response to the passive reduction in equity portfolio shares. Financial wealth shocks are associated with adjustments in expectations about household debt, retirement age and desired working hours, but have no substantial effect on expected spending. Finally, beliefs about the stock market recovery causally shape individuals' expectations about their own wealth and their plans regarding investment and labor market activity in the future.

Our findings highlight that exposure to stock market downturns is concentrated among groups who tend to be less exposed to income shocks and job losses during recessions. Moreover, when households incur losses to their retirement wealth during a crash, they plan to make up for them by increasing their labor supply in the following years and by postponing their retirement age. Similarly, people's expectations about the stock market recovery directly shape their expectations about own labor market activity. This implies that households who invest their retirement wealth in stocks accept fluctuations in their long-term expectations about retirement age and working life, in line with a

key mechanism in portfolio choice models including human capital (Bodie et al., 1992; Gollier, 2002). Households who are unwilling to accept such fluctuations may be reluctant to invest in stocks, contributing to the widely-documented non-participation in the stock market (Guiso and Sodini, 2013; Haliassos and Bertaut, 1995). Moreover, since for older households it is more difficult to make up for wealth losses by extending labor supply, this mechanism is in line with reductions in the equity share as people age. At a macro level, our results suggest that increasing household exposure to the stock market may generate a link from financial market developments to medium-term swings in labor supply.

Our results have implications for policymakers aiming to change agents' behavior through information interventions. Specifically, our findings highlight in the context of stock market expectations that framing communication in terms of historic events can be a powerful tool to stimulate individuals' expectations about wealth, investment and labor supply, potentially because such information is relatively easy to grasp. At the same time, since expectations about the stock market are differentially associated with economic decisions across groups, targeted forms of communication may be employed to reach different groups of households and thereby change expectations and decisions most effectively. Our findings are broadly in line with recent work pointing at the importance of individual characteristics in expectation formation, suggesting that the same communication may have very different effects on expectations and decisions across different segments of the population (Candia et al., 2020; D'Acunto et al., 2019b,c).

In addition, our findings have implications for the consequences of the COVID-19 pandemic. First, in order to adequately gauge the impact of the crisis on inequality in overall economic resources one should consider shocks to both income and wealth, as these shocks tend to hit different groups. Second, even though wealth losses from the stock market crash should have mostly been recovered by August 2020, the association between income shocks and plans to increase retirement age or working hours suggests that there may be an increase in labor supply in the US in the coming years, as households are trying to make up for lost income. This could put downward pressure on wages and further aggravate economic hardships for those at the bottom of the distribution.

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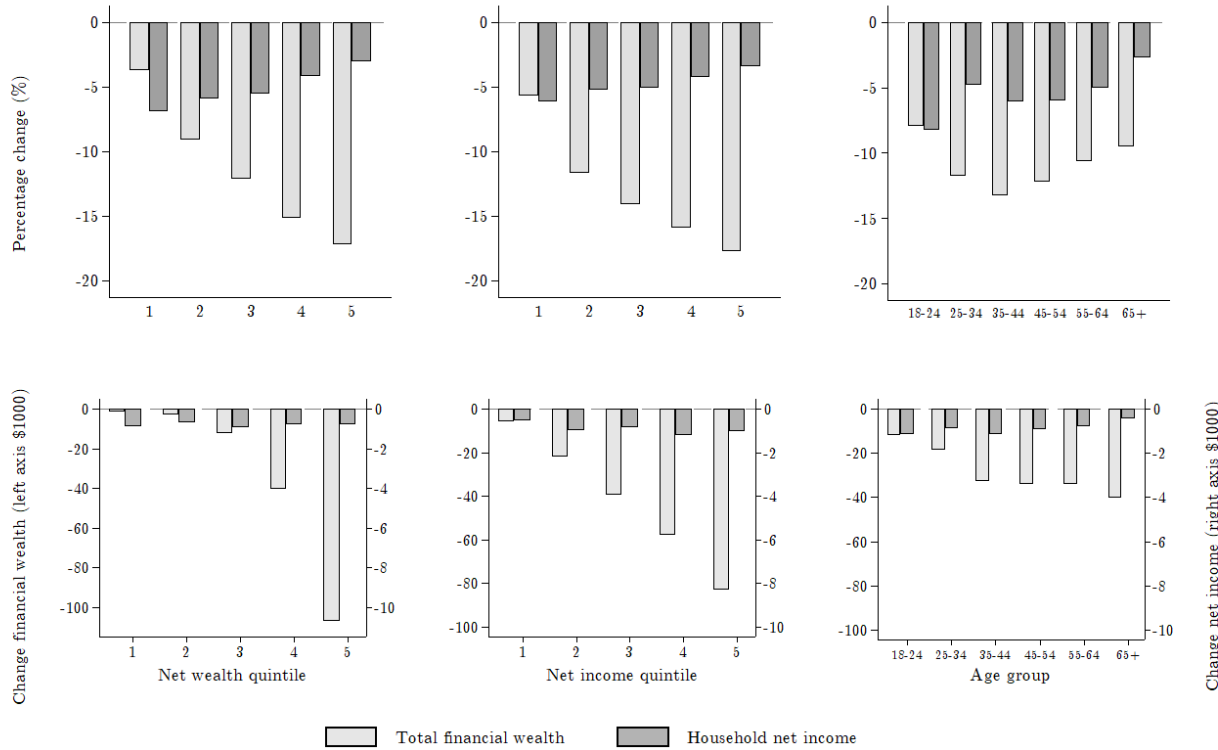
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Main figures and tables

Figure 1: Financial wealth and household net income shocks



Notes: This figure displays changes in the value of total financial assets due to the February/March 2020 stock market drop until the survey date and unexpected changes in net household income during the first quarter of 2020. Changes are reported in percentages (top row) and USD (bottom row), by quintile of pre-crisis net wealth (left column), by quintile of pre-crisis net income (middle column) and by age group (right column), respectively. Changes in total household financial wealth are the combined changes to financial assets outside of retirement accounts (other financial wealth) and inside retirement accounts. Changes in value of financial assets are net capital losses for the majority of respondents, and net capital gains for a small fraction of respondents. In the bottom panel changes in financial wealth are shown on the left axis in thousands of USD, the right axis displays the change in household net income in thousands of USD. We trim reported income and wealth shocks at the 2nd and 98th percentiles. The sample is the full sample without missings in the relevant survey questions.

Table 1: Determinants of realized and planned adjustments to stock share

	Changed stock share	Increased stock share	Decreased stock share	Plan change stock share	Plan incr. stock share	Plan decr. stock share
	(1)	(2)	(3)	(4)	(5)	(6)
Δ Net income (%)	-0.036 (0.052)	0.137** (0.054)	-0.173*** (0.056)	-0.062 (0.055)	0.100 (0.062)	-0.161*** (0.058)
Δ Retirement fin. wealth (%)				-0.090 (0.088)	-0.158* (0.084)	0.068 (0.073)
Δ Other fin. wealth (%)				-0.269*** (0.090)	-0.214** (0.088)	-0.055 (0.077)
Ln(Total fin. wealth)	2.836*** (0.873)	1.896** (0.810)	0.939 (0.824)	0.635 (0.879)	0.827 (0.861)	-0.191 (0.822)
Stock share in ret. wealth	-0.049 (0.034)	0.000 (0.029)	-0.050* (0.028)	-0.082** (0.034)	0.042 (0.031)	-0.124*** (0.025)
Stock share in ot. fin wealth	0.010 (0.033)	0.020 (0.028)	-0.011 (0.028)	0.026 (0.034)	0.042 (0.031)	-0.016 (0.026)
Share ret. in tot. fin. wealth	-0.151*** (0.047)	-0.103** (0.042)	-0.048 (0.044)	-0.173*** (0.047)	-0.177*** (0.045)	0.004 (0.039)
Any loss fin. crisis	7.627*** (2.538)	3.634 (2.493)	3.993* (2.343)	7.134*** (2.525)	-0.788 (2.552)	7.922*** (2.222)
Big loss fin. crisis	1.199 (3.152)	-7.420*** (2.681)	8.619*** (3.051)	-6.637** (3.011)	-7.127** (2.829)	0.490 (2.503)
Any loss dot-com	3.371 (2.572)	-1.338 (2.359)	4.709* (2.419)	3.412 (2.497)	2.768 (2.449)	0.644 (2.121)
Big loss dot-com	4.381 (4.443)	7.365* (4.023)	-2.985 (4.241)	8.189* (4.445)	7.820* (4.605)	0.369 (3.793)
Any loss Black Monday	8.085** (3.312)	0.340 (2.576)	7.745*** (2.996)	5.669* (3.112)	2.839 (2.752)	2.829 (2.349)
Big loss Black Monday	-2.557 (6.099)	2.844 (4.796)	-5.401 (5.411)	-0.854 (6.063)	-5.163 (5.254)	4.309 (4.515)
Male	11.591*** (2.350)	7.224*** (2.194)	4.367** (2.138)	11.618*** (2.418)	9.003*** (2.364)	2.615 (1.993)
At least bachelor	1.938 (10.936)	9.179 (10.930)	-7.240 (11.352)	-4.709 (10.091)	16.862 (10.723)	-21.572* (11.961)
Republican	-1.158 (2.184)	1.710 (2.089)	-2.868 (2.058)	3.080 (2.182)	3.661* (2.168)	-0.581 (1.923)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	.213	.148	.045	.27	.132	.119
Observations	2,148	2,148	2,148	1,999	1,999	1,999

Notes: This table shows OLS estimates of the determinants of realized (planned) adjustments to the overall portfolio equity share. The outcomes are dummies indicating whether the respondent's household has made any change, has increased or has decreased the share of stocks and stock mutual funds in overall financial assets since the beginning of the crisis (columns 1-3) and dummies indicating plans to change, increase or decrease the overall equity share in the weeks after the survey (columns 4-6), all coded as 0 or 100. All specifications use the four control arms, which have not received any information, using only respondents with positive stockholdings as of January 2020. All specifications control for shocks to income, trimmed at the 2nd and 98th percentiles, dummies for having lost any wealth or substantial wealth during past stock market crashes, gender, age, employment status, marital status, highest educational attainment, being the main earner, being financial decision-maker, party affiliation (dummies for Republican and other party), log net household income, log of total financial wealth, of real estate wealth, and of debt, share of total financial wealth in retirement accounts, borrowing constraints, stock market participation, stock shares in retirement and other accounts, investment experience, Census region, survey date, and the survey arm. Columns 4-6 additionally control for shocks to retirement and other financial wealth, trimmed at the 2nd and 98th percentile. Robust standard errors are reported in parentheses. * denotes significance at the 10 pct., ** at the 5 pct., and *** at the 1 pct. level.

Table 2: Effects of wealth and income shocks on expected behavior and plans

	Exp. spend. growth (%)	Exp. spend. growth (\$)	Exp. spend. growth (\$)	Incr. exp. debt	Incr. exp. desired hours	Incr. exp. retirement age
	(1)	(2)	(3)	(4)	(5)	(6)
Δ Retirement fin. wealth (%)	0.054 (0.036)			-0.206*** (0.073)	-0.302*** (0.089)	-0.398*** (0.096)
Δ Other fin. wealth (%)	-0.044 (0.037)			-0.432*** (0.073)	-0.401*** (0.090)	-0.257*** (0.094)
Δ Net income (quarterly, %)	0.171*** (0.027)			-0.320*** (0.042)	-0.328*** (0.049)	-0.221*** (0.054)
Δ Retirement fin. wealth (\$)		0.024*** (0.009)	0.021** (0.009)			
Δ Other fin. wealth (\$)		-0.001 (0.012)	-0.004 (0.012)			
Δ Net income (quarterly, \$)		0.655*** (0.104)				
Δ Net income (annual, \$)			0.454*** (0.071)			
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	.041	.053	.084	.215	.146	.095
Observations	3,761	3,565	3,535	3,845	2,377	2,377

Notes: This table shows estimates of the association of shocks to the respondent's household financial wealth and net income with expected economic decisions. The outcomes are expected growth of yearly household spending from 2019 to 2020 in percent, trimmed at the 2nd and 98th percentiles (column 1); expected household spending growth in dollars, trimmed at the 2nd and 98th percentiles (columns 2-3); and dummies indicating whether the coronavirus crisis increases the respondent's expectations about outstanding household debt by the end of 2020 (column 4), expected desired working hours over the next years (column 5, only if in labor force) or expected retirement age (column 6, only if in labor force), all coded as 0 or 100. Dollar changes in columns 2 and 3 are constructed from survey questions for retirement and other financial wealth and for income (assuming that the respondent expected a quarter of her 2019 income in the first quarter of 2020), and for spending from the survey question on percent changes and estimates of the level of spending of different groups in 2019 from the CEX. Columns 1, 2, 4, 5 and 6 show simple OLS estimates. Column 3 shows 2SLS estimates, where the respondent's expected dollar change in household income from 2019 to 2020 is instrumented with the unexpected shock to household income over the first quarter of 2020. All specifications are based on the four control arms, which have not received any information. All specifications control for gender, age, employment status, marital status, highest educational attainment, being the main earner, being financial decision-maker, party affiliation (dummies for Republican and other party), log net household income, logs of retirement wealth, of other financial wealth, of real estate wealth, and of debt, borrowing constraints, stock market participation, the equity share in total financial assets, investment experience, Census region, survey date, and the survey arm. Robust standard errors are reported in parentheses. * denotes significance at the 10 pct., ** at the 5 pct., and *** at the 1 pct. level.

Table 3: Determinants of expectations about the stock market and own wealth

	Stock recovery duration	Stock return: Mean	Stock return: SD	Stock return <-30%	Stock return >30%	Wealth recovery duration	Exp. wealth never to recover	Household financial prospects
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Δ Fin. wealth (%)	-0.005 (0.004)	-0.012 (0.026)	-0.045*** (0.013)	-0.014 (0.030)	-0.077* (0.039)	-0.034*** (0.003)	-0.159*** (0.054)	0.005*** (0.002)
Δ Net income (%)	-0.010*** (0.003)	0.085*** (0.017)	-0.001 (0.009)	-0.100*** (0.023)	0.067*** (0.022)	-0.005*** (0.002)	-0.088** (0.038)	0.007*** (0.001)
Any loss fin. crisis	-0.007 (0.120)	-1.679** (0.804)	0.602 (0.414)	1.289 (1.006)	-1.504 (1.162)	0.237*** (0.084)	4.460*** (1.691)	-0.077* (0.046)
Big loss fin. crisis	0.302** (0.150)	-1.965* (1.128)	-0.542 (0.515)	2.302 (1.451)	-0.404 (1.593)	0.156 (0.128)	-0.540 (2.166)	-0.260*** (0.062)
Any loss dot-com	-0.069 (0.125)	-0.362 (0.861)	1.088** (0.428)	0.261 (1.117)	-1.162 (1.206)	0.012 (0.106)	0.223 (1.745)	-0.009 (0.049)
Big loss dot-com	-0.215 (0.219)	-1.588 (1.662)	-0.860 (0.705)	4.313* (2.359)	0.608 (2.182)	-0.258* (0.155)	3.862 (3.267)	-0.040 (0.098)
Any loss Black Monday	0.282* (0.154)	-1.478 (1.046)	-0.700 (0.520)	-0.900 (1.354)	-3.558** (1.530)	0.239* (0.122)	-0.998 (2.049)	-0.057 (0.054)
Big loss Black Monday	0.206 (0.289)	0.649 (1.976)	-0.596 (0.813)	0.403 (2.798)	1.511 (2.551)	0.280 (0.248)	5.851 (4.212)	-0.042 (0.104)
Male	-0.640*** (0.103)	0.218 (0.709)	0.693** (0.345)	-1.167 (0.913)	0.082 (1.047)	-0.184*** (0.059)	-1.000 (1.404)	0.186*** (0.037)
At least bachelor	-0.069 (0.317)	0.279 (2.083)	-1.090 (1.003)	-5.728* (3.022)	-1.814 (2.820)	-0.303** (0.145)	-10.735** (4.637)	0.093 (0.104)
Republican	-0.657*** (0.095)	5.844*** (0.680)	-0.808** (0.337)	-3.577*** (0.862)	7.224*** (1.010)	-0.222*** (0.064)	-4.639*** (1.361)	0.240*** (0.036)
Stock investor	-0.445** (0.194)	0.088 (1.309)	1.314* (0.682)	-0.400 (1.676)	-0.482 (1.865)	0.469*** (0.125)	2.493 (2.754)	0.137* (0.072)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	.092	.048	.054	.024	.037	.304	.081	.088
Observations	3,918	3,918	3,918	3,918	3,918	3,614	3,918	3,918

Notes: This table shows OLS estimates of the determinants of respondents' expectations about the stock market and their own wealth. The outcomes are the expected duration of the recovery of the US stock market to its pre-crisis level of January 2020 in years (column 1); mean and standard deviation as well as probabilities assigned to extreme return realizations based on the respondent's reported probability distribution over the one year-ahead stock market return (columns 2-5); the expected recovery duration of the respondent's household net wealth (column 6); a dummy indicating whether the respondent thinks her household net wealth will never recover, coded as 0 or 100 (column 7); and a categorical measure of the respondent's subjective household financial prospects, z-scored using the mean and standard deviation in the sample (column 8). All specifications are based on the four control arms, which have not received any information. All specifications control for shocks to income and financial wealth, trimmed at the 2nd and 98th percentiles, dummies for having lost any wealth or substantial wealth during past stock market crashes, gender, age, employment status, marital status, highest educational attainment, being the main earner, being financial decision-maker, party affiliation (dummies for Republican and other party), log net household income, logs of retirement wealth, of other financial wealth, of real estate wealth, and of debt, borrowing constraints, stock market participation, the equity share in total financial assets, investment experience, Census region, survey date, and the survey arm. Robust standard errors are reported in parentheses. * denotes significance at the 10 pct., ** at the 5 pct., and *** at the 1 pct. level.

Table 4: Effects of information on stock market expectations: Experimental first stage

	Stock recovery duration	Agree: Recovery many yrs.	Agree: Set back many yrs.	Agree: Recover 2020	Stock return: Mean	Stock return: SD	Stock return <-30%	Stock return >30%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: All								
Info Fin. Crisis 2007	1.304*** (0.108)	0.207*** (0.041)	0.179*** (0.042)	-0.237*** (0.042)	-2.561*** (0.795)	0.014 (0.394)	2.040* (1.055)	-2.239** (1.134)
Panel B: Underestimators								
Info Fin. Crisis 2007	1.645*** (0.115)	0.317*** (0.051)	0.311*** (0.051)	-0.287*** (0.050)	-3.026*** (0.947)	0.086 (0.482)	1.271 (1.266)	-3.724*** (1.322)
Panel C: Under. & Stocks > 0								
Info Fin. Crisis 2007	1.503*** (0.134)	0.332*** (0.064)	0.308*** (0.066)	-0.293*** (0.063)	-2.226* (1.145)	-0.216 (0.567)	1.308 (1.517)	-2.520 (1.541)
Panel D: All								
Info Dot-com 2000	1.758*** (0.123)	0.101** (0.041)	0.145*** (0.042)	-0.199*** (0.043)	-1.615** (0.795)	0.220 (0.400)	1.238 (1.063)	-1.238 (1.107)
Panel E: Underestimators								
Info Dot-com 2000	2.261*** (0.134)	0.207*** (0.053)	0.231*** (0.053)	-0.211*** (0.054)	-1.545 (0.988)	0.216 (0.497)	1.123 (1.363)	-1.509 (1.342)
Panel F: Under. & Stocks > 0								
Info Dot-com 2000	2.071*** (0.170)	0.221*** (0.068)	0.259*** (0.069)	-0.164** (0.068)	-0.977 (1.158)	-0.086 (0.610)	0.742 (1.550)	-0.987 (1.526)
Panel G: All								
Info Black Monday 1987	-0.928*** (0.104)	-0.106*** (0.041)	-0.106** (0.041)	-0.063 (0.042)	1.465* (0.766)	0.246 (0.383)	-2.723*** (0.942)	-0.585 (1.133)
Panel H: Overestimators								
Info Black Monday 1987	-1.277*** (0.125)	-0.168*** (0.045)	-0.191*** (0.046)	0.045 (0.046)	1.987** (0.857)	0.294 (0.434)	-3.167*** (1.076)	0.025 (1.227)
Panel I: Over. & Stocks > 0								
Info Black Monday 1987	-1.109*** (0.157)	-0.138** (0.060)	-0.160*** (0.061)	0.075 (0.062)	1.887* (1.029)	0.181 (0.537)	-2.984** (1.212)	0.212 (1.451)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows OLS estimates of the effect of being shown information on the duration of a historical stock market crash on respondent's expectations about the stock market. The outcomes are the expected duration of the recovery of the US stock market to its pre-crisis level of January 2020 in years (column 1); agreement on 7-point scales to statements describing the severity of the current stock market crash, z-scored using the mean and the standard deviation in the sample (columns 2-4); mean and standard deviation as well as probabilities assigned to extreme return realizations based on the respondent's reported probability distribution over the one year-ahead stock market return (columns 5-8). Panels A-C are based on the treatment and control arms including information or questions on the Financial Crisis 2007-2009. Panels D-F are based on the treatment and control arms including information or questions on the burst of the Dot-com bubble 2000. Panels G-I are based on the treatment and control arms including information or questions on the Black Monday 1987. Panels A, D and G are based on the full sample in the corresponding arms. Panels B, E and H are based only on under-estimators (for Financial Crisis and Dot-com bubble) or over-estimators (for Black Monday) of the length of the recovery from the crash. Panels C, F and I are based only on under-estimators or over-estimators who participated in the stock market before the current crisis. All specifications control for the respondent's prior belief about the recovery duration following the corresponding crash as well as for gender, age, employment status, marital status, highest educational attainment, being the main earner, being financial decision-maker, party affiliation (dummies for Republican and other party), log net household income, logs of retirement wealth, of other financial wealth, of real estate wealth, and of debt, borrowing constraints, stock market participation, the equity share in total financial assets, investment experience, Census region and survey date. Robust standard errors are reported in parentheses. * denotes significance at the 10 pct., ** at the 5 pct., and *** at the 1 pct. level.

