Long-Term Beliefs

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ABSTRACT

Long-term (10-year horizon) subjective return expectations are much more important than near-term expectations in explaining stock market participation and risky share choices. The decision to trade or maintain equity allocation is more strongly related to levels and changes in long-term expectations than near-term expectations. Contrary to procyclical near-term expectations, long-term expectations are countercyclical consistent with rational expectations models of asset pricing. The procyclicality of near-term expectations is stronger for more financially sophisticated individuals while the countercyclicality of long-term expectations is more universal. The results have important implications for both theoretical and empirical household finance and asset pricing.

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I. Introduction

Time-series and cross-sectional variation in individuals' beliefs regarding the distribution of returns play a central role in both household finance and asset pricing. A growing literature establishes four important features of subjective return beliefs. First, cross-sectional variation in return perceptions plays an important role in explaining whether an individual participates in equity markets. Second, belief heterogeneity can help explain the fraction of assets allocated to equities, although the relation is an order of magnitude smaller than that implied by traditional models. Third, a small but growing body of work links expectations levels and changes in expectations to respondent trading. Fourth, inconsistent with both rational expectations and many behavioral asset pricing models, time-series variation in investors' perceived expected returns is procyclical (e.g., extrapolative beliefs). Nearly all this work, however, has been based on respondents' views of equity markets in the near-term (typically the following year).

In this study, we exploit a seven-year panel (the American Life Panel, ALP) of more than 3,800 Americans who report both near- and long-term expectations to investigate the role of long-term beliefs in the stock market participation, risky share, and trading decisions, as well as how individuals' perceptions of the distribution of returns vary with market conditions. Because ALP also collects perceived tail beliefs, the data allow us to examine not only expected likelihoods, but the role of cross-sectional and time-series variation in perceived near- and long-term uncertainty in driving these relations.

We begin by focusing on whether and how long-term expectations influence respondents' stock market participation, risky share, and trading decisions. Theoretically, it is not clear that long-term expectations should impact any of these decisions once accounting for near-term beliefs. For instance, if differences in near- and long-term expectations arise from perceived mispricing, then (absent frictions) once accounting for near-term beliefs, long-term beliefs should not be associated with participation, risky share, or trading as one can always adjust their position based on their near-term beliefs. An investor, for instance, who believes the market will earn negative returns in the near term (either because the market is currently overvalued or because the investor believes the market will become even more undervalued in the near term) should avoid a long position in equities (assuming a risk-free alternative) regardless of the investor's perception of the market's long-term return distribution.

On the other hand, there are several reasons to suspect that long-term expectations may play a role even when accounting for near-term expectations. First, reported expectations likely reflect a noisy measure of true expectations (see, e.g., Giglio et al. (2021), Binswanger and Salm (2017)). If the near-term and long-term measurement errors are less than perfectly correlated, then both near- and long-term expectations may both help explain respondents' choices. In fact, if long-term expectations are simply another noisy measure of "expected returns" (i.e., the expected 10-year return is simply the one-year expected return compounded 10 periods) and near- and long-term measurement errors are of a similar magnitude, then near- and long-term expectations will likely have similar relations with most variables. Second, respondents may be more confident about long-term predictions than near-term predictions as they perceive that although stock returns are hard to forecast in the near-term, equity markets generally rise in the long-term (e.g., Siegel (2014)). Third, if most respondents have an expected long-term holding horizon, then they may consider long-term expectations as more relevant than near-term expectations in their decisions. Fourth, if transaction costs and trading frictions (pecuniary or non-pecuniary) are substantial, respondent equity holdings may be most dependent on long-term beliefs, and portfolio revisions may be less responsive to shorter term views. Finally, as pointed out by Nagel (in Brunnermeier et al. (2021)), asset prices depend on long-horizon (i.e., infinite period) expectations. These factors, of course, are not mutually exclusive—all could play a role and, as a result, long-term expectations may be relevant even after accounting for near-term expectations. Ultimately, the role of long-term expectations is an empirical question.

We begin our examination by evaluating the relation between stock market participation and near- and long-term expectations. Surprisingly, long-term beliefs are much more important than near-term beliefs in explaining participation. For example, in our baseline tests, individuals' long-term expected returns are approximately five times as important as their near-term expected returns in explaining whether an individual holds equity. Replicating these tests on an independent sample (the Health and Retirement Study) yields nearly identical estimates.

Long-term expectations also play a much more important role than near-term expectations in explaining the risky share choice. For instance, in our baseline test, a one standard deviation higher near-term expected return is associated with a 0.7% higher risky share while a one standard deviation long-term expected return is associated with 6.8% higher risky share. As noted above, although pervious work finds a strong statistical relation between risky share and near-term expectations, the economic significance is an order of magnitude too small. In generating analogous estimates, we too find that when examining near-term expectations, the magnitude of the estimated relation is only

about 7% of plausible theoretical values. Long-term expectations, however, generate estimates substantially closer to theoretical values—accounting for as much as 68% of the theoretical value, i.e., nine times larger than near-term estimates (0.68/0.07).

Our panel also allows us to examine the relation between expectations levels, changes in expectations, and trading. We find most respondents report near-continuous adjustments to their near- and long-term expectations. Despite changing expectations over time, and consistent with previous work, respondents rarely adjust their portfolios. For instance, the typical American with equity in a retirement account and/or direct holdings reports a change in near-term (long-term) expectations in 90% (89%) of the trading windows we examine. These investors, however, make no change to their equity exposure in 75% of the trading windows. The inertia is even stronger in retirement accounts, as investors rebalance retirement accounts or adjust contributions in less than 15% of the investor-trading window observations.

Despite investors exhibiting strong inertia in their portfolios, both levels of and changes in long-term expectations help explain which investors trade, when they trade, and whether they buy or sell. For instance, the extent to which an investor's long-term expectations change over time (i.e., the volatility of their long-term expectations) is a better predictor than the volatility of their near-term expectations of whether an investor makes an adjustment to their equity exposure. Long-term expectations also play an important role in identifying which investors buy and sell. Specifically, buyers tend to exhibit both (a) higher lag long-term expectations (measured at the beginning of trade window) and (b) increased long-term expectations (over the trade window). Both near- and long-term expectations play a role in explaining which investors decrease equity exposure. Specifically, sellers tend to have more bearish and worsening near-term views but more bullish and increasing long-term views. That is, an investor is more likely to sell when they perceive their near-term bearishness as deviating more from their long-term view.

Our final set of tests focus on the time-series properties of near- and long-term expectations. Consistent with previous work, we find strong evidence of procyclical near-term beliefs. Surprisingly, however, respondents' long-term beliefs are strongly countercyclical. For example, low lag returns or a low value of Shiller's CAPE ratio are associated with more pessimistic near-term beliefs, but more optimistic long-term beliefs. We also find that both near- and long-term expectations are associated with mutual fund flows, venture capital flows, and perceived crash risk but, in general, with opposite signs. For instance, low mutual fund flows, low venture capital flows, and high crash risk are all associated with more bearish near-term expectations, but more bullish long-term expectations. As a

final test, we examine how these time-series relations vary with respondent sophistication. The results suggest that more sophisticated (e.g., better educated, more numerate, and more financially literate) respondents tend to exhibit greater procyclicality in near-term expectations while the countercyclicality in long-term expectations is more universal.

Our study contributes to our understanding of both household finance and asset pricing. We provide both normative and positive insights into the well-known stock market participation puzzle. Specifically, previous work (detailed in the next section) demonstrates that (1) higher expected near-term returns are associated with increased participation and (2) respondents' experience and characteristics impact stock market participation by impacting beliefs. For instance, individuals with lower trust (Guiso, Sapienza, and Zingales (2008)), lower socioeconomic status (Das, Kuhnen, and Nagel (2020)), or those who experience poor returns over their lifetime (Malmendier and Nagel (2011)) are less likely to participate in equity markets, at least in part, because they hold more bearish beliefs. Our results suggest the relation between expected return heterogeneity and participation is substantially stronger than suggested by previous work that focuses on near-term expectations. Second, and related, the mediating role of beliefs in linking respondent experience or characteristics to stock market participation may also be substantially stronger than that suggested by the examination of near-term beliefs. Third, because expected returns are a model primitive, studies that find other characteristics help explain stock market participation even when controlling for (near-term) expected returns may be misspecified as these characteristics may be correlated with long-term beliefs. In sum, the relation between stock market participation and "expected returns" is not as simple as typically modeled or estimated—heterogeneity in long-term expected returns is not simply a scaled factor of heterogeneity in near-term expected returns and the former exhibits a much stronger relation to stock market participation than the latter.

Our results also provide two important contributions to understanding the risky share decision. First, long-term expectations are much more important than near-term expectations in explaining the risky share choice (e.g., by a factor of up to 1,000%). Second, the relation between risky share and long-term expectations is much closer to values suggested by theory than the relation between risky share and near-term expectations. The results provide encouraging insights in helping to reconcile theory and empirical evidence. That is, our results suggest that at least some of the mismatch between theory and empirical evidence arises because investors focus on long-term expectations rather than near-term expectations when making the risky share decision. The results also provide promising avenues for future theory and empirical work that recognizes investors' beliefs vary with horizon and

investors appear to put much greater weight on long-term beliefs when making their investment choices.

From a normative perspective, stock market participation and risky share decisions are critical factors in explaining wealth inequality (e.g., Zumbrun (2023), Bhamra and Uppal (2019), Favilukis (2013)) and these choices have become more important over time given the secular shift from defined benefits to defined contribution plans. Our work suggests a promising new avenue for encouraging stock market participation such as focusing on long-horizon equity returns in financial literacy programs.

Our analysis also provides new insights into how expectations influence trading. Consistent with most previous work, our tests demonstrate that ALP investors exhibit a propensity for inaction or inertia. We also demonstrate that, despite their reluctance to trade, both near- and long-term reported expectations change almost continuously. That is, in most cases, changes in expectations do not lead to trading. Our results do demonstrate, however, that the volatility of long-term expectations better explains which investors trade than the volatility of near-term expectations. Moreover, both long- and near-term expectations play a role in predicting when and in which direction an investor trades.

Our analysis of the time-series relation between long-term expectations and market conditions suggests that retail investors may be more aware of the historical relation between valuation levels and expected returns than the near-term expectations analysis suggests (in both this study and previous work). That is, our work suggests retail investors' expectations are substantially more complicated than a simple return extrapolation story. The results are consistent with the hypothesis that most investors view the market as having near-term momentum, long-term reversals, and persistent volatility consistent with the empirical evidence (e.g., Lo and MacKinlay (1988), Poterba and Summers (1988)). In short, when markets have fallen and valuations are low, most respondents expect near-term continuation along with high near-term uncertainty. Moreover, these relations appear stronger for more financially sophisticated investors. At the same time, respondents appear to interpret low lag returns and valuation levels as a positive signal for long-term expectations—increasing the likelihood of a long-term rise in the market, the likelihood that markets rise at least 20% in the next decade, and decreasing likelihood markets fall at least 20% in the next decade. While mutual fund flows are positively associated with near-term respondent expectations and negatively associated with long-term expectations (when measured by net exchanges from bond to equity funds), these same relations hold when evaluating the dollar value of flows to venture capital inconsistent with the hypothesis that the

relation between expectations and flows only reflect the irrational flows of naïve retail investors. When perceived crash risk is high, near-term expectations are bearish and long-term expectations are bullish.

