

7547020-shocks-and-expected-stock-returns

SUMMARY: The study examines whether significant economic and non-economic shocks influence long-term stock market expectations of individuals. It utilizes unique survey data from a representative panel of individuals before, during, and after the COVID crisis, and around the Trump tariff announcement. Raw return expectations were found to be higher during the COVID period. However, after correcting for the market forecast based on the CAPE ratio of Campbell and Shiller, adjusted return expectations were found to be lower at the height of the crisis than before, and they quickly recovered afterward. The study also found that risk expectations were higher during the COVID period compared to other periods. The authors explore three possible channels for lower return expectations and find evidence supporting the cognitive/financial literacy and partisan channels. Respondents with higher financial literacy expected lower returns during the COVID shock, and similarly, Democratic voters were more pessimistic. The study does not find strong evidence that personal experience with COVID or economic measures associated with COVID affected expected returns. The tariff shock did not seem to impact return and risk expectations.

METHOD: The study uses a unique panel dataset collected from a representative sample of US individuals over five consecutive periods (2019, 2020, 2021, 2023, 2025). The dataset includes return expectations for different types of individuals and during different time periods, allowing for a comparison of expectations over time. The study considers two shocks: the COVID crisis and the Trump tariff announcements.

KEY FINDINGS:

- Raw return expectations were higher during the COVID period.
- Adjusted return expectations were lower at the height of the crisis than before and quickly recovered afterward.
- Risk expectations were higher during the COVID period compared to other periods.
- Evidence supports the cognitive/financial literacy and partisan channels for lower return expectations.
- Personal experience with COVID or economic measures associated with COVID did not affect expected returns.
- The tariff shock did not impact return and risk expectations.

IMPLICATION FOR TRADING: Understanding how shocks affect long-term stock market expectations is crucial for traders and investors. The study highlights the importance of cognitive/financial literacy and political leanings in shaping expectations. Traders should consider these factors when making investment decisions. The findings suggest that personal experiences with COVID or economic measures associated with COVID do not significantly impact expectations, but the cognitive/financial literacy and partisan channels do. These insights can help traders and investors better predict and adjust their expectations in response to market shocks.

Shocks and Expected Stock Returns

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Abstract

We study whether important economic and non-economic shocks shift long-term stock market expectations of individuals. We use unique survey data from the same representative panel of individuals before, during, and after the COVID crisis, and around the Trump April 2025 tariffs announcement. Raw return expectations are higher during COVID. However, when we correct for the market forecast based on the CAPE ratio of Campbell and Shiller, we find the opposite: adjusted return expectations are lower at the height of the crisis than before, and they quickly recover afterward. Risk expectations are higher during COVID compared to other periods. We study three possible channels for lower return expectations. We find evidence for the cognitive/financial literacy and partisan channels. Respondents with higher financial literacy expect lower returns during the COVID shock. Similarly, Democratic voters are more pessimistic. We do not find strong evidence that personal experience with COVID or economic measures associated with COVID affect expected returns. The purely economic shock of tariffs does not seem to impact return and risk expectations.

JEL Codes: D14; G11; G41; G51; G53

Keywords: Stock return expectations; COVID-19; long-term stock market forecasts; stock market participation; financial literacy; CAPE ratio.

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1. Introduction

Do long-term stock return expectations change in response to a major event? If yes, are these changes in expectations confined to the event period, or do they stay afterward? We use a unique panel data set in which we collect return expectations from a set of US individuals over five consecutive periods (2019, 2020, 2021, 2023, 2025). This dataset allows us to compare how return expectations change over time for different types of persons and during different time periods. Importantly, our sample period includes both the COVID-19 outbreak (henceforth COVID) in 2020 and the period of the Trump tariff announcements in April 2025. This setting enables us to observe how two different shocks affect long-run expectations of returns and risk for retail investors.¹ The first shock is a once-in-a-lifetime crisis triggered by the emergence of the COVID virus. The second shock is a pure economic shock in the form of tariff announcements by Donald Trump. Giglio, Maggiori, Stroebe, and Utkus (2021b) argue that changes in expectations following shocks are key for both macroeconomic and financial theory.

We contribute to the rapidly emerging literature on retail investors' expectations. Their number has surged over the years. In 2025, retail investors accounted for \$5.4 trillion in trading activity across stocks and ETFs, while collectively outperforming the S&P 500 Index.² Whereas institutional investors performed worse during the COVID crisis in early 2020, Robinhood investors were a stabilizing force (Glossner, Matos, Ramelli, and Wagner, 2025; Welch, 2022). The growing importance of retail investors renders it necessary to study what drives their stock market expectations.³

¹ We use the term “retail investor” in a broad sense. Not all respondents in our surveys hold stocks, but it is reasonable to assume that those who do not hold stocks have other investments, such as savings accounts or real estate (including residential real estate).

² Veiga and The Associated Press, *Fortune*, February 23, 2026: “How ‘dumb money’ took over stock markets: \$5.4 trillion of retail activity took place in 2025”. <https://fortune.com/2026/02/23/what-is-retail-trading-dumb-money-stock-markets-5-4-trillion-activity-2025/> (retrieved on April 21, 2026).

³ D’Acunto and Weber (2024) argue that households’ subjective expectations are meaningful in the sense that observable household characteristics help explain them. In the context of inflation expectations, Weber, D’Acunto, Gorodnichenko, and Coibon (2022) argue that such expectations have been shown to affect stock prices. A similar argument can be made for stock market expectations. Beutel and Weber (2026) argue that understanding individuals’ subjective models of financial markets is critical for finance research. In terms of economic implications, Anderson, Ghysels, and Juergens (2005) find that heterogeneity of beliefs matters in asset pricing.

Our paper is not the first to examine stock market expectations of individual investors.⁴ Hurd, Van Rooij, and Winter (2011) study return expectations for an Internet panel representative of the population in the Netherlands in 2004 and 2006. Giglio, Maggiori, Stroebe, and Utkus (2021a) use a survey of wealthy Vanguard customers to examine return expectations for the period from February 2017 to June 2020.⁵ Our study differs from those papers in two important ways. The focus of our study is on changes in return expectations for individuals against the backdrop of two important shocks. The first of these shocks is COVID, which is the type of shock that occurs once in a lifespan. The COVID shock is not just an economic shock but also affects other aspects of life. The second shock is the tariffs announced by Donald Trump in April 2025. These tariffs strongly affected the stock market, but, unlike COVID, they represent a purely economic shock. The second way our study differs from previous studies is that other research focuses on changes in raw return expectations reported by respondents. However, due to changes in economic conditions and perceived stock market under- and overvaluation, a rational individual may change their forecast of long-term (10-year) expected stock returns. This notion is supported by extensive work on the Cyclically Adjusted Price-to-Earnings (CAPE) Ratio, developed by Campbell and Shiller. CAPE is based on the current level of the Standard & Poor's (S&P) 500 Index divided by the 10-year average inflation-adjusted earnings of the same index. In a series of papers, Campbell and Shiller (1988a, 1988b, 1998, 2001) show that future 10-year stock returns on the S&P 500 are negatively associated with CAPE. The concept of market under- or overvaluation and the predictive power of CAPE and similar valuation metrics became pervasive in the financial press, social media, and other sources of financial information used by retail investors. For this reason, we construct a proxy for the market return forecasts based on the CAPE ratio, and we examine how the difference between expected returns and the CAPE-based prediction varies over time and especially during periods of shocks. We also study whether the COVID shock affects stock market participation. In addition, we analyze whether trading patterns change because of COVID. Namely, we study whether, during and after COVID, respondents trade more or less than before, and, if

⁴ Giglio, Maggiori, Rillo, Stroebe, Utkus, and Xu (2025) mention advantages of the use of survey data. First, they have the potential to reveal beliefs about future outcomes. Second, they reveal rich cross-sectional heterogeneity in expectations.

⁵ Hurd et al. (2011) ask for 1-year return expectations and Giglio et al. (2021a) ask for both 1-year and 10-year expectations.

their trading patterns change, whether they are more likely to buy or sell compared to the period before COVID.

The onset of COVID in February and March 2020 led to panic amongst the general population. The fear of contracting a potentially lethal disease and the lockdowns that soon followed disrupted people's lives. Results from previous literature suggest that such effects can have an impact on stock market expectations.⁶ Malmendier and Nagel (2011) find that investors who have experienced low stock returns during their lives report a lower willingness to take financial risks. These investors expect lower returns and are less likely to participate in the stock market. Bharath and Cho (2023) find that households affected by natural disasters have lower expectations of future stock returns and are less likely to participate in risky asset markets. Shi, Veld, and Yin (2025) find that respondents who experience traumatic events, such as the death of a family member or colleague, are less likely to hold risky assets, such as stocks. However, they find that the effect does not go through an expectations channel, but rather through a preferences channel.⁷

The second shock that we study is the Trump tariff announcements in April 2025. The extensive new tariffs were first announced on April 2, and they directly led to a stock market decline. On April 2, the S&P 500 closed at 5,671, and it fell to its lowest level of the year on April 8 (4,983), then gradually climbed back. Clearly, the tariffs had a significant economic impact, but unlike COVID, they hardly affected other aspects of people's lives.

We use a representative panel of households (UAS at the University of Southern California) to survey individuals on their 10-year stock return expectations at five different points in time:

- Before the outbreak of COVID in May and June 2019, from now on, pre-COVID;
- During the COVID outbreak in June 2020, from now on COVID;
- During the period that COVID settled down in July and August 2021, from now on COVID-normal;
- In June and July 2023, when COVID largely disappeared, from now on, post-COVID;

⁶ Gormsen and Koijen (2020) study the returns in the Covid period (until July 20, 2020) and find that the Covid period led to a lower expected growth in dividends.

⁷ They find that individuals exposed to trauma have lower risk preferences, but do not have lower return expectations.

- In April and May 2025, when Donald Trump announced tariffs for a large number of countries. The first large-scale tariff announcement was on April 2, 2025. We collected data from April 16 to May 28, 2025, from now on referred to as the tariff period.

We also ask investors about their stock portfolios at these five points in time. Finally, we survey them about their trades during the COVID period, at COVID-normal, post-COVID, and tariff periods. We then analyze whether COVID and tariff announcements have changed investor and non-investor expectations of return and risk.

For each of the five survey periods, we derive a CAPE-based prediction of future 10-year stock market returns, and we calculate the difference between each expected return and this prediction. This difference is labeled “deviation from forecast” and, henceforth, also referred to as CAPE-adjusted expectations. Therefore, in line with Bharath and Cho (2023), we expect that panel members will have lower CAPE-adjusted stock market expectations. Another way to look at it is that we expect that individuals will be “less happy”. Kaplanski, Levy, Veld, and Veld-Merkoulova (2015) find that investors who are in a better mood (happier) have higher stock market expectations. Therefore, following their results, we expect lower adjusted return expectations as well. After the shocks wear off, in 2021 and 2023, we expect adjusted expectations to return to pre-COVID levels.

We start our analysis by examining unadjusted return expectations, hereafter referred to as raw expectations, and find that they are significantly higher during the COVID shock than in other years. However, when we adjust for CAPE-based expected returns, the effect reverses. CAPE-adjusted return expectations are lower during the COVID shock, somewhat in line with the previous literature on the impact of life-changing events on economic behavior and expectations. However, we do not observe a permanent change. After the shock wears off, the adjusted expectations return to pre-COVID levels. Greenwood and Shleifer (2014) and Kaplanski, Levy, Veld, and Veld-Merkoulova (2016) find that investor return expectations are higher when past returns are higher.^{8,9} Since there is a variation in the recent realized returns across our survey waves, we control for the past returns. Our results are not affected by past realized returns.

⁸ Based on studies such as Greenwood and Shleifer (2014), Jin and Sui (2022) present a model of aggregate stock market prices based on return extrapolation.

⁹ In an experimental study, Beutel and Weber (2026) also find that individuals excessively extrapolate past returns. Kuchler and Zafar (2019) find that the extrapolation issue also applies to house prices.

We study three possible channels through which the different expected returns in the COVID period can be expected. The first one is the cognitive/financial literacy channel, proxied by financial literacy, intelligence, and the education of a respondent. We hypothesize that less cognitive/less financially literate investors will react stronger to the COVID shock compared to more financially literate respondents, whom we do not expect to change their expectations too much, since we are looking at *long-term* deviations (defined as the 10-year period ahead) from the forecast. The second channel is partisan politics. Barrios and Hochberg (2020) show that during the pandemic, a higher share of Trump voters in a county was associated with lower perceptions of risk. Other studies also show different behavior of Democrats and Republicans during the crisis such as less social distancing by Republicans (see, for example, Allcott, Boxell, Conway, Gentzkow, Thaler, and Yang, 2020). For this reason, we expect that voters for the Democratic party react differently to the COVID situation from voters for the Republican party. The third channel is personal salience or lived disruption in which we link beliefs more directly to local COVID restrictions, case intensity, or personal exposure.

In line with our channel expectations, we find that there is substantial heterogeneity among investors in their predictions. First of all, we find that respondents with lower financial literacy, show a higher standard deviation in expected returns compared to those with higher financial literacy. More financially literate people also have lower return expectations during the COVID period. With regard to the second channel, we find that Democrat voters had lower return expectations during the COVID period. We do not find strong results for the third channel of personal salience or lived disruption associated with COVID. Investors also expect greater risk during the COVID period compared to other periods. Overall, stock market participation and stock trading are not strongly impacted by the COVID shock, except that 2021 saw a higher participation compared to other years.

Most of the literature on stock return expectations focuses on the question of whether investor expectations are related to stock market participation. Hurd et al. (2011) conclude that individuals with higher expected stock returns are more likely to be stock investors. This finding is confirmed by Arrondel, Calvo-Pardo, and Tas (2014). They conclude that stock market participation increases monotonically with the conditional expectation of a positive stock market

return. Their finding even applies to young/or affluent people.¹⁰ Giglio et al. (2021a) also find that beliefs are reflected in portfolio allocations, but they also find that this effect is small on average.¹¹ We confirm their findings by showing that both raw and CAPE-adjusted expected returns are strongly positively correlated with the stock market participation. However, there is no discernible effect of COVID shock on participation, which is consistent with our findings that the shock's negative effects on expectations disappear within one year.

The tariff announcements in 2025 do not appear to affect return expectations in a similar way to COVID. Since investors react differently to the once-in-a-lifetime shock of COVID than to the economic shock of the tariff announcements, it is likely that the effects we observed are attributable to the psychological and social trauma rather than to purely economic reasons.

We contribute to the literature on retail investor stock market expectations in two important ways. First, ours is the first study (to the best of our knowledge) that not only looks at changes in individual return expectations but also relates those changes to a proxy for market expectations (CAPE-adjusted returns). We also show that the results are very different between changes in expected returns and changes in adjusted expected returns. The second contribution is that we use two distinct shocks (COVID and tariffs) to separate the effects of economic and non-economic factors on both the immediate and the long-term changes in adjusted expected returns. The COVID event, which combined economic and non-economic shocks, is associated with a decline in adjusted expected returns, but there is no long-run effect. The tariff shock does not appear to affect long-run stock market expectations.