Table 5: Effects of expected stock market recovery on own outlook and plans: OLS and 2SLS estimates

	Wealth recovery duration	Household financial prospects	Plan incr. stock share	Plan decr. stock share	Exp. spend. growth	Incr. exp. debt	Incr. exp. desired hours	Incr. exp. retirement age
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: All control groups (OLS)								
Expected stock recovery duration (years)	0.223*** (0.017)	-0.070*** (0.006)	-0.584** (0.282)	0.530* (0.280)	-0.250* (0.138)	1.063*** (0.258)	1.303*** (0.356)	1.727*** (0.362)
Observations	3,903	4,260	2,599	2,599	4,097	4,260	2,682	2,682
Panel B: All control groups&Stocks (OLS)								
Expected stock recovery duration (years)	0.455*** (0.029)	-0.088*** (0.009)	-0.584** (0.282)	0.530* (0.280)	-0.546*** (0.178)	0.517 (0.342)	2.050*** (0.453)	2.065*** (0.464)
Observations	2,297	2,599	2,599	2,599	2,515	2,599	1,915	1,915
Panel C: Fin. Cris. Und.&Stocks (OLS)								
Expected stock recovery duration (years)	0.407*** (0.043)	-0.113*** (0.017)	-0.300 (0.556)	0.517 (0.625)	-0.693* (0.372)	2.102*** (0.714)	3.079*** (0.894)	4.184*** (0.789)
Panel D: Fin. Cris. Und.&Stocks (2SLS)								
Expected stock recovery duration (years)	0.487*** (0.072)	-0.091** (0.042)	1.844 (1.491)	2.096 (1.413)	-0.844 (0.852)	2.063 (1.936)	5.770** (2.321)	5.704** (2.377)
First-stage F-stat	130.984	125.897	131.394	131.394	129.047	125.897	108.424	108.424
Observations	781	879	879	879	854	879	675	675
Panel E: Dot-com Und.&Stocks (OLS)								
Expected stock recovery duration (years)	0.429*** (0.046)	-0.073*** (0.014)	-0.190 (0.537)	0.337 (0.477)	-0.402 (0.309)	0.426 (0.552)	0.870 (0.707)	0.958 (0.715)
Panel F: Dot-com Und.&Stocks (2SLS)								
Expected stock recovery duration (years)	0.519*** (0.073)	0.025 (0.033)	0.553 (1.215)	-1.428 (1.075)	0.371 (0.639)	0.081 (1.362)	-0.639 (1.779)	-1.924 (1.867)
First-stage F-stat	119.547	148.127	150.857	150.857	150.266	148.127	112.237	112.237
Observations	740	839	839	839	823	839	625	625
Panel G: Black Mon. Over.&Stocks (OLS)								
Expected stock recovery duration (years)	0.531*** (0.040)	-0.081*** (0.012)	-1.680*** (0.415)	1.192*** (0.409)	-1.196*** (0.266)	0.635 (0.534)	1.124 (0.727)	0.837 (0.718)
Panel H: Black Mon. Over.&Stocks (2SLS)								
Expected stock recovery duration (years)	0.341*** (0.102)	-0.087 (0.054)	-4.298** (2.058)	3.773** (1.820)	-1.118 (1.136)	4.532* (2.453)	1.220 (3.600)	3.828 (3.716)
First-stage F-stat	48.703	50.007	48.322	48.322	54.393	50.007	27.102	27.102
Observations	903	1,033	1,033	1,033	993	1,033	756	756
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows OLS and 2SLS estimates of the effect of respondents' expected stock market recovery duration on their expectations about their own financial situation and behavior. The outcomes are the expected recovery duration of the respondent's household net wealth (column 1); a categorical measure of the respondent's subjective household financial prospects, z-scored using the mean and standard deviation in the sample (column 2); dummies indicating plans to increase or decrease the equity share in overall financial assets in the weeks after the survey (columns 3-4, only for stockholders); expected growth of yearly household spending from 2019 to 2020 in percent, trimmed at the 2nd and 98th percentiles (column 5); dummies indicating whether the coronavirus crisis increases the respondent's expectations about outstanding household debt by the end of 2020 (column 6), expected desired working hours over the next years (column 7, only if in labor force) or expected retirement age (column 8, only if in labor force). All dummy outcomes are coded as 0 or 100. Panels A and B are based on the four control arms, which have not received any information. In Panels D, F and H, we use the relevant information treatment dummy as instrument for expected recovery duration. Panels C-D are based on the treatment and control arms including information or questions on the Financial Crisis 2007-2009, Panels E-F (G-H) are based on the Dot-com (Black Monday) arms. Panels C-F (G-H) are restricted to under-estimators (over-estimators). Panels B-H are restricted to respondents who held stocks before the current crisis. All specifications control for the same list of covariates in Table 4. The specifications on planned stock trading in columns 3 and 4 also control for realized trading since the onset of the crisis. Panels C-H also control for the respondent's prior belief about the recovery duration following the corresponding crash. Robust standard errors are reported in parentheses. * denotes significance at the 10 pct., ** at the 5 pct., and *** at the 1 pct. level.

Online Appendix: Exposure to the COVID-19 Stock Market

Crash and its Effect on Household Expectations

Tobin Hanspal¹ Annika Weber² Johannes Wohlfart³

A Additional evidence

A.1 Descriptive evidence on wealth and income shocks

The main goal of our survey was to examine how exposure to a stock market crash affects households' expectations about investment, spending and labor supply. However, our survey also offers a comprehensive real-time snapshot of the financial situation of households in the US during the early stages of the COVID-19 pandemic. In this section we describe in detail how wealth shocks from the COVID-19 stock market crash are distributed across the population and how they are correlated with income shocks.

Unconditional wealth shocks Panel A of Figure A17 displays the average unconditional percent change (top row) in the value of household financial assets across groups, where those with no financial assets are coded as having experienced a shock of zero. Wealth losses due to the stock market crash are strongly increasing along the net wealth distribution (left column), with overall financial losses amounting to 4 percent of pre-crisis financial wealth in the lowest quintile and to about 17 percent in the highest quintile. There is a similar gradient of wealth losses along the pre-crisis net income distribution (middle column). The distribution of dollar losses (bottom row) is naturally much more skewed along the net wealth and income distribution, reflecting the strong inequality in financial asset holdings across groups (as shown in Figure A18). Unconditional wealth losses in dollar terms amount to \$30,415 at the mean and \$1,750 at the median, and average \$1,311 in the lowest and \$107,275 in the highest net wealth quintile. These findings are consistent with Coibion et al. (2020b), who find mean wealth losses of \$33,482 among households in the Nielsen homescan panel in April 2020.

The right column of Figure A17 displays unconditional capital losses by age group. Percent changes in financial wealth are most pronounced for those aged between 25 and 54 (net capital losses of between 13 and 14 percent), and are markedly lower for younger individuals (8 percent) and for older individuals (11 percent for those aged 55-64 and 10 percent for those above 65). Wealth shocks in dollar terms increase in age, reflecting

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increasing wealth accumulation over people's working life. Across net wealth, income and age groups, both absolute and percent losses are larger for holdings in retirement accounts (e.g., 401Ks or IRAs) than for holdings outside of retirement accounts, largely reflecting higher wealth (see Figure A18) and higher stock shares (see Figure A19) inside retirement accounts.

Figure A20 shows that unconditional wealth shocks are strongly increasing in educational attainment, are stronger for men, and less pronounced for those retired or part-time employed compared to those full-time employed as of January 2020. Given that we ask about household wealth, one should interpret these patterns along individual-level characteristics with caution.

Conditional wealth shocks The patterns in the distribution of unconditional losses in financial wealth reflect differences across groups in i) the fractions of households with no financial wealth before the crisis, who did not incur losses, ii) the pre-crisis stock share in financial assets, which differs substantially across groups (see Figure A19), iii) the types of risky assets households invest in, or iv) the tendency to realize losses across groups. While our survey data are not granular enough to address iii), we explore i) and ii) in more detail by studying conditional wealth losses across groups. In subsection 3.2 we also address iv) by studying active adjustments to stockholdings across groups.

Figure A21 reproduces Figure A17 for the sample of households who report positive holdings of financial assets inside or outside of retirement accounts as of January 2020.⁴ As before, percent financial losses are increasing in net wealth and income, and are hump-shaped in age. However, the patterns are substantially less pronounced than before. Due to differences in the value of financial assets, patterns of dollar changes in wealth across net wealth and income groups remain largely unchanged. Figure A22 restricts the sample further to households investing in stocks or stock mutual funds as of January 2020, which makes the patterns in percent losses across income and wealth groups almost uniform, while the age pattern remains. The last column of Figure A22 highlights that wealth losses are strongly increasing in the pre-crisis portfolio equity share. Finally, Figure A23 plots losses by pre-crash equity share bin separately for different groups. Mean losses conditional on portfolio equity share are mostly very similar across groups. This highlights that conditional on holding positive financial wealth, differences in capital losses to a large extent seem to be due to differences in portfolio shares invested in stocks and stock mutual funds. This becomes particularly evident when we compare mean experienced losses between the highest (5) and lowest (1) quintiles of the wealth and income distributions. As shown in Table A11, the difference in unconditional wealth

⁴ The values in the figure are conditional on positive overall financial wealth holdings and thereby hold the sample fixed across the three bars. The patterns look similar if we condition on positive retirement and non-retirement financial wealth holdings separately.

losses between the most and least wealthy households of 13 percentage points shrinks to 7 percentage points if we condition on holding positive financial wealth, declines further to 1.4 percentage points among those with positive investment in equities, and mean losses are virtually identical once we condition on households' pre-crisis equity share.

Conditional on pre-crisis portfolio equity share, the age pattern in percent wealth losses is no longer hump-shaped, although older households still display lower wealth losses. Overall, the unconditional difference in wealth losses between age group 35-44, which incurred the largest percent losses, and age group 65+ of 3.8 percentage points does not change substantially when conditioning on positive financial wealth, on holding stocks, or on pre-crisis equity share bin (see Table A12).⁵ These patterns suggest that smaller percent shocks among older households are to a large extent due to investment in equities that were less exposed to the crash compared to younger households. One potential explanation for these patterns is that a large fraction of retirement wealth is invested in products such as target-date funds (TDFs), which automatically reduce exposure to risks of large drops in the stock market over investors' lifetime (Balduzzi and Reuter, 2018; Mitchell and Utkus, 2012). Alternatively, older households could have sold more equity early on during the crash, or sold less equity around the low point of the market. Older respondents are less likely to have reduced the risky share during the crash compared to middle-age households (see Figure A3), suggesting that smaller losses could indeed be driven by less selling around the low point of the market. Exploring the dynamics of adjustments in equity holdings over the crash across groups in administrative data could be a fruitful avenue for future research.

Income shocks How does the distribution of wealth shocks across groups compare with the distribution of income shocks during the early stages of the pandemic? Figure A17 Panel B displays average shocks to household net income in the first quarter of 2020 across groups. We calculate these shocks based on a survey question asking respondents by what percent their household income in the first quarter was higher or lower than they had expected before the crisis. Strikingly, income shocks exhibit the opposite pattern compared to wealth shocks, with income losses being strongest for households in the bottom net wealth or income quintiles (7 and 6 percent respectively), and gradually becoming less severe, with those in the highest quintiles losing almost no income (top row). There is also a strong age gradient in income losses, with younger households being affected most severely and older households being more insulated. We convert these shocks into dollar changes using the approximation that, before the onset of the crisis, households had expected a quarter of their 2019 income for the first quarter of 2020 (bottom row). Unconditionally, respondents report to have lost \$844 of net household

⁵ The patterns are similar for the comparison between age group 35-44 and age group 55-64, which is still within working age years.

income over the first quarter 2020, on average. Income losses average \$536 in the lowest and \$1,047 in the highest net income quintile. While the income and wealth gradients naturally reverse, the age pattern remains fairly similar as for relative income losses.

Figure A24 provides evidence on the distribution of job losses, the main drivers of shocks to household incomes, among the respondents in our sample. A striking 26% of our respondents report that they have lost their job from January 2020 until the time of our survey in early April, in line with other recent evidence (Adams-Prassl et al., 2020; Bick and Blandin, 2020; Coibion et al., 2020e). Job losses broadly follow the same patterns as income losses. They are more prevalent for lower net wealth, for lower income and for younger households. Women, individuals with lower education, and part-time workers are also more likely to have lost their jobs.

Taken together, these findings imply that income losses and wealth losses during the early stages of the COVID-19 pandemic tend to be negatively correlated across groups. More generally, households' exposure to stock market crashes is concentrated among groups of households who tend to be less affected by income shocks during recessions (Hoynes et al., 2012). This is in line with earlier findings documenting that wealth inequality tends to decline during recessions, at least in the short run (Kuhn et al., 2020).⁶

A.2 Heterogeneity in the MPC out of income shocks

In Figure A6 we examine heterogeneity in the effect of shocks to expected annual income on expected spending. Income shocks have the most pronounced effect for households with below median age, with below median incomes, or with no liquid assets, and for credit-constrained households, in line with the idea that these groups are more likely to exhibit hand-to-mouth behavior. Moreover, income shocks have particularly strong effects on expected spending of individuals who expect their incomes never to recover, in line with predictions from standard life-cycle models on the differential effects of permanent and transitory income shocks.

A.3 Comparison of findings on earlier retirement with Coibion et al. (2020b)

Coibion et al. (2020b) document that many workers who lost their job between January and April 2020 report that they have dropped out of the labor force, and partially retired early. How do their findings align with ours? First, expectations about later retirement are unobserved in their survey, so the fact that we find large fractions report-

⁶ Given the concentration of stock ownership in households at the top of the distribution, decreasing stock prices tend to reduce wealth inequality across households. However, differences in the relative speed of recovery of equity and housing markets led to a spike in wealth inequality in the aftermath to the Financial Crisis 2007-2009 (Kuhn et al., 2020).

ing an increased expected retirement age is not inconsistent with their results. Second, in line with their findings, a significant fraction of our respondents (4 percent) report downward adjustments of their expected retirement age. In the following we compare the magnitudes of these patterns across the two datasets.

Coibion et al. (2020b) report that among those who dropped out of the labor force between January until April 2020, the fractions reporting “retirement” as a reason are 28 percent among those employed as of January and 21 percent among those unemployed as of January. In our survey we ask questions on expected retirement age only to those employed or in full-time education as of January. Among those of our respondents who have lost their jobs since January, 6 percent report that they have decreased their expected retirement age due to the corona crisis. There are two potential reasons for difference in magnitudes. First, while Coibion et al. (2020b) focus on those who transitioned from being employed to being out of the labor force (only part of which lost their job due to the corona crisis), we focus on those who lost their job on account of the corona crisis (not all of which dropped out of the labor force). Second, our question is explicitly phrased as referring to expecting to retire earlier *due to the coronavirus crisis*, so we do not capture transitions from being employed to retirement that are unrelated to the pandemic.

The fraction of our respondents reporting downward adjustments of expected retirement age due to the corona crisis can be compared more directly to their estimated change in the fraction of retired individuals from January to April by 4 percentage points (from 25 to 29 percent), as we do in Table A13. In our survey, while 4 percent of all respondents who were employed as of January report to have downward adjusted their expected retirement age due to the corona crisis, this fraction becomes 3 percent when scaled to the full population (assuming that the same fraction of those unemployed as of January decided to retire early). The table also reports these numbers across different demographic groups. The tendency to reduce expected retirement age is higher among those with higher incomes and among the highly educated, in line with the patterns reported by Coibion et al. (2020b). Different to the findings in Coibion et al. (2020b), we find the tendency to expect earlier retirement to be more pronounced among men. One complication in a one-to-one comparison of magnitudes is that Coibion et al. (2020b) focus on those who have retired at the time of the survey, while our measure additionally includes those who have not yet retired but expect to do so in the future earlier than they had anticipated. Overall, our results are qualitatively similar to theirs, although there are differences in magnitudes.

B Additional figures

Figure A1: Information Treatment *FinCrisisInfo*

You estimated that stock prices recovered to their pre-crisis level 5 years after the beginning of their drop in October 2007.

We now provide you with information on the actual development of stock prices during the Financial Crisis that started in 2007.

Starting from the beginning of the drop in stock prices in October 2007, it took **about 5 ½ years** until stock prices recovered to their pre-crisis level in March 2013.



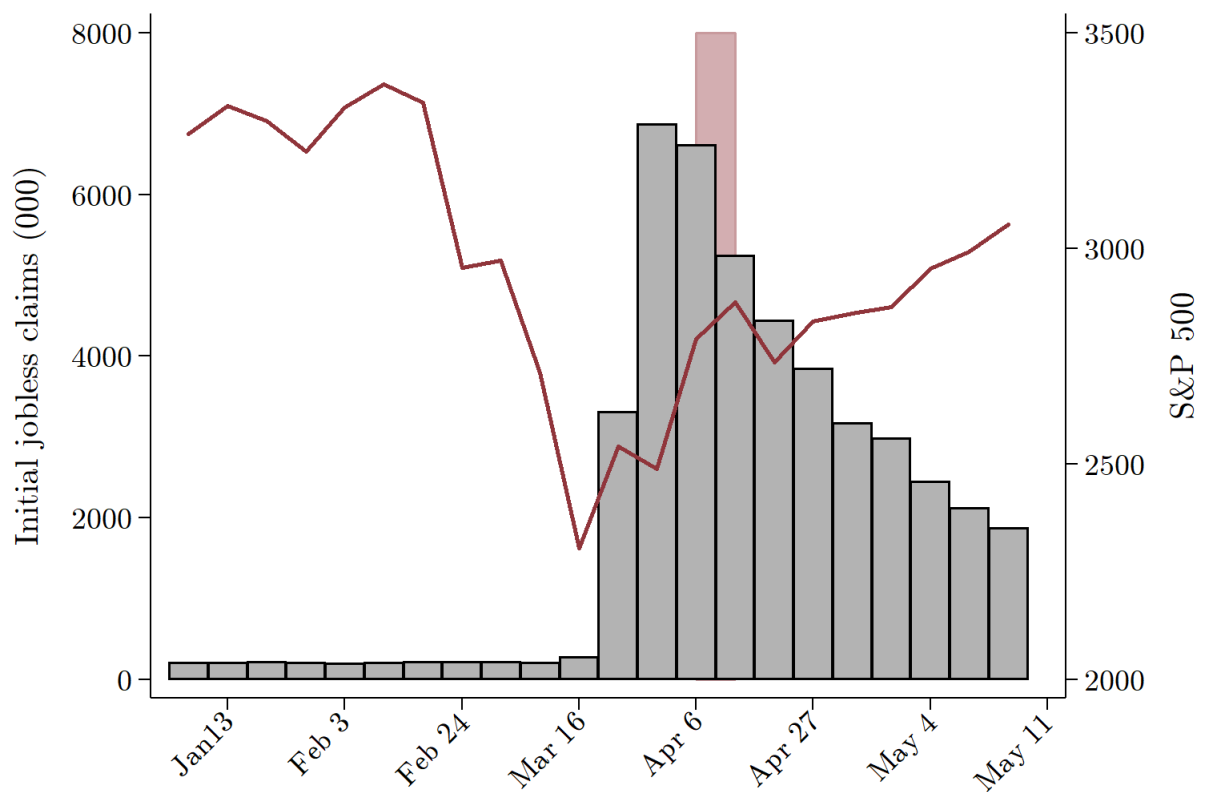
Source: The number is based on the time that the stock market index S&P500 needed to recover to its pre-crisis level.

Note: You will be able to go to the next slide after you have spent a few seconds on this slide.



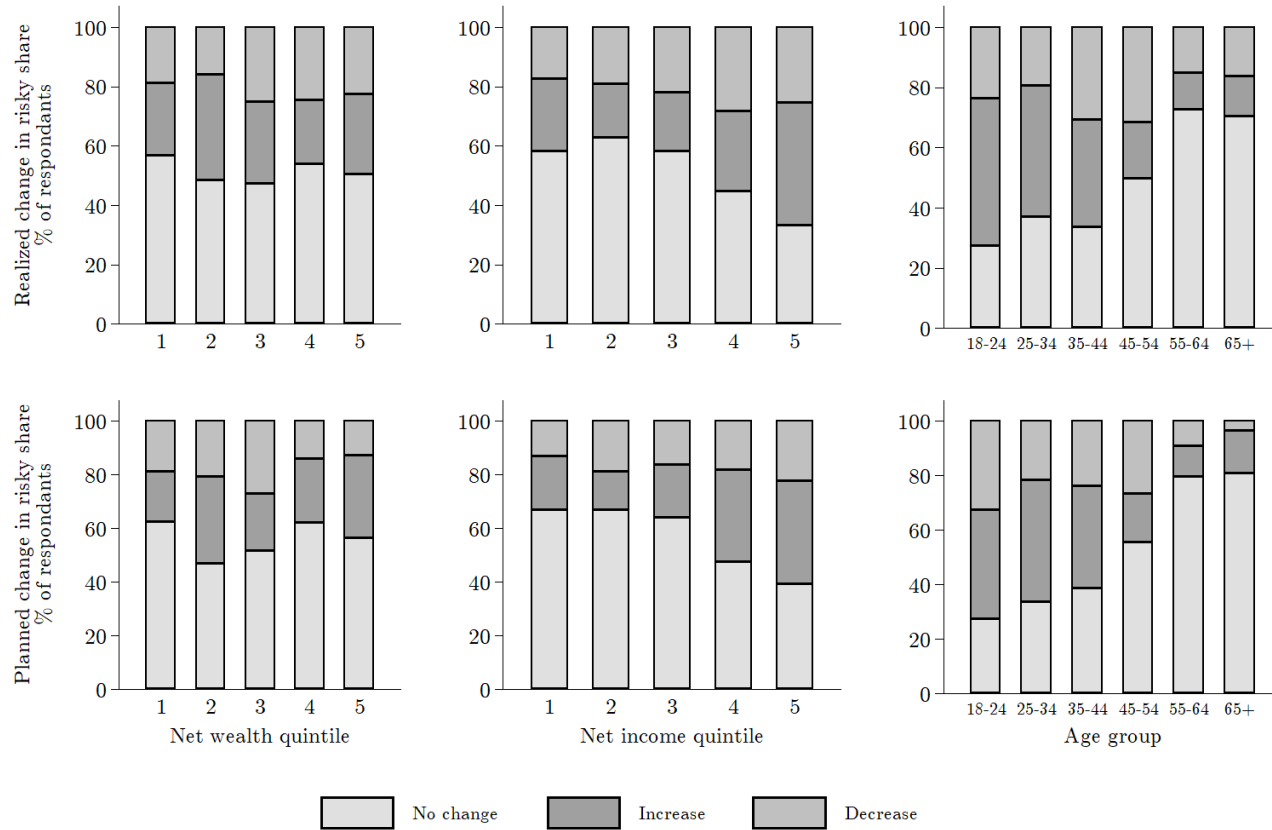
Notes: This figure illustrates the information treatment screen, providing an example of the *FinCrisisInfo* treatment arm. The information treatment includes a dynamic figure contrasting the respondent's prior belief (in dark orange, on the right) with the actual number of years it took for the US stock market to recover to its levels before the Financial Crisis 2007-2009 (in yellow, on the left). Recovery durations for the three different information treatments *FinCrisisInfo*, *BlackMondayInfo* and *DotComInfo* are calculated based on monthly time series data of the S&P500.