Overall, the strong relations between long-term expectations and both participation and risky share decisions, the important role of long-term expectations in trading decisions, and the surprising countercyclicality of long-term beliefs provide exciting avenues for both theory and future empirical work in household finance and asset pricing.

II. Background

Expectations are central to understanding household finance and asset pricing as both portfolio choice models (e.g., Merton (1969)) and asset pricing models (see discussion in Adam and Nagel (2023)) require assumptions regarding investors' return beliefs as model primitives. Previous work documents several important empirical regularities associated with subjective expected stock returns. First, individuals exhibit substantial heterogeneity in beliefs and this heterogeneity is related to (1) participating in equity markets (e.g., Vissing-Jorgensen (2003), Hurd (2009), Hurd, Van Rooij, and Winter (2011), Arrondel, Calvo Pardo, and Tas (2014), Binswanger and Salm (2017), Drerup, Enke, and von Gaudecker (2017), Merkoulova and Veld (2022)), (2) the extent to which respondents participate, i.e., the fraction of wealth invested in equity (e.g., Dominitz and Manski (2007), Amromin and Sharpe (2014), Giglio et al. (2021), Binswanger and Salm (2017)), and (3) investor trading (e.g., Hoffmann, Post, and Pennings (2013), Merkle and Weber (2014), Giglio et al. (2021)).

An extensive body of work (e.g., De Bondt (1993), Vissing-Jorgensen (2003), Hurd (2009), Hurd, Van Rooij, and Winter (2011), Amromin and Sharpe (2014), Greenwood and Shleifer (2014), Adam, Matveev, and Nagel (2021), Giglio et al. (2021)) also finds that time-series variation in investors' near-term return beliefs is positively related to lag returns and inversely related to traditional expected return metrics such as the dividend-price ratio. As pointed out in the literature (e.g., Barberis et al. (2015)), these patterns are inconsistent with both traditional rational expectations models (e.g., Campbell and Cochrane (1999), Bansal and Yaron (2004), Wachter (2013)) that explain the countercyclical patterns in returns (e.g., Cochrane (2011)) as well as behavioral models of extrapolation of fundamentals (e.g., Hirshleifer, Li, and Yu (2015)), prospect theory (e.g., Barberis, Huang, and Santos (2001)), ambiguity aversion (e.g., Ju and Miao (2012))), and noise trader risk (e.g., De Long et al. (1990a)).[1] The procyclicality has largely been interpreted (e.g., Greenwood and Shleifer (2014), Amromin and Sharpe

[1] See Barberis et al. (2015) for additional discussion.

(2014)) as arising from investors naïvely extrapolating returns consistent with a number of behavioral return extrapolation models (e.g., De Long et al. (1990b), Hong and Stein (1999), Barberis et al. (2015)).

With a few notable exceptions, the vast majority of work studying beliefs focuses on the next year. Although primarily focusing on expected returns over the next 12 months, Vissing-Jorgensen (2003) finds investors' ten-year expected returns between 1998-2002 (UBS/Gallup survey data) exhibit lower time-series variation than near-term expected returns. Amromin and Sharpe (2014) consider longer-term expected returns for a sample for Michigan Surveys of Consumer Attitudes and Behavior between 2000-2005 but limit their analysis of valuation levels and beliefs to near-term expected returns. Adam, Matveev, and Nagel (2021) examine the relation between the price/dividend ratio and 28 surveys including four long-term horizon surveys. Although they conclude that "almost all" of the surveys and horizons exhibit "procyclical" expectations, the point estimates for the four long-term horizon surveys are negative, albeit only one of the four coefficients is statistically meaningful at the 5% level or better. Giglio et al. (2021) report descriptive statistics (based on a panel of Vanguard investors) for long-term expected returns but, in their analysis, only consider the relations between long-term expectations, near-term expectations, and expected GDP growth (which are all positively correlated).

A. Expectations and trading behavior

Although previous work is largely in agreement that respondent near-term expectations are positively related to equity market participation and the risky share choice, the evidence regarding near-term expectations and trading is scarcer and more mixed. Based on a sample of Dutch retail investors during a 12-month period around the financial crisis (April 2008-March 2009), Hoffmann, Post, and Pennings (2013) find no evidence that the level of, or changes in, near-term expectations explains whether an investor is a net buyer or seller, but both levels and innovations in near-term expectations are positively associated with trading, e.g., higher expectations are associated with making a trade, but not the sign of the trade. Merkle and Weber (2014) examine the relation between expected returns for the next quarter and trading for a sample of UK investors over a two-year period and find that near-term expectations levels have little relation with trading, but that increases in near-term expectations are positively related to net buying. Giglio et al. (2021) find a statistically strong, but economically weak, positive relation between changes in risky share and both lag levels of near-term expectations and changes in near-term expectations. They find the relation is stronger when the sample is limited to respondents who trade.

B. Returns and risk premia

Although a broad literature finds evidence of extrapolative near-term beliefs (see cites above), several studies (Bacchetta, Mertens, and van Wincoop (2009), Nagel and Xu (2022)) find that because interest rates are procyclical, the relation between expected market risk premia and the log dividend-price ratio is closer to acyclical. Nagel and Xu (2022), however, do find a procyclical relation between near-term expected risk premia and lag returns. In sum, it is possible that at least some of the procyclical relations identified in the literature arise from researchers focusing on expected returns while investors potentially focus on risk premia (see Dahlquist and Ibert (2023) for additional discussion). Regardless, as Adam and Nagel (2023) point out, both procyclical and acyclical beliefs are inconsistent with rational expectations models.

C. Non-retail expectations

In contrast to the procyclical near-term expectations of retail investors, evidence from professionals is more mixed. For example, work suggests that CFOs extrapolate past returns in forming both near-term returns expectations (Greenwood and Shleifer (2014)) and near-term risk premium expectations (Nagel and Xu (2022)). In contrast, variation in professional forecasters' near-term risk premium (from the Livingston survey) is countercyclical (Nagel and Xu (2022)). In an interesting study, Dahlquist and Ibert (2023) find professional asset managers' long-term (most are at least a 10-year horizon) equity risk premium forecasts are countercyclical but argue that differences from retail investors do not arise from differences in horizon. Similarly, Wang (2020) finds buy-side analysts' 7-year forecasts exhibit countercyclicality. In an interesting contemporaneous paper, Gandhi, Gormsen, and Lazarus (2023) infer "forward" expectations from near- and long-term estimates based on options data and surveys of professionals and CFOs and find professionals exhibit countercyclical forward expectations. In the case of CFOs, the authors find, consistent with our analysis of retail investors, procyclical near-term expectations and countercyclical long-term expectations.

III. Data and Descriptive Statistics

Our primary data comes from the RAND American Life Panel (ALP), an ongoing nationally representative longitudinal panel that started in 2003. The initial sample of approximately 2,000 individuals has grown to more than 6,000 individuals over time (see Pollard and Baird (2017) for additional details regarding the ALP). Because respondents are compensated, completion rates—

typically around 70%—are much higher than most surveys.[2] During the financial crisis in late 2008, ALP began surveying participants regarding the "Effects of the Financial Crisis." The first "wave" of data collection began in November 2008 and the final wave ends 87 months later in January 2016. ALP executed this survey for a total of 61 waves (i.e., there are 61 data collection points) in either long-form (29 waves) or short-form (32 waves) formats.

A. Beliefs

The long-form wave questionnaires include six questions regarding both near- and long-term perceived stock market return distributions. Specifically, respondents are asked three questions about near-term beliefs:

> *We are interested in how well you think the economy will do in the future. By next year at this time, what is the percent chance that mutual fund shares invested in blue chip stocks like those in the Dow Jones Industrial Average will be worth more than they are today?*
>
> *By next year at this time, what is the percent chance that mutual fund shares invested in blue-chip stocks like those in the Dow Jones Industrial Average will have*
> *-gained in value by more than 20 percent compared to what they are worth today?*
> *-fallen in value by more than 20 percent compared to what they are worth today?*

Respondents are asked three analogous questions regarding returns over the next decade:

> *Now please think about how the stock market will change over the next 10 years: What are the chances that mutual fund shares invested in blue chip stocks like those in the Dow Jones Industrial Average will be worth more in 10 years than they are today?*
>
> *What are the chances that mutual fund shares invested in blue-chip stocks like those in the Dow Jones Industrial Average will have*
> *-increased in value by more than 20 percent in 10 years compared to what they are worth today?*
> *-fallen in value by more than 20 percent in 10 years compared to what they are worth today?*

The short-form wave questionnaires ask the three return probability questions for near-term returns, but only the first question (the likelihood equity markets are worth more in 10 years) for long-term returns.[3] Roughly, between 2009 and 2013, surveys were monthly with two short-form waves followed by a quarterly long-form wave. Between 2013 and 2016, ALP eliminated the short-form waves and simply executed quarterly long-term waves.[4]

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[2] See https://www.rand.org/research/data/alp/panel/completion-rates.html.

[3] Wave 44 of the survey was split into two portions (44.1 and 44.2). Only respondents to 44.1 were asked the likelihood that stock returns over the next decade would exceed 20% or fall by more than 20%.

[4] Beginning in wave 26, ALP began asking half the respondents to place 20 balls into six return bins that ranged $E(r)<-20\%$, $-20\%<E(r)<-10\%$, $-10\%<E(r)<0\%$, $0\%<E(r)<10\%$, $10\%<E(r)<20\%$, $20\%<E(r)$. We do not infer beliefs from this

We consider both raw probability beliefs (e.g., perceived likelihood market rises in the next year) as well as imputed return distribution moments. Following previous work (e.g., Ben-David, Graham, and Harvey (2013)), we assume perceived returns are normally distributed and infer each respondent's perceived expected return distribution from their two outside probability estimates.[5] Specifically, we estimate the perceived distribution of continuously compounded returns from the respondent's estimates of the likelihoods of a gain greater than 20% or a loss greater than 20% at both the one- and ten-year horizons.[6,7] The mapping of probability estimates into return distribution moments requires, of course, that a respondent's perceived likelihoods satisfy basic probability laws, e.g., the sum of probabilities cannot exceed 100%.[8] Approximately 69% of the near-term forecasts and 62% of the long-term forecasts are consistent with probability laws and allow us to estimate the mean and variance of the perceived distribution of near-term returns and long-term returns for each respondent at each point in time.[9] The substantial number of responses that are inconsistent with probability laws is consistent with previous work (e.g., de Bruin et al. (2000), Merkoulova and Veld (2022)) although it is

question because respondents answer this question differently than the open-ended questions. For example, when asked directly, less than 9% of respondents report there is a 0% chance the market will fall by 20% in the next year, yet 84% of respondents place no balls in E(r)<-20% bin, i.e., respondents clearly avoid placing any balls in the extreme bins.