¹⁰ Arrondel, Calvo-Pardo, Giannitsarou, and Haliassos (2022) study how systematic social interactions affect the accuracy of stock market expectations. They find that this accuracy improves through such interactions. Shin (2021) uses an experimental setting to demonstrate that the probability of subjects participating in the stock market increases in their subjective returns. In his setting, experiencing returns is more important than merely observing them.

¹¹ Merkoulova and Veld (2022b) define the personal equity risk premium (PERP) as the difference between the stock market expectation of an individual and her personal opportunity cost of capital. They find that both components of the PERP are related to stock market participation and stock market investment: higher expected returns are associated with more stock market participation and investment, and a higher opportunity cost of capital is associated with less participation and investment.

2. Data and variables description

2.1. The survey

We carry out a survey in five waves, separated by one to two years, over the period 2019 – 2025. Our survey period covers the periods before COVID, during COVID, during COVID-normal, post COVID, and during the Trump tariff announcements of April 2025. While the importance of COVID crisis for people's lives is well-known and well-documented, Figure 1 shows that the announcement of tariffs in 2025 led to a stark increase in Google searches and can, therefore, be expected to be a commonly known factor in the formation of our respondents' economic beliefs.

[Please Insert Figure 1 here]

Our main variable of interest is the long-term stock market return expectation of panel members. We follow Ben-David, Graham, and Harvey (2013), who surveyed senior finance executives in the United States about their expected returns and expected risk. The exact question that we asked the panel members is a slightly simplified adjustment of the question of Ben-David et al. (2013)¹² and is:

I expect the average annual return over the next 10 years will be:

1 = __%

2 = I don't understand the question and/or I don't want to answer.

We submitted five different surveys to the Understanding America Study (UAS) Internet panel of the University of Southern California in Los Angeles. This Internet panel has been operational since 2014 and is representative of approximately 6,000 adult respondents living in the U.S. An important advantage of this panel is that it offers the opportunity for researchers to include their own survey questions. The responses can be linked to both background data on demographics and to answers of the same respondents in previous surveys.¹³ The first survey was submitted before COVID and was open from May 23 to June 22, 2019 (UAS 184 = pre-COVID). The second survey was submitted during the COVID peak and ran from June 3, 2020, to June 30, 2020 (UAS 295 = COVID). The third survey covers late COVID and was open from July 15, 2021, to August

¹² See Merkoulova and Veld (2022b) for a discussion of the differences between our question and the original question.

¹³ See Allatar, Messel, and Rogofsky (2018) for information on this panel, including a discussion on how the administrators keep the panel to be nationally representative. Participants are paid \$1.50 per minute that they spend answering questions and they are guaranteed anonymity.

15, 2021 (UAS 387 = COVID-normal). The fourth survey covers the period after COVID; that survey ran from June 19, 2023, to July 10, 2023 (UAS 557 = post-COVID). The fifth and last survey covered the period of the Trump tariff announcements and ran from April 16, 2025, to May 28, 2025.

Each of the five surveys included the same stock market expectations question mentioned above. In addition, our survey includes questions about whether panel members invest in stocks and/or fixed income, as well as a question on loss aversion. In the 2021, 2023, and 2025 surveys, we also ask questions about trading and the brokerage services that respondents used in 2020, 2021, 2023, and 2025. Our questionnaires are included in Appendix A. Appendix B contains the financial literacy questions.

2.2. CAPE-adjusted return calculations

While there is a heated debate in the asset pricing literature over the existence of long-term predictability of stock returns, many sources of financial information for private investors (such as financial advisers, financial newspapers, or social media) tend to make such predictions, often based on recent market trends or multiples. In our analysis, we attempt to capture this phenomenon by focusing not on the raw expected returns but on the deviations from a proxy for market expectations. To this end, for each month when we survey our respondents, we derive a CAPE-based prediction of future 10-year stock market returns and calculate the difference between each expected return and this prediction (named “deviation from forecast”). Under the null hypothesis of no effects from a shock, we expect that individuals' deviations from the forecast will not change from one survey wave to another due to COVID or other factors. To estimate predicted S&P 500 returns, we apply the concept of cyclically adjusted price-earnings ratios (CAPE), developed by Campbell and Shiller (1988a, 1988b, 1998, 2001) and extensively used to forecast long-term stock returns in both academic and industry settings.

We use the monthly CAPE values and other variables provided by Robert Shiller at shillerdata.com. For each survey month, we generate a predicted 10-year nominal S&P index return (a measure most comparable to the expected returns the survey respondents are asked to provide) as follows.

First, we regress the monthly Real 10-year Excess Annualized Stock Returns (RER) on Excess CAPE yields using all available monthly data from January 1990 through the month 10

years prior to the month for which we are generating the return forecast. The adjusted R-squared for these regressions is in the range of 0.62 to 0.76, indicating strong in-sample predictive power of CAPE yields.

Second, we produce the forecast for RER for the survey month using the coefficients estimated above and the value of Excess CAPE yield for this month.

Finally, we convert the estimated RER forecast into the forecast for index return using the following formula:

$$S\&P \text{ index return forecast} = RER \text{ forecast} + Long \text{ interest rate} - S\&P \text{ dividend yield}.$$

The S&P dividend yield is estimated using the 10 years of dividend yield and the S&P 500 index level history immediately prior to the survey month.

2.3. Correction for past stock return

Kaplanski et al. (2016) study stock return expectations of retail investors. They find that realized stock returns are positively correlated with next month's expected returns. For this reason, we have added a variable, “Past return,” that measures realized stock returns over the week before the completion of a survey. We know exactly on which day and at which time each UAS questionnaire is completed. For each respondent, we calculate the realized stock market return over the five-day trading period preceding the completion of this respondent's questionnaire.¹⁴ These realized returns are estimated for the S&P 500 Index.

3. Sample description

The first survey round (May/June 2019) was completed by 3,108 respondents.¹⁵ However, a large number of these respondents did not answer the question about expected stock market returns. Merkoulova and Veld (2022a) label those respondents as “expected return ignorant”. Subsequent

¹⁴ If the subject filled out the questionnaire before the market was open ($T < 9.30$ hours Eastern Standard Time = WST) or during the time the market was open ($9.30 \text{ hours EST} < T < 16.00 \text{ hours EST}$), the last known daily realized return is the same as the previous day return. If the market was closed at the time of questionnaire completion ($T > 16.00 \text{ hours EST}$), the last-known realized return is the same day realized return. The realized return over the last five trading days includes the realized return defined above plus the realized return over the previous four trading days.

¹⁵ See Merkoulova and Veld (2022a) for a complete description of the respondents and their characteristics.

surveys were addressed only to those panel members who provided a numerical answer to the question about expected stock returns in each of our earlier surveys. For example, the fifth-round survey (April/May 2025) was presented only to respondents who provided numerical responses to the questions on expected stock returns in 2019, 2020, 2021, and 2023.

The demographic characteristics of the respondents who completed the surveys are included in Table 1.

[Please Insert Table 1 here]

Our sample of 1,223 respondents includes 641 males (52%) and 582 females (48%). In 2019, 66% of our respondents invested in stocks. That percentage went slightly down to 65% in 2020, then up to 69% in 2021, and down again to 64% in 2023 and 65% in 2025. Note that it is difficult to draw any conclusions on the level of stock market participation from this data. The reason is that we include only respondents who provided a numerical answer to the expected stock returns question across three rounds. As Merkoulova and Veld (2022a) document, the inability or unwillingness to come up with expectations for stock returns is strongly associated with non-participation. As far as there is an increase in stock market participation between 2019 and 2021, that may be due to the emergence of commission-free trading through apps like Robinhood and to investors being awash with cash after the COVID lockdowns of 2020.

Given that the other variables are relatively stable over the years (except for an obvious variable such as age), we present them only for 2019. The summary statistics are presented in Panel B. The median age is relatively high (57 years) because the panel includes only people 18 years and older. Education is measured over five different levels, labeled as 0 (= no high school diploma), 1 (= high school, General Educational Development (GED), some college, or an associate degree), 2 (= Bachelor's degree), 3 (= Master's or professional degree), and 4 (= PhD). This variable, similarly to income, shows the variation that can be expected for a panel representative of the United States population. On average, respondents answer 11 of 14 financial literacy questions correctly. The trust variable is measured only in 2019 because we expect it to be relatively stable for each respondent. It is measured on a scale from zero to ten, where zero denotes "you can never be too careful," and ten denotes "most people can be trusted". The results in Table 1 show a mean of 4.59 for the trust variable with a median of five.¹⁶ Following Grinblatt, Keloharju,

¹⁶ The question for the trust variable comes from Guiso, Sapienza, and Zingales (2008) who base it on the following question from the World Values Survey Questionnaire: "Generally speaking,

and Linnainmaa (2011), we also control for intelligence. Our intelligence measure is based on Merkoulova and Veld (2022a), who calculate this variable using the UAS 83-85 surveys. The measures in these surveys consist of number series (UAS 83), picture vocabulary (UAS 84), and verbal analogies (UAS 85). These scores are combined in one “intelligence score,” where a score of 50 means that the person’s intelligence is equal to that of the average person in the general population. For our measure, we add the three separate intelligence scores to obtain a single score. The mean score for our sample is 165.36, and the median is 166.95. So, the average respondent to the five questionnaires has a higher intelligence than the average person in the United States.

The answers of the respondents to the stock investment questions are included in Table 2.

[Please Insert Table 2 here]

An interesting trend in Table 2 is that the number of small stock investors seems to increase over the years. The percentage of respondents with less than \$2,000 in stocks increases from 3.62% in 2019 to 4.76%-5.02% in the 2021-2025 waves. This increase may be related to the emergence of Robinhood and similar apps. For example, Welch (2022) argues that some reports have pegged the typical account size of a Robinhood investor as low as \$2,000.

4. Changes in expected return, risk and trading around COVID and tariffs crises: Raw versus CAPE-adjusted results

Table 3 presents the expected stock returns, loss aversion, and past stock returns data.

[Please Insert Table 3 here]

Panel A shows the stock return expectations and the realized stock returns. Expected returns are all winsorized at the 5% level to avoid the effects of outliers. The average expected annual stock return in the pre-COVID period (2019) is 6.88% with a median of 5%. Surprisingly, the mean expected stock returns seem to be highest during the COVID period (2020). In 2020, the mean expected return was 7.82%, which is higher than in the pre-COVID year and the COVID-normal and post-COVID years (7.17% in 2021 and 6.33% in 2023). When testing for differences between survey waves, we find that 2020 expectations are significantly higher than those in 2019,

would you say that most people can be trusted or that you have to be very careful in dealing with people?”.

2020, and 2023. The mean return expectations after the 2025 tariff announcements were significantly higher than in 2023 but significantly lower than in the COVID year (2020).¹⁷

As argued in Section 2.2, more interesting than the raw return expectations are the deviations from the CAPE returns. When these deviations are considered, the picture changes dramatically. The mean deviation from CAPE returns is -0.10% in 2020, lower than both the pre-COVID period (1.68% in 2019) and the COVID-normal and post-COVID periods (1.61% in 2021 and 0.85% in 2023). The median difference from the CAPE returns is a negative 1.83% in 2020, which is lower than the median differences in the other years. We test for differences across survey waves and find that the 2020 mean differences are significantly lower than those in 2019, 2021, and 2023. When comparing the mean deviations from the CAPE returns between the COVID period and the tariffs period, we find significantly higher expected returns for the tariffs period.

Following Greenwood and Shleifer (2014) and Kaplanski et al. (2016), we also measure the realized past five-day returns on the S&P 500 before the surveys were completed. We find low past returns in 2019 (mean of -1.22%), high returns in 2020 (mean of 2.92%), lower returns in 2021 (mean of -0.69%), close to zero returns in 2023 (0.44%), and higher returns in 2025 (1.10%). Figure 2 shows the market behavior around each survey date.

[Please Insert Figure 2 here]

This figure shows the well-known pattern of a largely booming stock market with large dips before our COVID and tariff surveys.

The loss aversion question is based on Choi and Robertson (2020) and asks respondents, on a scale from 1 to 5, how important the possibility of even small losses in stock investments is to them (1 = not important at all; 5 = extremely important). We find a mean score of 2.68 with a median of 3 in 2019. The loss aversion was lower in 2020, 2021, and 2023, with mean (median) scores of 2.34 (2), 2.50 (2), and 2.58 (2).¹⁸

We also compare the expected volatility between the different survey periods. For this purpose, we need to convert their confidence intervals into individual volatility estimates. We

¹⁷ Giglio et al. (2025) present a graph of the 10-year return expectations in their sample around the tariff announcements and find that they decline in that period. However, they don't present exact numbers and the exact period over which their returns are measured, so it is difficult to compare their results to ours.

¹⁸ In order to keep the costs of the questionnaire low, we did not ask the loss aversion question in 2025.

follow Ben-David et al. (2013), who use the Davidson and Cooper (1976) method to recover respondents' individual probability distribution, based on the normal distribution. The imputed individual volatility is calculated as:

$$\hat{\sigma}_i = \frac{x(0.90) - x(0.10)}{z}$$

where $x(0.90)$ and $x(0.10)$ represent the 90th and 10th percentiles of the respondent i 's distribution, and z is the number of standard deviations within the confidence interval (equal to 2.65 for the 80 percent interval we are using). We follow Ben-David et al. (2013) and transform the imputed volatility of the average ten-year returns into an annualized volatility by multiplying the volatility of the average ten-year returns by the square root of ten.

Panel B of Table 3 includes the volatility data. The estimated volatility is 2.59 for 2019, then increases to 3.68 for 2020, drops back to 3.12 for 2021, then to 2.35 for 2023, and finally increases to 2.75 for 2025. The respondents expect significantly higher volatility in 2020 than in other years, including the tariff year. That result is in line with what we would expect. However, this goes against earlier findings by Kaplanski et al. (2015), who found that investors show a negative relationship between expected return and risk.

Hallas, Hatibie, Koch, Majumdar, Pyarali, Wood, and Hale (2021) developed a set of indicators for the (U.S.) government response to COVID.¹⁹ This set of indices is named the Oxford COVID-19 Government Response Tracker (OxCGRT). We use the Stringency Index, which measures the strictness of “lockdown-style” closures and containment policies that primarily restrict people’s behavior. They calculated this index for all U.S. states throughout 2020 and 2021.²⁰ This index is measured on a scale from zero to 100, where zero reflects no stringency measures and 100 is the maximum recorded stringency. All states had a Stringency Index of zero on January 1, 2020. For each respondent, we know the state in which they live, and we relate their stock market expectations to the average value of the Stringency Index for their state, measured over the period from January 1, 2020 (the first date on which the index was calculated) to June 2, 2020 (the day that the questionnaire opened). Hallas et al. (2021) also developed an index for the

¹⁹ These indices differ strongly between states. For example, the Stringency Index is lower in states with more lenient restrictions, such as North Dakota or South Dakota and higher in states with more stringent restrictions, such as Vermont or Hawaii.