Figure A2: US stock market and number of initial jobless claims around the survey period



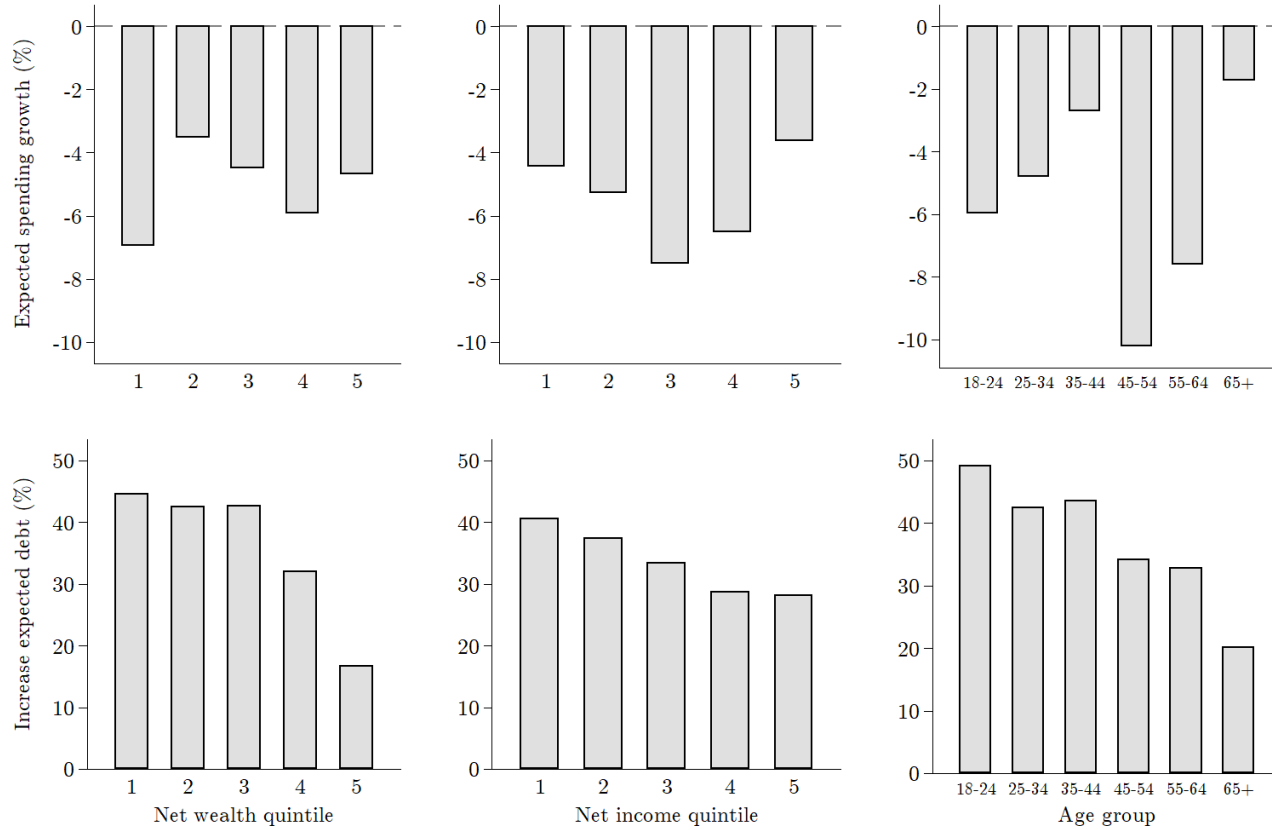
Notes: This figure displays the number of initial jobless claims (in thousands, left axis) and the development of the S&P500 stock market index (index points, right axis) over the first 20 weeks in 2020, on a weekly basis. The April 6th-13th survey period is highlighted in light red.

Figure A3: Realized and planned adjustments to stock share across groups



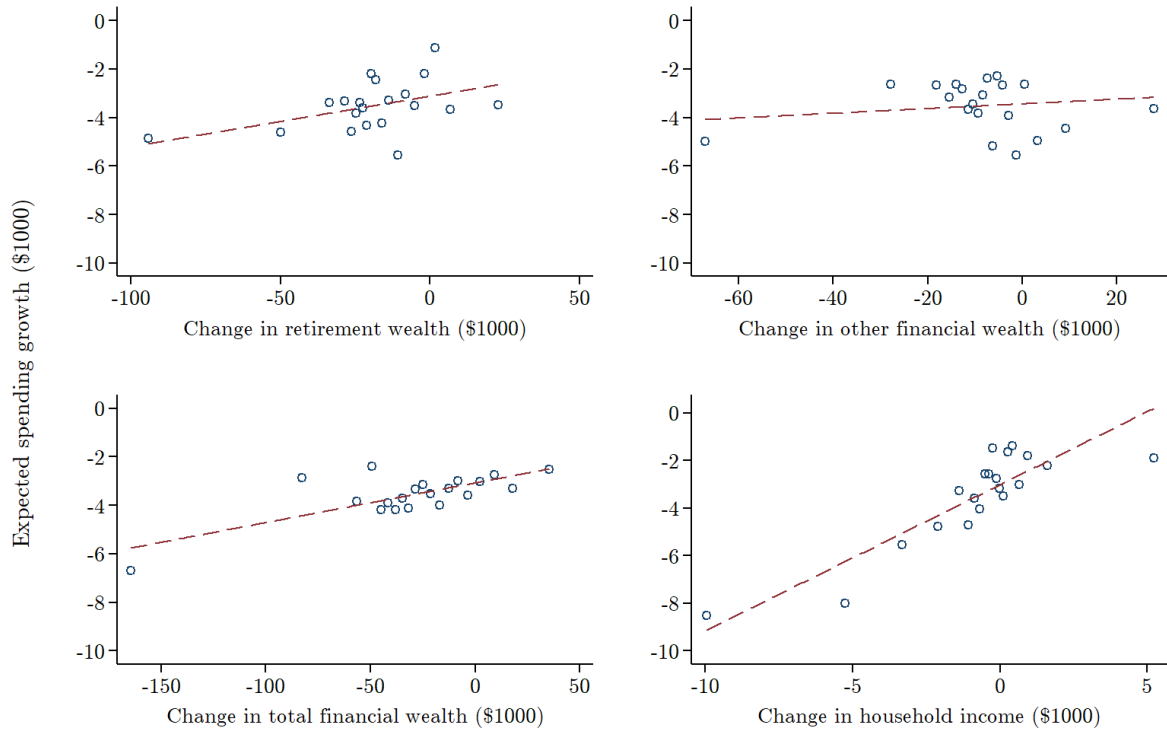
Notes: The top row of this figure displays the fractions of pre-crisis stockholders in different groups reporting that they made no active change, actively increased, or actively decreased the share of their overall financial assets (including retirement and non-retirement accounts) that is invested in the stock market since the beginning of the crisis, while the bottom row plots the percent of respondents who stated that they are planning to make no change, increase, or decrease their investment in the following weeks. The fractions are plotted by quintile of the pre-crisis net wealth distribution (left), quintile of the pre-crisis net income distribution (middle), and age group (right). The sample consists of all pre-crisis stock investors in the pure control group, who have not received any questions or information on past crashes before answering to the questions on investment behavior.

Figure A4: Changes in expected spending and debt across groups



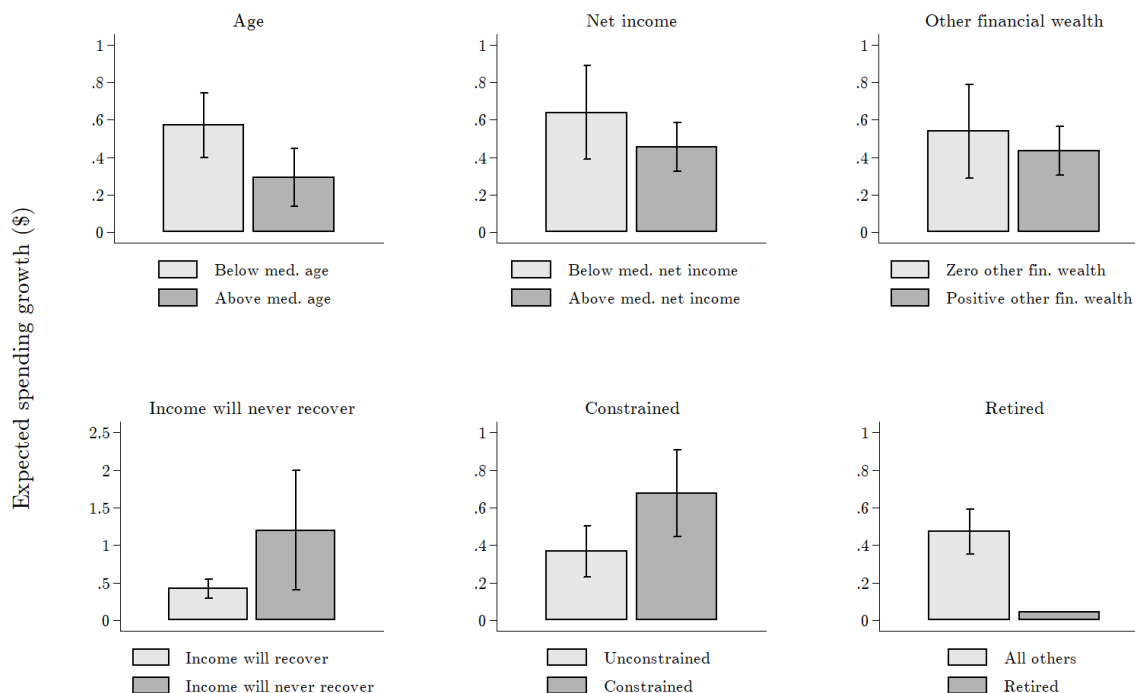
Notes: This figure displays the average percent change in expected total nominal household spending in 2020 compared to 2019 (top row) and the percent of respondents reporting that the current crisis increases their expected outstanding household debt by the end of the year 2020 (bottom row), by quintile of the pre-crisis net wealth distribution (left), by quintile of the pre-crisis net income distribution (middle) and by age group (right). The sample consists of respondents in the pure control group, who have not received any questions or information on past crashes before answering to the questions on spending and debt.

Figure A5: Effects of wealth and income shocks on expected spending



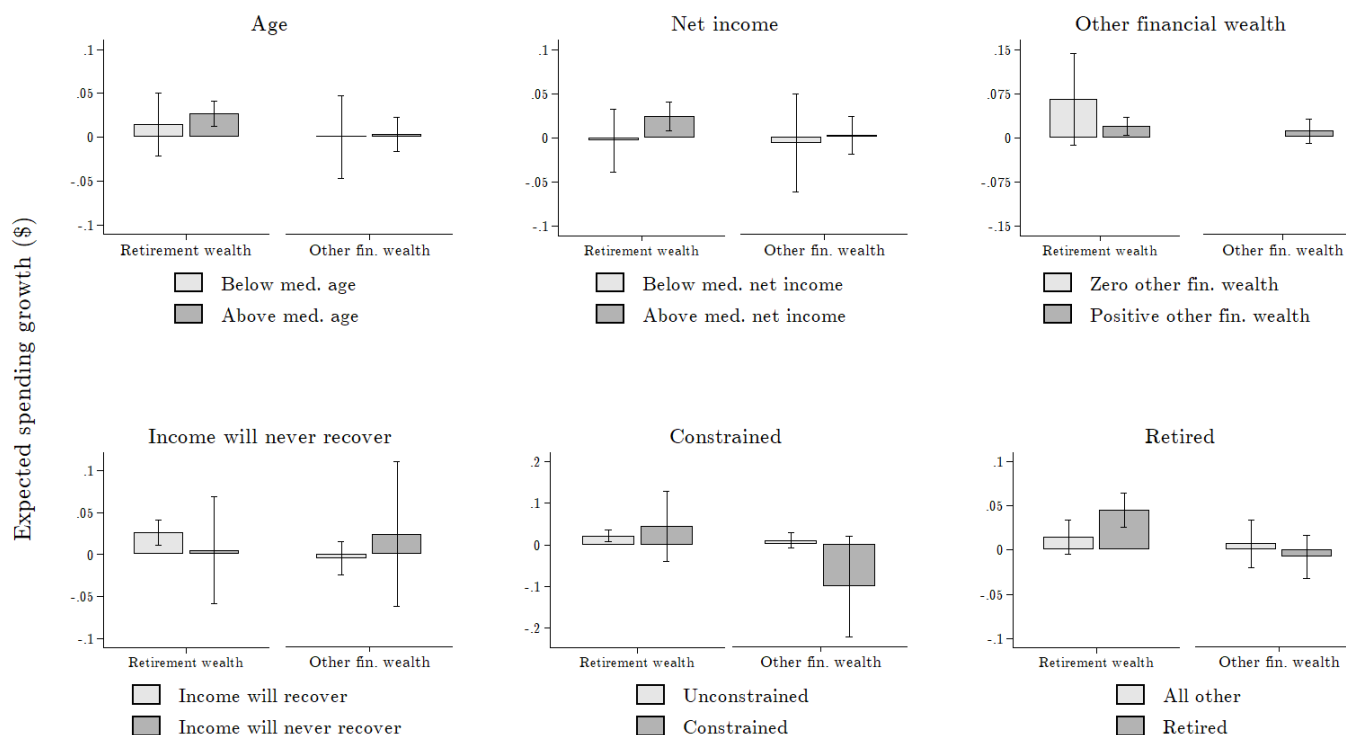
Notes: This figure shows binned scatter plots of the association of shocks to the respondent's household financial wealth and net income with expected growth of total nominal household spending in 2020 compared to 2019. The plots in the top row and in the bottom right are based on specification 2 shown in Table 2, which jointly includes shocks to income, retirement financial wealth and other financial wealth. The plot in the bottom left is based on a similar specification replacing the shocks to financial wealth in retirement accounts and in non-retirement accounts with the shock to overall financial wealth. The outcome is expected household spending growth in dollars, trimmed at the 2nd and 98th percentiles. Dollar changes are constructed from survey questions for retirement and other financial wealth and for income (assuming that the respondent expected a quarter of her 2019 income for the first quarter of 2020), and for spending from the survey question on percent changes and estimates of the level of spending of different groups in 2019 from the CEX. All specifications are based on respondents in the four control arms, who have not received any information. All specifications control for gender, age, employment status, marital status, highest educational attainment, being the main earner, being financial decision-maker, party affiliation (dummies for Republican and other party), log net household income, logs of retirement wealth, of other financial wealth, of real estate wealth, and of debt, borrowing constraints, stock market participation, the equity share in total financial assets, investment experience, Census region, survey date, and the survey arm.

Figure A6: Effects of income shocks on expected spending: Heterogeneity



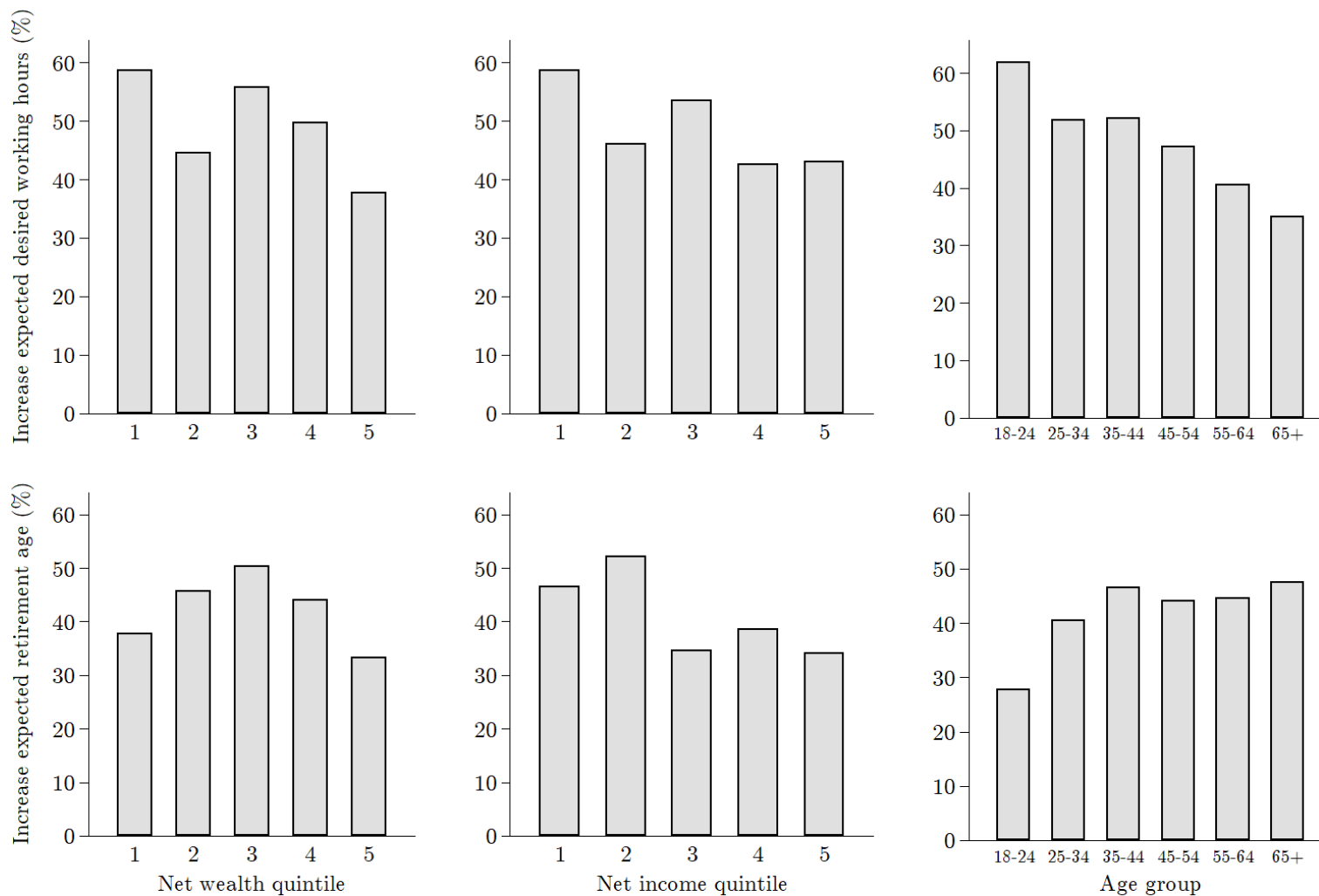
Notes: This figure shows heterogeneity in the effect of income shocks on expected growth of total nominal household spending in 2020 compared to 2019 across groups. The plots are based on the 2SLS specification shown in Table 2 column 3, where the respondent's expected dollar change in household income from 2019 to 2020 is instrumented with the unexpected shock to household income in the first quarter, estimated for different subsamples. The different panels show median splits (below and equal to median vs. strictly above median) according to age (top left) and pre-crisis household net income (top middle), by an indicator (0 vs. 1) for holding other (non-retirement) financial wealth in January 2020 (top right), by an indicator for believing household income will never recover (bottom left), by an indicator for the respondent's household facing credit constraints (bottom middle), and being retired (bottom right). The outcome is expected household spending growth in dollars, trimmed at the 2nd and 98th percentiles. Dollar changes are constructed from survey questions for retirement and other financial wealth and for income (assuming that the respondent expected a quarter of her 2019 income in the first quarter of 2020), and for spending from the survey question on percent changes and estimates of the level of spending of different groups in 2019 from the CEX. In the bottom right panel we do not include confidence bands as the interval is large and insignificant. For all others we include 90% confidence intervals. All specifications are based on respondents in the four control arms, who have not received any information. All specifications control for the same set of controls as in Table 2.