[5] Ben-David, Graham, and Harvey (2013) estimate CFOs' standard deviation of perceived expected return distributions based on two questions regarding S&P 500 returns: "There is a 1-in-10 chance the actual return will be less than __%" and "There is a 1-in-10 chance the actual return will be greater than __%." Thus, different from the ALP data we use that gives a return and asks for a likelihood (e.g., chance market earns more than 20%), the CFO survey gives a likelihood and asks for a return (e.g., 1-in-10 chance return will be greater than __%). Inferring perceived return distributions from either uses the same process, i.e., there is a unique normal distribution that fits any pair of return probability beliefs. See Cook (2010) for details. Note also that Ben-David, Graham, and Harvey (2013)assume discrete returns are normally distributed.

[6] We assume continuous returns are normally distributed (i.e., discrete returns are log-normally distributed) because (1) the central limit theorem implies continuously compounded returns will be normally distributed at long horizons (e.g., Fama and French, 2018), and (2) realized long-term discrete returns more closely resemble log-normal distribution than a normal distribution.

[7] Because we focus on continuously compounded returns, we convert respondents' estimates of the likelihood of discrete returns to continuously compounded returns when estimating the respondent's perceived distribution of near- or long-term expected returns. Specifically, a respondent's likelihood of a 20% or greater gain in (discrete) prices is equivalent to the respondent's likelihood of a continuously compounded return of 18.2% (i.e., ln(1.2)) and the reported likelihood of a 20% or greater fall in prices is equivalent to the respondent's likelihood of a -22.3% (i.e., ln(0.8)) or worse continuously compounded return.

[8] Specifically, to compute the lognormal return distribution mean and standard deviation we require that neither (1) the sum of the probabilities is greater than or equal to 100%, and (2) the perceived likelihood of a 20% gain or a 20% loss is zero.

[9] As noted above, we follow Ben-David, Graham, and Harvey (2013) and use the two outside return likelihoods to estimate the perceived distribution of expected returns. It is also possible to estimate the perceived distribution using all three likelihood estimates by minimizing the sum of squared errors (see, e.g., Dominitz and Manski (1997)). The limitation of the three-point estimate is that a greater number of individuals are excluded from the analysis due to violation of basic probability laws (e.g., the respondent reports a 70% chance the market rises and a 30% chance the market falls by more than 20%). Following the literature and given our desire to capture the views of the greatest number of individuals, we focus on two-point estimates. As detailed in the Internet Appendix, the two- and three-point estimates are similar. For example, the correlation between the two- and three-point estimates of expected returns and standard deviations ranges from 0.84 to 0.92.

unclear if such beliefs arise because of standard measurement error or the structure of expectations (e.g., Binswanger and Salm (2017), Drerup, Enke, and von Gaudecker (2017)). Regardless, because estimation of distributional parameters can generate extreme values, we winsorize (at the 5th and 95th percentiles) the estimates of respondents' implied perceptions of the mean and standard deviation of the distribution for near- and long-term returns.

B. Ownership

In the first two waves (both long form), ALP asked respondents a single question of stock ownership—whether the respondent owned stock or stock mutual funds "directly," in "employer pension accounts," or "in other retirement accounts such as IRAs." Beginning in third wave (a short-form wave), ALP began asking about both direct holdings (e.g., "do not include stock holdings that are part of an IRA, 401(k), Keogh, or similar retirement account"), and holdings in retirement accounts separately. The question regarding stock holdings in retirement accounts was subsequently asked only in long-form waves. Thus, we can identify whether a respondent participates in equity markets (either directly or in their retirement account) in a total of 30 waves (the 29 long-form waves plus wave 3).

In six of the surveys (executed in January 2011, 2012, 2013, 2014, 2015, and 2016), ALP also collected information regarding respondents' assets allowing us to compute the fraction of financial assets held in equites for these waves (i.e., including both direct holdings and retirement holdings). Appendix A provides data construction details.

C. Trading

As noted above, in the first two waves, respondents are asked about ownership of any stock or stock mutual fund including both directly held shares and shares held in retirement accounts. In addition, respondents are asked if they have purchased or sold shares since October 1st, 2008 (for the first wave) or since the previous interview wave (for the second wave). Thus, we can classify investors as non-traders, buyers, or sellers in each of the first two waves.

From wave 3 forward, respondents are asked separate questions about directly held stocks versus equity in retirement accounts. Specifically, in wave 3 and all subsequent waves (both short- and long-form) respondents are asked about trading stocks held directly since the previous wave. In addition, in wave 3 and all subsequent long-form waves, respondents are asked (1) if they have taken any action to increase or decrease equity in their retirement accounts and (2) whether they have changed the allocation of new contributions to their retirement accounts since the last long-form wave. From this

set of questions (direct trading in all waves≥3 and retirement trading in wave 3 and all long-form waves≥3), we can classify investors as non-traders, buyers, sellers, or ambiguous (e.g., if the respondent purchased directly held equity and sold retirement equity) between each long-form wave. Appendix A provides details of the trade classification process.

D. Respondent characteristics

The ALP surveys also collect data regarding respondents' gender, race, marital status, employment status, age, education, and income. In addition, in other surveys ALP collects measures of numeracy, financial literacy, their perceived level of understanding the market, and overconfidence. Appendix A provides details regarding construction of the respondent characteristic variables.

E. Health and Retirement Study

The Health and Retirement Study (HRS) is a biennial (even numbered years) longitudinal panel survey of more than 20,000 individuals aged 50 and older and their spouses (see Fisher and Ryan (2018) for details). In 2009, HRS completed an "off-year" Internet survey to a random subset of HRS participants that included the same six questions (e.g., perceived likelihood of more than 20% fall in prices in the next year or decade) as the ALP surveys discussed above. As with the ALP data, we estimate one- and ten-year expected returns and uncertainty from the outside quantiles and winsorize the results at the 5^{th} and 95^{th} percentile to mitigate the role of outliers. As detailed in Appendix A, the HRS data also allows us to measure respondent characteristics (age, education, marital status, employed, retired, gender, race, and income), determine whether a respondent participates in equity markets, and compute the fraction of assets invested in equities. Because the HRS sample is of Americans age 50 and older, relative to the ALP sample, respondents are older (e.g., median age of 66 in HRS versus 53 in ALP), more likely to be married, less likely to be working, more likely to be retired, and have higher income.

F. Market characteristics

We examine how near- and long-term expectations vary with two measures of lag market returns, six measures of market valuation levels, four measures of investor flows (two mutual fund flow metrics to proxy for retail investors' flows and two venture capital flow metrics to proxy for sophisticated investors' flows), a near-term sentiment measure used in previous studies, and three measures of perceived risk. Specifically, we compute market returns over the previous six months or year using

data from the Center for Research in Security Prices (CRSP). The six market valuation measures include dividend yield, net payout yield, Lettau and Ludvigson (2001) consumption-aggregate wealth (*cay*) ratio, Shiller's CAPE ratio, surplus consumption ratio computed from consumption data, and surplus consumption ratio computed from options data. All variables are measured at the end of the month prior to the survey and we multiply CAPE and both surplus consumption ratio variables by -1 such that a higher value for any of the valuation metrics implies higher expected returns or, equivalently, lower current valuation level. The CAPE data is from Robert Shiller's website, the *cay* data is from Martin Lettau's website, and Alex Kontoghiorghes generously provided both surplus consumption measures. We follow Boudoukh et al. (2007) to compute the market's monthly dividend yield (dividends over the past 12 months divided by end of period market capitalization) and net payout yield (dividends plus repurchases less issuances over past 12 months divided by end of period market capitalization) and exclude financials. Further following these authors, we use the natural logarithm of both ratios. The authors propose the net payout yield better captures valuation levels as firms have increasingly substituted share repurchases for dividends.

We consider five measures of flows and sentiment. We use Investment Company Institute data to compute monthly flows to equity mutual funds as total flows scaled by total net assets. We also compute net exchanges from bond and money market funds to equity funds (scaled by total assets) as Ben-Rephael, Kandel, and Wohl (2012) propose that net exchanges—reflecting active decisions made by investors—better capture investors' views than net flows that also capture passive decisions (e.g., automated pension fund contributions). In addition to the mutual fund flow measures, we compute two measures of flows to sophisticated investors. Specifically, following DeVault, Sias, and Starks (2019), we compute (1) the quarterly percentage change in the dollar value of "cash-for-equity" venture capital deals, and (2) the quarterly change in the number of venture deals. We also examine the relation between ALP expectations and the American Association of Individual Investors (AAII) survey of near-term net bullishness based on expected market direction over the next six months.

We consider three measures of perceived market risk: VIX, Shiller's individual investors' crash confidence index, and Shiller's institutional investors' crash confidence index. VIX is measured in the month prior to the survey. Shiller's raw crash ratio is the fraction of surveyed investors who believe there is less than a 10% chance of a "…catastrophic stock market crash in the U.S…" in the next six months. Separate surveys are collected for institutional investors and "high-income" individual investors. We reverse scale the crash indices such that a higher value indicates more investors believe crash risk is high (i.e., we compute the fraction of investors who believe the chance of a crash is greater

than 10%). Although the Shiller surveys are monthly, the indices are based on six month moving averages. Because our goal is to capture perceived crash risk when expectations are measured, we center the Shiller survey around the expectations data (e.g., expectations in January 2009 are matched with crash beliefs over October 2008 to March 2009). Appendix A provides construction details for the market characteristics.

G. Descriptive statistics

Table I reports descriptive statistics of respondent characteristics for our pooled cross-sectional time-series of 90,134 observations (from 3,866 individuals; the average respondent participates in 23.3 survey waves) that include any individual-survey wave observation where the respondent answers at least one of the six stock market expectations questions. Our sample is 59% female, nearly two thirds are married, approximately half are working, and the average respondent is 51 years old with 15 years of education. Income levels average about $68,000 (with an intraquartile range from $32,500 to 87,500). Approximately 55% hold equity (either directly or in a retirement account), 29% report holding equity outside their retirement account (most of whom also hold retirement equity), nearly 65% have a retirement account, and about 34% of financial assets are invested in equities. Appendix A provides computation details for these variables.

[Insert Table I about here]

The first three rows of Panel A in Table II report descriptive statistics for respondents' answers to the likelihood of the market rising, rising more than 20%, and falling more than 20% over the next year. The penultimate column reports historical values based on the CRSP value-weighted index between 1926 and 2020. The final column reports the fraction of respondents who report perceived likelihoods lower than the associated historical value. Consistent with previous work (e.g., Hurd (2009), Hurd, Van Rooij, and Winter (2011), Kuhnen and Miu (2017), Das, Kuhnen, and Nagel (2020), Giglio et al. (2021), Sias, Starks, and Turtle (2023)), individuals' near-term beliefs tend to be more bearish than historical values—the typical (median) respondent believes markets are as likely to fall as rise in the next year compared to a historical likelihood of 75%.[10]

[10] Because the analysis in the present study focuses on cross-sectional and time-series variation in near- versus long-term expectations, mean levels do not impact our estimates. Most surveys of expectations ask respondents to estimate the likelihood markets increase in the next year and find that respondents tend to underestimate (relative to historical averages) the likelihood markets increase, e.g., the HRS survey used by Hurd (2009), the Dutch DNB Household Survey used by Hurd, Van Rooij, and Winter (2011), and the Michigan Survey of Consumers used by Das, Kuhnen, and Nagel (2020). In contrast, Giglio et al. (2021) ask their Vanguard investors for expected returns directly. Even in this case, however, the

[Insert Table II about here]

Panel B in Table II reports analogous statistics for respondents' perceptions of the distribution of expected equity returns over the next decade. Consistent with Sias, Starks, and Turtle (2023), who use a subset of this data to investigate the negativity bias in expected returns, the results reveal that, relative to historical values, the typical individual underestimates both long-term expected returns and long-term return volatility. For example, the median respondent perceives only a 50/50 chance that the market increases more than 20% in the next decade versus a 93% historical likelihood (second to last column). As shown in the Internet Appendix, matching the point estimate reported by Giglio et al. (2021) for their sample of Vanguard investors, the correlation between near- and long-term expected returns is 0.302.