²⁰ Information about the calculation of this index as well as the data they use can be found at: <https://github.com/OxCGRT/covid-policy-tracker> (retrieved on April 2, 2025).

economic support that states give: the Economic Support Index, hereafter the Economic Index. This index measures the extent of economic support provided through income support and debt relief. In addition, they have an overall Government Response Index, from now on Government Index, that records how the responses of the states have varied across all indicators. That index captures the entire range of government responses. Like the Stringency Index, these indices are measured on a scale from one to 100. We study these effects in our analysis. As a related matter we also study other COVID related variables, such as number of COVID deaths and whether the respondent had suffered from COVID him or herself.

Panel C of Table 3 presents data on lockdown severity and COVID spread variables. The mean Stringency Index was 64.85 in 2020 and was 31.72 in 2021. The index dropped to 24.01 in 2023. The medians are in approximately the same range. The mean Government Index went down from 63.19 in 2020 to 47.58 in 2021 and 37.66 in 2023. The number of confirmed COVID cases strongly increased between 2020 and 2023. In 2020, there were, on average, a little more than 66,000 cases; in 2021 1.3 million confirmed COVID cases; and in 2023, more than 3.7 million cases. The mean Economic Index is 75.92 in 2020, 46.11 in 2021, and 28.06 in 2023.²¹

Table 4 includes the trading data.

[Please Insert Table 4 here]

We have trading data for 2020, 2021, 2023, and 2025. In 2020, we find that 77% of the respondents did not trade between February 1, 2020, and the date that they completed the questionnaire. That number was slightly lower in 2021 (74%), but higher in 2023 (78%), and especially in 2025 (85%).²² In all years, more people bought than sold shares. The median number of trades is 4 in both 2020 and 2023, 5 in 2021, and 2 in 2025. The median number of stocks traded is 3 in 2020 and 2023, and 4 in 2021.²³

²¹ There was no economic support anymore in 2025.

²² Note that in 2025, we asked for trading data for a much shorter period, i.e., April 1 to the time that the questionnaire was filled out (between April 16 and May 28, 2025). The shorter period is likely to explain the fall in trading activity in 2025.

²³ We did not ask the question are number of stocks traded in 2025.

5. Main results

We start by analyzing changes in CAPE-adjusted expected returns across levels of financial literacy. Our *a priori* expectation is that more rational respondents will expect similar (CAPE-adjusted) long-term stock market returns before and during COVID, while less rational individuals will change their expectations much more in response to the recent shock. We would not expect rational investors to substantially change their expectations over a long horizon, such as the 10 years on which our survey is based. We use financial literacy as a proxy for investor rationality. For our tests, we group financial literacy responses into four categories based on financial literacy scores: 0-8, 9-10, 11-12, and 13-14. Figure 3 confirms that, indeed, the standard deviation of changes in return expectations is highest for those with the lowest financial literacy.

[Please Insert Figure 3 here]

Table 5 presents the results of a formal test for the changes in deviations of expected returns from CAPE by financial literacy.

[Please Insert Table 5 here]

The tests in Table 5 show that the changes in deviations of expectations are significantly different for low financial literacy respondents compared to their higher financial literacy counterparts. This finding applies to both changes from the normal period to COVID crisis (2019 to 2021) and to the return to post-COVID normal (2021 to 2023). Most importantly, we find that the standard deviation of the changes monotonically decreases with the level of financial literacy across all four comparisons of deviations from CAPE returns.

5.1. Factors explaining changes in beliefs

Previous studies also find substantial heterogeneity in investors' beliefs.²⁴ Giglio et al. (2021a) argue that this heterogeneity can be decomposed into three components: (1) fixed individual characteristics; (2) common variation in individual beliefs over time, and (3) a residual component that captures idiosyncratic individual time variation and measurement error. Following Giglio et al. (2021a), we carry out a variance decomposition of returns. The results of this analysis are included in Table 6.

²⁴ See, for example, Hurd et al. (2011) and Giglio et al. (2021a).

[Please Insert Table 6 here]

This table presents the R^2 , which represents the proportion of the variance in stated individual beliefs and the measures derived from those beliefs that is explained by the combination of time and individual fixed effects. With respect to the average annual stock market return, we find that time fixed effects capture 1.1% of the total panel variation, whereas individual fixed effects capture 37.6% of the total variation. The remaining variation is a combination of idiosyncratic belief changes within individuals over time as well as measurement error in beliefs (see Giglio et al., 2021a). Our results are very close to those of Giglio et al. (2021a), who find that 0.5% of the expected 10-year stock returns in their sample can be explained by time series effects and 45% can be explained by individual fixed effects. We find marginally stronger time fixed effects than Giglio et al. (2021a), possibly because our sample includes two strong shocks.

We continue by analyzing the factors affecting return expectations using random effects panel regressions. The dependent variable is the expected stock market return minus the CAPE return. Table 7 contains the results.

[Please Insert Table 7 here]

Panel A contains the baseline results of the regressions. Model (1) presents the results for the baseline model, which includes all the usual control variables. Respondents who worry more about small losses on their stock investments, and who are consequently labeled as “loss averse”, have lower stock return expectations. Older and more intelligent individuals also have lower CAPE-corrected return expectations. In Model (2), we add dummies for the years 2019, 2021, 2023, and 2025, with 2020, the COVID year, being the omitted variable. The dummies for all four non-COVID years are significantly positive at the 1% level. These results indicate that respondents were less optimistic during the COVID crisis. In Model (3), we include a dummy variable for past returns but omit the year dummies. Contrary to previous findings, for example, by Greenwood and Shleifer (2014) and Kaplanski et al. (2016), we find that stock return expectations are lower after a period of rising stock prices. However, these previous studies focused on raw returns, whereas we study the difference between expectations and CAPE-adjusted returns. For that reason, a direct comparison with previous studies is difficult.

When we combine the year dummies with the past returns (Model (4)), the year dummies for 2019, 2021, 2023, and 2025 all remain significant at the 1% level, and the past returns variable becomes non-significant. Thus, the negative correlation between past returns and CAPE-adjusted

return expectations is most likely an artifact of the omitted year dummies. In line with the univariate results presented earlier, we find no indication that the tariff shock is associated with lower CAPE-corrected return expectations. This result shows that only the shock incorporating both economic and significant non-economic components had an effect on long-term expectations. Model (5) and (6) contains a dummy for Democrat voters.²⁵ This dummy is not significant.

In Table 8, we analyze how respondents' risk expectations changed over time.

[Please Insert Table 8 here]

Panel A contains the baseline regressions. Model (1) shows that older respondents, those who are more risk-averse, and individuals with higher intelligence generally have lower risk expectations than other respondents, but that males and those with higher financial literacy have higher risk expectations. We are primarily interested in changes in risk expectations during the COVID period. Model (2) shows that respondents expected significantly lower risk in all non-COVID years than in the omitted COVID year (2020). In Model (3), we add CAPE-adjusted returns, and we find that expected risk is higher when return expectations are higher. In Model (4), we find that both the high-risk-high-expected-returns pattern and the lower risk expectations for all four non-COVID years hold when we combine year dummies with expected returns. In Models (5) to (7), we add variables for past returns and Democrats. Importantly, for our study, neither of these variables changes the conclusion that risk expectations are significantly higher in the COVID year (2020).

5.2. How did the crisis affect beliefs?

We suggest three possible channels through which the COVID crisis may affect expected returns. The first one is the cognitive/financial literacy channel. We proxy this channel using three variables: financial literacy (this is the variable that relates to the most previous studies), intelligence, and education. We hypothesize that less cognitively-oriented/low financial literacy respondents suffer from affective overreaction, which is an intense disproportionate emotional response to a trigger where the reaction far outweighs the situation. An example of such an

²⁵ “Democrat” is a variable obtained from the UAS 180, corresponding to the answer to Question 4 from this questionnaire: “We know it is still a long way away, but the presidential election state party primaries and caucuses will be held next year, in 2020. If you decide to vote in your state’s presidential primary or caucus, which party’s primary or caucus are you most likely to vote in, if any?” Those who answered 1-Democratic Party are defined as Democrats in our study.

overreaction is the finding of Kaplanski and Levy (2010) that the average market loss of an aviation disaster is 60 billion dollars, while the estimated overall loss is no more than one billion dollars. We expect that respondents who are low in cognition or financial literacy will display larger deviations from benchmark forecasts. Van Rooij, Lusardi, and Alessie (2011) develop two indices for financial literacy. They use five questions for their basic financial literacy index and ten questions for their advanced financial literacy index. A previous UAS questionnaire (UAS 121) uses 14 questions to test financial literacy, of which all five basic literacy questions and eight of the ten advanced literacy questions are based on the original study by Van Rooij et al. (2011). In addition, a new question is added. We use a financial literacy index constructed by awarding one point for each correct answer in UAS 121.

The second possible channel goes through partisanship. Several studies find strong differences in reactions to the COVID threat between Democratic and Republican voters. Baker, Farrokhnia, Meyer, Pagel, and Yannelis (2020) cite evidence from several surveys in March 2020 where substantially more Democrats than Republicans were worried about the virus. Baccini, Brodeur, and Weymouth (2021) show similar results for a Gallup poll in October 2020. Barrios and Hochberg (2020) conclude that Trump voters perceive lower risk from COVID compared to others. We hypothesize that Democratic voters will have lower return expectations compared to others, because they are more worried about the virus and less supportive of government interventions during the pandemic.

The third possible channel is based on personal experiences and the disruption caused by the COVID crisis. We hypothesize that the individuals who were personally affected by illness, deaths, or government intervention due to COVID, will be more likely to overstate the effects of the COVID crisis on the economy. To test for the third channel, we use the fact that COVID had different effects in different U.S. states and that economic measures to support businesses may have translated into higher stock return expectations. We also test for the effect that lockdowns and other government interventions had on stock return expectations in 2020 and 2021.

We present the results of our empirical tests for the first two channels in Table 9 and for the third channel in Table 10.

[Please Insert Table 9 here]

In the first four regressions reported in Table 9, we study the effect of the first two channels of the COVID crisis on expected returns, i.e., cognitive/financial literacy channel (as proxied by financial

literacy, intelligence and education) and partisanship, on expected returns. For this purpose, we include interaction variables between the cognitive/financial literacy variables and Democratic affiliation and the COVID shock year, 2020. Model (1) shows a negative relation between expected returns and the interaction variable between the year 2020 and financial literacy. This result means that persons with higher financial literacy expected lower returns in the COVID year, 2020. Models (2) and (3) show similar effects for respectively intelligence and education. These results suggests that cognition and financial literacy act as channels between the COVID shock and expected returns. The results for Model (4) indicate that Democrats have lower return expectations in 2020. Since the Republican (Trump) administration was in charge in this period, the disconnect between Democratic voters and the government, along with their negative perception of the government, may have driven their more negative expectations.

In Models (5) to (8) of Table 9, we study the effects of the cognitive/financial literacy and partisan channels on risk expectations in the time of crisis. Just like in the first four regressions, we interact the variables related to two channel variables, proxies for cognitive/financial literacy level and Democratic affiliation, with a dummy for the COVID year, 2020. We do not find an effect of the interaction between the shock year and financial literacy in Model (5), but we do find significant negative effects for intelligence and education in Models (6) and (7). Remarkably, we find that Democrats expect less volatility in 2020.

We test for the third channel, consisting of economic and non-economic experiences with COVID, in Table 10.

[Please Insert Table 10 here]

This panel includes the findings for the regressions with the COVID variables. In these regressions we only consider the years 2020 and 2021, because these are the only years with (serious) COVID consequences and restrictions. The dummy for the year 2021 is significantly positive for all models. Models (1), (2), and (3) include variables for respectively the Economic Index, the Government Index, and the Stringency Index. Only the Economic Index is significantly positive (at the 10%-level). The number of COVID deaths is not significant (Model 4). Also, we don't find evidence for the effect of the respondent having had COVID him or herself (Model 5).

Overall, we find no substantial support for the personal salience channel of the economic and non-economic experiences with COVID. We conclude that it is primarily the (lack of)

cognitive abilities/financial literacy and the political party affiliation that were responsible for the significant negative effect of COVID crisis on stock return expectations.

5.3. Economic effects of the changes in beliefs

Having documented that the crisis led to significant changes in risk and return beliefs, in this section, we investigate whether these changes resulted in meaningful decision outcomes, such as stock market participation and trading.

Table 11 contains the results for stock market participation. The dependent variable is one for stock investors and zero for non-investors.

[Please Insert Table 11 here]

Model (1) shows the results for the base model. The results of this analysis are strongly in line with previous studies: better-educated respondents, those with higher income, higher trust, and better financial literacy are more likely to participate in the stock market. In Model (2), we add dummies for the years 2019, 2021, 2023, and 2025. In line with the univariate results in Table 1, we find that stock market participation went up in 2021 compared to 2020.²⁶ In Models (3) to (8), we focus on the effects of past returns, expected returns, and the CAPE-adjusted returns. We find that higher expected returns as well as higher CAPE-adjusted returns are associated with higher stock market participation. In all regressions, we find higher stock market participation in 2021 than in 2020.

Table 12 reports the results on stock trading.

[Please Insert Table 12 here]

This table only includes observations for 2020, 2021, 2023, and 2025 because we did not collect trading information in 2019. Model (1) shows that respondents with higher income and higher financial literacy are more likely to trade stocks. In line with previous studies, we also find that males trade more and that older people trade less. In Model (2), we add dummies for the years 2021, 2023, and 2025; the COVID year (2020) is the omitted variable. The dummy for 2021 is significant at the 10% level, indicating more trading in 2021 compared to 2020. The dummy for

²⁶ This result goes against the finding of Niculaescu, Sangiorgi, and Bell (2023) who find that, on average, investors increased their investments during the first COVID wave. However, they contribute this result largely to investors with experience with COVID, those who are in a vulnerable health category, those who tested positive, and investors who are close to somebody who died because of COVID.

2025 is significantly negative at the 1% level, indicating that trading in 2025 was lower than in 2020. However, the period we asked about in 2025 was much shorter than in the other years, so the lack of trading may be explained by that. Past returns are added in Model (3), but this variable is not significant. In Model (4), we include both year dummies and the past returns variable. The significance of the year dummies does not change in that specification. The expected returns in Models (5) and (6) are significant at the 10% level. Adding this variable does not change the results for the year dummies. In Models (7) and (8), we add the CAPE-adjusted returns. This variable is significant at the 10% level in Model (10). Adding this variable removes the 10% significance for 2021, but does not change the result for 2025.