Figure A7: Effects of wealth shocks on expected spending: Heterogeneity



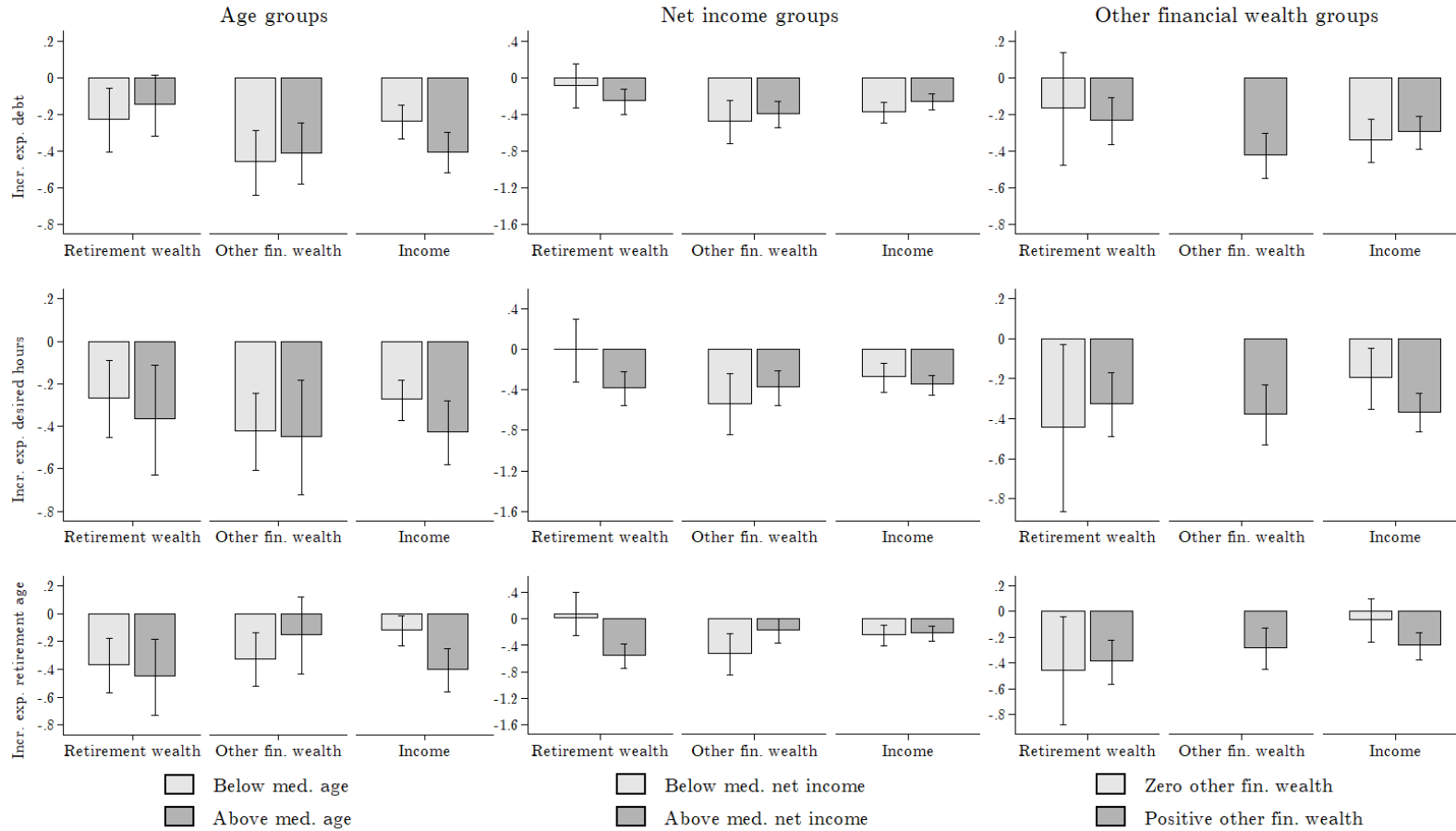
Notes: This figure shows heterogeneity in the association of shocks to the respondent's household retirement financial wealth and non-retirement financial wealth and the expected growth of total nominal household spending in 2020 compared to 2019. The plots for wealth shocks are based on the reduced-form specification controlling for the first quarter-income shock shown in Table 2 column 2, estimated for different subsamples. The outcome is expected household spending growth in dollars, trimmed at the 2nd and 98th percentiles. Dollar changes are constructed from survey questions for retirement and other financial wealth and for spending from the survey question on percent changes and estimates of the level of spending of different groups in 2019 from the CEX. We plot coefficients on changes to a respondent's household retirement financial wealth and other financial wealth by median splits (below and equal to median vs. strictly above median) according to age (top left) and pre-crisis household net income (top middle), by an indicator (0 vs. 1) for holding other (non-retirement) financial wealth in January 2020 (top right), by an indicator for believing individual income will never recover (bottom left), by an indicator for the respondent's household facing credit constraints (bottom middle), and by being retired (bottom right). 90% confidence intervals are displayed in all figures. All specifications are based on respondents in the four control arms, who have not received any information. All specifications control for the same set of controls as in Table 2.

Figure A8: Changes in expected labor market activity across groups



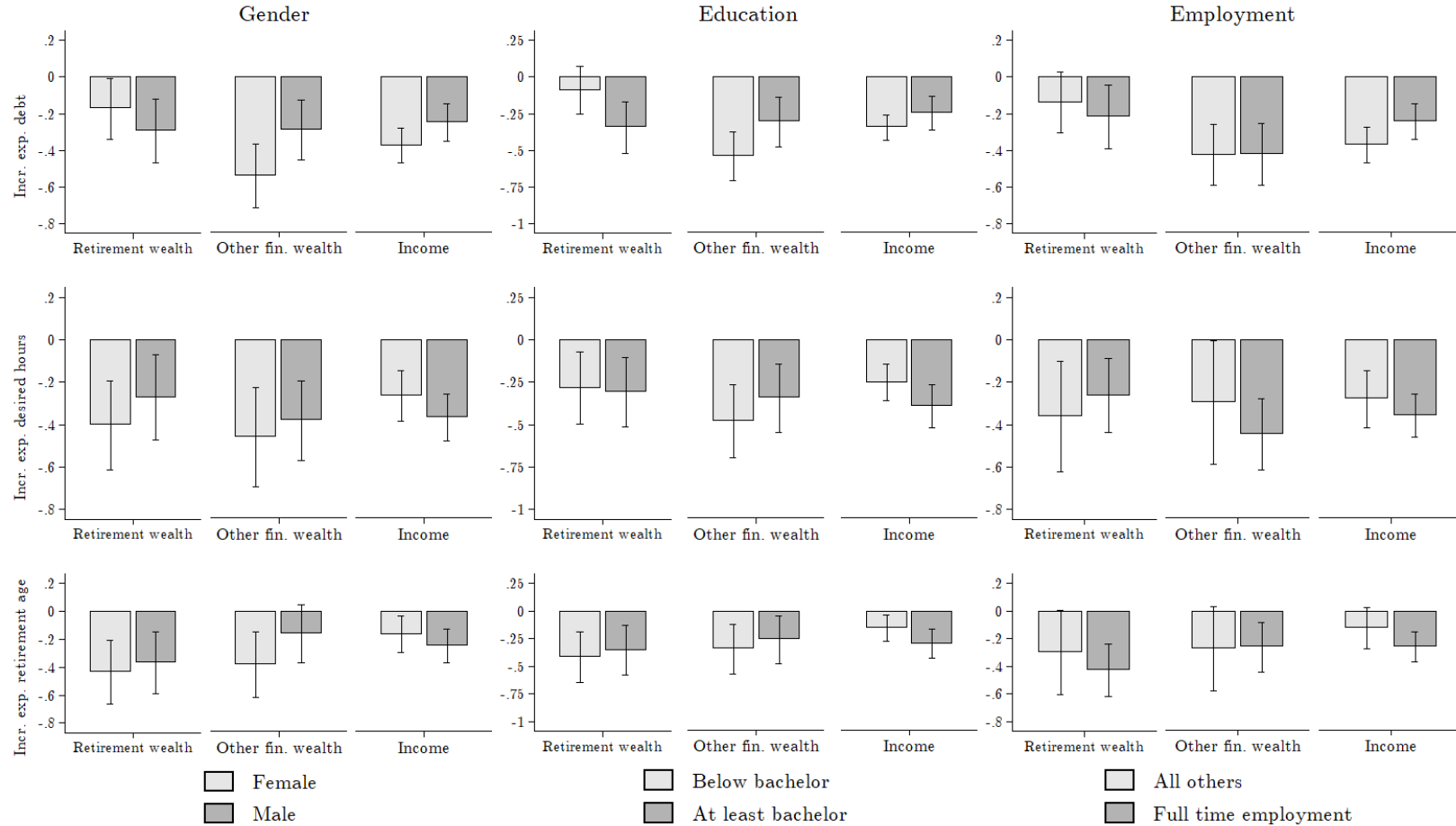
Notes: This figure displays the percent of respondents who report that they have upward adjusted their expectations about desired working hours in the next years (top row) or their retirement age (bottom row) due to the current crisis (bottom row), by quintile of the pre-crisis net wealth distribution (left), by quintile of the pre-crisis net income distribution (middle) and by age group (right). The sample consists of respondents in the pure control group, who have not received any questions or information on past crashes before answering to the questions on expected labor market activity.

Figure A9: Effects of wealth and income shocks on economic plans: Heterogeneity I



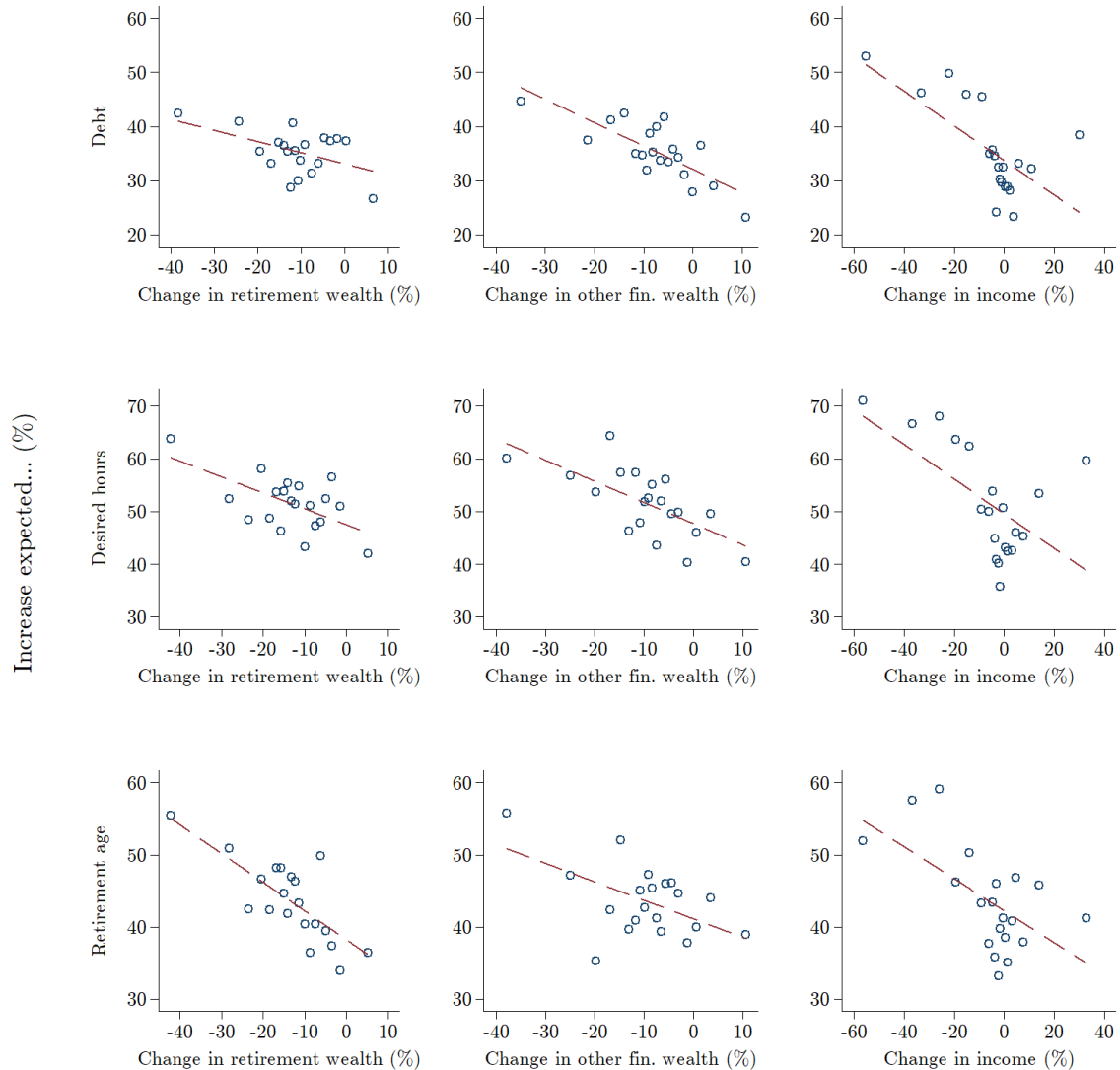
Notes: This figure shows heterogeneity in the effect of shocks to the respondent's household financial wealth and net income on expected economic decisions. We plot the coefficients from specifications regressing indicators for whether the coronavirus crisis increases the respondent's expectations about outstanding household debt by the end of 2020 (top row), expected desired working hours over the next years (middle row) and expected retirement age (bottom row), all coded as 0 or 100, on changes to a household's retirement financial wealth, other financial wealth, and net household income. We plot these coefficients across columns by median splits (below and equal to median vs. strictly above median) according to age (left column) and pre-crisis household net income (middle), and by an indicator (0 vs. 1) for holding other (non-retirement) financial wealth in January 2020 (right). 90% confidence intervals are displayed in all figures. All specifications are based on respondents in the four control arms, who have not received any information. All specifications control for the same set of controls as in Table 2.

Figure A10: Effects of wealth and income shocks on economic plans: Heterogeneity II



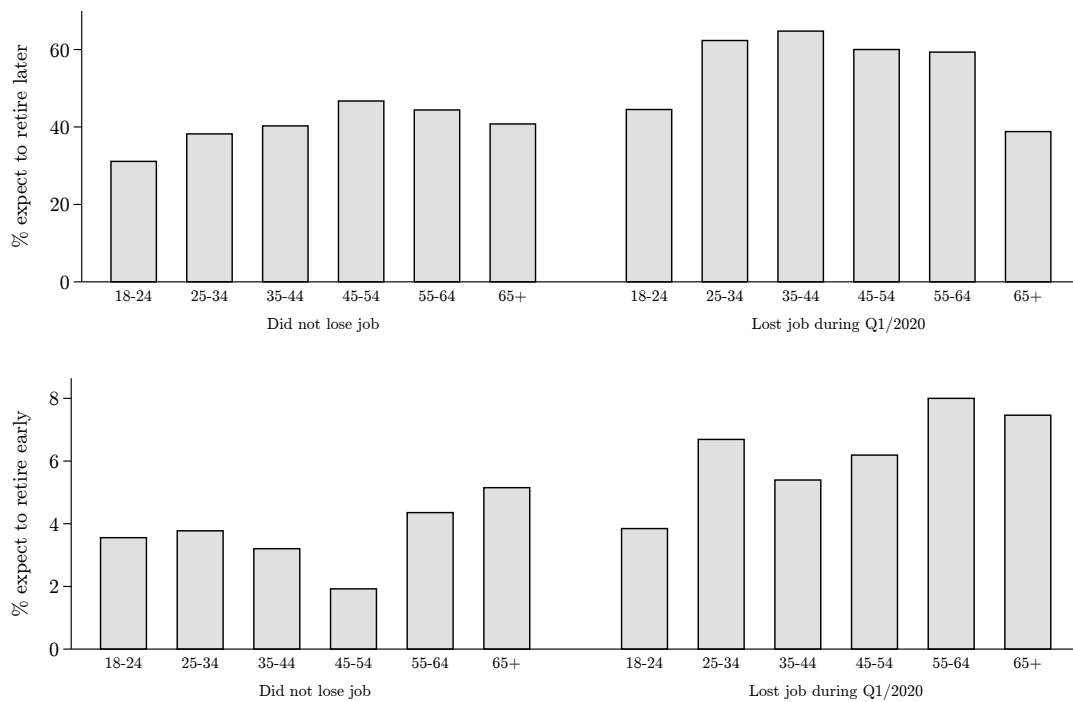
Notes: This figure shows heterogeneity in the effect of shocks to the respondent's household financial wealth and net income on expected economic decisions. We plot the coefficients from specifications regressing indicators for whether the coronavirus crisis increases the respondent's expectations about outstanding household debt by the end of 2020 (top row), expected desired working hours over the next years (middle row) and expected retirement age (bottom row), all coded as 0 or 100, on changes to a household's retirement financial wealth, other financial wealth, and net household income. We plot these coefficients across columns by indicators for gender (left column), education of at least a bachelors degree (middle), and being full-time employed pre-crisis (right). 90% confidence intervals are displayed on all figures. All specifications are based on respondents in the four control arms, who have not received any information. All specifications control for the same set of controls as in Table 2.

Figure A11: Effects of wealth and income shocks on economic plans



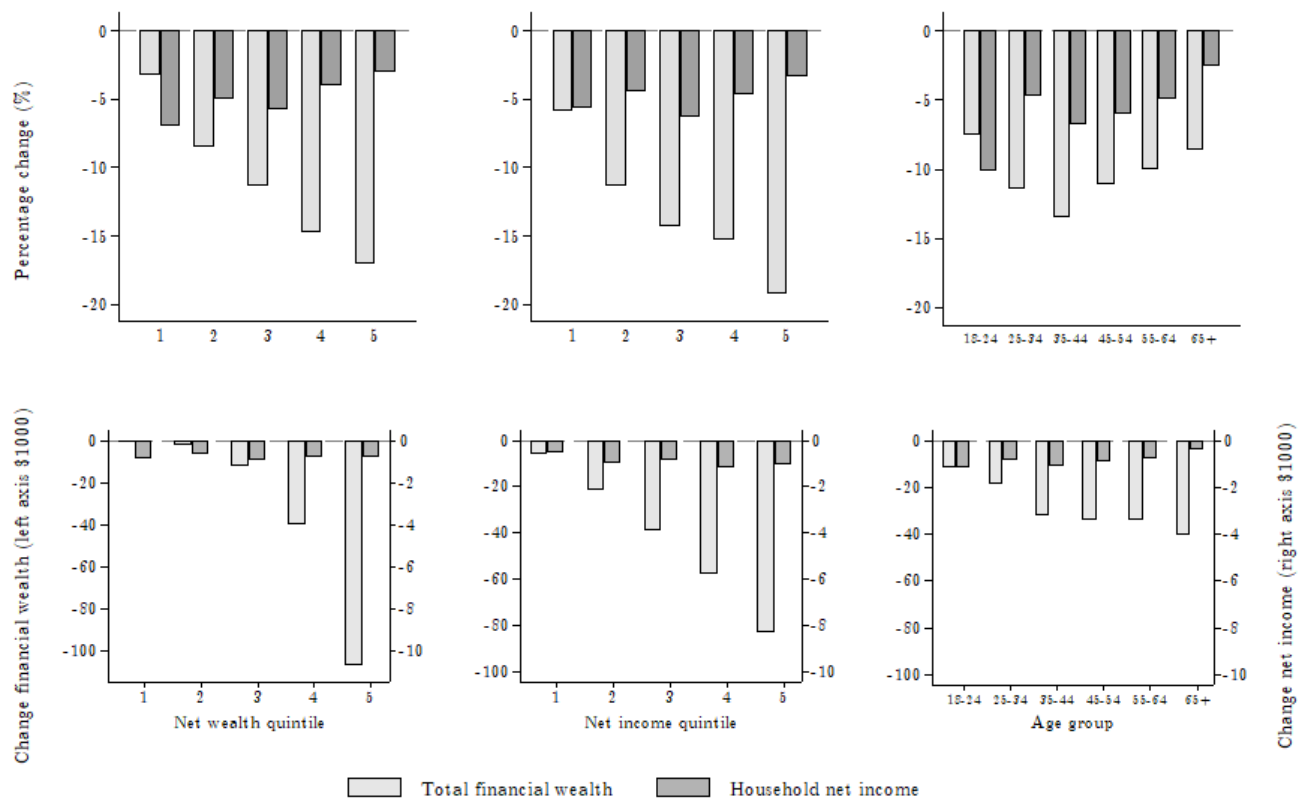
Notes: This figure shows binned scatter plots of the association of shocks to the respondent's household financial wealth and net income with expected economic decisions. The outcomes are a dummy indicating whether the coronavirus crisis increases the respondent's expectations about outstanding household debt by the end of 2020 (left column), expected desired working hours over the next years (middle column, only if in labor force), or expected retirement age (right column, only if in labor force), all coded as 0 or 100. The underlying regressions are specifications 4, 5, and 6 in Table 2, which jointly include changes to retirement financial wealth, to other financial wealth, and to household net income. For each outcome (debt, desired working hours, and retirement age), we plot coefficients on changes in retirement wealth (top), changes in other financial wealth (middle), and by changes in household income (bottom) in percentage terms, respectively. All specifications are based on respondents in the four control arms, who have not received any information. All specifications control for the same set of controls as in Table 2.