IV. Long-Term Expectations, Stock Market Participation, Risky Share, and Trading

Previous work reveals a strong positive relation between heterogeneity in near-term expected returns and stock market participation. In this section, we add perceived long-term expected returns, near-term tail beliefs, and long-term tail beliefs as explanatory variables to the analysis.

A. Stock market participation

Following much of the literature, we estimate a linear probability model (e.g., Hong, Kubik, and Stein (2004), Puri and Robinson (2007), Giannetti and Wang (2016), Barth, Papageorge, and Thom (2020)) of stock market participation on near- and long-term beliefs.[11] To allow direct comparison between coefficients, we standardize (i.e., rescale to zero mean and unit variance) expected returns and standard deviations. The first column in Table III reports the coefficient (*t*-statistics are based on standard errors clustered at the respondent level) from a regression of stock market participation (as shown in Table I, 55% of ALP respondents hold equities) on wave fixed effects and near-term expected returns. To ensure results do not arise from differences in samples, we limit the analysis to respondent-wave observations where we can measure both near- and long-term expected returns and uncertainty. Consistent with previous work, respondents with more bullish near-term beliefs are more likely to invest in equities—a one standard deviation higher near-term expected return is associated with a 5.5% increase in the likelihood of holding equities (statistically significant at the 1% level).

average expected return of their sample of relatively sophisticated investors is less than half the historical value of 9.3% for the CRSP value weighted index between 1926 and 2020.

[11] As detailed in the Internet Appendix, limited dependent variable models generate identical conclusions.

[Insert Table III about here]

The results in the second column reveal equity market participation is strongly related to long-term expected returns and the results in the third column suggest that the relation between near-term beliefs and market participation largely arises from the correlation between near- and long-term beliefs. That is, once including the long-term expected return, the coefficient associated with the near-term expected return falls from 5.5% to 2.2%. Moreover, because both variables are standardized, we can directly compare the estimates—the coefficients suggest that perceived long-term expected returns are approximately five times (0.109/0.022=4.95) as important as perceived near-term expected returns in explaining equity market participation. The penultimate row in Panel A reveals that the difference in coefficients associated with near- and long-term expected returns is statistically significant at the 1% level. The fourth column adds the standard deviations of the perceived one- and ten-year returns.[12] Consistent with traditional theory, both near- and long-term uncertainty are associated with a lower likelihood of participating in equity markets and we cannot reject the hypothesis that near- and long-term uncertainty are equally important. The difference in coefficients associated with expected returns becomes even larger and remains statistically significant (at the 1% level).

The fifth column adds respondent characteristics—respondent age, years of education, income, and indicators for gender, White race, married, working, and retired—to test if these variables fully account for the relation between long-term beliefs and equity market participation. The results reveal that although respondent characteristics reduce the magnitude of the coefficient associated with long-term expected returns, the relation between stock market participation and both near- and long-term expected returns remains statistically significant (at the 1% level) and the effect size for long-term expected returns remains meaningfully larger (at the 1% level) than near-term expected returns. The effects associated with both near- and long-term uncertainty, however, are largely absorbed by other respondent characteristics.

The first four columns of Panel B repeat the analysis but replace inferred expected returns and standard deviations with the perceived likelihood markets rise in the next year or decade and the

[12] Most extant work assumes variation in expected returns drives variation in participation. It is possible, of course, that those who choose to participate in equity markets, for whatever reason, learn more about historical equity returns, i.e., causation runs the other way (see discussion in Dimmock et al. (2016)). The relations between participation, near-term expectation, and long-term expectations, however, appear harder to reconcile with the explanation that a better understanding of historical equity returns primarily drives the relation between expected returns and participation as it would require that participation "causes" a better understanding of long-term returns than near-term returns and, at the same time, the vast majority of individuals—including those participating in equity markets—grossly underestimate long-term equity returns.

perceived likelihood markets fall by at least 20% in the next year or decade. Sample sizes are larger because, as discussed in the data section, it includes respondents whose beliefs violate probability laws.

The results in Panel B are even stronger than the results in Panel A. For instance, as shown in the first column, a one standard deviation higher perceived likelihood markets rise in the next year is associated with 14% higher likelihood the respondent holds equity. As shown in the third column, however, the relation between near-term perceived likelihoods and equity market participation is largely absorbed by the relation between long-term perceived likelihoods and equity market participation. In all cases (columns 3, 4, and 5), we can reject (at the 1% level) the hypothesis that near- and long-term perceptions of the likelihood markets rise are equally important.

One potential concern is that although a substantial literature demonstrates a strong positive relation between near-term return perceptions and stock market participation across multiple independent samples, our analysis limited to the American Life Panel. Thus, to ensure our results are not sample-specific, we repeat these tests based on the HRS 2009 Internet survey which asked the same set of questions regarding both near- and long-term beliefs. Because the data are based on only one survey, the HRS analysis does not include wave fixed effects and the sample is smaller. Results, reported in Table III columns 6-10, however, reveal remarkable consistency across the samples. For instance, comparing Panel A column 3 (ALP sample) to column 8 (HRS sample), the coefficients associated with near-term expected returns are 2.2% and 1.6%, respectively; the coefficients associated with long-term expected returns are 10.9% and 8%, respectively. Moreover, we are again able to reject (at the 5% level or better), in every case (columns 8, 9, and 10), the hypothesis that the coefficients associated with near- and long-term expected returns are equally important in explaining stock market participation.

B. Risky share

In traditional models (e.g., Merton (1969)) the fraction of wealth held in the risky asset (the risky share) is positively related to perceived expected returns. When empirically examining the risky share, previous work sometimes includes respondents with zero weight in risky assets (e.g., Cesarini et al. (2010), Fagereng, Mogstad, and Rønning (2021), Giglio et al. (2021)) and sometimes excludes respondents who choose to not invest in equities (e.g., Barnea, Cronqvist, and Siegel (2010), Black et al. (2017)); thus, we consider both samples. Although the risky share is bound by 0 and 1 (assuming

no short sales or margin trading), as above, we follow much of the literature and estimate the relation between risky share and near-term beliefs with a linear probability model.[13]

Table IV reports results of regressions of the risky share on expectations. As with Table III, we standardize the reported explanatory variables such that coefficients can be directly compared and reflect the change in the risky share associated with a one standard deviation change in the regressor. As before, standard errors are clustered at the respondent level. The estimates in the first five columns are based on samples that include respondents with an equity share of zero while the final five columns are limited to stock market participants. Directly analogous to Table III, Panel A reports results based on near- and long-term expected returns and standard deviations, while Panel B reports results based on near- and long-term perceived likelihoods the market rises or falls by more than 20%. As discussed in the data section, the sample is limited to six waves of the ALP Financial Crisis Surveys (Januarys for 2011-2016) that collect respondent asset values (see Appendix A for details).

[Insert Table IV about here]

The results in Table IV yield three important insights. First, consistent with previous work, higher near-term expected returns (Panel A column 1) or a higher likelihood of the market rising in the next year (Panel B columns 1 and 6), are positively related to the risky share. For instance, the top left cell suggests a one standard deviation higher near-term expected return is associated with 2.7% larger risky share. Second, the remaining columns in Table IV reveal that, similar to the stock market participation decision, long-term expectations are much more important than near-term expectations in explaining the risky share. The results in column 3 of Panel A, for example, reveal the effect on risky share for one standard deviation higher expected long-term return is approximately 10 times that for a one-standard deviation near-term expected return (i.e., 6.762/0.674). In fact, the results in Panel A reveal little evidence that near-term expected returns have any explanatory power once accounting for long-term expected returns. Moreover, the penultimate row of Panel A reveals the difference in standardized coefficients associated with expected returns is statistically significant at the 1% level in every case. Near-term expectations fare better in Panel B which focuses on perceived likelihoods rather than inferred expected returns. As with Panel A, however, the coefficient associated with long-term likelihood market rise in the next decade is uniformly larger than the corresponding coefficient associated with the likelihood markets rise in the next year and the difference is statistically meaningful as shown in columns 3-5.

[13] As detailed in the Internet Appendix, we reach identical conclusions when estimating the relation with a tobit model.

Third, not only are long-term expectations much more important than near-term expectations in explaining the risky share, the magnitude of the coefficients associated with long-term expected returns are much closer to the values predicted by theory. Specifically, as noted above, previous work finds that although there is a strong statistical relation between risky share and near-term expected returns, the economic effect is an order of magnitude smaller than that implied by traditional theory. For example, in the Merton (1969) model for power-utility investors (where γ is relative risk aversion), the risky share is given by:

$$\%Equity = \frac{E(R) - R_f}{\gamma\sigma^2(R)}. \quad (1)$$

Giglio et al. (2021) generate a "back of the envelope" estimate of the economic magnitude implied by theory assuming (1) all investors have a relative risk aversion coefficient of 6 (i.e., a value consistent with evidence from the experimental literature)[14] and, (2) the standard deviation of the annual market return is 20% (i.e., the historical value; see Table II). Based on these assumptions the coefficient associated with unstandardized near-term expected returns should be 4.1 (i.e., $(1/(6\times0.2^2))$. That is, a 1% higher expected near-term return should be associated with 4.1% higher equity share. Empirically, the authors' baseline estimate is 0.69, or approximately 17% (0.69/4.1) of the hypothesized conceptual value.

Because we standardized our regressors (to allow them to be directly compared and tested for equality), our coefficients are not directly comparable to those reported by Giglio et al. (2021). Dividing our standardized coefficients by the standard deviation of the variable, however, returns the unstandardized coefficient. For the sample of near-term expected return used in the first five columns of Panel A in Table IV, the standard deviation of one-year expected returns is 8.76.[15] Thus, the unstandardized coefficient is 0.307 (2.686/8.76); a value even lower than that reported by Giglio et al. (2021) and only about 7% of the theoretical value (0.307/4.1).

Equation (1), of course, is horizon independent in the Merton (1969) context. That is, although it is common to use annualized values, it also holds for longer (and shorter) horizon returns (as long as

[14] The authors note that the experimental literature estimates γ somewhere between 3 and 10 and give examples for γ=4 and γ=6. As we detail below, our (relative) comparisons between the implied one- and ten-year coefficients are qualitatively unchanged by the proposed γ, i.e., the coefficient associated with long-term expectations accounts for a much larger fraction of the implied theoretical coefficient than the coefficient associated with near-term expectations.