6. Conclusions

We study the impact of the COVID crisis on return and risk expectations of retail investors. This group of investors has become more important over the years as their numbers have increased. The growing importance of retail investors underscores the need to understand what drives their return expectations. Such expectations can change dramatically during shocks.

Our main finding is that individuals were more negative relative to the market indicators about future stock returns during this crisis. This effect remains after correcting for realized stock returns and demographic variables.

We study three potential channels through which the COVID shock could have impacted investor expectations. The first channel is the lack of sufficient cognitive abilities to process the information, including financial literacy. The second channel consists of the possible partisan reactions to the COVID crisis. We study the possibility that people voting for the Democratic Party rather than the Republican Party drive differences in expectations. Finally, we investigate how personal experiences with COVID and government interventions affect investors' reactions. We find that the effects of shocks on expectations were mitigated for those with better cognitive ability and/or financial literacy. Democratic voters were more negative about the outlook for the stock market, possibly driven by partisan disagreement with the Trump administration. We did not find clear evidence for the effect of COVID restrictions, case intensity, or personal experience. After the COVID crisis subsided, return expectations quickly returned to pre-COVID levels. We

conclude that COVID created a shock associated with lower return expectations, but these lower expectations were not permanent and returned to "normal" after the COVID effect wore off.

Finally, to distinguish the effects of purely economic shock from the wider impact of a crisis that affected all aspects of life, we compare the changes in expectations during the COVID shock with those around the Trump tariff announcements in 2025. We find that a purely economic shock does not result in a significant shift in expectations. Therefore, our results are most likely attributable to the psychological and social impact of a shock rather than to the extrapolation of the economic impact of the crisis on the long-term stock return expectations.

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Table 1. Sample characteristics

This table reports descriptive statistics for the sample population. Panel A presents the distribution of the main categorical variables. Panel B presents the summary statistics. The sample is composed of 1,223 individuals who at least partially completed all four questionnaires and reported their return expectations in each wave.

Panel A: Distribution of categorical variables

Gender			Married	Born in the US	Invest in stocks				
			2019		2019	2020	2021	2023	2025
Male	641	Yes	848	1,140	799 (66%)	790 (65%)	839 (69%)	780 (64%)	723 (65%)
Female	582	No	374	83	417 (34%)	432 (35%)	383 (31%)	438 (36%)	393 (35%)
Total	1,223		1,222	1,223	1,216	1,222	1,222	1,218	1,116

Race	Household income, 2019			Education, 2019		Credit score		Labor status, 2019	
White	1,077	Less than \$5,000	7	Level 0: No high school diploma	20	300–499	20	Working	712
Black	54	5,000 to 7,499	6	Level 1: High school, GED, some college, or an associate degree	584	500–549	35	Retired	303
Native American	7	7,500 to 9,999	12	Level 2: Bachelor’s degree	347	550–599	45	Unemployed or on leave	33
Asian	38	10,000 to 12,499	23	Level 3: Master’s or professional degree	231	600–649	72	Disabled	50
Islander or Mixed	44	12,500 to 14,999	14	Level 4: PhD	41	650–699	89	Other/mixed	124
		15,000 to 19,999	31			700–749	168		
		20,000 to 24,999	39			750–799	276		
		25,000 to 29,999	44			800–850	439		
		30,000 to 34,999	54			Don’t know	79		
		35,000 to 39,999	34						
		40,000 to 49,999	96						
		50,000 to 59,999	94						
		60,000 to 74,999	153						
		75,000 to 99,999	221						
		100,000 to 149,999	224						
		150,000 or more	169						
Total	1,220		1,221		1,223		1,223		1,222

Panel B: Summary statistics in 2019

	Min	25%	Median	75%	Max	Mean	Std. dev.	No. obs.
Age	20	45	57	66	92	55.63	13.48	1,221
Household size	1	2	2	3	9	2.57	1.28	1,206
Trust	0	3	5	7	10	4.59	2.62	1,218
Financial literacy	0	10	12	13	14	11.18	2.53	1,223
Intelligence	78.19	154.37	166.95	179.34	205.89	165.36	18.92	1,221

Table 2. Stock investments

This table presents the distribution of stock portfolio values. The 2020, 2021, 2023, and 2025 questionnaires gave dollar results. They are collapsed in the same brackets as the 2019 data.

Stock portfolio value										
	2019		2020		2021		2023		2025	
Category (in dollars)	No. obs.	%	No. obs.	%	No. obs.	%	No. obs.	%	No. obs.	%
None	417	34.29	432	35.35	383	31.34	438	35.96	393	35.22
Less than 2,000	44	3.62	59	4.83	60	4.91	58	4.76	56	5.02
2,001–5,000	33	2.71	32	2.62	33	2.70	25	2.05	27	2.42
5,001–10,000	35	2.88	25	2.05	34	2.78	30	2.46	16	1.43
10,001–15,000	33	2.71	14	1.15	22	1.80	23	1.89	13	1.16
15,001–30,000	66	5.43	63	5.16	48	3.93	52	4.27	43	3.85
30,001–50,000	54	4.44	78	6.38	64	5.24	57	4.68	50	4.48
50,001–100,000	114	9.38	122	9.98	106	8.67	92	7.55	87	7.80
100,001–200,000	145	11.92	118	9.66	122	9.98	114	9.36	103	9.23
Above 200,001	275	22.62	279	22.83	350	28.64	329	27.01	328	29.39
Total	1,216	100.00	1,222	100.00	1,222	100.00	1,218	100.00	1,116	100.00

Table 3. Stock return expectations, loss aversion, past stock returns, and lockdowns

This table presents descriptive statistics for the variables measuring respondents' stock return expectations, loss aversion, and stock returns prior to the day a survey is completed (Panel A), estimated volatility expectations (Panel B), and lockdown severity and COVID spread variables (Panel C). Expected, 10th-, and 90th-percentile returns and volatility are winsorized at the 5% level in both tails.

Panel A. Stock return expectations and realized stock returns

	Min	25%	Median	75%	Max	Mean	Std. dev.	No. obs.
Expected average annual stock market return								
- 2019	2.00	4.00	5.00	8.00	20.00	6.88	4.51	1,223
- 2020	2.00	4.00	6.00	10.00	25.00	7.82	5.73	1,223
- 2021	2.00	4.00	6.00	8.00	20.00	7.17	4.70	1,223
- 2023	2.00	4.00	5.00	8.00	15.00	6.33	3.53	1,223
- 2025	2.00	4.00	6.00	8.00	20.00	6.93	4.51	1,048
<i>t</i> -test for differences								
between survey waves:	Difference in means	<i>t</i> -test	<i>p</i> -value			Difference in means	<i>t</i> -test	<i>p</i> -value
- 2020 minus 2019	0.94***	4.51	0.00	- 2025 minus 2019		0.06	0.29	0.77
- 2020 minus 2021	0.65***	3.08	0.00	- 2025 minus 2021		-0.23	-1.20	0.23
- 2020 minus 2023	1.49***	7.76	0.00	- 2025 minus 2023		0.61***	3.60	0.00
				- 2025 minus 2020		-0.89***	-4.05	0.00
Average 10 th percentile of stock market return								
- 2019	0.50	2.00	4.00	6.00	30.00	6.27	7.08	1,208
- 2020	1.00	2.00	5.00	8.00	40.00	7.32	8.97	1,207
- 2021	1.00	2.00	5.00	7.00	25.00	6.15	6.01	1,222
- 2023	1.00	2.00	4.00	6.00	25.00	5.83	5.91	1,218
- 2025	1.00	2.00	4.00	7.00	50.00	8.09	11.75	1,045
<i>t</i> -test for differences								
between survey waves:	Difference in means	<i>t</i> -test	<i>p</i> -value			Difference in means	<i>t</i> -test	<i>p</i> -value
- 2020 minus 2019	1.05***	3.19	0.00	- 2025 minus 2019		1.82***	4.52	0.00
- 2020 minus 2021	1.17***	3.78	0.00	- 2025 minus 2021		1.94***	5.05	0.00
- 2020 minus 2023	1.49***	4.83	0.00	- 2025 minus 2023		2.26***	5.90	0.00
				- 2025 minus 2020		0.77*	1.76	0.08

	Min	25%	Median	75%	Max	Mean	Std. dev.	No. obs.
Average 90 th percentile of stock market return								
- 2019	2.00	5.00	8.00	12.00	50.00	11.48	11.52	1,212
- 2020	3.00	5.00	10.00	15.00	50.00	13.52	12.66	1,207
- 2021	2.00	5.00	10.00	14.00	50.00	12.34	11.75	1,221
- 2023	2.00	5.00	8.00	11.00	40.00	10.13	8.78	1,219
- 2025	2.00	5.00	8.00	12.00	50.00	12.01	12.29	1,045
<i>t</i> -test for differences between survey waves:								
	Difference in means	<i>t</i> -test	<i>p</i> -value			Difference in means	<i>t</i> -test	<i>p</i> -value
- 2020 minus 2019	2.04***	4.15	0.00	- 2025 minus 2019		0.53	1.07	0.29
- 2020 minus 2021	1.18**	-2.39	0.02	- 2025 minus 2021		-0.32	-0.64	0.52
- 2020 minus 2023	3.39***	-7.67	0.00	- 2025 minus 2023		1.88***	4.23	0.00
				- 2025 minus 2020		-1.51***	-2.86	0.00
Deviation from CAPE returns								
- 2019	-3.50	-1.17	-0.17*** (8.17)	2.83	14.83	1.68*** (12.98)	4.51	1,223
- 2020	-5.83	-3.83	-1.83*** (8.85)	2.17	17.17	-0.010 (-0.06)	5.73	1,223
- 2021	-3.56	-1.56	0.44*** (5.68)	2.44	14.46	1.61*** (11.98)	4.70	1,223
- 2023	-3.51	-1.51	-0.51*** (1.91)	2.49	10.01	0.85*** (8.39)	3.54	1,223
- 2025	-3.18	-1.18	0.82*** (9.23)	2.82	15.86	1.84*** (13.17)	4.52	1,048
<i>t</i> -test for differences between survey waves:								
	Difference in means	<i>t</i> -test	<i>p</i> -value			Difference in means	<i>t</i> -test	<i>p</i> -value
- 2020 minus 2019	-1.69***	-8.08	0.00	- 2025 minus 2019		0.16	0.85	0.40
- 2020 minus 2021	-1.62***	-7.64	0.00	- 2025 minus 2021		0.23	1.18	0.24
- 2020 minus 2023	-0.86***	-4.45	0.00	- 2025 minus 2023		0.99***	5.85	0.00
				- 2025 minus 2020		1.85***	8.43	0.00

	Min	25%	Median	75%	Max	Mean	Std. dev.	No. obs.
One-week prior realized return on S&P500								
- 2019	-2.91	-1.88	-1.16	-1.16	5.09	-1.22	1.18	1,223
- 2020	-5.07	2.71	2.83	4.85	5.67	2.92	2.51	1,223
- 2021	-2.90	-1.03	-0.97	0.91	3.79	-0.69	1.59	1,223
- 2023	-1.84	-0.07	0.22	1.15	2.90	0.44	1.25	1,223
- 2025	-3.84	-3.27	0.32	4.58	8.49	1.10	4.27	1,123
<i>t</i> -test for differences between survey waves:								
	Difference in means	<i>t</i> -test	<i>p</i> -value			Difference in means	<i>t</i> -test	<i>p</i> -value
- 2020 minus 2019	4.14***	52.24	0.00	- 2025 minus 2019		2.32***	18.24	0.00
- 2020 minus 2021	3.62***	42.57	0.00	- 2025 minus 2021		1.79***	13.68	0.00
- 2020 minus 2023	2.48***	31.00	0.00	- 2025 minus 2023		0.66***	5.17	0.00
				- 2025 minus 2020		-1.82***	-12.75	0.00
Loss aversion								
- 2019	1.00	2.00	3.00	3.00	5.00	2.68	1.13	1,222
- 2020	1.00	1.00	2.00	3.00	5.00	2.34	1.16	1,221
- 2021	1.00	2.00	2.00	3.00	5.00	2.50	1.15	1,221
- 2023	1.00	2.00	2.00	3.00	5.00	2.58	1.22	1,217

Panel B. Estimated annual volatility of stock market returns

	Min	25%	Median	75%	Max	Mean	Std. dev.	No. obs.
Estimated annual volatility of stock market returns								
- 2019	0.38	1.13	1.89	3.40	9.43	2.59	2.20	826
- 2020	0.38	1.51	2.26	3.77	16.98	3.68	4.04	867
- 2021	0.38	1.13	2.26	3.77	11.32	3.12	2.77	873
- 2023	0.38	1.13	1.89	3.02	7.55	2.35	1.78	851
- 2025	0.38	1.13	1.89	3.40	10.94	2.75	2.57	715
<i>t</i> -test for differences between survey waves:								
	Difference in means	<i>t</i> -test	<i>p</i> -value			Difference in means	<i>t</i> -test	<i>p</i> -value
- 2020 minus 2019	1.09***	6.83	0.00	- 2025 minus 2019		0.16	1.31	0.19
- 2020 minus 2021	0.56***	3.39	0.00	- 2025 minus 2021		-0.37***	-2.70	0.00
- 2020 minus 2023	1.33***	8.78	0.00	- 2025 minus 2023		0.40***	3.61	0.00
				- 2025 minus 2020		-0.93***	-5.32	0.00

Panel C. Lockdown severity and COVID spread variables

	Min	25%	Median	75%	Max	Mean	Std. dev.	No. obs.
Stringency Index on the survey start date								
- 2020	45.37	60.19	66.67	69.44	83.33	64.85	8.05	1,223
- 2021	22.02	30.17	31.70	33.17	46.59	31.72	3.22	1,223
- 2023	19.49	22.29	23.05	25.33	31.09	24.01	2.33	1,223
Confirmed COVID cases								
- 2020	539	21,154	40,004	78,482	387,384	66,259	77,164	1,220
- 2021	24,550	560,920	1,003,432	1,402,765	4,161,113	1,300,000	1,105,019	1,221
- 2023	148,393	1,732,724	2,985,193	3,969,832	11,800,000	3,739,081	3,201,313	1,221
Had COVID								
- 2020	0	0	0	0	1	0.05	0.22	1,219
- 2021	0	0	0	0	1	0.02	0.14	1,194
Deaths								
- 2020	10	702	2,174	4,751	31,537	3,833	6,208	1,220
- 2021	258	8,198	18,127	27,805	64,183	23,138	19,108	1,221
- 2023	791	15,802	32,182	48,892	98,544	40,143	29,942	1,221
Government Index								
- 2020	49.22	59.64	62.24	67.71	78.12	63.19	6.98	1,223
- 2021	39.57	45.97	47.33	49.28	56.68	47.58	2.96	1,223
- 2023	28.67	34.97	37.43	40.04	46.78	37.66	4.13	1,223
Economic Index								
- 2020	62.50	62.50	87.50	87.50	100	75.92	13.23	1,223
- 2021	37.50	37.50	37.50	62.50	75	46.11	12.57	1,223
- 2023	0	0	25	37.50	75	28.06	24.33	1,223

Table 4. Trading

This table contains the number of trades and the number of stocks traded in 2020, 2021, 2023, and 2025. The numbers are winsorized at the 5th percentile.