Figure A12: Retirement plans and job loss by age category



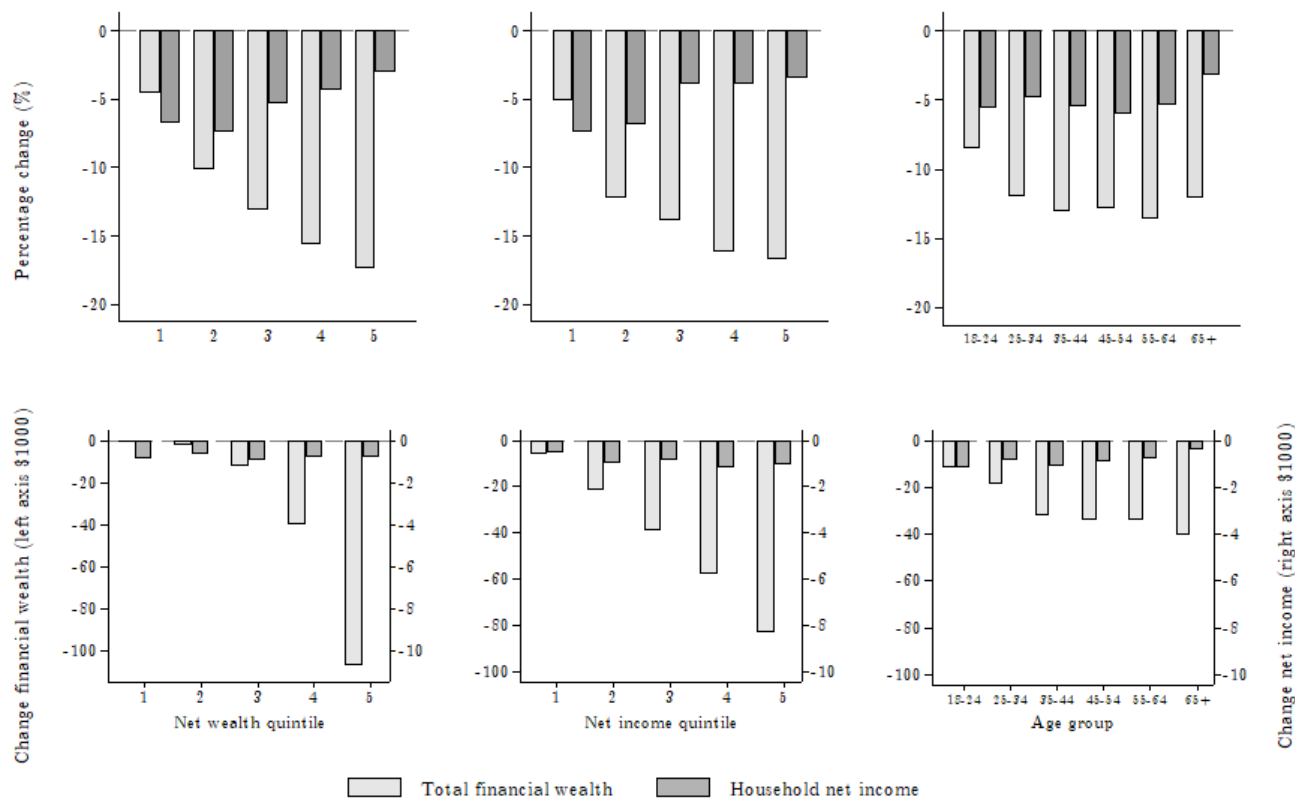
Notes: This figure displays the percentage of respondents who state they at they expect to retire later (top) or earlier (bottom) due to the corona crisis, among those who did not lose their job since January 2020 (left) and among those who did lose their job (right). We plot these percentages by age group. The sample is the full sample without missings in the relevant survey questions.

Figure A13: Financial wealth and household net income shocks, first half of sample period (April 6th-8th)



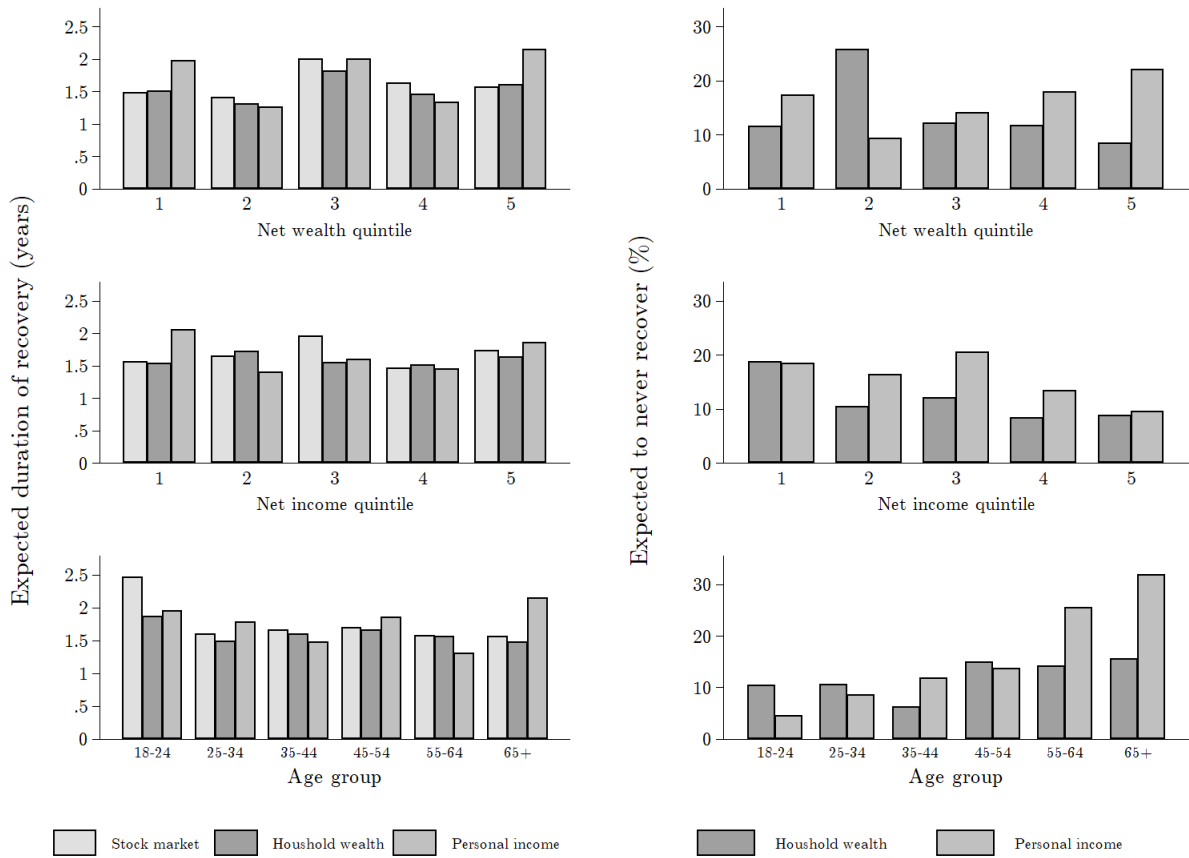
Notes: This figure reproduces Figure 1 using only respondents that answered the survey during the first half of the sample period (April 6th-8th). This figure displays changes in the value of total financial assets due to the February/March 2020 stock market drop until the survey date and unexpected changes in net household income during the first quarter of 2020. Changes are reported in percentages (top row) and USD (bottom row), by quintile of pre-crisis net wealth (left column), by quintile of pre-crisis net income (middle column) and by age group (right column), respectively. Changes in total household financial wealth are the combined changes to financial assets outside of retirement accounts (other financial wealth) and inside retirement accounts. Changes in value of financial assets are net capital losses for the majority of respondents, and net capital gains for a small fraction of respondents. In the bottom panel changes in financial wealth are shown on the left axis in thousands of USD, the right axis displays the change in household net income in thousands of USD. We trim reported income and wealth shocks at the 2nd and 98th percentiles.

Figure A14: Financial wealth and household net income shocks, second half of sample period (April 9th-13th)



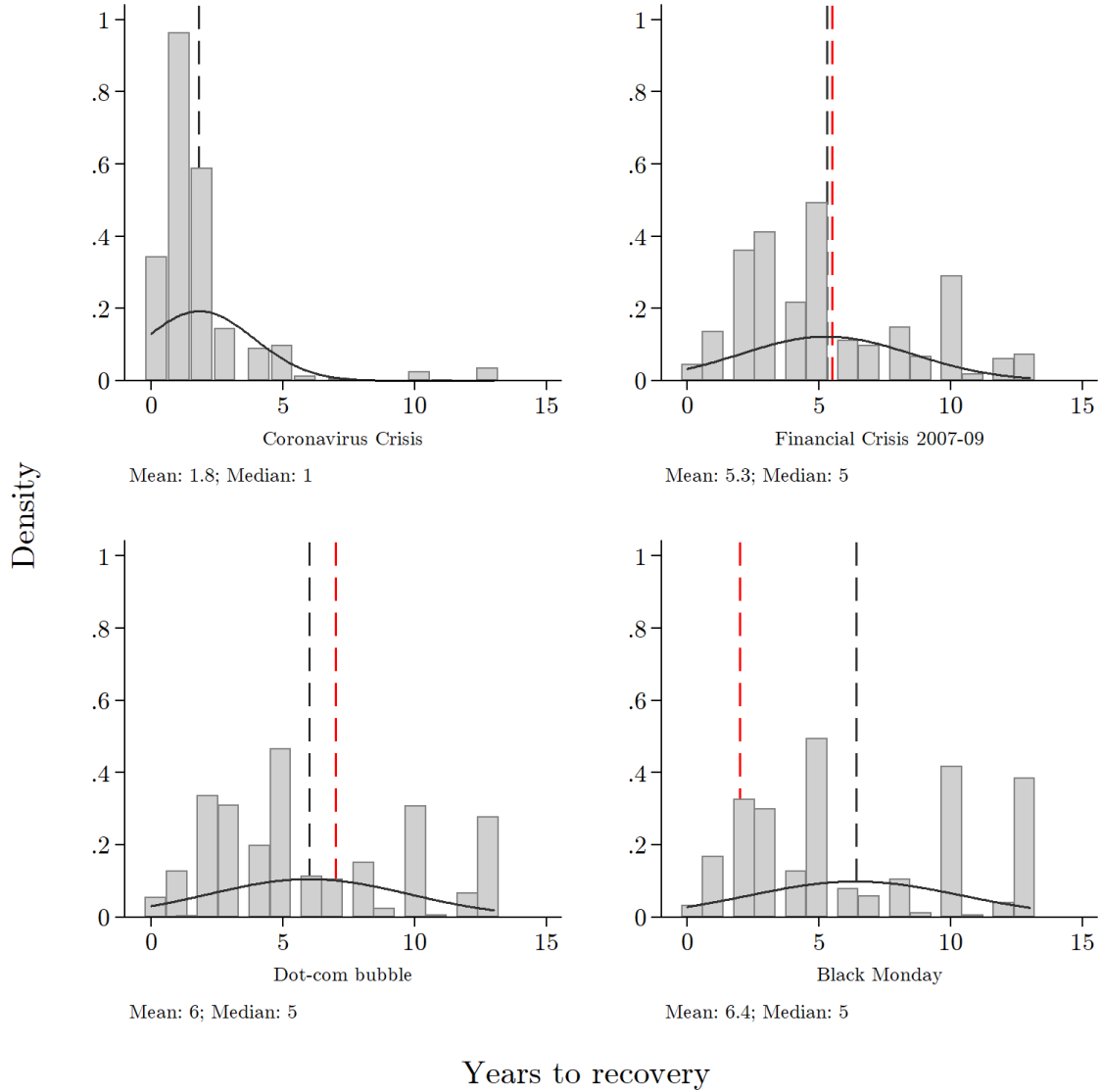
Notes: Notes: This figure reproduces Figure 1 using only respondents that answered the survey during the second half of the sample period (April 9th-13th). This figure displays changes in the value of total financial assets due to the February/March 2020 stock market drop until the survey date and unexpected changes in net household income during the first quarter of 2020. Changes are reported in percentages (top row) and USD (bottom row), by quintile of pre-crisis net wealth (left column), by quintile of pre-crisis net income (middle column) and by age group (right column), respectively. Changes in total household financial wealth are the combined changes to financial assets outside of retirement accounts (other financial wealth) and inside retirement accounts. Changes in value of financial assets are net capital losses for the majority of respondents, and net capital gains for a small fraction of respondents. In the bottom panel changes in financial wealth are shown on the left axis in thousands of USD, the right axis displays the change in household net income in thousands of USD. We trim reported income and wealth shocks at the 2nd and 98th percentiles.

Figure A15: Expected duration of recovery across groups



Notes: This figure displays respondents' subjective expectations about the duration of the recovery in years for the US stock market, the respondent's pre-crisis household net wealth, and the respondent's pre-crisis household net income (left column) and the fractions of respondents who believe that their household net wealth or income will never recover (right column) by quintile of the pre-crisis net wealth distribution (top row), by quintile of the pre-crisis net household income distribution (middle row), and by age group (bottom row). The figures on expected recovery duration of the stock market and own wealth condition on those who have made financial losses, while the figures on income recovery duration condition on those who have incurred income losses. The sample consists of respondents in the pure control group, who have not received any questions or information on past crashes before answering to the questions on expected recovery duration.

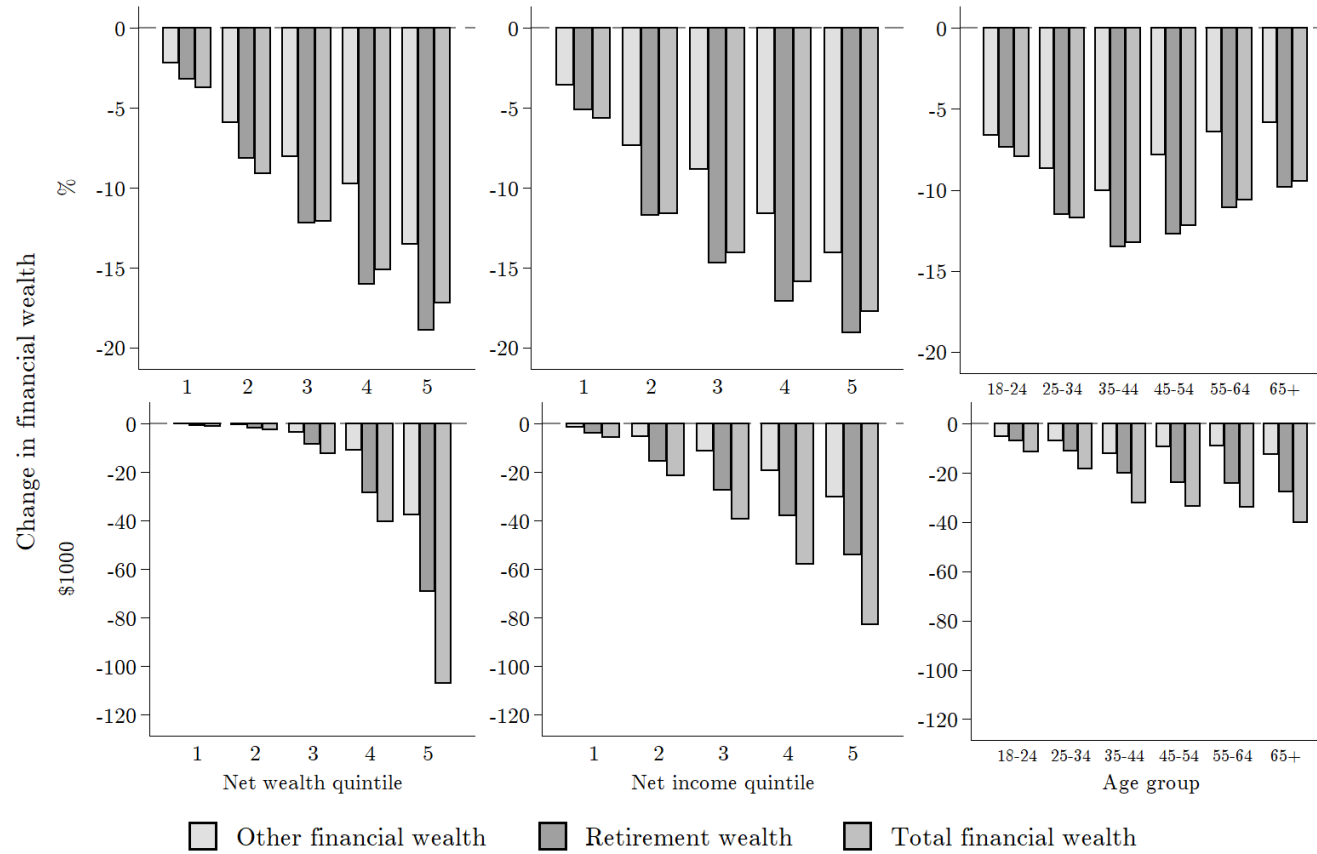
Figure A16: Beliefs about durations of current and historical stock market recoveries



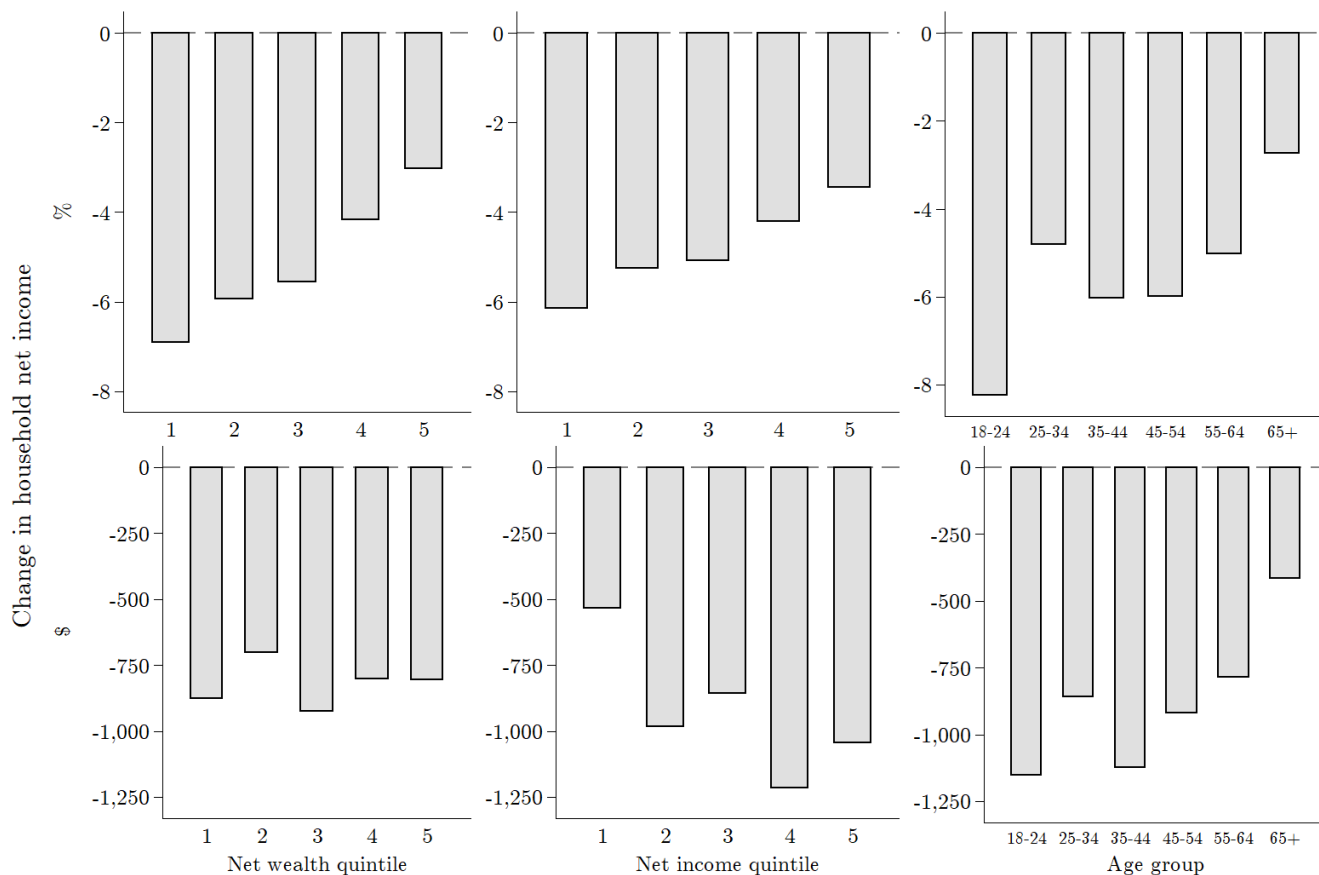
Notes: This figure displays respondents' subjective beliefs about the duration of the recovery of the US stock market in years for the Coronavirus crisis (top left), the Financial Crisis 2007-2009 (top right), the Dot-com bubble (bottom left) and the crisis following Black Monday on October 19, 1987 (bottom right). The sample for the Coronavirus crisis consists of the pure control sample, where respondents did not receive any questions or information on past crashes before answering the question on expected recovery duration from the current crash. For the Financial Crisis, the Dot-com bubble and Black Monday it consists of the control and treatment samples in the relevant arms that answered questions on the corresponding crash. The expected duration is elicited prior to the respondent receiving information about the true duration (red dashed line). The mean estimate of the recovery duration is displayed as the black dashed line. Recovery duration is winsorized at 13 years in each subfigure.