[15] The 8.76% figure is the standard deviation of near-term expected returns across our panel (i.e., it is not the 20% standard deviation of historical one-year returns). Note also that the 8.76 figure is based on six waves and limited to those that we can compute risky share and expected returns. Thus, the figure differs slightly from the 10.27 figure reported in Table II which is based on the broader sample.

expected returns and variance of returns are of the same horizon). Thus, under the same assumptions, the coefficient associated with 10-year returns should be $1/(\gamma\sigma^2(R_{10\ year}))$. Given the Merton (1969) model assumption of serially independent returns (and thus variance is proportional to time), and the same parameters, the implied (unstandardized) coefficient associated with 10-year returns is 0.41 (i.e., $1/(6\times0.2^2\times10)$). That is, the theoretical expected coefficient associated with 10-year expected returns is $1/10^{th}$ the theoretical expected coefficient associated with 1-year expected returns. Dividing the reported coefficient in column 2 of Panel A, 6.964, by the standard deviation of 10-year expected returns (24.8 for the sample used in Panel A) generates an unstandardized value of 0.28, which is 68% of the expected theoretical value (0.28/0.41). That is, long-term expectations are more than 9 times as large as the comparable near-term coefficient in matching the theoretical value ((0.28/0.41)/(0.307/4.1)). Giglio et al. (2021) note that the experimental literature estimates γ somewhere between 3 and 10 and give examples for γ of 4 and 6. The ratio of relative fraction of theoretical value, however, is independent of the coefficient of relative risk aversion, i.e., long-term expectations account for approximately 9 times as much of the theoretical value as near-term expectations regardless of the magnitude of the relative risk aversion or market volatility.[16]

Although we use the annual variance and 10 times the annual variance to compute the theoretical value for both near- and long-term expected returns, empirically markets exhibit long-term mean reversion such that the variance of 10-year returns is less than 10 times the variance of 1-year returns (i.e., there is some evidence, see Siegel (2014), that markets are less risky in the long-run). Specifically, as shown in Table 2, the historical standard deviation of 10-year returns is 47.4% implying a theoretical coefficient of 0.74 (i.e., $1/(6\times0.474^2)$ for 10-year returns. Of course, if using 10-year return variance for long-term returns, one must use $1/10^{th}$ that value for near-term expected returns in the context of the Merton (1969) model (as the model is not conditional on horizon). Using these values, the theoretical (unstandardized) coefficients for near- and long-term returns are 7.4 and 0.74, respectively, and empirical estimates of near- and long-term expected returns account for 4% and 38% of the theoretical value (i.e., again long-term expectations are relatively 9.2x better than near-term expectations).[17]

[16] That is, the above calculation can be written as: $[0.281/(1/\gamma10\sigma^2(R_{1year}))]/[0.307/(1/\gamma\sigma^2(R_{1year}))] = 2.81/0.307 = 9.2$, regardless of the value of γ or $\sigma^2(R_{1year})$.

[17] Comparisons with Giglio et al. (2021), however, are clouded because the samples differ on multiple dimensions including the facts that (1) their Vanguard investor sample is wealthier and, likely, more sophisticated than the average ALP respondent, (2) Vanguard investors are asked to report their expected return rather than the likelihood markets rise, rise 20%, and fall 20%, (3) the Vanguard sample consists of 80% investors with direct holdings and 20% with retirement accounts while most ALP respondents who participate in equity markets, do so via their retirement accounts, (4) the

Analogous to the stock market participation analysis, we repeat these tests for the HRS sample and find similar results. For instance, when including all respondents, and both near- and long-term expectations (i.e., Panel B column 3), a one standard deviation higher perceived likelihood markets rise in the next decade (year) is associated with an 8.0% (2.6%) higher risky share for the ALP sample and a 7.2% (2.4%) higher risky share for the HRS sample. The Internet Appendix provides the detailed HRS risky share results.

C. Trading

As discussed in the background section, relatively few studies have examined how near-term expectations relate to trading behavior and none, as far as we are aware, have examined the relation between trading and long-term expectations. In this section, we begin by examining both how often investors in our sample trade and how often their reported expectations change. Recall the trade windows capture trading between long-form waves (approximately quarterly over our October 2008-January 2016; the average trading window is 93 days) sample period. Panel A in Table V reports the analysis for the March 2009-January 2016 period when ALP asked separate questions about trading in direct accounts versus retirement accounts. The sample is limited to respondents who either report owning stock in a retirement account (top row), directly (second row), or either (third row).[18] The first four columns report time-series mean (across the 27 trading windows) of the cross-sectional average fraction of investors that (1) report they made no trades or adjustments to their positions, (2) purchased equity, (3) sold equity, and (4) traded ambiguously (e.g., increased their retirement equity and decreased direct holdings; see Appendix A for details). The final three columns report, respectively, the fraction of respondents who report a change in at least one of their three near-term expectations (chance market rises, rises more than 20%, and falls more than 20% over the next year), at least one of their three long-term expectations, or at least one of the six expectations over the next year or decade.

authors estimate a tobit model rather than a linear probability model, and (5) nearly all Vanguard investors participate in equity markets. As noted above, the Internet Appendix also provides tobit estimates. The results reveal coefficients closer to those reported by Giglio et al. (2021) for one-year expected returns (e.g., an unstandardized coefficient of 0.51 compared to the authors' 0.69). Once again, however, the tobit estimates for long-term expectations are much closer to theoretical value relative to near-term values. Specifically, in the tobit model, long-term expectations are approximately 8 times better than near-term expectations in matching posited theoretical values.

[18] As discussed in the data section and detailed in Appendix A, we also include respondents who report selling stock over the trading interval but no longer owning stock at the end of the trading interval.

The results reveal that most individuals trade infrequently—especially in their retirement accounts. Specifically, in more than 85% of the observations, respondents make no adjustment to equity exposure in their retirement accounts in the trading window. Respondents who hold equity directly (most of whom also hold retirement equity) are more active—with transactions in more than 26% of the observations. The results are largely consistent with evidence of household inaction and inertia (e.g., Agnew, Balduzzi, and Sundén (2003), Brunnermeier and Nagel (2008), Bilias, Georgarakos, and Haliassos (2010), Alvarez, Guiso, and Lippi (2012)) and, as pointed out by Gomes, Haliassos, and Ramadorai (2021), inconsistent with view that most retail investors engage in excessive trading (e.g., Odean (1999), Barber and Odean (2000), Grinblatt and Keloharju (2001)).

[Insert Table V about here]

The last three columns reveal that although respondents trade relatively infrequently, their reported return expectations change almost continuously. Specifically, respondents report a change in their near-term expectations in more 90% of the trading window observations, long-term expectations in more than 89% of the observations, and changes to any expectations in more than 93% of the observations.

Panel B in Table V reports trading data from the first two waves of the financial crisis survey when respondents are asked about holdings and trading for combined direct and retirement accounts. These two surveys cover trading from the peak crisis period (October 2008-March 2009). Thus, we combine respondents' trading over the period to examine how they traded in the crisis period ("ambiguous" refers to respondents who report buying in one period and selling in the other).[19] The analysis reveals two interesting results. First, relative to the non-crisis period (Panel A), investors were more likely to trade. Specifically, while the average trading window in Panel B is 44% longer than in Panel A (i.e., 133 days versus 93 days), respondents exhibit a 72% increase in the likelihood of trading (i.e., (1-0.5658)/(1-0.7480)). The difference is statistically meaningful at the 1% level.[20] Second, these investors were much more likely to increase, rather than decrease, their equity exposure during the crisis period. The results are consistent with evidence that retail investors in the Netherlands increased their equity exposure during the financial crisis (Hoffmann, Post, and Pennings (2013)) but appears inconsistent

[19] Because we do not observe expectations at the beginning of the crisis period (i.e., the first survey asks about trading since October 1, 2008 but does not ask respondents about their past expectations), we do not examine changes in expectations over this period.

[20] For each investor in each trade window (crisis period and the 27 trade windows in the post-March 2009 period), we compute the average likelihood of trading in a window as the trade indictor divided by the number of days in the trade window for that investor. We then compute a *t*-test for difference in means of the scaled likelihood of trading for the crisis period trade window versus the post-March 2009 trade windows. The *t*-statistic is 5.46.

with the evidence that mutual fund flows are low when markets have fallen and valuation levels are low (Greenwood and Shleifer (2014)). In sum, the results in Panels A and B suggest that although respondents report almost continuously changing near- and long-term expectations, most respondents report not trading—even in the crisis period.

Given most investors do not trade, we next examine if near- and long-term expectations can help identify which investors are more likely to trade versus maintain their positions—those with volatile or stable near-term expectations versus those with volatile versus stable long-term expectations. Specifically, we sort investors into two groups by the volatility of their near-term expectations (i.e., investors with relatively stable near-term expectations and investors with relatively volatile near-term expectations) and independently sort these same investors into two groups by the volatility of their long-term expectations. Panels C and D report the time-series mean of the cross-sectional average trading and expectations data for investors sorted by the volatility of near-term expectations and long-term expectations, respectively. The results reveal two interesting insights. First, even investors with relatively stable expectations exhibit substantial changes in both near- and long-term expectations, e.g., the last column in Panels C and D ranges from 95% to 98%. Second, variation in long-term expectations is more important in the trading decision than variation in near-term expectations. For example, column 1 shows that respondents with relatively stable near-term expectations do not trade in 75.44% of the trading windows while those with volatile near-term expectations do not trade in 72.72% of the trading windows—a difference of 2.72%. In contrast, the "no-trading" difference for respondents with stable and volatile long-term expectations is 7.72%—nearly three times as large (0.0772/0.0272). A paired *t*-test (based on the means cross the 28 waves) of the difference in differences (0.0772-0.0272) is significant at the 1% level (*t*-statistic=5.60). In sum, the results in Panels C and D suggest stability of long-term expectations is more important than stability of near-term expectations in explaining the inertia.

We next consider how levels of, and changes in, both near- and long-term expectations influence trading choices. Specifically, we estimate a multinomial logistic regression of trading on near- and long-term expectations at the beginning of the trading window, changes in near- and long-term expectations over the trading window, the number of days between the respondent's beginning and end of trading window surveys, and respondent characteristics (respondent age, years of education, income, and indicators for gender, White race, married, working, and retired).[21] Given that previous work finds

[21] Our approach is modeled after the Giglio et al. (2021) analysis of the relation between changes in risky share, beginning of period near-term expectations, and changes in near-term expectations. As noted in the background section, these

that changes in expectations are related to volume but not the direction of trading (Hoffmann, Post, and Pennings (2013)), we do not assume the relation between expectations and trading is symmetric for the buy and sell decision and therefore estimate a multinomial logit model.