		2020			2021			2023			2025		
		No. obs.	Percent	Mean dollar amount	No. obs.	Percent	Mean dollar amount	No. obs.	Percent	Mean dollar amount	No. obs.	Percent	Mean dollar amount
Trading direction													
-	No trading	934	76.62		906	74.20		952	78.16		943	84.65	
-	Sold more than bought	52	4.26	60,284	60	4.92	41,825	69	5.66	37,924	36	3.23	113,533
-	Bought = sold	71	5.82		81	6.63		68	5.58		39	3.50	
-	Bought more	162	13.29	12,613	174	14.25	25,270	129	10.59	13,974	96	8.62	11,252
-	Total	1,219	100.00		1,221	100.00		1,218	100.00		1,114	100.00	
		Min	25%	Median	75%	Max	Mean	Std. dev.	No. obs.				
Number of trades													
-	2020	0	2	4	10	50	9.21	12.98	282				
-	2021	1	2	5	10	40	8.54	10.34	314				
-	2023	0	2	4	10	30	6.92	7.90	265				
-	2025	0	1	2	5	25	4.63	6.22	171				
Number of stocks traded													
-	2020	0	0	3	11	300	26.78	70.60	283				
-	2021	0	1	4	10	350	33.43	84.33	314				
-	2023	0	0	3	8	175	16.26	40.78	262				

Table 5. Changes in expectations by level of financial literacy

This table presents means, medians and standard deviations of the changes in deviations of expected returns from CAPE returns between survey waves, broken down by financial literacy levels. Financial literacy is the respondent's score on the financial literacy index, between zero and 14.

	Change from 2019 to 2020			Change from 2020 to 2021			Change from 2021 to 2023				Change from 2023 to 2025			
Financial literacy score	Mean	t-stats	Standard deviation	Mean	t-stats	Standard deviation	Mean	t-stats	Standard deviation	No. obs.	Mean	t-stats	Standard deviation	No. obs.
0-8	-0.87	-1.34	9.13	1.83***	3.06	8.38	-2.45***	-5.32	6.43	195	1.23**	2.22	6.91	156
9-10	-0.79	-1.33	8.39	0.75	1.53	6.89	-0.78**	-2.05	5.42	200	0.93**	2.37	5.09	169
11-12	-2.10***	-6.57	6.00	1.60***	5.58	5.38	-0.20	-0.77	4.74	352	1.11***	3.72	5.10	293
13-14	-2.09***	-9.45	4.19	1.91***	8.78	4.74	-0.48***	-2.93	3.56	476	1.06***	5.13	4.27	430
Total	-1.69***	-8.85	6.66	1.62***	9.42	6.01	-0.76***	-5.51	4.83	1,223	1.08***	6.83	5.09	1,048
ANOVA	3.23			1.87			10.34				0.10			
F-test (prob)	(0.02)			(0.13)			(0.00)				(0.96)			
Bartlett's equal-variance test χ^2 (prob):														
			160.79			115.77			117.12				59.51	
			(0.00)			(0.00)			(0.00)				(0.00)	

Table 6. Decomposing the Variation in Beliefs

This table presents R^2 , the proportion of variance in the stated individual beliefs and the measures derived from those beliefs, explained by time fixed effects, individual fixed effects, and the combination of time and individual fixed effects. All variables are winsorized at 5% level at both tails.

	R^2 (in %)			No. obs.
	Time FE	Individual FE	Time and individual FE	
Expected average annual stock market return	1.10	37.55	38.64	5,940
Average 10 th percentile of stock market return	1.02	31.67	32.81	5,900
Average 90 th percentile of stock market return	0.95	34.89	35.84	5,904
Deviation from CAPE returns	2.16	37.06	39.28	5,940
Estimated annual volatility of stock market returns	2.77	43.08	45.54	4,132

Table 7. Factors affecting deviations from CAPE

This table contains the results of random effects panel regressions in which the dependent variable is the deviation from CAPE, defined as the difference between expected returns and CAPE returns. Loss aversion is defined as the score to the loss aversion question; trust is the respondent's score on the trust index, between zero and 10; Financial literacy is the respondent's score on the financial literacy index, between zero and 14; intelligence is measured using number series, picture vocabulary, and verbal analogies. Education is measured in five categories, where not having a high school diploma is the omitted category. Democrats is a dummy variable that is equal to one if the respondent indicates that they are likely to vote for the Democratic party, and is equal to zero otherwise. Standard errors are reported under each coefficient. ***, **, and * indicate statistical significance at, respectively, the 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)	(5)
Male	-0.056 (0.169)	-0.064 (0.168)	-0.063 (0.169)	-0.064 (0.168)	-0.083 (0.169)
Age	-0.020*** (0.006)	-0.026*** (0.006)	-0.020*** (0.006)	-0.026*** (0.006)	-0.025*** (0.006)
Born in the US	-0.254 (0.328)	-0.217 (0.327)	-0.245 (0.328)	-0.214 (0.327)	-0.257 (0.329)
Income	-0.015 (0.026)	-0.029 (0.027)	-0.015 (0.026)	-0.030 (0.027)	-0.028 (0.027)
Loss aversion	-0.113** (0.056)	-0.177*** (0.056)	-0.136** (0.056)	-0.177*** (0.056)	-0.181*** (0.056)
Trust	-0.032 (0.032)	-0.031 (0.032)	-0.035 (0.032)	-0.031 (0.032)	-0.034 (0.032)
Financial literacy	-0.032 (0.042)	-0.023 (0.042)	-0.035 (0.042)	-0.023 (0.042)	-0.025 (0.042)
Intelligence	-0.032*** (0.005)	-0.032*** (0.005)	-0.032*** (0.005)	-0.032*** (0.005)	-0.033*** (0.005)
Education					
1	-0.581 (0.657)	-0.597 (0.657)	-0.607 (0.658)	-0.600 (0.657)	-0.492 (0.672)
2	-0.728 (0.677)	-0.773 (0.676)	-0.769 (0.677)	-0.778 (0.676)	-0.638 (0.692)
3	-0.616 (0.689)	-0.668 (0.688)	-0.630 (0.689)	-0.669 (0.688)	-0.479 (0.704)
4	-0.608 (0.799)	-0.643 (0.798)	-0.643 (0.799)	-0.646 (0.798)	-0.462 (0.812)
Year 2019		1.712*** (0.169)		1.617*** (0.196)	1.675*** (0.170)
Year 2021		1.665*** (0.168)		1.583*** (0.189)	1.646*** (0.169)
Year 2023		0.964*** (0.170)		0.908*** (0.180)	0.939*** (0.170)
Year 2025		2.057*** (0.179)		2.016*** (0.184)	2.023*** (0.180)
Past returns			-0.128*** (0.020)	-0.023 (0.024)	
Democrats					-0.218 (0.168)
Constant	9.549*** (1.047)	8.894*** (1.049)	9.759*** (1.048)	8.985*** (1.054)	8.981*** (1.067)
Observations	5,868	5,868	5,868	5,868	5,801
χ^2	102.155	283.167	141.287	284.012	277.669

Table 8. Factors affecting expected risk

Results of random effects panel regressions where the dependent variable is expected stock market risk, defined as imputed volatility:

$$\hat{\sigma}_i = \frac{x(0.90) - x(0.10)}{z}$$

where $x(0.90)$ and $x(0.10)$ represent the 90th and 10th percentiles of the respondent's distribution, and z is the number of standard deviations within the confidence interval (equal to 2.65 in our case). This number is multiplied by the square root of ten to obtain the annualized volatility. Loss aversion is defined as the score to the loss aversion question; trust is the respondent's score on the trust index, between zero and 10; Financial literacy is the respondent's score on the financial literacy index, between zero and 14; intelligence is measured using number series, picture vocabulary, and verbal analogies. Education is measured in five categories, where not having a high school diploma is the omitted category. Democrats is a dummy variable that is equal to one if the respondent indicates that they are likely to vote for the Democratic party, and is equal to zero otherwise. CAPE adj. returns are calculated as the difference between expected returns and CAPE returns. Standard errors are reported under each coefficient. ***, **, and * indicate statistical significance at, respectively, the 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Male	0.267** (0.121)	0.257** (0.120)	0.272*** (0.103)	0.264*** (0.101)	0.270** (0.121)	0.257** (0.120)	0.262** (0.121)
Age	-0.026*** (0.004)	-0.022*** (0.005)	-0.020*** (0.004)	-0.015*** (0.004)	-0.026*** (0.004)	-0.022*** (0.005)	-0.021*** (0.005)
Born in the US	-0.036 (0.233)	-0.062 (0.232)	0.060 (0.198)	0.042 (0.195)	-0.026 (0.234)	-0.063 (0.232)	-0.060 (0.234)
Income	-0.008 (0.020)	-0.001 (0.020)	0.005 (0.017)	0.015 (0.017)	-0.008 (0.020)	-0.002 (0.020)	0.001 (0.020)
Loss aversion	-0.121*** (0.043)	-0.084** (0.042)	-0.090** (0.039)	-0.038 (0.038)	-0.114*** (0.043)	-0.084** (0.042)	-0.079* (0.042)
Trust	0.005 (0.023)	0.004 (0.023)	0.007 (0.020)	0.006 (0.020)	0.006 (0.023)	0.004 (0.023)	0.010 (0.023)
Financial literacy	0.077** (0.031)	0.073** (0.031)	0.081*** (0.027)	0.077*** (0.026)	0.077** (0.031)	0.073** (0.031)	0.065** (0.031)
Intelligence	-0.008** (0.004)	-0.008** (0.004)	0.001 (0.003)	0.002 (0.003)	-0.008** (0.004)	-0.008** (0.004)	-0.008** (0.004)

Education							
1	0.132 (0.516)	0.160 (0.511)	-0.030 (0.444)	-0.028 (0.435)	0.147 (0.516)	0.159 (0.511)	0.114 (0.519)
2	0.181 (0.526)	0.223 (0.521)	0.083 (0.452)	0.114 (0.443)	0.198 (0.526)	0.222 (0.521)	0.209 (0.530)
3	0.281 (0.532)	0.329 (0.528)	0.074 (0.458)	0.105 (0.449)	0.290 (0.533)	0.328 (0.528)	0.327 (0.537)
4	-0.015 (0.601)	0.051 (0.597)	-0.107 (0.515)	-0.040 (0.505)	-0.003 (0.602)	0.050 (0.597)	0.066 (0.605)
Year 2019		-1.088*** (0.123)		-1.659*** (0.116)		-1.104*** (0.143)	-1.064*** (0.123)
Year 2021		-0.514*** (0.121)		-1.070*** (0.113)		-0.528*** (0.136)	-0.495*** (0.121)
Year 2023		-1.255*** (0.123)		-1.620*** (0.114)		-1.264*** (0.130)	-1.228*** (0.123)
Year 2025		-0.809*** (0.130)		-1.468*** (0.122)		-0.816*** (0.135)	-0.783*** (0.130)
CAPE-adj. returns			0.257*** (0.010)	0.284*** (0.009)			
Past returns					0.057*** (0.015)	-0.004 (0.017)	
Democrat							-0.156 (0.120)
Constant	4.924*** (0.813)	5.318*** (0.809)	2.468*** (0.706)	2.935*** (0.693)	4.810*** (0.814)	5.335*** (0.813)	5.266*** (0.819)
Observations	4,085	4,085	4,081	4,081	4,085	4,085	4,045
χ^2	60.538	193.349	806.518	1142.126	75.296	193.352	187.079

Table 9. Changes in beliefs in times of crisis

This table contains the results of random effects panel regressions testing the mechanisms of the changes in beliefs about return and risk during the COVID crisis. In columns (1)-(4) the dependent variable is the deviation from CAPE, defined as the difference between expected returns and CAPE returns. In columns (5)-(8) the dependent variable is expected stock market risk, defined as imputed volatility:

$$\hat{\sigma}_i = \frac{x(0.90) - x(0.10)}{z}$$

where $x(0.90)$ and $x(0.10)$ represent the 90th and 10th percentiles of the respondent's distribution, and z is the number of standard deviations within the confidence interval (equal to 2.65 in our case). This number is multiplied by the square root of ten to obtain the annualized volatility. Loss aversion is defined as the score to the loss aversion question; trust is the respondent's score on the trust index, between zero and 10; Financial literacy is the respondent's score on the financial literacy index, between zero and 14; intelligence is measured using number series, picture vocabulary, and verbal analogies. Education is measured in five categories, where not having a high school diploma is the omitted category. Democrats is a dummy variable that is equal to one if the respondent indicates that they are likely to vote for the Democratic party, and is equal to zero otherwise. CAPE adj. returns are calculated as the difference between expected returns and CAPE returns. Standard errors are reported under each coefficient. ***, **, and * indicate statistical significance at, respectively, the 1%, 5%, and 10% levels.