Figure A17: Wealth and income shocks across groups

Panel A: Financial wealth shocks

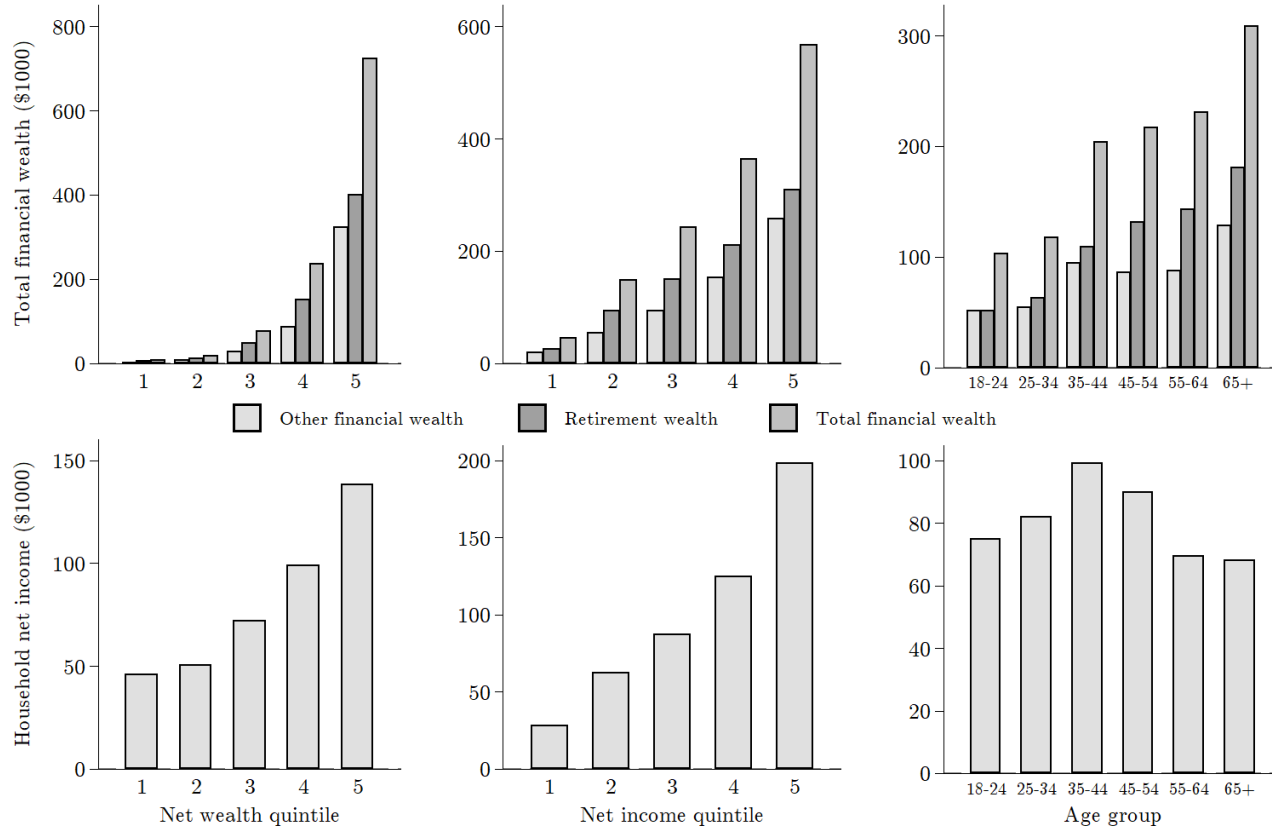


Panel B: Household net income shocks



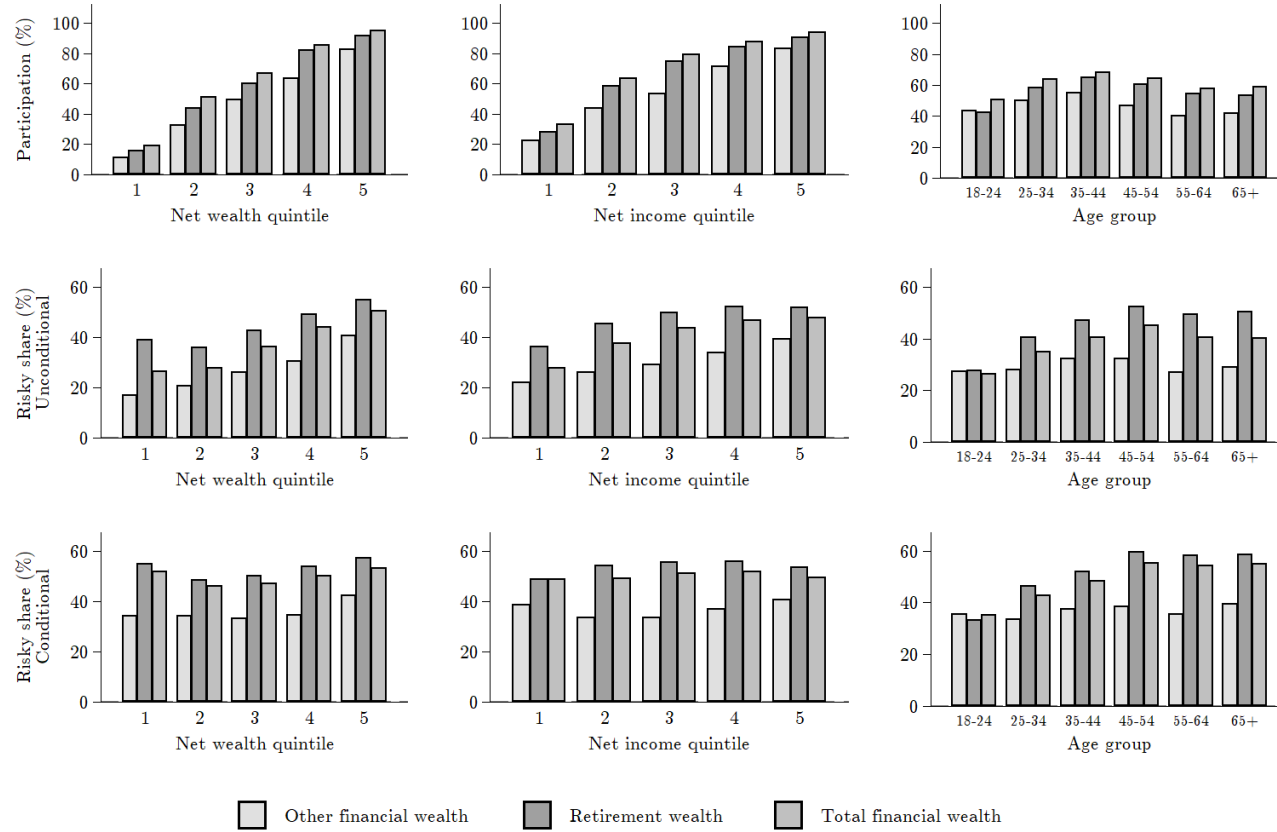
Notes: This figure displays the change in the value of financial assets due to the February/March 2020 stock market drop until the survey date in percentage terms and in USD (Panel A) and unexpected changes in net household incomes during the first quarter of 2020 in percentages and USD (Panel B), by quintile of pre-crisis net wealth (left column), by quintile of the pre-crisis net income (middle column) and by age group (right column). Changes in the value of household financial assets are displayed separately for financial assets outside of retirement accounts (other financial wealth), financial assets in retirement accounts, and for the combined value of financial assets. Changes in value of financial assets are net capital losses for the majority of respondents, and net capital gains for a small fraction of respondents. We trim reported shocks to income and financial wealth at the 2nd and 98th percentiles. The sample is the full sample without missings in the relevant survey questions. Average percent reductions in overall financial wealth can be larger than both average percent reductions for the individual components as we coded those with no wealth in a given category as having experienced a shock of zero in that category.

Figure A18: Financial assets and incomes across groups



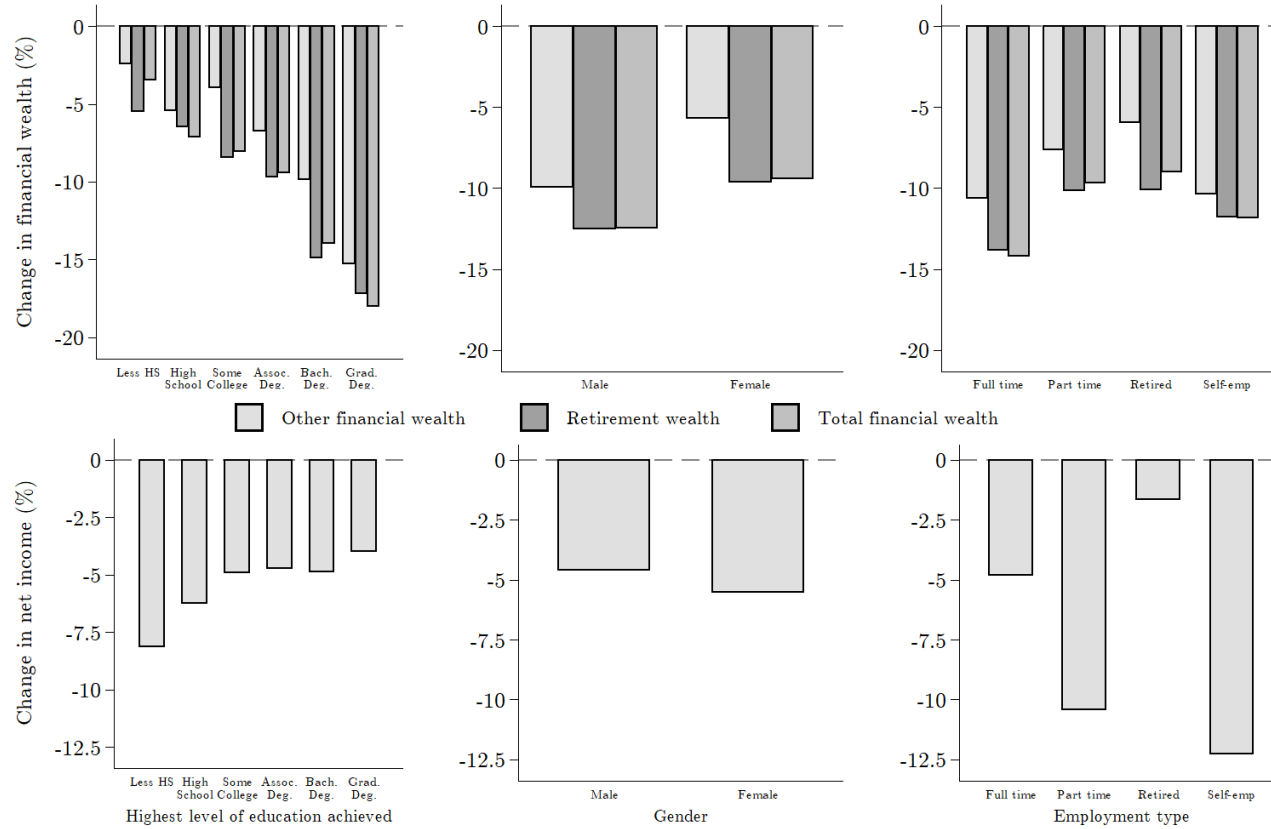
Notes: This figure displays the average value of financial assets (top row) and gross household income during the first quarter of 2020 (bottom row), by quintile of pre-crisis net wealth (left column), by quintile of the pre-crisis net income (middle column) and by age group (right column). Values of financial assets are displayed separately for financial assets outside of retirement accounts, for financial assets in retirement accounts, and for the combined value of all financial assets. The sample is the full sample without missings in the relevant survey questions.

Figure A19: Participation and stock share of financial wealth across groups



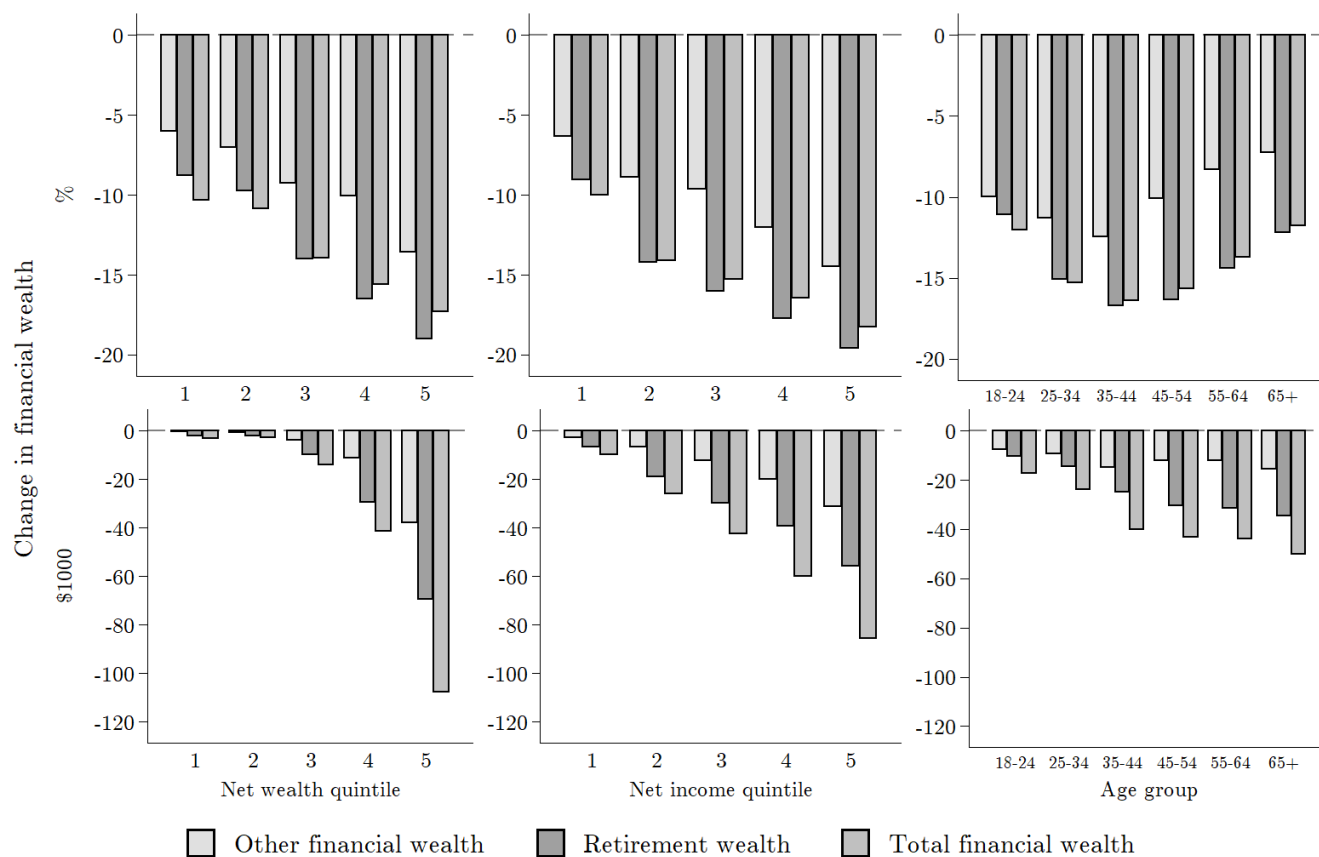
Notes: This figure displays participation, and the share of financial wealth held, in stocks or mutual funds by quintile of pre-crisis net wealth (left column), by quintile of the pre-crisis net income (middle column) and by age group (right column), respectively. The top row plots the rate of participation in stocks and stock mutual funds in the full sample. The middle row plots the unconditional equity share, and the bottom plots the conditional equity share including only respondents that report positive holdings of stocks or stock mutual funds as of January 2020. Equity shares are displayed separately for financial assets outside retirement accounts, for financial assets in retirement accounts, and for the combined value of financial assets. The sample includes all respondents without missings in the relevant survey questions.

Figure A20: Income and wealth shocks across groups



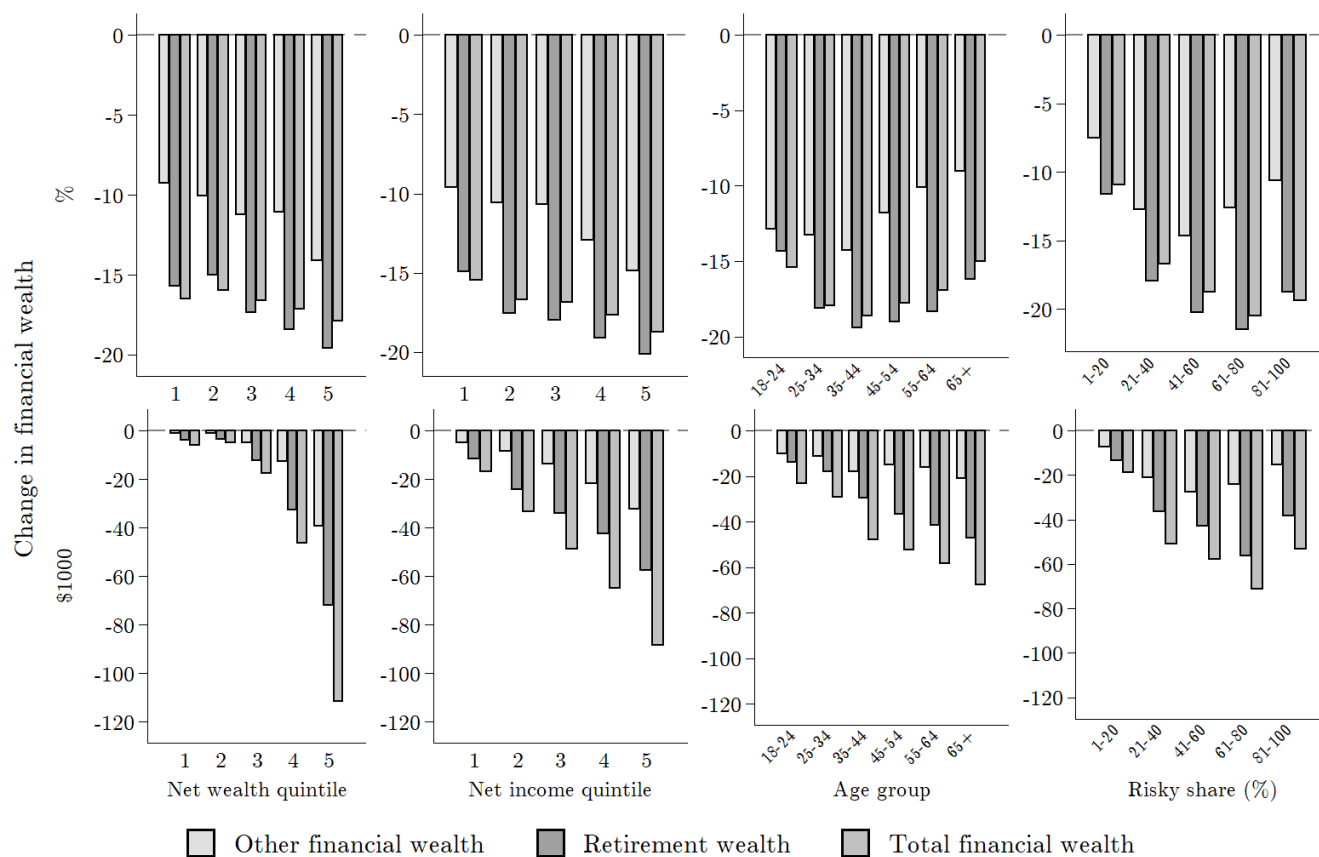
Notes: This figure displays the change in the value of financial assets due to the February/March 2020 stock market drop until the survey date in percentage terms as amounts in USD (top panel) and unexpected changes in net household incomes during the first quarter of 2020 in percentages and USD amounts (bottom panel), by highest level of education achieved (left column), gender (middle column), and pre-crisis employment type (right column). Changes in the value of financial assets are displayed separately for financial assets outside of retirement accounts, for financial assets in retirement accounts, and for the combined value of all financial assets. Changes in value of financial assets are net capital losses for the majority of respondents, and net capital gains for a small fraction of respondents. We trim reported shocks to income and financial wealth at the 2nd and 98th percentiles. The sample is the full sample without missings in the relevant survey questions. Note that the average percent reduction in overall financial wealth can be larger than both average percent reductions for the individual components as we coded those with no wealth in a given category as having experienced a shock of zero percent in that category.

Figure A21: Conditional wealth shocks across groups (Financial wealth > 0)



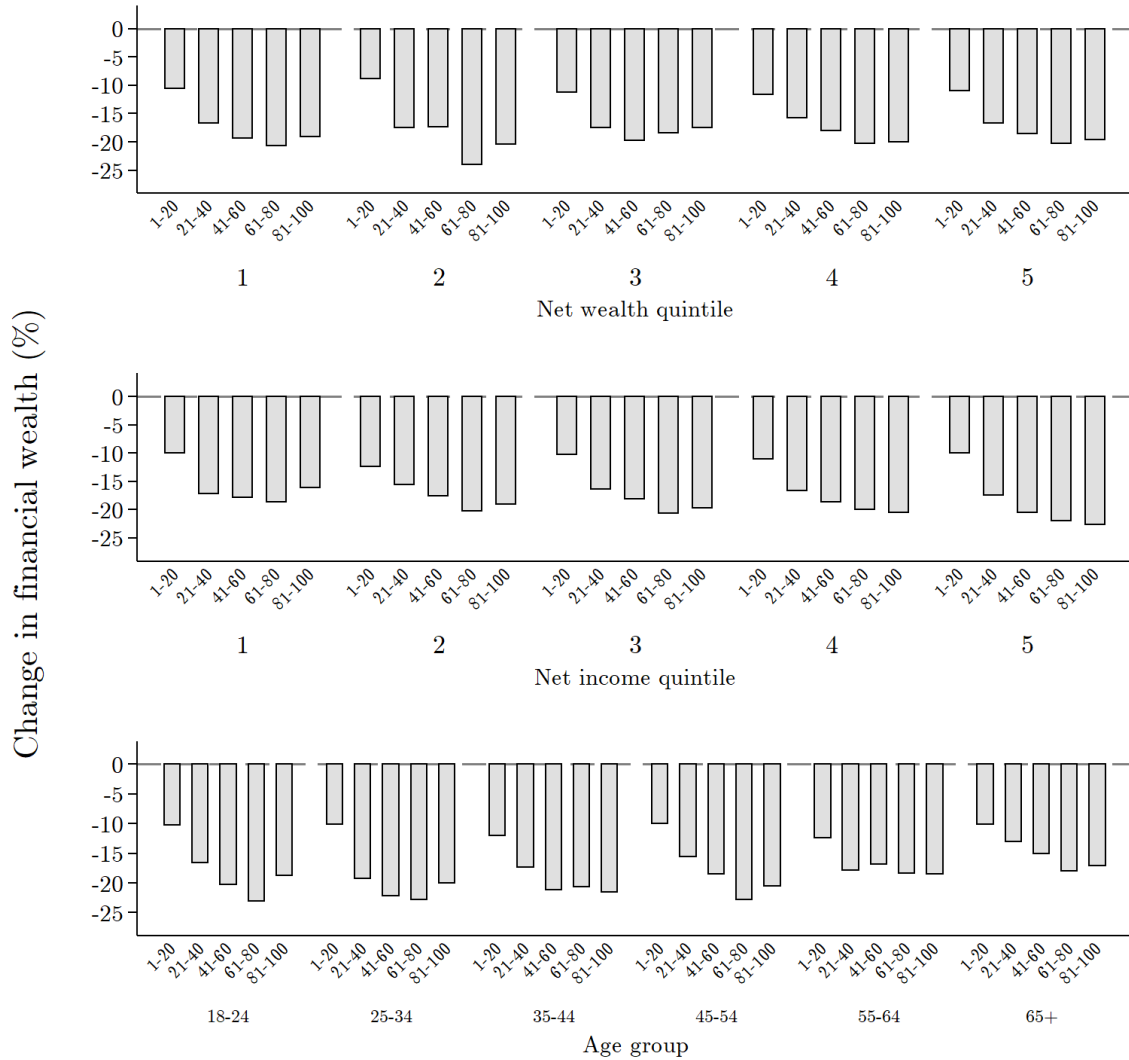
Notes: This figure displays the change in the value of financial assets due to the February/March 2020 stock market drop until the survey date in percentage terms and as amounts in USD, by quintile of pre-crisis net worth (left column), by quintile of pre-crisis net income (middle column) and by age group (right column). Changes in the value of financial assets are displayed separately for financial assets outside of retirement accounts, for financial assets in retirement accounts, and for the combined value of all financial assets. The values are conditional on positive financial wealth in January 2020. Changes in the value of financial assets are net capital losses for the majority of respondents, and net capital gains for a small fraction of respondents. We trim reported shocks to financial wealth at the 2nd and 98th percentiles. The sample is the full sample without missings in the relevant survey questions. Note that the average percent reduction in overall financial wealth can be larger than both average percent reductions for the individual components as we coded those with no wealth in a given category as having experienced a shock of zero percent in that category.