The first two columns of Panel A in Table VI report marginal effects from the regression of buying (n=1,458; 16.5% of observations) and selling (n=695, 7.9% of observations) relative to non-trading (n=6,688; 75.6% of observations) on both the respondent's perceived expected near-term returns at the beginning of the trading window and the change in the respondent's perceived near-term expected return over the trading window. Columns (3) and (4) repeat the analysis with long-term expectations, while the final two columns repeat the analysis with both near- and long-term expectations. In all cases, the variables are standardized so that the marginal effect reflects the association with a one standard deviation change in the variable. Panel B replaces expected returns with the perceived likelihood markets rise (measured at the beginning of the trade window) and changes in the perceived likelihood markets rise over the trade window. The Panel B sample includes 3,301 net purchases (17.3% of observations), 1,628 net sales (8.5% of observations), and 14,156 no change to positions (74.1% of observations).[22]

[Insert Table VI about here]

The results in the first four columns reveal that higher long-term expected returns and increases in long-term expected returns tend to be positively associated with both the likelihood an ALP investor buys and sells. For instance, a one standard deviation higher beginning of trading window long-term expected return is associated with 2.2% higher likelihood of buying and 1.4% higher likelihood of selling (both statistically significant at the 1% level). The results are economically meaningful. Given the unconditional likelihoods of buying and selling are approximately 16% and 8%, respectively (see Table V), these translate into a 14% increase (i.e., 0.022/0.160) in the likelihood of buying and an 18% increase in the likelihood of selling (i.e., 0.014/0.080) relative to mean levels. In isolation, we find no evidence that either levels or changes in near-term expected returns influence the likelihood of selling (column 2), but higher perceived likelihood of markets rising in the near term or an increase in the near-term likelihood are associated with buying (column 1 of Panel B).

authors find that both higher lag expectations and changes in expectations predict increased risky share due to trading for their sample of Vanguard investors.

[22] The sample for Panel A consists of respondents' whose beliefs allow computation of the respondent return mean and volatility, and have data in waves 2-61 such that we can observe their beginning of wave expectations and changes in expectations. Correspondingly, the sample for Panel B consists of respondents with adequate data in waves 2-61 (including those whose beliefs violate probability laws).

The last two columns include both near- and long-term expectations. Similar to the analysis of stock market participation and risky share, we find little evidence that near-term expected returns play a role in explaining buying once accounting for (levels or changes in) long-term expected returns. In contrast, the last column suggests an investor is more likely to sell if they hold near-term bearish and worsening expectations but long-term bullish and improving expectations. That is, investors with a greater divergence in near- and long-term expectations are more likely to sell.

V. Time-Series Variation in Expectations

We next examine the time-series variation in near- and long-term beliefs in relation to lag returns—that is, does our sample exhibit return extrapolation in near-term beliefs consistent with previous work, and are long-term beliefs equally extrapolative?[23] We also expand on this work by examining how time-series variation in respondents' perceptions of risk and tail beliefs vary with lag returns. Our initial tests focus on beliefs about return probabilities as this sample (1) more closely matches the survey expectations used by Greenwood and Shleifer (2014), (2) includes all respondents (including those whose beliefs violate probability laws), and (3) includes the likelihood markets rise in the next year or decade in all 61 waves (versus the 29 waves where we can estimate long-term expected returns).[24] The sample period includes 66 different months over the 87-month period between November 2008 and January 2016.[25]

Table VII reports estimates from univariate panel regressions of the perceived likelihoods of the market rising, rising more than 20%, and falling more than 20% over the next year or decade. To ensure we capture time-series (rather than cross-sectional) variation in beliefs, we include respondent

[23] Giglio et al. (2021) point out that most the variation in panel expectations arise from cross-sectional variation—persistent belief heterogeneity across individuals—rather than from time-series variation in the common component of returns (we verify the results in the authors' online appendix). Nonetheless, there is substantial variation in the time-series of both near- and long-term perceived likelihoods and expected returns. For instance, over our 87-month sample period, the mean likelihood the market rises in the next year ranges from 37% to 50% and the mean likelihood markets rise in the next decade ranges from 49% to 67%. In short, although cross-sectional variation in perceived return distributions is a promising area of future investigation, there is also substantial time-series variation in expectations.

[24] For example, Greenwood and Shleifer (2014) use the AAII sentiment index which is computed as the fraction of respondents who believe the market will go up in the next six months less the fraction who believe it will fall in the next six months (see Appendix A for details).

[25] As detailed above, the first two ALP financial crisis surveys included November 2008 through March 2009. At that point, the surveys become monthly until April 2013 when they become quarterly.

fixed effects.[26,27] In addition, to allow for direct comparisons across variables, we rescale each regressor to unit variance over all observations (which, of course, does not impact the associated *t*-statistic) such that the associated coefficient is the change in the dependent variable given a one standard deviation change in the independent variable. Standard errors are clustered by respondent.

[Insert Table VII about here]

The first column of Panel A in Table VII reveals, consistent with previous evidence, that respondents hold more bullish near-term views following strong market performance. Specifically, a one-standard deviation higher lag six-month (12-month) return is associated with a 1.04% (0.55%) increase in the perceived likelihood markets rise over the next year. Both values are statistically significant at the 1% level. The second and third columns of the second row reveal, however, evidence more consistent with conventional theory. Specifically, lower returns over the previous year are associated with an increase in perceived uncertainty, i.e., lower returns are associated with a higher perceived likelihood of markets falling or rising more than 20% over the next year. Interestingly, lower lag six-month returns are also associated with an increased likelihood of a 20% or greater near-term loss, but a lower likelihood of a 20% or greater near-term gain.

The fourth column in Panel A repeats the analysis for the likelihood markets rise in the next decade and reveals a surprising result. Contrary to the relation documented for near-term returns (in both our data and previous work), time-series variation in the likelihood markets rise in the next decade is strongly inversely related to lag returns. For example, a one standard deviation higher lag six-month (12-month) return is associated with a 0.44% (1.66%) lower perceived likelihood markets rise in the next decade.[28] Further consistent with respondents recognizing that low lag returns are associated with higher expected returns, low lag returns are positively related to the perceived likelihood of a 20% rise in prices in the next decade, but exhibit a much weaker relation with the perceived likelihood of a 20% fall in prices in the next decade.

Panel B repeats the analysis for the six market valuation measures—log dividend to price ratio, log net payout ratio, consumption aggregate wealth (cay) ratio, log CAPE ratio, and surplus

[26] It is possible, for example, that some individuals are more likely to respond to surveys when they are bullish. As a result, the cross-sectional average or median response may be related to lag returns because of changing samples. Because the ALP data identifies respondents, we add respondent fixed effects to preclude this possibility.

[27] Specifically, we demean the regressors by respondent which is identical to adding respondent fixed effects (see, for example, http://pages.stern.nyu.edu/~adesouza/sasfinphd/index/node60.html).

[28] As detailed in the Internet Appendix, respondents exhibit consistency across their views, e.g., the correlation between the perceived likelihood that markets rise in the next year and the perceived likelihood markets rise in the next decade is 0.7.

consumption measures traditionally and from options prices. As detailed above, we multiply the final three metrics by -1 such that a higher value implies higher expected returns for all six metrics.

The results in the first column of Panel B in Table VII are fully consistent with the results of (almost all) previous studies and reveal that respondents hold more bullish near-term views when markets are richly valued. Specifically, the perceived likelihood of a positive market return in the following year exhibits a material (statistically significant at the 5% level or better) negative relation with all six market valuation measures. Once again, however, the relation changes dramatically when examining the likelihood markets rise in the next decade as the coefficients in the fourth column are all positive (and statistically significant at the 1% level). For example, a one standard deviation higher dividend to price ratio is associated with 0.45% lower likelihood markets rise in the next year, but a 2.07% higher likelihood markets rise in the next decade. The results in columns (2), (3), (5), and (6) also suggest that respondents perceive that low market valuations are associated with increased near-term uncertainty, but higher long-term expected returns. For example, a one standard deviation higher dividend to price ratio is associated with a 1.15% higher perceived likelihood markets rise by 20% in the next year and a 0.75% higher perceived likelihood markets fall by at least 20% in the next year. In contrast, a one-standard deviation higher dividend to price ratio is associated with 3% higher perceived likelihood markets rise at least 20% in the next decade and a small (but statistically significant) decreased likelihood that markets fall at least 20% in the next decade. In sum, the results in Panels A and B suggest that the typical respondent associates low valuation levels and low lag returns with lower perceived near-term returns, higher perceived near-term volatility, and higher perceived long-term returns.

Because the ALP is a nationally representative panel, just over half of the respondents hold any equities (see Table I). As a result, it is possible that ALP respondents' beliefs may have little relation to the beliefs of market participants, of other surveys that focus only on market participants, or of more sophisticated investors. We take three approaches to investigating this issue. First, following Greenwood and Shleifer (2014), we consider the relation between expectations and mutual fund flows. Second, we examine the relation between ALP expectations and the AAII survey that fully overlaps our period. Third, following DeVault, Sias, and Starks (2019), we consider a measure of sophisticated investors' flows via the change in the number of venture capital deals and the percentage change in the dollar value of venture capital deals.

Consistent with Greenwood and Shleifer (2014), the first column of Panel C reveals a strong positive relation between the perceived likelihood markets rise in the next year and mutual fund flows

or net exchanges (statistically significant at the 1% level). Moreover, the third row of Panel C reveals a strong positive relation between the AAII six-month market sentiment measure and near-term return perceptions. Finally, the results suggest that near-term return perceptions are also strongly positively related to sophisticated investors' flows as proxied by venture capital flows. As shown in the third column, all five metrics are also strongly negatively related to the perceived likelihood markets fall by 20% in the next year. That is, when ALP respondents perceive a high likelihood of a near-term negative shock, AAII investors are bearish, and flows to mutual funds and venture capital are muted.

Once again, the results reverse when we consider the likelihood markets rise in the next decade. Specifically, net exchanges to mutual funds, AAII sentiment, and the change in venture capital flows are negatively related to the likelihood markets rise in the next decade. Similarly, all five measures are strongly negatively related to the long-term likelihood markets rise at least 20%. That is, ALP respondents have more bullish long-term views when mutual funds or venture capital flows are low and AAII respondents' view of the market in the next six months is more bearish.

The strong relations in Panels A, B, and C for the perceived likelihood markets fall at least 20% in the next year (column 3) and markets rise at least 20% in the next decade (column 5) suggest that near-term expectations are bearish and long-term expectations are bullish when respondents perceive high near-term risk. In Panel D, we investigate this hypothesis by examining these relations for Shiller's individual investors' and institutional investors' near-term crash risk index, as well as VIX. The results reveal strong evidence that investors are near-term bearish and long-term bullish when crash risk is high as all three metrics are inversely related to the perceived likelihood markets rise in the next year (column 1), but positively related to the perceived likelihood markets fall by at least 20% in the next year (column 3), rise in the next decade (column 4), and rise by at least 20% (column 5) in the next decade.

Table VIII repeats the univariate panel regression analysis replacing probability beliefs with inferred expected returns, inferred expected risk premia, and standard deviations for the return distribution. This sample is limited to respondents who report probabilities that do not violate probability laws (i.e., those observations for which we can estimate the first two moments of the return distribution). Although the results in the first three columns are based on all 61 survey waves, the results in the last three columns are based on the 29 long-form surveys in 35 unique months starting November 2008 and ending in January 2016 (i.e., over the same 87-month period as both the first and last surveys are long form).