	Return expectations				Risk expectations			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Male	-0.060 (0.168)	-0.059 (0.168)	-0.054 (0.168)	-0.080 (0.169)	0.259** (0.120)	0.259** (0.120)	0.261** (0.120)	0.264** (0.121)
Age	-0.026*** (0.006)	-0.026*** (0.006)	-0.026*** (0.006)	-0.025*** (0.006)	-0.022*** (0.004)	-0.022*** (0.004)	-0.023*** (0.004)	-0.022*** (0.004)
Income	-0.027 (0.026)	-0.026 (0.026)	-0.028 (0.026)	-0.026 (0.027)	-0.001 (0.020)	-0.001 (0.020)	-0.001 (0.020)	0.002 (0.020)
Trust	-0.031 (0.032)	-0.030 (0.032)	-0.030 (0.032)	-0.033 (0.032)	0.003 (0.023)	0.003 (0.023)	0.004 (0.023)	0.009 (0.023)
Financial literacy	0.028 (0.043)	-0.023 (0.042)	-0.029 (0.041)	-0.025 (0.042)	0.087*** (0.032)	0.072** (0.031)	0.074** (0.031)	0.065** (0.031)
Intelligence	-0.032*** (0.005)	-0.023*** (0.005)	-0.032*** (0.005)	-0.033*** (0.005)	-0.008** (0.004)	-0.005 (0.004)	-0.008** (0.004)	-0.008** (0.004)
Education			0.022 (0.106)				0.095 (0.075)	
Democrat				-0.107 (0.177)				-0.049 (0.127)
Year 2020	1.183* (0.606)	5.447*** (1.173)	-0.968*** (0.294)	-1.329*** (0.174)	1.702*** (0.507)	3.850*** (0.936)	1.355*** (0.221)	1.091*** (0.126)
Year 2020#Financial literacy	-0.247*** (0.053)				-0.068 (0.043)			
Year 2020#Intelligence		-0.042*** (0.007)				-0.017*** (0.006)		
Year 2020#Education			-0.349** (0.149)				-0.239** (0.107)	
Year 2020#Democrat				-0.559** (0.274)				-0.499** (0.197)
Constant	9.844*** (1.055)	8.930*** (1.077)	9.790*** (0.844)	10.435*** (1.067)	4.318*** (0.813)	3.884*** (0.829)	4.420*** (0.634)	4.349*** (0.818)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,868	5,868	5,868	5,801	4,085	4,085	4,085	4,045
χ^2	262.346	277.234	244.136	239.776	152.013	159.664	153.381	150.618

Table 10. Direct COVID experiences and changes in expected returns

This table contains the results of random effects panel regressions in which the dependent variable is the deviation from CAPE, defined as the difference between expected returns and CAPE returns. Loss aversion is defined as the score to the loss aversion question; trust is the respondent's score on the trust index, between zero and 10; Financial literacy is the respondent's score on the financial literacy index, between zero and 14; intelligence is measured using number series, picture vocabulary, and verbal analogies. Education is measured in five categories, where not having a high school diploma is the omitted category. The Economic (Support) Index, the Government (Response) Index, and the Stringency Index are all based on the report of Hallas et al. (2021) and they measure respectively the extent of economic support provided by the state of the respondent through income support and debt relief, the overall response of the state of the respondent, and the strictness or "lockdown-style" closures and containment policy of the state of the respondent. Standard errors are reported under each coefficient. ***, **, and * indicate statistical significance at, respectively, the 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)	(5)
Male	0.089 (0.250)	0.079 (0.250)	0.078 (0.250)	0.094 (0.250)	0.047 (0.251)
Age	-0.031*** (0.009)	-0.031*** (0.009)	-0.031*** (0.009)	-0.032*** (0.009)	-0.028*** (0.009)
Born in the US	-0.516 (0.488)	-0.538 (0.488)	-0.540 (0.488)	-0.514 (0.489)	-0.598 (0.490)
Income	-0.026 (0.041)	-0.022 (0.041)	-0.022 (0.041)	-0.015 (0.041)	-0.017 (0.041)
Loss aversion	-0.158* (0.093)	-0.164* (0.093)	-0.164* (0.093)	-0.179* (0.094)	-0.165* (0.094)
Trust	-0.051 (0.047)	-0.050 (0.047)	-0.050 (0.047)	-0.047 (0.047)	-0.052 (0.048)
Financial literacy	-0.118* (0.062)	-0.116* (0.062)	-0.115* (0.062)	-0.114* (0.062)	-0.120* (0.062)
Intelligence	-0.051*** (0.008)	-0.051*** (0.008)	-0.051*** (0.008)	-0.052*** (0.008)	-0.050*** (0.008)
Education					
1	-0.505 (0.966)	-0.509 (0.968)	-0.532 (0.967)	-0.557 (0.966)	-0.342 (0.976)
2	-0.770 (0.995)	-0.781 (0.997)	-0.800 (0.996)	-0.845 (0.995)	-0.613 (1.004)
3	-0.516 (1.013)	-0.518 (1.015)	-0.537 (1.015)	-0.636 (1.014)	-0.288 (1.022)
4	-0.086 (1.181)	-0.092 (1.182)	-0.108 (1.182)	-0.159 (1.181)	0.088 (1.191)
Year 2021	2.097*** (0.307)	1.850*** (0.350)	1.613*** (0.576)	1.506*** (0.270)	1.672*** (0.176)
Economic Index	0.014* (0.009)				
Government Index		0.012 (0.019)			
Stringency Index			-0.002 (0.017)		
Deaths				0.070 (0.092)	
Had COVID					0.649 (0.538)
Constant	12.322*** (1.671)	12.636*** (1.986)	13.494*** (1.897)	12.967*** (1.697)	12.886*** (1.573)
Observations	2,420	2,420	2,420	2,415	2,388
χ^2	218.75	215.95	215.545	218.087	208.713

Table 11. Stock market participation

This table contains the results of random effects panel logit regressions, where the dependent variable is a dummy equal to one for stock investors and zero for non-investors. Loss aversion is defined as the score to the loss aversion question; trust is the respondent's score on the trust index, between zero and 10; Financial literacy is the respondent's score on the financial literacy index, between zero and 14; intelligence is measured using number series, picture vocabulary, and verbal analogies. Education is measured in five categories, where not having a high school diploma is the omitted category. CAPE adj. returns are calculated as the difference between expected returns and CAPE returns. Standard errors are reported under each coefficient. ***, **, and * indicate statistical significance at, respectively, the 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Male	0.380*	0.362	0.378*	0.362	0.389*	0.376*	0.390*	0.376*
	(0.224)	(0.225)	(0.224)	(0.225)	(0.225)	(0.226)	(0.225)	(0.226)
Age	-0.022***	-0.015*	-0.021***	-0.015*	-0.019**	-0.015*	-0.020**	-0.015*
	(0.008)	(0.009)	(0.008)	(0.009)	(0.008)	(0.009)	(0.008)	(0.009)
Born in the US	0.237	0.213	0.240	0.211	0.279	0.263	0.284	0.262
	(0.442)	(0.444)	(0.442)	(0.445)	(0.443)	(0.446)	(0.443)	(0.446)
Income	0.266***	0.281***	0.267***	0.281***	0.270***	0.281***	0.268***	0.281***
	(0.029)	(0.030)	(0.029)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)
Loss aversion	0.055	0.050	0.050	0.050	0.071	0.063	0.067	0.063
	(0.050)	(0.051)	(0.050)	(0.051)	(0.051)	(0.051)	(0.051)	(0.051)
Trust	0.192***	0.189***	0.192***	0.189***	0.192***	0.190***	0.193***	0.190***
	(0.042)	(0.043)	(0.042)	(0.043)	(0.042)	(0.043)	(0.042)	(0.043)
Financial literacy	0.508***	0.500***	0.507***	0.501***	0.510***	0.505***	0.511***	0.505***
	(0.057)	(0.057)	(0.057)	(0.057)	(0.057)	(0.057)	(0.057)	(0.057)
Intelligence	-0.008	-0.008	-0.008	-0.008	-0.008	-0.008	-0.008	-0.008
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Education								
1	1.916**	1.908**	1.909**	1.911**	1.923**	1.921**	1.925**	1.921**
	(0.894)	(0.897)	(0.894)	(0.897)	(0.897)	(0.901)	(0.898)	(0.901)
2	3.029***	3.041***	3.021***	3.045***	3.054***	3.068***	3.054***	3.067***
	(0.918)	(0.921)	(0.918)	(0.921)	(0.922)	(0.925)	(0.922)	(0.925)
3	3.285***	3.300***	3.279***	3.302***	3.336***	3.349***	3.336***	3.349***
	(0.937)	(0.940)	(0.937)	(0.940)	(0.941)	(0.945)	(0.942)	(0.945)
4	5.442***	5.424***	5.434***	5.426***	5.475***	5.47***	5.481***	5.47***
	(1.224)	(1.227)	(1.223)	(1.227)	(1.229)	(1.233)	(1.230)	(1.233)

Year 2019		0.150 (0.145)		0.195 (0.169)		0.187 (0.146)		0.106 (0.146)
Year 2021		0.507*** (0.146)		0.546*** (0.164)		0.530*** (0.146)		0.459*** (0.147)
Year 2023		-0.092 (0.146)		-0.065 (0.155)		-0.044 (0.147)		-0.117 (0.147)
Year 2025		-0.082 (0.154)		-0.064 (0.158)		0.017 (0.158)		-0.068 (0.159)
Past returns			-0.018 (0.017)	0.011 (0.021)				
Expected returns					0.031*** (0.011)	0.031*** (0.011)		
CAPE-adj. returns							0.033*** (0.011)	0.031*** (0.011)
Constant	-8.815*** (1.375)	-9.278*** (1.390)	-8.795*** (1.375)	-9.324*** (1.393)	-9.317*** (1.394)	-9.719*** (1.410)	-9.101*** (1.386)	-9.472*** (1.400)
Observations	5,936	5,936	5,936	5,936	5,862	5,862	5,862	5,862
χ^2	380.37	393.735	381.186	393.784	382.518	394.045	382.821	393.888

Table 12. Stock trading

This table presents results of random effects panel logit regressions, where the dependent variable is equal to one if a respondent reports trading stocks, and zero otherwise. Loss aversion is defined as the score to the loss aversion question; trust is the respondent's score on the trust index, between zero and 10; Financial literacy is the respondent's score on the financial literacy index, between zero and 14; intelligence is measured using number series, picture vocabulary, and verbal analogies. Education is measured in five categories, where not having a high school diploma is the omitted category. CAPE adj. returns are calculated as the difference between expected returns and CAPE returns. Standard errors are reported under each coefficient. ***, **, and * indicate statistical significance at, respectively, the 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Male	0.801*** (0.160)	0.804*** (0.163)	0.801*** (0.160)	0.804*** (0.163)	0.789*** (0.160)	0.796*** (0.163)	0.789*** (0.160)	0.796*** (0.163)
Age	-0.022*** (0.006)	-0.013** (0.006)	-0.023*** (0.006)	-0.013** (0.006)	-0.022*** (0.006)	-0.013** (0.006)	-0.022*** (0.006)	-0.013** (0.006)
Born in the US	-0.620** (0.292)	-0.668** (0.298)	-0.619** (0.292)	-0.669** (0.298)	-0.576** (0.293)	-0.623** (0.299)	-0.575** (0.293)	-0.623** (0.299)
Income	0.104*** (0.027)	0.133*** (0.028)	0.104*** (0.027)	0.133*** (0.028)	0.101*** (0.027)	0.129*** (0.028)	0.100*** (0.027)	0.129*** (0.028)
Loss aversion	-0.033 (0.054)	-0.021 (0.055)	-0.033 (0.054)	-0.021 (0.055)	-0.027 (0.054)	-0.018 (0.055)	-0.030 (0.054)	-0.018 (0.055)
Trust	0.041 (0.030)	0.035 (0.031)	0.041 (0.030)	0.035 (0.031)	0.044 (0.030)	0.039 (0.031)	0.044 (0.030)	0.039 (0.031)
Financial literacy	0.259*** (0.043)	0.248*** (0.044)	0.259*** (0.043)	0.248*** (0.044)	0.260*** (0.043)	0.252*** (0.044)	0.260*** (0.043)	0.252*** (0.044)
Intelligence	-0.005 (0.005)	-0.005 (0.005)	-0.005 (0.005)	-0.005 (0.005)	-0.004 (0.005)	-0.005 (0.005)	-0.005 (0.005)	-0.005 (0.005)
Education								
1	1.018 (0.858)	0.973 (0.864)	1.017 (0.858)	0.976 (0.864)	1.012 (0.859)	0.974 (0.867)	1.007 (0.859)	0.974 (0.867)
2	1.578* (0.869)	1.567* (0.876)	1.577* (0.870)	1.571* (0.876)	1.579* (0.871)	1.574* (0.879)	1.571* (0.870)	1.574* (0.879)
3	1.747** (0.876)	1.754** (0.884)	1.747** (0.877)	1.754** (0.883)	1.76** (0.878)	1.767** (0.886)	1.753** (0.877)	1.767** (0.886)
4	1.449	1.435	1.449	1.434	1.458	1.449	1.452	1.449

	(0.948)	(0.957)	(0.948)	(0.957)	(0.949)	(0.959)	(0.948)	(0.959)
Year 2021		0.226*		0.274*		0.237*		0.183
		(0.123)		(0.143)		(0.123)		(0.125)
Year 2023		-0.129		-0.097		-0.099		-0.156
		(0.127)		(0.136)		(0.128)		(0.128)
Year 2025		-0.822***		-0.796***		-0.805***		-0.870***
		(0.142)		(0.147)		(0.144)		(0.147)
Past returns			-0.005	0.013				
			(0.016)	(0.020)				
Expected returns					0.023*	0.024*		
					(0.012)	(0.012)		
CAPE-adj. returns							0.013	0.024*
							(0.012)	(0.012)
Constant	-5.582***	-6.064***	-5.567***	-6.119***	-5.894***	-6.426***	-5.63***	-6.232***
	(1.145)	(1.165)	(1.146)	(1.168)	(1.164)	(1.187)	(1.149)	(1.173)
Observations	4,722	4,722	4,722	4,722	4,652	4,652	4,652	4,652
Chi ²	191.458	233.993	191.425	234.492	190.515	230.642	188.949	230.564

Figure 1. Google Trends search activity for the word “tariffs” from February to July 2025.

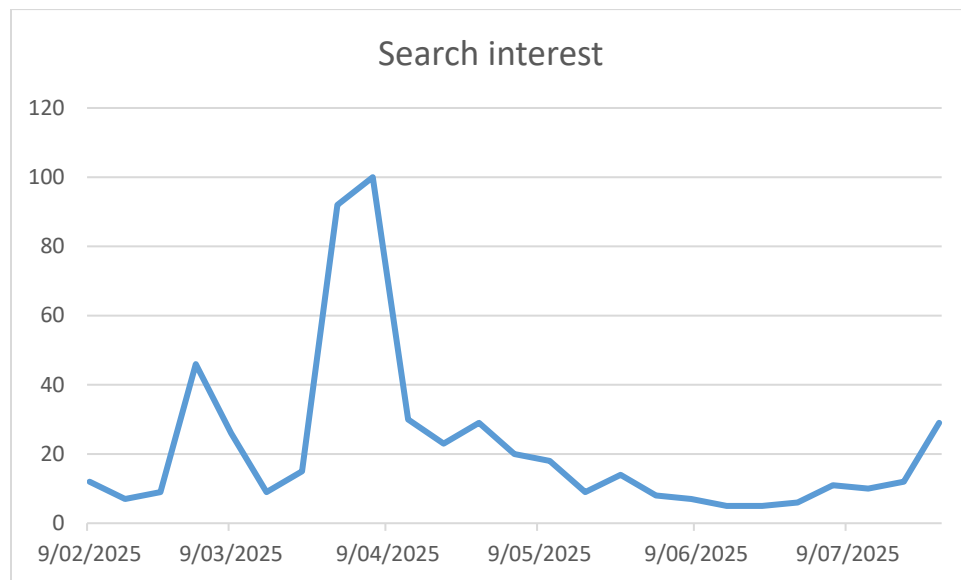


Figure 2. Market behavior around the survey date.