Figure A22: Conditional wealth shocks across groups (Risky share > 0)



Notes: This figure displays the change in the value of financial assets due to the February/March 2020 stock market drop until the survey date in percentage terms, and as amounts in USD, by quintile of the pre-crisis net worth distribution (left column), by quintile of the pre-crisis net income distribution (second column), by age group (third column), and by bin of the equity share in total financial wealth. Changes in the value of financial assets are displayed separately for financial assets outside of retirement accounts, for financial assets in retirement accounts, and for the combined value of financial assets. The values are conditional on positive equity investments in January 2020. Changes in the value of financial assets are net capital losses for the majority of respondents, and net capital gains for a small fraction of respondents. We trim reported shocks to financial wealth at the 2nd and 98th percentiles. The sample is the full sample without missings in the relevant survey questions. Note that the average percent reduction in overall financial wealth can be larger than the average percent reductions for both individual components as we coded those with no wealth in a given category as having experienced a shock of zero percent in that category.

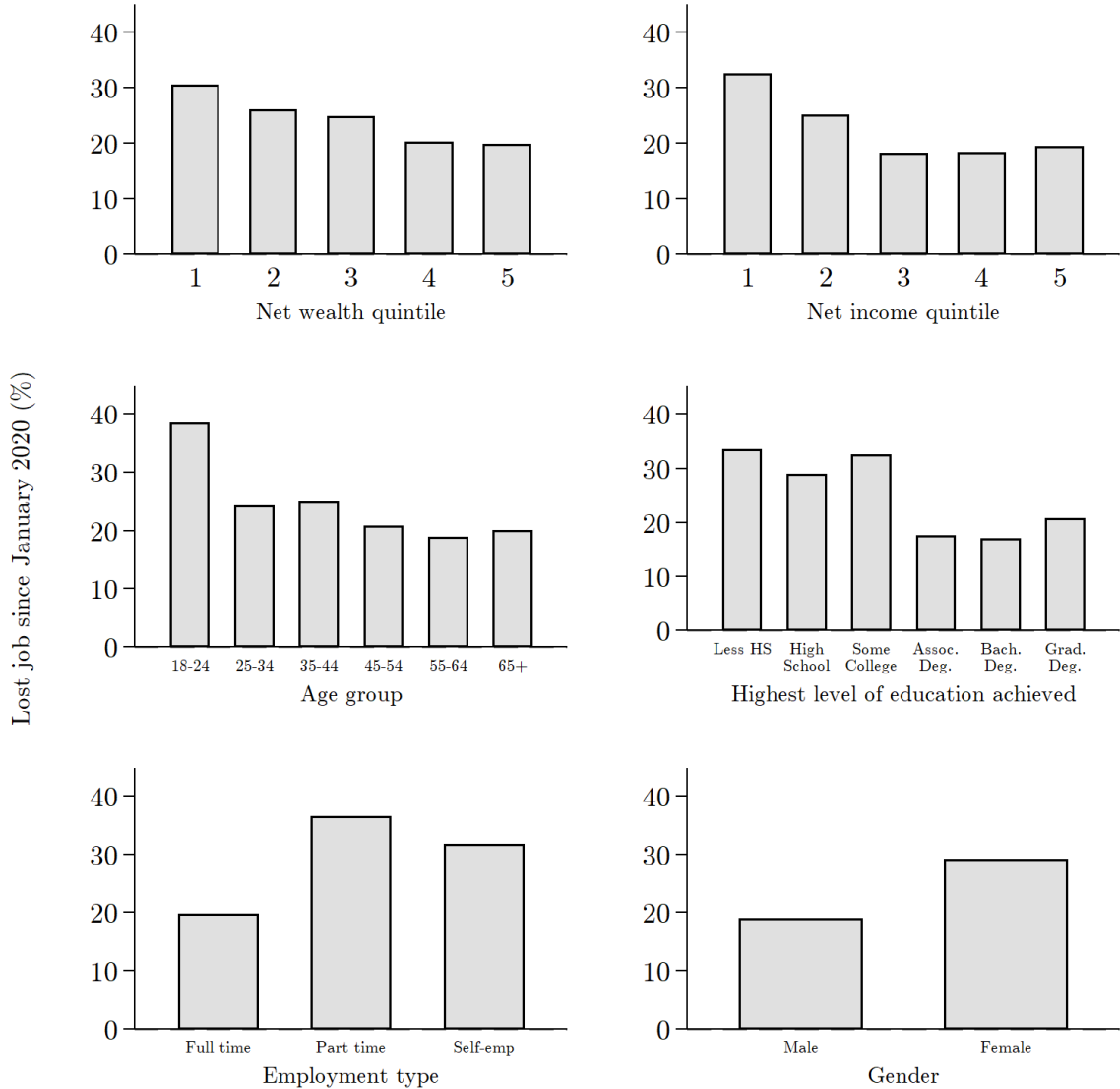
Figure A23: Wealth shocks across groups by risky share



January 2020 risky share allocation

Notes: This figure displays the change in the value of financial assets due to the February/March 2020 stock market drop until the survey date in percentage terms by equity portfolio share bin, separately by quintile of the pre-crisis net worth distribution (top row), by quintile of the pre-crisis net income distribution (middle row), by age group (bottom row). Changes in the value of financial assets are for the combined value of financial assets inside and outside of retirement accounts. The values are conditional on positive equity investments in January 2020. Changes in the value of financial assets are net capital losses for the majority of respondents, and net capital gains for a small fraction of respondents. We trim reported shocks to financial wealth at the 2nd and 98th percentiles. The sample is the full sample without missings in the relevant survey questions.

Figure A24: Job losses across groups



Notes: This figure displays the percentage of respondents who lost their job since January 2020 by pre-crisis net wealth quintile (top left), pre-crisis net income quintile (top right), age (middle left), education (middle right), pre-crisis employment type (bottom left), and gender (bottom right). The question is presented only to respondents who report to have been employed as of January 2020. The sample is the full sample without missings in the relevant survey questions.

C Additional tables

Table A1: Treatment and sample details

Treatment	Sample	Information	Respondents
Financial Crisis 2007-2009	Information	5.5 years	1,055
	Control	-	1,050
Dot-com bubble	Information	7 years	1,041
	Control	-	1,063
Black Monday	Information	2 years	1,091
	Control	-	1,058
Pure control	Control	-	1,089
Total			7,447

Notes: The table gives an overview of the various control and treatment arms in the survey. The final number of participants is listed in the column *Respondents*.

Table A2: Descriptive statistics

	Our sample					ACS		
	Mean	SD	P10	Median	P90	Obs.	Mean	Median
Female	0.51	0.50	0	1	1	7,447	0.51	
Age (years)	48.64	16.29	26	49	70	7,447	47.60	
- 18-24 years (d)	0.10	0.30	0	0	0	7,447	0.12	
- 25-34 years (d)	0.16	0.36	0	0	1	7,447	0.18	
- 35-44 years (d)	0.19	0.39	0	0	1	7,447	0.16	
- 45-54 years (d)	0.17	0.38	0	0	1	7,447	0.16	
- 55-65 years (d)	0.20	0.40	0	0	1	7,447	0.18	
- 65 years and older (d)	0.19	0.39	0	0	1	7,447	0.19	
Bachelor's degree or higher (d)	0.39	0.49	0	0	1	7,447	0.30	
Some college or associate degree (d)	0.40	0.49	0	0	1	7,447		
High school (d)	0.19	0.39	0	0	1	7,447		
Married (d)	0.53	0.50	0	1	1	7,447		
Separated (d)	0.13	0.34	0	0	1	7,447		
Widowed (d)	0.05	0.21	0	0	0	7,447		
Household income (gross, USD)	80,952	57,246	20,000	62,500	175,000	7,417	91,673	65,700
- <15,000 (d)	0.09	0.29	0	0	0	7,417	0.10	
- 15,000-25,000 (d)	0.08	0.28	0	0	0	7,417	0.08	
- 25,000-50,000 (d)	0.21	0.41	0	0	1	7,417	0.20	
- 50,000-75,000 (d)	0.17	0.38	0	0	1	7,417	0.17	
- 75,000-100,000 (d)	0.14	0.35	0	0	1	7,417	0.13	
- 100,000-150,000 (d)	0.17	0.38	0	0	1	7,417	0.16	
- 150,000-200,000 (d)	0.07	0.26	0	0	0	7,417	0.07	
- >200,000 (d)	0.05	0.23	0	0	0	7,417	0.09	
Census Region (d)								
- West	0.22	0.41	0	0	1	7,447	0.24	
- Midwest	0.25	0.43	0	0	1	7,447	0.21	
- Northeast	0.21	0.41	0	0	1	7,447	0.18	
- South	0.33	0.47	0	0	1	7,447	0.38	
Democrat	0.39	0.49	0	0	1	7,447		
Republican	0.37	0.48	0	0	1	7,447		
Employment situation (d)								
- Employed	0.53	0.50	0	1	1	7,447	0.62 ¹⁾	
- Self-employed	0.07	0.25	0	0	0	7,447		
- Unemployed	0.07	0.25	0	0	0	7,447	0.03	
- Out of labor force	0.33	0.47	0	0	1	7,447	0.35	
Retired	0.21	0.41	0	0	1	7,447		
Other	0.12	0.33	0	0	1	7,447		
Financial wealth (USD)	208,528	315,752	0	55,000	662,500	7,447		
Retirement wealth (USD)	120,738	180,658	0	17,500	575,000	7,447		
Other financial wealth (USD)	87,790	159,373	0	7,500	325,000	7,447		
Real estate wealth (USD)	223,761	338,990	0	150,000	625,000	7,447		
Debt outstanding (USD)	70,827	137,519	0	7,500	250,000	7,447		
Household net wealth (USD)	357,326	536,009	-11,500	132,500	1,150,000	7,447		
Stock investor (d)	0.61	0.49	0	1	1	7,447		
% Equity in fin. wealth (%)	39.14	33.23	0	40	91	5,835		
Inv. experience > 10 yrs. (d)	0.55	0.50	0	1	1	4,567		
Credit constrained (1-5)	2.53	1.45	1	2	5	7,447		

Notes: The table shows summary statistics for the 7,447 respondents in the final sample. Stock market experience is elicited for stock investors only. The share of equity in total financial assets is conditional on positive financial asset holdings as of January 2020. Observation numbers for some wealth items vary due to item non-response. ¹⁾ includes self-employed.

Table A3: Integrity of treatment randomization

	FinCrisis Info	FinCrisis Control	DotCom Info	DotCom Control	Black Monday Info	Black Monday Control	Pure Control	P-value	Obs.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Female	0.51	0.50	0.52	0.51	0.51	0.52	0.53	0.815	7,447
Age	48.32	48.65	48.53	48.94	48.21	48.84	48.94	0.907	7,447
Bachelor's degree or higher	0.38	0.38	0.38	0.40	0.39	0.39	0.39	0.981	7,447
HH income (gross, USD)	80,074	80,836	82,281	81,628	81,753	79,662	80,472	0.939	7,417
Republican	0.37	0.37	0.39	0.36	0.36	0.36	0.37	0.817	7,447
Democrat	0.38	0.39	0.38	0.39	0.39	0.40	0.38	0.928	7,447
Region Midwest	0.25	0.24	0.25	0.23	0.25	0.27	0.23	0.470	7,447
- South	0.33	0.30	0.35	0.34	0.33	0.33	0.34	0.190	7,447
- West	0.21	0.25	0.21	0.22	0.20	0.21	0.21	0.273	7,447
Stock investor	0.61	0.64	0.61	0.62	0.61	0.59	0.61	0.565	7,447

Notes: The table shows respondent characteristics across the 7 treatment and control arms. Column 8 shows the p-Value of an F-test that all coefficients are zero when jointly regressing the respective characteristics on all treatment dummies.

Table A4: Determinants of realized and planned adjustments to stock share: Pure control only

	Changed stock share	Increased stock share	Decreased stock share	Plan change stock share	Plan incr. stock share	Plan decr. stock share
	(1)	(2)	(3)	(4)	(5)	(6)
Δ Net income (%)	-0.203* (0.106)	-0.022 (0.115)	-0.181 (0.113)	-0.267** (0.122)	0.029 (0.142)	-0.296*** (0.110)
Δ Retirement fin. wealth (%)				0.005 (0.181)	-0.203 (0.176)	0.209 (0.155)
Δ Other fin. wealth (%)				-0.480*** (0.175)	-0.348** (0.172)	-0.132 (0.160)
Ln(Total fin. wealth)	2.733 (1.740)	-1.487 (1.712)	4.220** (1.660)	0.960 (1.769)	0.109 (1.845)	0.851 (1.613)
Stock share in ret. wealth	-0.073 (0.069)	-0.020 (0.061)	-0.053 (0.055)	-0.106 (0.072)	-0.034 (0.063)	-0.071 (0.049)
Stock share in ot. fin wealth	-0.044 (0.065)	-0.015 (0.054)	-0.029 (0.058)	-0.036 (0.065)	-0.039 (0.056)	0.003 (0.053)
Share ret. in tot. fin. wealth	-0.074 (0.089)	-0.034 (0.086)	-0.040 (0.086)	-0.092 (0.093)	-0.063 (0.090)	-0.029 (0.081)
Any loss fin. crisis	4.355 (5.250)	0.934 (5.201)	3.421 (4.740)	-0.202 (5.343)	-4.541 (5.330)	4.339 (4.523)
Big loss fin. crisis	10.581* (5.805)	-1.029 (4.675)	11.611** (5.729)	-8.162 (5.398)	-10.969** (5.026)	2.807 (4.661)
Any loss dot-com	-6.620 (5.424)	-7.927 (5.038)	1.307 (4.961)	-2.290 (5.387)	5.642 (5.251)	-7.933** (3.952)
Big loss dot-com	-12.558 (7.925)	7.262 (6.896)	-19.821*** (6.592)	7.637 (8.543)	2.022 (8.043)	5.615 (6.503)
Any loss Black Monday	7.533 (6.558)	2.634 (5.830)	4.899 (5.917)	6.042 (6.147)	3.738 (5.808)	2.303 (4.492)
Big loss Black Monday	-11.810 (10.551)	-14.421** (6.596)	2.611 (9.362)	-12.090 (9.951)	-10.374 (8.497)	-1.716 (6.631)
Male	11.502** (4.970)	7.733* (4.494)	3.769 (4.297)	1.098 (4.944)	4.701 (4.594)	-3.603 (3.779)
At least bachelor	-22.711 (20.880)	-21.361 (22.314)	-1.350 (15.922)	10.944 (21.657)	-11.292 (25.271)	22.236* (12.633)
Republican	-6.972 (4.556)	-7.019 (4.352)	0.047 (4.268)	0.050 (4.445)	-0.710 (4.424)	0.760 (3.816)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	.221	.135	.057	.279	.108	.102
Observations	550	550	550	503	503	503

Notes: This table shows OLS estimates of the determinants of realized and planned adjustments to the share of equities in total financial assets. The outcomes are dummies indicating whether the respondent's household has made any change, has increased or has decreased the equity share in total financial assets since the beginning of the stock market drop (columns 1-3) and dummies indicating plans to change, increase or decrease the equity share in overall financial assets in the weeks after the survey (columns 4-6), all coded as 0 or 100. All specifications are based on the pure control group, which has not received any information and not answered any questions on past crashes, using only respondents who report positive stockholdings as of January 2020. All specifications control for the same set of variables as in Table 1. Columns 4-6 additionally control for shocks to retirement and other financial wealth, trimmed at the 2nd and 98th percentiles. Robust standard errors are reported in parentheses. * denotes significance at the 10 pct., ** at the 5 pct., and *** at the 1 pct. level.

Table A5: Income and wealth shocks and expected economic decisions: Pure control only

	Exp. spend. growth (%)	Exp. spend. growth (\$)	Exp. spend. growth (\$)	Incr. exp. debt	Incr. exp. desired hours	Incr. exp. retirement age
	(1)	(2)	(3)	(4)	(5)	(6)
Δ Retirement fin. wealth (%)	0.018 (0.068)			-0.148 (0.148)	-0.274 (0.188)	-0.696*** (0.195)
Δ Other fin. wealth (%)	-0.061 (0.070)			-0.443*** (0.140)	-0.371** (0.176)	0.006 (0.179)
Δ Net income (quarterly, %)	0.189*** (0.048)			-0.286*** (0.085)	-0.358*** (0.105)	-0.401*** (0.100)
Δ Retirement fin. wealth (\$)		0.048*** (0.016)	0.039** (0.017)			
Δ Other fin. wealth (\$)		0.011 (0.019)	-0.002 (0.021)			
Δ Net income (quarterly, \$)		0.584*** (0.201)				
Δ Net income (annual, \$)			0.536*** (0.139)			
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	.048	.044	.114	.198	.108	.124
Observations	970	917	906	987	603	603

Notes: This table shows estimates of the association of shocks to the respondent's household net income and financial wealth with expected economic decisions. The outcomes are expected growth of yearly household spending from 2019 to 2020 in percent, trimmed at the 2nd and 98th percentiles (column 1); expected household spending growth in dollars, trimmed at the 2nd and 98th percentiles (columns 2-3); and dummies indicating whether the coronavirus crisis increases the respondent's expectations about outstanding household debt by the end of 2020 (column 4), expected desired working hours over the next years (column 5, only if in labor force) or expected retirement age (column 6, only if in labor force), coded as 0 or 100. Dollar changes in columns 2 and 3 are constructed from survey questions for retirement and other financial wealth and for income (assuming that the respondent expected a quarter of her 2019 income in the first quarter of 2020), and for spending from the survey question on percent changes and estimates of the level of spending of different groups in 2019 from the CEX. Columns 1, 2, 4, 5 and 6 show simple OLS estimates. Column 3 shows a 2SLS estimate, where the respondent's expected dollar change in household income from 2019 to 2020 is instrumented with the unexpected shock to household income in the first quarter. All specifications are based on the pure control group, which has not received any information and not answered any questions on past crashes. All specifications control for the same set of variables as in Table 2. Robust standard errors are reported in parentheses. * denotes significance at the 10 pct., ** at the 5 pct., and *** at the 1 pct. level.