[Insert Table VIII about here]

The long-term expected return results in Table VIII are consistent with those in Table VII. Inferred long-term expected returns rise with lower lag returns (Panel A), cheaper valuations (Panel B), outflows to mutual funds or venture capital firms or when AAII investors are more bearish (Panel C), and when investors perceive high near-term crash risk (Panel D). Not surprisingly, given procyclical interest rates, the results in column (5) reveal these relations tend to be even stronger when evaluating long-term risk premia. The results in the final column reveal a negative relation between the perceived standard deviation of long-term returns and lag return (Panel A) or flows (Panel C) and a positive relation for valuation levels (Panel B) and crash risk (Panel D); but as shown in Table VII, this is primarily driven by the relation between these metrics and the likelihood of a 20% gain in the next decade rather than increased perceived risk (i.e., the likelihood of a 20% fall in prices in the next decade). For instance, as shown in Table VII, a one standard deviation higher 12-month lag return is associated a 2.9% decrease in the likelihood of a 20% gain over the next decade and 0.2% increase in the likelihood of a 20% decline in prices over the next decade.

The results for near-term inferred expected returns are less consistent—inferred expected returns over the next year are positively related to returns over the previous six months but negatively related to returns over the previous year. Similarly, the first column in Panel B finds some evidence that low valuations are associated with higher near-term expected returns as the coefficients with dividend to price ratio, CAPE, and one of the surplus consumption ratios are positive and meaningfully different from zero. The coefficient on *cay*, however, is negative (and significant at the 1% level). The results appear to be related to the fact that most of the valuation metrics tend to be more strongly related to the perceived likelihood markets rise by 20% in the next year than fall by 20% in the next year. The results in Panels C and D are largely consistent with those reported in the first column of Table VII. The second column in Table VIII reveals little evidence that time-series variation in the risk-free rate plays a substantial role in explaining the relations for the ALP sample (i.e., the results in column 2 are similar to those in column 1). Finally, the results in the third column reveal that inferred standard deviation of near-term returns tends to be greater when lag 12-month returns are lower, when markets are cheaper, when mutual funds and venture capital experience outflows, when AAII investors are more bearish, and when crash risk is greater.

In sum, consistent with previous work, the results in Tables VII and VIII suggest ALP respondents hold procyclical near-term expectations. Moreover, near-term bullishness is associated with both mutual fund flows and venture capital flows. Surprisingly, however, these relations reverse when considering long-horizon beliefs. Moreover, perceived near-term risk tends to rise when lag

returns, or valuations levels, are low. Thus, although time-series variation in near-term beliefs is inconsistent with traditional models of time-varying expected returns, time-series variation in both long-term expected returns and near-term uncertainty perceptions are largely consistent with such models. Similarly, although the near-term results are consistent with behavioral models where investors extrapolate returns, the long-term results are inconsistent with such models. In short, the results suggest a more complex view of the relation between expectations, lag returns, and market valuation levels—despite their pro-cyclical near-term views, respondents appear to recognize that low lag returns, low valuation levels, and high market risk are associated with greater near-term uncertainty and a larger long-term risk premium.

A. Respondent characteristics, near- and long-term expectations, lag returns, market valuation, flows, and crash risk

Both empirical (e.g., Amromin and Sharpe (2014), Greenwood and Shleifer (2014)) and theoretical (e.g., Barberis et al. (2015)) work posit that extrapolators are naïve investors (usually trading against fully rational agents). The rich ALP data allow us to investigate the relation between proxies for financial sophistication and time-series patterns in expectations. Specifically, we sort respondents by education, income, stock market participants versus non-participants, numeracy, self-assessed understanding of the stock market, demonstrated financial literacy, and overconfidence and reexamine the relation between near-term expectations, long-term expectations, lag returns, market valuation, flows, and crash risk. Appendix A provides details of each classification scheme.

Table IX reports coefficients from panel regressions of the perceived likelihood market rise in the next year or decade on returns over the previous 12 months (columns 1 and 2), log dividend to price (columns 3 and 4), net exchanges to equity funds (columns 5 and 6), and perceived crash risk (columns 7 and 8). These values are directly analogous to those reported in columns 1 and 4 of Table VII but limited to, for example, individuals with more education (>13 years; 57% of the sample) versus those with less education (≤13 years, 43% of the sample). As before, all regressions include respondent fixed effects, and regressors are standardized such that the coefficient reflects the change in likelihood arising from a one standard deviation change in the regressor. For instance, column 1 of Panel A reveals that a one standard deviation higher lag return over the previous year ($R_{m,-1\text{ to }-12}$) is associated with 0.887% (statistically significant at the 1% level) higher perceived likelihood markets rise in the next year for those with more than 13 years of education, but only a 0.080% higher likelihood markets rise in the next year for those with 13 years or less education (not materially different from zero). The difference, reported in the third row, is statistically significant at the 1% level.

[Insert Table IX about here]

Table IX yields three important results. First, the procyclicality of near-term returns and countercyclicality of long-term returns is pervasive. In nearly all cases, the signs match. For instance, both high- and low-income individuals exhibit more bearish near-term expectations and bullish long-term expectations when the dividend to price ratio is high. Second, there is evidence that more sophisticated respondents are more procyclical than less sophisticated respondents. Specifically, those with higher education (Panel A), higher numeracy (Panel D), and higher financial literacy (Panel F) exhibit greater procyclicality than their less educated, numerate, and financially literate counterparts. Third, although procyclicality in near-term expectations is related to respondent characteristics, we find little evidence of meaningful differences in long-term countercyclicality.

The results in Table IX are inconsistent with the hypothesis that procyclicality increases with investor naivete when limited to a broad-based US sample of individuals. Rather the results are consistent with the hypothesis that more financially sophisticated individuals are likely more aware of, or more mentally invested in, market conditions and therefore more sensitive to market conditions. However, if such is the case, we find no evidence that such awareness is related to the countercyclicality of long-term expectations.

VI. Discussion and Robustness

Surveys can be sensitive to language and interpretation. For example, there are at least three approaches to estimating respondents' perceived distribution of expected returns: (1) ask for distributional parameters (e.g., what is the variance of returns over the next decade?), (2) provide respondents a likelihood as a prompt to elicit a return (e.g., there is a 1 in 10 chance returns will be less than ___ in the next decade), and (3) provide respondents a return and ask for a likelihood (e.g., what are the chances that markets will be lower ten years from today?). A growing body of research suggests, however, that asking respondents about probabilistic expectations has considerable value (e.g., see reviews by Manski (2004), Manski (2018)).

In addition, the ALP questions are, arguably, the simplest approach to mental calculations—presumably, nearly everyone can understand the question of whether one expects the stock market to be higher or lower ten years from today. Few (including most economists), however, would be able to easily infer the likelihood of a 20% gain in ten years given a one-year expected return and standard deviation. Nonetheless, the ALP questions are so straightforward, they arguably are the best method

to capture respondents' actual views (which explains why this structure has become popular in surveys eliciting beliefs).[29]

Nonetheless, some remain skeptical of survey results. Cochrane (2011) posits, for example, that respondents' reported views may reflect risk neutral probabilities rather than true subjective probabilities. Recent work (Adam, Matveev, and Nagel (2021)), however, finds strong evidence inconsistent with this hypothesis using multiple related tests. Lamont (2004) views survey data, "…just one rung above anecdotes in the quality ladder." Yet evidence suggests surveys do reflect respondents' beliefs and actions, as both our work and previous work demonstrates. Greenwood and Shleifer (2014) propose that the overall evidence suggests, "…it is more plausible to conclude that investors understand the questions, and to take their answers at face value."

Another concern is that when individuals have no idea regarding a probability, they respond 50%. Thus, our results could be impacted by individuals who actually have "no opinion" regarding the distribution of equity returns (de Bruin et al. (2000)). The ALP data allows us to examine this possibility. Specifically, for respondents who report a 50% chance markets rise in the next year, ALP asks "Do you think it is equally likely the shares will be worth more in a year as it is they will be worth less or are you just unsure about the chances?" ALP asks an analogous question about returns over the next decade (in all but the first ALP financial crisis survey) for respondents who report a 50/50 chance markets will rise in the next decade. To examine this issue, we demonstrate (detailed in the Internet Appendix) that our results remain intact when eliminating all respondents who report their 50/50 perceived probability indicates they are just unsure about the chances.

Additional limitations include the facts that that survey answers can be "glib" (Amromin and Sharpe (2014)) and our data cover a period of 87 months (e.g., compared to lengthier calendar samples, such as Greenwood and Shleifer (2014) 192 months of Gallup/UBS data). Importantly, (1) the patterns we find in near-term ALP expectations match the patterns found in previous work and (2) ALP near-term expectations are strongly related to the AAII near-term sentiment measure. The ALP data also has unique advantages—by collecting both near- and long-term expectations, and not only measures of "bullishness," but also tail beliefs. At least with respect to stock market participation and risky share, an independent dataset (the HRS data) generates nearly identical results. Finally, the fact that long-term expectations play a critical role in the stock market participation, risky share, and trading

[29] As Manski (2004), Manski (2018) points outs, eliciting probabilistic expectations overcomes many of the limitations of alternative approaches and, as such, the use of probabilistic expectations has become ubiquitous in the past few decades including the Health and Retirement Study, the Survey of Economic Expectations, the National Longitudinal Survey of Youth, the Survey of Consumer Expectations, and the Bank of Italy Survey of Household Income and Wealth.

decisions, as well as relate to time-series patterns in market conditions, suggest that the data do capture systematic variation in investors' beliefs, inconsistent with the notion that the data are just noise.

VII. Conclusions

Long-term expectations are much more important than near-term expectations in explaining who participates in equity markets. Long-term expectations also play a much more important role than near-term expectations in explaining the risky share decision. The relation between long-term expectations and risky share is meaningfully closer to theoretical values than the relation between near-term expectations and risky share. Long-term expectations also play a central role in the trading decision. The countercyclical time-series properties of long-term expectations differ sharply from procyclical properties of near-term expectations documented widely in the literature. Time-series variation in long-term expectations tend to match traditional asset pricing theories and some behavioral theories but is inconsistent with behavioral theories that rely on return extrapolation. In contrast, variation in near-term expected returns tends to match behavioral theories that rely on return extrapolation inconsistent with traditional asset pricing theories or behavioral theories of extrapolation of fundamentals, prospect theory, ambiguity aversion, and noise trader risk. In short, the central role of long-term expectations in stock market participation, risk share choices, and trading, as well as the surprisingly strong countercyclicality of long-term beliefs, provides important insights for both theory and empirical work.