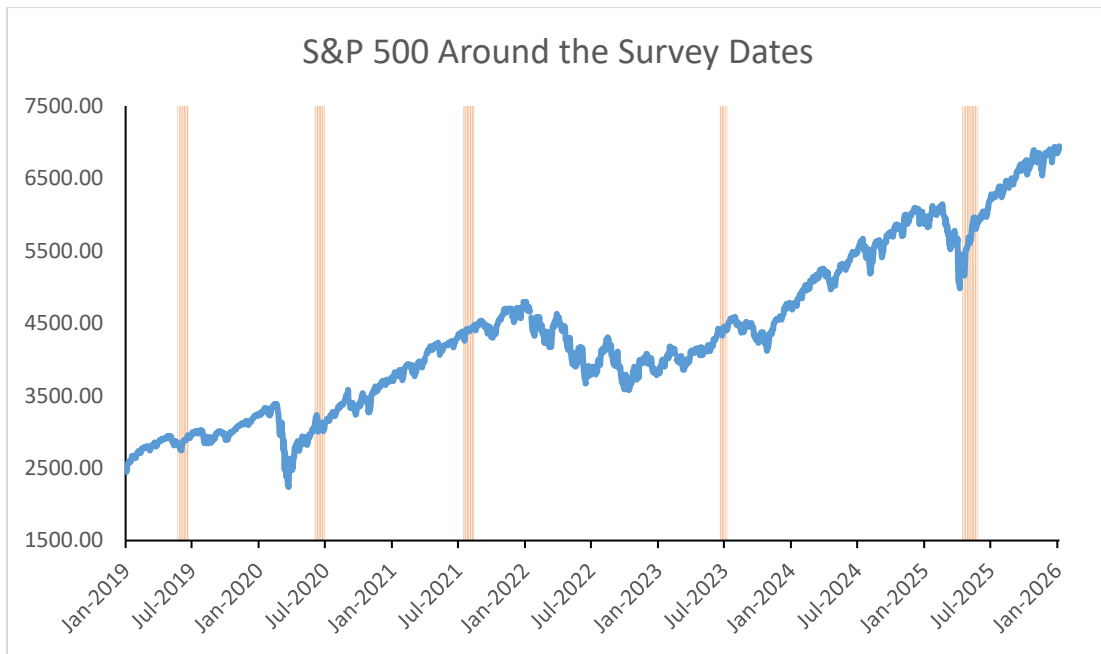
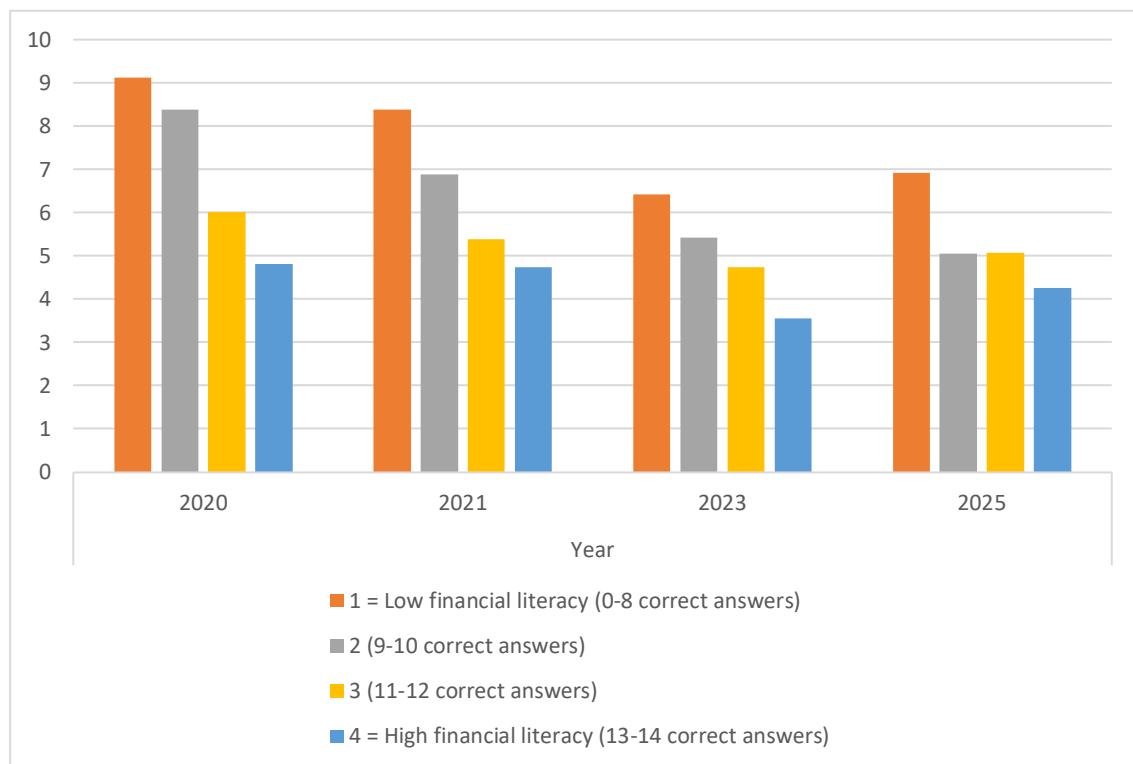


Figure 3. Standard deviation of the changes in CAPE-adjusted expectations between survey waves.



Appendix A: Questionnaires UAS 184, UAS 295, UAS 387, UAS 557, and UAS 713

Field days

- UAS 184: May 23 to June 22, 2019
- UAS 295: June 3 to June 30, 2020
- UAS 387: July 15 to August 15, 2021
- UAS 557: June 19, 2023 to July 10, 2023
- UAS 713: April 16, 2025 to May 28, 2025

UAS 184

Introduction

The following questionnaire is part of a research project. By means of this project we are trying to determine how individuals invest.

Question 1

What is the approximate total value of the stocks in your current financial investment portfolio? This portfolio is defined as the sum of your investments in retirement accounts and investments that are held outside these accounts. Stocks are defined as the stocks of individual firms and investments in equity mutual funds.

- 1 = I do not have any investments in stocks.
- 2 = Under 2,000 dollars.
- 3 = 2,001–5,000 dollars.
- 4 = 5,001–10,000 dollars.
- 5 = 10,001–15,000 dollars.
- 6 = 15,001–30,000 dollars.
- 7 = 30,001–50,000 dollars.
- 8 = 50,001–100,000 dollars.
- 9 = 100,001–200,000 dollars.
- 10 = above 200,001 dollars.

*Please answer the next questions based on your best guess on how the stock market will perform over the **next 10 years**. Here is an example of what we mean by average annual (yearly) return: It is a simple average of each year's return. So, if in the first year the stock market goes up by 2% and in the second-year market goes up by 4%, the average annual return over two years is 3% - we want your best guess, so please do not look anything up.*

Question 2

I expect the average annual return over the next 10 years will be:

1 = __%

2 = I do not understand the question and/or I do not know what to answer.

Question 3

I believe that there is a small (1-in-10, or 10%) chance the actual return over 10 years will be less than:

1 = ____%

2 = I do not understand the question and/or I do not know what to answer.

Question 4

I believe that there is a small (1-in-10, or 10%) chance the actual return over 10 years will be greater than:

1 = ____%

2 = I do not understand the question and/or I do not know what to answer.

Only respondents who answered “2” for either of the Questions 2-3 received the following message: “Can we please ask you to reconsider the question(s) below? Your answers are important to us and we would value your opinion. Please only select “I do not understand the question/I do not know what to answer” if you really do not have idea what to answer.

Question 5

How important is the following factor in determining the percentage of your investable assets that is currently invested in stocks?

The possibility of even small losses on my stock investments makes me worry.

1 = Not important at all

2 = A little important

3 = Moderately important

4 = Very important

5 = Extremely important

Question 6

Generally speaking, would you say that most people can be trusted or that you have to be very careful in dealing with people?

0 = You can never be too careful

...

10 = Most people can be trusted

999 = I don't know

UAS 295

Questions 1-5 of UAS 295 are identical to Questions 1-5 of UAS 184

Question 6

Between February 1, 2020 until today, did you place orders to sell or buy any stocks (do not count any automatic investment taking place in your retirement accounts without your direct orders)?

1 = I did not have any stocks before February 1 and I did not buy any stocks during this period

2 = Only sold

3 = Sold more (in dollar terms) than bought

4 = Sold and bought about the same dollar amount

5 = Bought more (in dollar terms) than sold

6 = Only bought

7 = I did not trade stocks in this period at all

Question 7

(This question goes to respondents who answered 2 or 3 in Question 6)

What is the approximate dollar amount by which you sold more stocks than bought in this period (since February 1)?

Question 8

(This question goes to respondents who answered 5 or 6 in Question 6)

What is the approximate dollar amount by which you bought more stocks than sold in this period (since February 1)?

UAS 387

*Please answer the next questions based on your best guess on how the stock market will perform over the **next 10 years**. Here is an example of what we mean by average annual (yearly) return:*

It is a simple average of each year's return. So, if in the first year the stock market goes up by 2% and in the second-year market goes up by 4%, the average annual return over two years is 3% - we want your best guess, so please do not look anything up.

Question 1

I expect the average annual return over the next 10 years will be:

1 = ____%

2 = I don't understand the question and/or I don't know what to answer.

Question 2

I believe that there is a small (1-in-10 or 10 percent) chance the actual return over 10 years will be **less than**:

1 = ____%

2 = I don't understand the question and/or I don't know what to answer.

Question 3

I believe that there is a small (1-in-10 or 10 percent) chance the actual return over 10 years will be **greater than**:

1 = ____%

2 = I don't understand the question and/or I don't know what to answer.

Question 4

What is the approximate total value of the stocks in your current financial investment portfolio? This portfolio is defined as the sum of your investments in retirement accounts and investments that are held outside these accounts. Stocks are defined as the stocks of individual firms and investments in equity mutual funds.

1 = I do not have any investments in stocks

2 = \$_____

Question 5

How important is the following factor in determining the percentage of your investable assets that is currently invested in stocks?

The possibility of even small losses on my stock investments makes me worry.

- 1 = Not important at all
- 2 = A little important
- 3 = Moderately important
- 4 = Very important
- 5 = Extremely important

Question 6

Between February 1, 2021 until today, did you place orders to sell or buy any stocks (do not count any automatic investment taking place in your retirement accounts without your direct orders)?

- 1 = I did not have any stocks before February 1 and I did not buy any stocks during this period
- 2 = Only sold
- 3 = Sold more (in dollar terms) than bought
- 4 = Sold and bought about the same dollar amount
- 5 = Bought more (in dollar terms) than sold
- 6 = Only bought
- 7 = I did not trade stocks in this period at all

Question 7

(This question goes to respondents who answered 2 or 3 in Question 6)

What is the approximate dollar amount by which you sold more stocks than bought in this period (since February 1)?

Question 8

(This question goes to respondents who answered 5 or 6 in Question 6)

What is the approximate dollar amount by which you bought more stocks than sold in this period (since February 1)?

Question 9

(Questions 9 – 13 go to respondents who answered 2, 3, 4, 5, or 6 in Question 6. The broker names are randomized.)

Which of the following brokerage services did you use for trading from February to {date of the survey} 2021 (please tick all that apply):

- 1 = Robinhood
- 2 = TD Ameritrade
- 3 = E-Trade Financial
- 4 = Charles Schwab

5 = Fidelity
6 = Citadel Securities
7 = Interactive Brokers
8 = Merrill Edge (Bank of America)
9 = Vanguard
10 = Other, namely:

Question 10

How many individual transactions (buying or selling stocks) did you make during the period of February – {date of survey} 2021?

Question 11

Approximately how many individual stocks did you trade during the period of February – {date of survey} 2021?

Question 12

What stock represents your largest trade (in dollars) during the period of February – {date of survey} 2021?

Question 13

Was it a buy or sell transaction?

1 = Buy transaction

2 = Sell transaction

Set of questions 14 – 18 are identical to questions 9 – 13, but are offered to the respondents who reported that they traded stocks in the period February – June 2020, and refer to that period.

UAS 557

Questions 1-5 of UAS 557 are identical to Questions 1-5 of UAS 387. Questions 6-8 and 10-13 are also identical, except that 2021 is replaced by 2023.

Question 9 is slightly different from UAS 387 :

Question 9

Which of the following brokerage services did you use for trading from February to June 2023 (please tick all that apply) (*in randomized order, with #16 coming last*):

- 1 = Robinhood
- 2 = TD Ameritrade
- 3 = E-Trade Financial
- 4 = Charles Schwab
- 5 = Fidelity
- 6 = Merrill Edge (Bank of America)
- 7 = Vanguard
- 8 = WeBull
- 9 = Stash
- 10 = Ameriprise
- 11 = Edward Jones
- 12 = LPL
- 13 = Morgan Stanley
- 14 = Wells Fargo
- 15 = Raymond James
- 16 = Acorns
- 17 = eToro
- 18 = Other, please specify

Question 14

How often do you visit Internet Bulletin boards, such as Reddit, to read about investments?
Please indicate the answer that is closest for you.

- 1 = never
- 2 = approximately monthly
- 3 = approximately weekly
- 4 = approximately daily
- 5 = more than once each day

UAS 713

Questions 1-4 of UAS 713 are identical to Questions 1-4 of UAS 387.

Questions 5 to 10 are slightly different from UAS 387 :

Question 5

n_001 Between April 1, 2025 until today, did you place orders to sell or buy any stocks (do not count any automatic investment taking place in your retirement accounts without your direct orders)?

1 = I did not have any stocks before April 1 and I did not buy any stocks during this period

2 = Only sold

3 = Sold more (in dollar terms) than bought

4 = Sold and bought about the same dollar amount

5 = Bought more (in dollar terms) than sold

6 = Only bought

7 = I did not trade stocks in this period at all

Question 6

(This question goes to respondents who answered 2 or 3 in Question 5)

n_002a What is the approximate dollar amount by which you sold more stocks than bought in this period (since April 1)?

Question 7

(This question goes to respondents who answered 5 or 6 in Question 5)

n_002b What is the approximate dollar amount by which you bought more stocks than sold in this period (since April 1)?

Question 8

This question only goes to respondents who answered 2 to 6 in Q5.

How many individual transactions (buying or selling stocks) did you make during the period from April 1, 2025 to now?

Question 9

This question only goes to respondents who answered 2 to 6 in Q5.

What stock was, in dollar amount, your biggest purchase (or sale) since April 1, 2025 to now?

Question 10

Did you use the Robinhood brokerage service between April 1, 2025 and now?

1 = yes

2 = no

Appendix B: Relevant questions from UAS 121

Questions on financial arithmetic

Question 1

Suppose you had \$100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow: more than \$102, exactly \$102, less than \$102?

- 1 = More than \$102.
- 2 = Exactly \$102.
- 3 = Less than \$102.
- 4 = I do not know.

Question 2

Suppose you had \$100 in a savings account and the interest rate was 20% per year and you never withdraw money or interest payments. After 5 years, how much would you have on this account in total?

- 1 = More than \$200.
- 2 = Exactly \$200.
- 3 = Less than \$200.
- 4 = I do not know.

Question 3

Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be able to buy more than, exactly the same as, or less than today with the money in this account?

- 1 = More than today.
- 2 = Exactly the same as today.
- 3 = Less than today.
- 4 = I do not know.