Table A6: Determinants of expectations about the stock market and own wealth: Pure control only

	Stock recovery duration	Stock return: Mean	Stock return: SD	Stock return <-30%	Stock return >30%	Wealth recovery duration	Exp. wealth never to recover	Household financial prospects
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Δ Fin. wealth (%)	-0.010* (0.006)	0.020 (0.058)	-0.024 (0.026)	-0.032 (0.065)	-0.041 (0.086)	-0.022*** (0.005)	-0.229** (0.113)	0.010*** (0.003)
Δ Net income (%)	-0.002 (0.004)	0.087*** (0.033)	-0.005 (0.018)	-0.111** (0.043)	0.087* (0.044)	-0.006** (0.003)	-0.065 (0.067)	0.004** (0.002)
Any loss fin. crisis	-0.138 (0.156)	-1.868 (1.643)	0.234 (0.803)	-1.043 (1.798)	-3.853 (2.417)	0.057 (0.124)	4.437 (3.473)	-0.113 (0.087)
Big loss fin. crisis	0.168 (0.215)	0.693 (2.222)	-0.119 (0.990)	-0.744 (2.414)	3.531 (3.386)	-0.043 (0.170)	2.799 (4.205)	-0.098 (0.111)
Any loss dot-com	0.100 (0.171)	-1.673 (1.776)	0.493 (0.890)	3.121 (2.180)	-0.379 (2.549)	0.229 (0.161)	-3.492 (3.446)	-0.046 (0.097)
Big loss dot-com	-0.537** (0.234)	-0.211 (3.496)	-1.509 (1.497)	-1.645 (3.785)	2.219 (5.506)	-0.302 (0.242)	-3.943 (6.226)	0.340* (0.178)
Any loss Black Monday	0.139 (0.215)	-3.562 (2.268)	0.123 (1.014)	0.860 (2.789)	-6.867** (3.124)	0.138 (0.191)	-3.158 (4.107)	-0.010 (0.117)
Big loss Black Monday	-0.118 (0.254)	0.864 (3.843)	-0.200 (1.496)	0.595 (4.885)	2.592 (4.876)	-0.206 (0.237)	21.798** (8.856)	-0.246 (0.195)
Male	-0.170 (0.169)	-0.267 (1.418)	1.488** (0.682)	-0.556 (1.716)	0.515 (2.033)	-0.107 (0.093)	4.130 (2.803)	0.279*** (0.076)
At least bachelor	-0.258 (0.580)	0.156 (4.319)	-1.612 (1.874)	-9.319 (6.354)	-4.785 (5.214)	-0.169 (0.241)	-0.711 (7.900)	0.194 (0.182)
Republican	-0.194 (0.151)	6.885*** (1.430)	-0.271 (0.665)	-4.814*** (1.733)	7.546*** (2.113)	-0.249** (0.108)	-4.913* (2.780)	0.325*** (0.072)
Stock investor	-0.494* (0.279)	-1.219 (2.512)	2.124 (1.341)	2.196 (3.233)	-1.204 (3.619)	0.613*** (0.210)	-0.679 (5.395)	0.165 (0.144)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	.045	.049	.049	.017	.055	.234	.075	.091
Observations	1,014	1,014	1,014	1,014	1,014	941	1,014	1,014

Notes: This table shows OLS estimates of the determinants of respondents' expectations about the stock market and their own wealth. The outcomes are the expected duration of the recovery from the current crash in years (column 1); mean and standard deviation as well as probabilities assigned to extreme return realizations based on the respondent's reported probability distribution over the one year-ahead stock market return (columns 2-5); the expected recovery duration of the respondent's household financial wealth (column 6); a dummy indicating whether the respondent thinks her household net wealth will never recover, coded as 0 or 100 (column 7); and a categorical measure of the respondent's subjective household financial prospects, z-scored using the mean and standard deviation in the sample (column 8). All specifications are based on the pure control group, which has not received any information and not answered any questions on past crashes. All specifications control for the same set of variables as in Table 3. Robust standard errors are reported in parentheses. * denotes significance at the 10 pct., ** at the 5 pct., and *** at the 1 pct. level.

Table A7: Correlational evidence on beliefs about past crashes

	Stock recovery duration	Agree: Recovery many yrs.	Agree: Set back many yrs.	Agree: Recover 2020	Stock return: Mean	Stock return: SD	Stock return <-30%	Stock return >30%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Fin Crisis								
Prior recovery duration Fin. Crisis 2007	0.245*** (0.029)	0.049*** (0.009)	0.048*** (0.009)	-0.017* (0.010)	-0.153 (0.169)	0.101 (0.094)	0.153 (0.231)	-0.159 (0.252)
Observations	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050
Panel B: Dot-com								
Prior recovery duration Dot-com 2000	0.225*** (0.025)	0.032*** (0.008)	0.031*** (0.008)	-0.010 (0.008)	0.159 (0.153)	0.135* (0.076)	0.010 (0.196)	0.355 (0.228)
Observations	1,063	1,063	1,063	1,063	1,063	1,063	1,063	1,063
Panel C: Black Monday								
Prior recovery duration Black Monday 1987	0.313*** (0.026)	0.058*** (0.007)	0.051*** (0.008)	-0.034*** (0.008)	-0.409*** (0.153)	0.229*** (0.073)	0.541*** (0.201)	-0.217 (0.228)
Observations	1,058	1,058	1,058	1,058	1,058	1,058	1,058	1,058
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows OLS estimates of the effect of prior beliefs about the duration of a past stock market crash on the respondent's expectations about the stock market. The outcomes are the expected duration of the recovery from the current crash in years (column 1); agreement on 7-point scales to statements describing the severity of the current stock market crash, z-scored using the mean and the standard deviation in the sample (columns 2-4); mean and standard deviation as well as probabilities assigned to extreme return realizations based on the respondent's reported probability distribution over the one year-ahead stock market return (columns 5-8). Panel A is based on the control arm including questions on the Financial Crisis 2007-2009. Panel B is based on the control arm including questions on the burst of the Dot-com bubble 2000. Panel C is based on the control arm including questions on the Black Monday 1987. All specifications control for gender, age, employment status, marital status, highest educational attainment, being the main earner, being financial decision-maker, party affiliation (dummies for Republican and other party), log net household income, logs of retirement wealth, of other financial wealth, of real estate wealth, and of debt, borrowing constraints, stock market participation, the equity share in total financial assets, investment experience, Census region and survey date. Robust standard errors are reported in parentheses. * denotes significance at the 10 pct., ** at the 5 pct., and *** at the 1 pct. level.

Table A8: Effects of information on own outlook and plans: Experimental reduced form

	Wealth recovery duration	Household financial prospects	Plan incr. stock share	Plan decr. stock share	Exp. spend. growth	Incr. exp. debt	Incr. exp. desired hours	Incr. exp. retirement age
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: All								
Info Fin. Crisis 2007	0.484*** (0.078)	-0.100** (0.043)	0.952 (1.931)	3.054* (1.818)	-0.951 (0.914)	0.335 (1.924)	6.429** (2.632)	5.186* (2.662)
Panel B: Underestimators								
Info Fin. Crisis 2007	0.522*** (0.086)	-0.099* (0.052)	2.827 (2.333)	3.215 (2.211)	-1.478 (1.106)	2.978 (2.381)	7.401** (3.210)	8.229** (3.235)
Panel C: Under. & Stocks > 0								
Info Fin. Crisis 2007	0.761*** (0.130)	-0.136** (0.066)	2.827 (2.333)	3.215 (2.211)	-1.281 (1.328)	3.101 (3.002)	9.099** (3.773)	8.995** (3.917)
Panel D: All								
Info Dot-com 2000	0.573*** (0.087)	0.009 (0.043)	0.285 (2.015)	-2.085 (1.843)	-1.255 (0.928)	-1.477 (1.909)	-4.891* (2.623)	-3.710 (2.664)
Panel E: Underestimators								
Info Dot-com 2000	0.683*** (0.109)	0.022 (0.054)	1.149 (2.601)	-2.967 (2.279)	-0.533 (1.141)	-1.019 (2.334)	-4.145 (3.251)	-3.243 (3.321)
Panel F: Under. & Stocks > 0								
Info Dot-com 2000	1.017*** (0.164)	0.051 (0.069)	1.149 (2.601)	-2.967 (2.279)	0.779 (1.374)	0.167 (2.898)	-1.328 (3.822)	-3.998 (3.974)
Panel G: All								
Info Black Monday 1987	-0.157** (0.074)	0.048 (0.042)	3.293* (1.984)	-2.228 (1.710)	-1.027 (0.924)	-5.598*** (1.877)	-0.566 (2.612)	-0.806 (2.611)
Panel H: Overestimators								
Info Black Monday 1987	-0.242*** (0.088)	0.088* (0.047)	4.647** (2.253)	-4.079** (1.981)	-0.066 (1.070)	-6.705*** (2.141)	-1.607 (2.953)	-4.698 (2.962)
Panel I: Over. & Stocks > 0								
Info Black Monday 1987	-0.385*** (0.146)	0.097 (0.062)	4.647** (2.253)	-4.079** (1.981)	1.296 (1.361)	-5.026* (2.709)	-1.170 (3.558)	-3.673 (3.609)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows OLS estimates of the effect of being shown information on the duration of a past stock market crash on the respondent's expectations about her own financial situation and behavior. The outcomes are the expected recovery duration of the respondent's household financial wealth (column 1); a categorical measure of the respondent's subjective household financial prospects, z-scored using the sample mean and standard deviation (column 2); dummies indicating plans to increase or decrease the equity share in overall financial assets in the weeks after the survey (columns 3-4, only for stockholders); expected percent growth of yearly household spending from 2019 to 2020, trimmed at the 2nd and 98th percentiles (column 5); dummies indicating whether the coronavirus crisis increases the respondent's expected household debt outstanding by the end of 2020 (column 6), expected desired working hours over the next years (column 7, only if in labor force) or expected retirement age (column 8, only if in labor force). All dummy outcomes are coded as 0 or 100. Panels A-C use the treatment and control arms referring to the Financial Crisis 2007-2009. Panels D-F (G-I) use the treatment and control arms referring to the Dot-com bubble 2000 (the Black Monday 1987). Panels A, D and G are based on the full sample in the corresponding arms. Panels B, E and H use only under-estimators (for Financial Crisis and Dot-com bubble) or over-estimators (for Black Monday) of the respective recovery duration. Panels C, F and I use only under-estimators or over-estimators who held stocks before the current crisis. All specifications control for the respondent's prior belief about the recovery duration following the corresponding crash, gender, age, employment status, marital status, highest educational attainment, being the main earner, being financial decision-maker, party affiliation (dummies for Republican and other party), log net household income, logs of retirement wealth, of other financial wealth, of real estate wealth, and of debt, borrowing constraints, stock market participation, the equity share in total financial assets, investment experience, Census region and survey date. Columns 3 and 4 also control for realized trading since the onset of the crisis. Robust standard errors are reported in parentheses. * denotes significance at the 10 pct., ** at the 5 pct., and *** at the 1 pct. level.

Table A9: Effects of expected stock market recovery on own outlook and plans: Heterogeneity

	Wealth recovery duration	Household financial prospects	Plan incr. stock share	Plan decr. stock share	Exp. spend. growth	Incr. exp. debt	Incr. exp. desired hours	Incr. exp. retirement age
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Age \leq median								
Expected stock recovery duration (years)	0.244*** (0.078)	-0.047*** (0.012)	-0.809* (0.420)	0.396 (0.415)	-0.317 (0.272)	-0.145 (0.490)	2.085*** (0.525)	1.922*** (0.535)
Panel B: Age $>$ median								
Expected stock recovery duration (years)	0.995*** (0.082)	-0.128*** (0.011)	-0.190 (0.356)	0.750** (0.375)	-0.730*** (0.222)	1.236** (0.496)	2.179** (0.854)	2.136** (0.909)
p-value (A=B)	0.00	0.00	0.26	0.53	0.24	0.05	0.93	0.84
Panel C: Net income \leq median								
Expected stock recovery duration (years)	0.529*** (0.099)	-0.085*** (0.012)	-0.739* (0.402)	0.506 (0.440)	-0.348 (0.292)	1.234** (0.534)	2.063*** (0.744)	1.407* (0.790)
Panel D: Net income $>$ median								
Expected stock recovery duration (years)	0.698*** (0.070)	-0.090*** (0.012)	-0.554 (0.398)	0.580 (0.356)	-0.762*** (0.226)	0.158 (0.431)	2.184*** (0.556)	2.853*** (0.570)
p-value (C=D)	0.16	0.72	0.74	0.90	0.26	0.12	0.90	0.14
Panel E: Net wealth \leq median								
Expected stock recovery duration (years)	0.739*** (0.066)	-0.102*** (0.010)	-0.540 (0.336)	0.669** (0.312)	-0.649*** (0.204)	0.695* (0.385)	2.421*** (0.553)	2.661*** (0.573)
Panel F: Net wealth $>$ median								
Expected stock recovery duration (years)	0.348*** (0.116)	-0.057*** (0.015)	-0.709 (0.506)	0.168 (0.552)	-0.332 (0.343)	0.253 (0.657)	1.289 (0.791)	1.107 (0.788)
p-value (E=F)	0.00	0.02	0.78	0.43	0.43	0.56	0.24	0.11
Panel G: Female								
Expected stock recovery duration (years)	0.488*** (0.082)	-0.078*** (0.011)	-0.750** (0.355)	0.570 (0.380)	-0.586** (0.230)	0.339 (0.477)	2.755*** (0.689)	1.871*** (0.682)
Panel H: Male								
Expected stock recovery duration (years)	0.710*** (0.084)	-0.102*** (0.013)	-0.409 (0.456)	0.516 (0.420)	-0.575** (0.277)	0.669 (0.482)	1.508** (0.595)	2.211*** (0.631)
p-value (G=H)	0.06	0.16	0.55	0.92	0.98	0.63	0.17	0.71
Panel I: Below Bachelor								
Expected stock recovery duration (years)	0.507*** (0.085)	-0.083*** (0.011)	-0.596 (0.364)	0.673* (0.364)	-0.359 (0.241)	0.986** (0.461)	2.030*** (0.589)	2.093*** (0.620)
Panel J: At least Bachelor								
Expected stock recovery duration (years)	0.714*** (0.078)	-0.092*** (0.013)	-0.694 (0.436)	0.497 (0.409)	-0.730*** (0.256)	-0.034 (0.496)	2.277*** (0.683)	2.082*** (0.679)
p-value (I=J)	0.07	0.61	0.86	0.75	0.29	0.13	0.78	0.99
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows OLS estimates of the effects of respondents' expected stock market recovery duration on the respondent's expectations about her own situation and behavior for different subgroups. The outcomes are the expected recovery duration of the respondent's household net wealth (column 1); a categorical measure of the respondent's subjective household financial prospects, z-scored using the mean and standard deviation in the sample (column 2); dummies indicating plans to increase or decrease the risky share in overall financial assets in the weeks after the survey (columns 3-4, only for stockholders); expected growth of yearly household spending from 2019 to 2020 in percent, trimmed at the 2nd and 98th percentiles (column 5); dummies indicating whether the coronavirus crisis increases the respondent's expectations about outstanding household debt by the end of 2020 (column 6), expected desired working hours over the next years (column 7, only if in labor force) or expected retirement age (column 8, only if in labor force). All dummy outcomes are coded as 0 or 100. All estimations are based on the four control arms, which have not received any information, and are restricted to those who participated in the stock market before the current crisis. All specifications control for the same list of covariates in Table 4. Columns 3 and 4 also control for realized trading since the onset of the crisis. Robust standard errors are reported in parentheses. * denotes significance at the 10 pct., ** at the 5 pct., and *** at the 1 pct. level.

Table A10: Perceived purpose of the survey

	All	All, excl. pure ctrl	Info treat., all	Ctrl. all, ex pure ctrl.	Difference (4) –(3)
	(1)	(2)	(3)	(4)	(5)
Impact COVID-19 on HH finances	47.25	46.29	44.62	47.97	3.35** [2.68]
Expectations	10.23	10.54	11.39	9.68	-1.71* [-2.22]
Knowledge test	2.73	2.88	3.36	2.40	-0.96* [-2.29]
Comparison of fin. crises	2.32	2.56	3.01	2.11	-0.90* [-2.27]
Experiment	0.07	0.08	0.09	0.06	-0.03 [-0.44]
Do not know	3.32	3.40	3.83	2.96	-0.86 [-1.90]
Other	34.08	34.26	33.70	34.82	1.12 [0.94]
Observations	7,447	6,358	3,187	3,171	

Notes: This table shows the relative frequency (in %) of answers to the question “What do you think was the purpose of the survey?” Answers were given as free text entries. We manually categorize the answers into 8 categories based on meaningful keywords, (1) impact of the corona crisis on household finances, (2) household economic expectations, (3) knowledge test/education, (4) comparison of different financial crises, (6) some form of experiment, (7) do not know, and (8) other. Column 1 is based on the entire sample. Column 2 excludes respondents in the pure control group, who have not received any questions or information on previous crashes. Column 3 is based on respondents in the three information treatment arms *FinCrisisInfo*, *DotComInfo* and *BlackMondayInfo*. Column 4 is based on respondents in the three control treatment arms *FinCrisisCtrl*, *DotComCtrl* and *BlackMondayCtrl*, excluding the pure control group. Column 5 shows the differences across percentages in the treatment and control arms, excluding the pure control group. * denotes significance at the 10 pct., ** at the 5 pct., and *** at the 1 pct. level.

Table A11: Average losses across groups and samples

Sort	Sample	Difference in change in wealth between 5th and 1st income or wealth quintile (%)		
		Other financial wealth	Retirement wealth	Total financial wealth
		(1)	(2)	(3)
Net wealth	Unconditional	-11.33	-15.70	-13.48
	Financial wealth > 0	-7.58	-10.23	-6.99
	Stocks > 0	-4.81	-3.85	-1.37
	Conditional on equity share bin	-3.49	-2.01	0.03
Net income	Unconditional	-10.50	-13.93	-12.07
	Financial wealth > 0	-8.18	-10.58	-8.23
	Stocks > 0	-5.23	-5.21	-3.23
	Conditional on equity share bin	-4.52	-4.33	-2.43

Notes: The table shows the differences in the percent change in financial wealth between the 5th and 1st quintiles of the distributions of household net wealth and household net income. Differences in the percent change in wealth are displayed separately for non-retirement financial wealth (column 1), other financial wealth (column 2), and total financial wealth (column 3). We display differences between the two extreme quintiles unconditionally for the entire sample, for the subsample of individuals with positive financial wealth holdings as of January 2020, for the subsample of individuals with positive equity investments as of January 2020, and conditional on positive equity investments controlling for subjects' equity share bin (0-20%, 20-40%, 40-60%, 60-80%, 80-100%). For the conditional differences controlling for equity share we regress the percent change in wealth on an indicator for subjects in the top quintile of net wealth (net income) and dummies for equity share bin, where the sample is restricted to individuals in the top and bottom quintiles of net wealth (net income), and display the coefficient estimate on the dummy for the top quintile. Within each (sub-)sample presented in the table, we include all respondents with nonmissing survey responses.

Table A12: Average losses across age groups

Category	Sample	Difference in change in wealth compared to age category 35-44 (%)		
		Other financial wealth	Retirement wealth	Total financial wealth
		(1)	(2)	(3)
18-24 years	Unconditional	-3.45	-6.13	-5.29
25-34 years		-1.38	-1.95	-1.51
45-54 years		-2.21	-0.76	-1.03
55-64 years		-3.66	-2.39	-2.62
65 years and older		-4.23	-3.65	-3.75
18-24 years	Financial wealth > 0	-2.46	-5.60	-4.34
25-34 years		-1.15	-1.63	-1.09
45-54 years		-2.38	-0.38	-0.73
55-64 years		-4.18	-2.32	-2.66
65 years and older		-5.21	-4.49	-4.61
18-24 years	Stocks > 0	-1.39	-5.08	-3.21
25-34 years		-1.00	-1.28	-0.67
45-54 years		-2.48	-0.38	-0.80
55-64 years		-4.18	-1.05	-1.68
65 years and older		-5.02	-3.22	-3.57
18-24 years	Conditional on equity share bin	0.19	-3.30	-1.10
25-34 years		-0.44	-0.30	0.26
45-54 years		-2.36	-0.77	-1.32
55-64 years		-4.26	-1.33	-2.13
65 years and older		-5.46	-3.91	-4.31

Notes: The table shows the differences in the percent change in financial wealth between individuals in the age category ‘35-44 years’ and all other age categories. Differences in the percent change in wealth are displayed separately for non-retirement financial wealth (column 1), other financial wealth (column 2), and total financial wealth (column 3). We display differences between the two age categories unconditionally for the entire sample, for the subsample of individuals with positive financial wealth holdings as of January 2020, for the subsample of individuals with positive equity investments as of January 2020, and conditional on positive equity investments controlling for subjects’ equity share bin (0-20%, 20-40%, 40-60%, 60-80%, 80-100%). For the conditional differences controlling for equity share we regress the percent change in wealth on an indicator for subjects in the ‘35-44 years’ age category and dummies for equity share bin, where the sample includes the baseline category (‘35-44 years’) and the comparison age category, and display the coefficient estimate on the dummy for the ‘35-44 years’ age category. Within each (sub-)sample presented in the table, we include all respondents with nonmissing survey responses.

Table A13: Changes in expected retirement age across groups

		<i>Expect to retire late</i>						<i>Expect to retire early</i>					
		All			Age 55 +			All			Age 55 +		
		mean (1)	obs. (2)	scaled to population (3)	mean (4)	obs. (5)	scaled to population (6)	mean (7)	obs. (8)	scaled to population (9)	mean (10)	obs. (11)	scaled to population (12)
All		0.45	4,726	0.31	0.45	1,048	0.18	0.04	4,726	0.03	0.05	1,048	0.02
By gender:	male	0.43	2,590	0.34	0.41	464	0.17	0.05	2,590	0.04	0.07	464	0.03
	female	0.47	2,136	0.30	0.49	584	0.20	0.03	2,136	0.02	0.04	584	0.02
By age category:	18-24	0.35	622	0.33				0.04	622	0.04			
	25-34	0.45	954	0.41				0.05	954	0.04			
	35-44	0.46	1,161	0.42				0.04	1,161	0.03			
	35-44	0.50	941	0.41				0.03	941	0.02			
	55-64	0.47	748	0.28				0.05	748	0.03			
	65+	0.40	300	0.09				0.06	300	0.01			
By education:	High school	0.42	683	0.25	0.40	159	0.13	0.04	683	0.02	0.06	159	0.02
	Some college/assoc. degree	0.45	1,830	0.31	0.50	392	0.19	0.03	1,830	0.02	0.05	392	0.02
	Bachelor's degree or higher	0.46	2,139	0.36	0.44	492	0.21	0.05	2,139	0.04	0.05	492	0.03
By income:	1	0.44	325	0.27	0.46	325	0.15	0.04	1,288	0.02	0.06	325	0.02
	2	0.49	215	0.32	0.48	215	0.19	0.04	784	0.03	0.06	215	0.02
	3	0.45	178	0.33	0.44	178	0.21	0.04	739	0.03	0.07	178	0.03
	4	0.45	180	0.36	0.46	180	0.22	0.04	923	0.03	0.03	180	0.01
	5	0.43	116	0.38	0.41	116	0.24	0.05	819	0.04	0.05	116	0.02

Notes: This table shows the share of respondents who state to expect to retire later (earlier) than planned due to the pandemic. The question was presented only to respondents who have been employed or in full-time education as of January 2020. Columns 1 and 7 display the fractions who state to expect to retire later (earlier) than planned due to the pandemic for the relevant group. Columns 3 and 9 scale these fractions to the full population and assuming the same propensities to retire late (early) among those who were unemployed as of January 2020.