Question 4-

Assume a friend inherits \$10,000 today and his sibling inherits \$10,000 by 3 years from now. Who is richer today because of the inheritance?

- 1 = My friend.
- 2 = His sibling.
- 3 = They are equally rich.
- 4 = I do not know.

Question 5

Suppose that in the year 2020, your income has doubled and prices of all goods have doubled too. In 2020, will you be able to buy more, the same or less than today with your income?

- 1 = Buy more than today.
- 2 = Buy the same as today.
- 3 = Buy less than today.
- 4 = I do not know.

Questions on the function of the stock market

Question 6

Which of the following describes the main function of the stock market?

- 1 = The stock market helps to predict stock earnings.
- 2 = The stock market results in an increase in the price of stocks.
- 3 = The stock market brings people who want to buy stocks together with those who want to sell stocks.
- 4 = None of the above.
- 5 = I do not know.

Question 7

Which of the following statements is correct?

- 1 = Once one invests in a mutual fund, one cannot withdraw money in the first year.
- 2 = Mutual funds can invest in several assets, for example invest in both stocks and bonds.
- 3 = Mutual funds pay a guaranteed rate of return which depends on their performance.
- 4 = None of the above.
- 5 = I do not know.

Questions on financial sophistication

Question 8

If the interest rates (rise/fall), what should happen to bond prices?

- 1 = They should rise.
- 2 = They should fall.
- 3 = They should stay the same.
- 4 = I do not know.

Question 9

Do you think the following statement is true?

Buying a (single company/stock mutual fund) usually provides a safer return than a (single company/stock mutual fund).

- 1 = True.
- 2 = False.
- 3 = I do not know.

Question 10

Do you think that the following statement is true or false?

(Stocks/Bonds) are normally riskier than (stocks/bonds).

- 1 = True.
- 2 = False.
- 3 = I do not know.

Question 11

Considering a long period (for example 10 or 20 years), what normally gives the highest return?

- 1 = Savings accounts.
- 2 = Bonds.
- 3 = Stocks.
- 4 = I do not know.

Question 12

Normally, which asset described below displays the highest fluctuations over time: savings accounts, bonds or stocks?

- 1 = Savings accounts.
- 2 = Bonds.
- 3 = Stocks.
- 4 = I do not know.

Question 13

When an investor spreads his or her money among different assets, does the risk of losing a lot of money increase, decrease, or stay the same?

- 1 = Increase.
- 2 = Decrease.

3 = Stay the same.
4 = I do not know.

Question 14

Is the following statement true?

Housing prices in the US can never go down?

1 = True.
2 = False.
3 = I do not know.

Appendix C. Additional Results.

This Appendix contains additional results and their brief discussion.

Table 1C presents the changes in raw expected returns by level of financial literacy. The results in this table are in line with Table 5 in the paper, which presents changes in the deviations of expected returns from CAPE across survey waves, broken down by financial literacy level.

Table 2C presents the findings from regressions of expected stock market risk on the COVID variables. Four out of five models confirm the significance of the 2021 dummy. None of the COVID variables are significant.

Panel 3C includes the regressions with the dependent variable being stock market participation. The difference with Table 10 is that we add the COVID variables. Both the Government Index and the Stringency Index are significant at the 10% level, indicating that the restrictions lead to greater participation, possibly because people are seeking other forms of entertainment. This result is in line with Ozik, Sadka, and Shen (2021), who find that COVID led to an increase in trading activity and stock market participation because of more free time (lockdowns and cancellation of live sports and entertainment), increased savings, and the availability of trading apps, such as Robinhood.

Table 4C includes the regressions where the dependent variable is respectively the stock market participation (Models (1) to (4)) and trading (Models (5) and (6)). The difference with Tables 11 and 12 is that we add interactions between demographics and year dummies for the COVID year, 2020. The results show that there are very few significant interactions between the year dummies and stock market participation and/or trading.

Table 1C. Changes in expected returns by level of financial literacy

This table presents means, medians and standard deviations of the changes in expected returns between survey waves, broken down by financial literacy levels.

	Change from 2019 to 2020			Change from 2020 to 2021			Change from 2021 to 2023				Change from 2023 to 2025			
Financial literacy score	Mean	t-stats	Standard deviation	Mean	t-stats	Standard deviation	Mean	t-stats	Standard deviation	No. obs.	Mean	t-stats	Standard deviation	No. obs.
0-8	1.75***	2.67	9.13	-0.44	-0.73	8.38	-2.53***	-5.50	6.42	195	0.83	1.50	6.92	156
9-10	1.84***	3.11	8.39	-1.53***	-3.13	6.89	-0.87**	-2.27	5.42	200	0.55	1.41	5.05	169
11-12	0.52	1.61	6.01	-0.67**	-2.34	5.38	-0.28	-1.13	4.73	352	0.73**	2.45	5.08	293
13-14	0.55**	2.48	4.82	-0.36*	-1.66	4.74	-0.55***	-3.37	3.55	476	0.67***	3.27	4.26	430
Total	0.94***	4.94	6.67	-0.65***	-3.80	6.01	-0.84***	-6.10	4.82	1,223	0.69***	4.40	5.08	1,048
ANOVA	3.33			1.87			10.36				0.09			
F-test (prob)	(0.02)			(0.13)			(0.00)				(0.97)			
Bartlett's equal-variance test χ^2 (prob):														
			160.70			115.75			117.67				60.29	
			(0.00)			(0.00)			(0.00)				(0.00)	

Table 2C. Factors affecting expected risk: Regressions with COVID variables.

Results of random effects panel regressions where the dependent variable is expected stock market risk, defined as imputed volatility:

$$\hat{\sigma}_i = \frac{x(0.90) - x(0.10)}{z}$$

where $x(0.90)$ and $x(0.10)$ represent the 90th and 10th percentiles of the respondent's distribution, and z is the number of standard deviations within the confidence interval (equal to 2.65 in our case). This number is multiplied by the square root of ten to obtain the annualized volatility. Loss aversion is defined as the score to the loss aversion question; trust is the respondent's score on the trust index, between zero and 10; Financial literacy is the respondent's score on the financial literacy index, between zero and 14; intelligence is measured using number series, picture vocabulary, and verbal analogies. Education is measured in five categories, where not having a high school diploma is the omitted category. The Economic (Support) Index, the Government (Response) Index, and the Stringency Index are all based on the report of Hallas et al. (2021) and they measure respectively the extent of economic support provided by the state of the respondent through income support and debt relief, the overall response of the state of the respondent, and the strictness or "lockdown-style" closures and containment policy of the state of the respondent. Standard errors are reported under each coefficient. ***, **, and * indicate statistical significance at, respectively, the 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)	(5)
Male	0.280 (0.197)	0.280 (0.197)	0.277 (0.197)	0.289 (0.198)	0.271 (0.201)
Age	-0.024*** (0.007)	-0.024*** (0.007)	-0.024*** (0.007)	-0.024*** (0.007)	-0.023*** (0.008)
Born in the US	-0.252 (0.386)	-0.251 (0.386)	-0.256 (0.386)	-0.247 (0.387)	-0.240 (0.392)
Income	-0.021 (0.034)	-0.021 (0.034)	-0.021 (0.034)	-0.018 (0.034)	-0.020 (0.035)
Loss aversion	-0.057 (0.077)	-0.056 (0.077)	-0.056 (0.077)	-0.064 (0.078)	-0.057 (0.078)
Trust	0.009 (0.038)	0.009 (0.038)	0.009 (0.038)	0.009 (0.038)	0.006 (0.039)
Financial literacy	0.078 (0.051)	0.078 (0.051)	0.077 (0.051)	0.078 (0.051)	0.075 (0.052)
Intelligence	-0.017*** (0.006)	-0.017*** (0.006)	-0.017*** (0.006)	-0.017*** (0.006)	-0.016** (0.007)
Education					
1	1.263 (0.814)	1.263 (0.814)	1.266 (0.814)	1.248 (0.815)	1.259 (0.824)
2	1.287 (0.828)	1.287 (0.828)	1.289 (0.828)	1.256 (0.83)	1.269 (0.839)
3	1.357 (0.840)	1.356 (0.840)	1.358 (0.840)	1.319 (0.841)	1.385 (0.851)
4	0.524 (0.965)	0.522 (0.964)	0.519 (0.965)	0.494 (0.966)	0.492 (0.98)
Year 2021	-0.544** (0.248)	-0.503* (0.287)	-0.337 (0.479)	-0.579*** (0.216)	-0.529*** (0.144)
Economic Index	-0.001 (0.007)				
Government Index		0.001 (0.016)			
Stringency Index			0.006 (0.014)		
Deaths				0.020 (0.073)	
Had COVID					-0.052 (0.422)
Constant	6.163*** (1.445)	6.031*** (1.697)	5.736*** (1.64)	6.002*** (1.465)	6.045*** (1.377)
Observations	1,724	1,724	1,724	1,720	1,702
χ^2	41.399	41.391	41.550	42.887	40.390

Table 3C. Stock market participation: Regressions with COVID variables.

This table contains the results of random effects panel logit regressions, where the dependent variable is a dummy equal to one for stock investors and zero for non-investors. Loss aversion is defined as the score to the loss aversion question; trust is the respondent's score on the trust index, between zero and 10; Financial literacy is the respondent's score on the financial literacy index, between zero and 14; intelligence is measured using number series, picture vocabulary, and verbal analogies. Education is measured in five categories, where not having a high school diploma is the omitted category. The Economic (Support) Index, the Government (Response) Index, and the Stringency Index are all based on the report of Hallas et al. (2021) and they measure respectively the extent of economic support provided by the state of the respondent through income support and debt relief, the overall response of the state of the respondent, and the strictness or "lockdown-style" closures and containment policy of the state of the respondent. Standard errors are reported under each coefficient. ***, **, and * indicate statistical significance at, respectively, the 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)	(5)
Male	0.265 (0.281)	0.267 (0.282)	0.259 (0.282)	0.271 (0.280)	0.281 (0.282)
Age	-0.012 (0.011)	-0.012 (0.011)	-0.012 (0.011)	-0.012 (0.011)	-0.012 (0.011)
Born in the US	-0.136 (0.577)	-0.129 (0.579)	-0.177 (0.581)	-0.097 (0.577)	-0.223 (0.580)
Income	0.427*** (0.048)	0.429*** (0.048)	0.434*** (0.048)	0.430*** (0.048)	0.429*** (0.048)
Loss aversion	-0.050 (0.086)	-0.051 (0.087)	-0.055 (0.087)	-0.043 (0.087)	-0.055 (0.087)
Trust	0.172*** (0.053)	0.175*** (0.053)	0.175*** (0.053)	0.175*** (0.053)	0.186*** (0.053)
Financial literacy	0.498*** (0.074)	0.500*** (0.075)	0.501*** (0.075)	0.498*** (0.074)	0.497*** (0.075)
Intelligence	-0.019** (0.009)	-0.019** (0.009)	-0.019** (0.009)	-0.019** (0.009)	-0.019** (0.009)
Education					
1	2.076* (1.124)	2.143* (1.129)	2.108* (1.130)	2.046* (1.121)	2.310** (1.142)
2	3.021*** (1.159)	3.076*** (1.163)	3.044*** (1.164)	2.993*** (1.155)	3.270*** (1.175)
3	3.529*** (1.191)	3.595*** (1.196)	3.558*** (1.197)	3.444*** (1.188)	3.752*** (1.207)
4	5.723*** (1.638)	5.783*** (1.643)	5.729*** (1.645)	5.691*** (1.633)	5.919*** (1.649)
Year 2021	0.714** (0.309)	1.120*** (0.339)	1.569*** (0.551)	0.325 (0.266)	0.588*** (0.157)
Economic Index	0.005 (0.009)				
Government Index		0.036* (0.019)			
Stringency Index			0.030* (0.016)		
Deaths				0.100 (0.097)	
Had COVID					0.334 (0.484)
Constant	-9.163*** (1.904)	-11.129*** (2.200)	-10.859*** (2.104)	-9.565*** (1.927)	-8.978*** (1.793)
Observations	2,419	2,419	2,419	2,414	2,387
χ^2	186.39	185.91	185.86	187.51	185.75

Table 4C. Stock market participation and trading: Effects of the cognitive/financial literacy channel during crisis.

This table contains the results of random effects panel logit regressions with the interactions between the various proxies for the cognitive/financial literacy channel and the crisis year dummy. In columns (1)-(3), the dependent variable is a dummy equal to one for stock investors and zero for non-investors. In columns (4)-(6), the dependent variable is equal to one if a respondent reports trading stocks and zero otherwise. Loss aversion is defined as the score to the loss aversion question; trust is the respondent's score on the trust index, between zero and 10; Financial literacy is the respondent's score on the financial literacy index, between zero and 14; intelligence is measured using number series, picture vocabulary, and verbal analogies. Education is measured in five categories, where not having a high school diploma is the omitted category. Standard errors are reported under each coefficient. ***, **, and * indicate statistical significance at, respectively, the 1%, 5%, and 10% levels.

	Participation			Trading		
	(1)	(2)	(3)	(4)	(5)	(6)
Male	0.382* (0.224)	0.381* (0.224)	0.371* (0.224)	0.801*** (0.161)	0.803*** (0.161)	0.806*** (0.162)
Age	-0.023*** (0.008)	-0.023*** (0.008)	-0.023*** (0.008)	-0.021*** (0.006)	-0.021*** (0.006)	-0.023*** (0.006)
Income	0.264*** (0.029)	0.265*** (0.029)	0.265*** (0.029)	0.107*** (0.027)	0.107*** (0.027)	0.110*** (0.027)
Trust	0.193*** (0.042)	0.193*** (0.042)	0.189*** (0.042)	0.040 (0.030)	0.040 (0.030)	0.040 (0.030)
Financial literacy	0.514*** (0.058)	0.511*** (0.057)	0.521*** (0.057)	0.232*** (0.045)	0.258*** (0.043)	0.270*** (0.043)
Intelligence	-0.008 (0.007)	-0.006 (0.007)	-0.007 (0.007)	-0.005 (0.005)	-0.009* (0.005)	-0.004 (0.005)
Education			0.863*** (0.144)			0.209** (0.098)
Year 2020	0.009 (0.486)	1.036 (0.947)	-0.184 (0.248)	-1.012* (0.614)	-2.572** (1.020)	-0.568** (0.250)
Year 2020#Financial literacy	-0.014 (0.044)			0.099* (0.051)		
Year 2020#Intelligence		-0.007 (0.006)			0.016*** (0.006)	
Year 2020#Education			0.028 (0.139)			0.372*** (0.115)
Constant	-8.730*** (1.382)	-8.952*** (1.395)	-7.721*** (1.095)	-5.422*** (1.157)	-5.019*** (1.175)	-4.912*** (0.843)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,936	5,936	5,936	4,722	4,722	4,722
χ^2	380.491	381.132	378.621	196.931	199.196	197.428