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Appendix A – Variable Detail and Construction

Panel A: ALP variables	
Female	Gender is identified in the pre-loaded demographic data for each "effects of the financial crisis" survey.
White race	Ethnicity is identified in the pre-loaded demographic data for each "effects of the financial crisis" survey.
Married	Current living situation is asked in each survey. Those who respond, "Married or living with a partner" are classified as married. All others (e.g., separated, divorced, widowed, never married) are classified as non-married.
Working	Current job status is identified in each survey. Respondents who report, "working now" are classified as working.
Retired	Current job status is identified in each survey. Respondents who report "retired" are classified as retired.
Age	Respondent age is reported in each survey.
Years Education	Respondents report 16 possible answers for "What is the highest level of school you have completed or the highest degree you have received?" We assign the following years of education for each answer (1) less than 1st grade=0, (2) 1st, 2nd, 3rd or 4th grade=2.5, (3) 5th or 6th grade=5.5, (4) 7th or 8th grade=7.5, (5) 9th grade=9, (6) 10th grade=10, (7) 11th grade=11, (8) 12 grade no diploma=12, (9) high school graduation=12, (10) some college but no degree=13, (11) associate degree in college occupational/vocational program=14, (12) associate degree in college academic program=14, (13) bachelor's degree=16, (14) master's degree=18, (15) professional school degree (e.g., MD, DDS, DVM, LLB, JD)=22, (16) Doctorate degree (e.g., PhD EdD)=22.
Income	Respondents report values for family income questions. The first question, "family income" reports 14 possible income buckets—with the final bucket indicating income greater than 75,000. "Family income part 2" asks those who report family income greater than 75,000 to report income in four additional buckets. The 14 family income buckets are: inc.<$5k, $5k≤inc<$7.499k, $7.5k≤inc<$9.999k, $10k≤inc<$12.499k, $12.5k≤inc<$14.999k, $15k≤inc<$19.999k, $20k≤inc<$24.999k, $25k≤inc<$29.999k, $30k≤inc<$34.999k, $35k≤inc<$39.999k, $40k≤inc<$49.999k, $50k≤inc<$59.999k, $60k≤inc<$74.999k, $75k≤inc. The family income part 2 groupings are: $75k≤inc<$99.999k, $100k≤inc<$124.999k, $125k≤inc<$199.999k, $200k≤inc. For respondents who report income less than $75K, we use the bucket midpoint. For respondents who report income of at least $75k, but less than $200k, we use the bucket midpoint of family income part 2. For respondents who report income greater than $200k, we assume income is $250k.
Numeracy	ALP survey 32 (in the field from 5-27-2008 to 6-30-2008) included a series of 17 questions used to compare measures of numeracy in Weller et al. (2013). The authors conclude that the eight-item Rasch-based numeracy measure generally performed better than other measures. The Rasch metric consists of a series of increasingly difficult problems to better discriminate numeracy. The authors provide (via the ALP website for registered users; scores.xlsx), the Rasch based score for ALP survey 32 participants. We classify respondents with Rasch numeracy score greater than 4 as high numeracy and those with score of 4 or less as low numeracy.
Understand market	In 14 of the financial crisis waves (1, 2, 11, 14, 24, 38, 41, 50, 54, 55, 58, 59, 60, and 61) respondents are asked "How would you rate your understanding of the stock market with scores from 1 (extremely good) to 6 (extremely poor). We

	reverse score the variable (so higher values indicate greater understanding) and average score of all waves for which the respondent answers this question. Those with an average score of at least 3 (understands the market extremely good, very good, somewhat good) are classified as high self-rated understanding of the market. Those with average scores less than 3 (somewhat poor, very poor, extremely poor) are classified as low self-rated understanding of the market.
Financial literacy	ALP survey 5 (in the field from 5-8-2006 to 11-1-2007) asked respondents a series of 13 financial literacy questions. The survey is describe in Parker et al. (2012). We compute the fraction of the 13 questions correctly answered and classify respondents who correctly answer at least 75% (i.e., at least 10) of the questions as high financial literacy.
Overconfidence	ALP survey 6 (in the field from 8-14-2006 to 11-20-2007) asked respondents 14 true/false general knowledge questions (e.g., alcohol causes dehydration). Respondents are also asked their confidence in each answer ranging from 50% (just guessing) to 100% (absolutely sure). Following Parker et al. (2012), overconfidence is computed as the difference the average confidence in their answer and fraction of correct answers. We classify respondents with positive differences as overconfident and those with negative differences as not overconfident.
Holds equities	In the first two waves of the financial crisis surveys (both long-form), respondents (ST001) are asked, "Do [you (or your husband/wife/partner)] have any shares of stock or stock mutual funds? Please include stocks that [you (or your husband/wife/partner)] hold in an employer pension account." Thus, in the first two waves, respondents are classified as equity market participants based on this question. In all subsequent waves, respondents are asked (ST001), "In the next set of questions we will ask you about stock holdings. Please, do not include stock holdings that are part of an IRA, 401(k), Keogh or similar retirement accounts. Do [you(and/or your husband/wife/partner)] have any shares of stock or stock mutual funds?" In short-form wave 3 and all subsequent long-form waves, respondents who report having retirement account (RA001) are asked (RA006), "Are any of these retirement accounts invested in stocks or stock mutual funds, either fully or partially?" In these waves, we classify respondents who hold report owning stocks (either directly or in retirement account) as equity holders. Respondents who answer they do not have money in stock directly and either report no retirement stock or do not have a retirement account are classified as non-participants. In total, we measure the variable in 30 waves—the 29 long-form waves plus wave 3.
Holds equity directly	As described in the above cell, the first two waves asked about any stock holdings (direct or in a retirement account). Starting in the third wave (ST001), respondents are asked the question about direct holdings in all subsequent waves. We classify respondents who answer yes as holding equity directly and those that respond no as not holding equity (i.e., we do not include respondents who do not answer the question). We measure the variable in 59 waves (i.e., we exclude the first two waves as respondent are asked about their combined stock holdings).
Has retirement account	Starting in wave 3, respondents are asked in every wave (RA001), "We are interested in how people save for retirement. Do [you (and/or your husband/wife partner)] have any IRA, 401k, Keogh or similar retirement saving accounts? Please include any such accounts that [you (and/or your husband/wife/partner)] have through [your (and/or your [spouse's/partner's])] employer." Thus, we measure this variable in 59 waves (≥wave 3).
Holds retirement equity	In wave 3 and all subsequent long-form waves, respondents who answer that they have a retirement account (see above cell), are asked (RA006) "Are any of these

	retirement accounts invested in stocks or stock mutual funds, either fully or partially?" Because there are 27 long-form waves after wave 3 (where the question is first asked), we measure this variable in 28 waves (wave 3 plus the subsequent 27 long-form waves).
%Stock	In Effects of the Financial Crisis waves 23 (January 2011), 35 (January 2012), 47 (January 2013), 53 (January 2014), 57 (January 2015), and 61 (January 2016), respondents were asked about the value of their assets. We define financial assets as the sum of (1) other real estate ("Other real estate: such as land, rental real estate, or money owed to you on a land contract or mortgage. Do not include your primary residence [or second home] that you have already reported. Do not include business or farm real estate which we ask about separately below"), (2) bonds ("Corporate, municipal, government or foreign bonds, or bond funds: Do not include any assets you reported earlier, for example under retirement accounts. Do not include government savings bonds or treasury bills, asked about below"), (3) savings accounts ("Checking or savings accounts, or money market funds: Do not include any assets you reported earlier, for example under retirement accounts"), (4) CDs ("CDs, Government Savings Bonds, or Treasury Bills: Do not include any assets you reported earlier, for example under retirement accounts"), (5) other savings ("Do [you (or your spouse/partner)] have any other savings or assets, such as jewelry, money owed to you by others, a collection for investment purposes, cash value of any life insurance policies or an annuity that you haven't already told us about?"), (6) assets in trust not yet reported ("What is the total value of the assets in the trust that you have not yet reported?"), (7) value of retirement account ("Adding all these retirement saving accounts together, what is the total value of these accounts?"), (8) value of direct stock holdings ("What are [your (and your spouse's/partner's)] stock holdings worth now?"). We compute the value of stock as the sum of the value of direct stock holdings (see (8)) and the product of retirement assets (see (7)) and the reported fraction of retirement assets held in equity (RA007; "About what fraction of the total value of these retirement accounts is invested in stocks or stock mutual funds?").
Trades	We compute trading for each long-form wave. The process for computing trading is wave dependent. To ensure we know when the trading occurred, we only compute trading for respondents who complete the previous long-form survey (see below for details). Waves 1 and 2: As noted above, in these waves, respondents are asked (ST001), "Do [you (or your husband/wife/partner)] have any shares of stock or stock mutual funds? Please include stocks that [you (or your husband/wife/partner)] hold in an employer pension account." In the first wave, respondents are also asked if they traded stock since October 1, 2008 (ST004), "Since about October 1st, 2008, the beginning of the financial crisis, have [you (and/or your husband/wife/partner)] bought or sold any stock or stock mutual funds?" with answers of "1 Bought only", "2 Sold only", "3 Both bought and sold", and "4 Neither bought nor sold." For respondents who report they both bought and sold, they are asked, (ST007) "Thinking both of what [you (and/or your husband/wife/partner)] bought and what [you (and/or your husband/wife/partner)] sold since October 1st, 2008, did you overall take money out of the stock market or did you overall put money in?" with answers, "1 Took out", "2 Put in", and "3 Neither (purchases and sales were worth about the same)". We classify respondents as non-traders if they report holding money in equity and either (1) neither bought nor sold or (2) bought and sold equal

amounts. We classify investors as buyers if they report owning shares and either (1) bought only or (2) net put money in equities. We classify investors as sellers if they either (1) report having money in stock and selling or took money out, or (2) report not having money in stock and selling. Similarly, in the second wave respondents are asked the same question, except respondents who responded in the first wave were asked about their trading since the first wave, while respondents who did not answer in the first wave were asked about their trading since October 1st, 2008. Because, as noted above, we require respondents to complete the previous survey to measure trading, our wave 2 sample captures trading since the 1st wave.

Wave 5: The previous long-form wave is wave 2, therefore we consider three waves of data (wave 3, wave 4, and wave 5) to determine trading between waves 2 and 5. Recall, that subsequent to wave 2, the question from waves 1 and 2 (ST001, ST004, ST007) are asked in all waves but are now limited to direct holdings (i.e., stock held outside of retirement funds). Thus, we use the same algorithm used in waves 1 and 2 to determine if an investor did not trade, buy, or sell in their direct holdings in each of the three waves.

In all (≥ wave 5) long-form waves, respondents are then asked a series of questions about retirement savings and trading. First respondents are asked if have a retirement savings account (RA001), "We are interested in how people save for retirement. Do [you and/or your spouse/partner] have any IRA, 401(k), Keogh or similar retirement saving accounts? Please include any such accounts that [you and/or your spouse/partner] have through a current or former employer" with answers "Yes", "No", and "Don't know." If the respondent answers yes, they are asked if any of the retirement funds are invested in equities (RA006) "Are any of these retirement accounts invested in stocks or stock mutual funds, either fully or partially?" with answers "Yes" or "No". If the respondent answers yes, they asked about trading retirement stock since the last long-form survey (RA008), "Since [time frame reference for when last taken RA002-RA015 questions], have [you and/or your spouse/partner] taken any action to change the amount invested in stocks or stock mutual funds?" with answers "Yes, increased the amount", "Yes, decreased the amount", and "No". Respondents are further asked about new contributions since the last long-form survey (RA009): "Since [time frame reference for when last taken RA002-RA015 questions], have [you and/or your spouse/partner] made any new contributions to retirement accounts such as IRAs, 401(k)s, KEOGHS?" with answers "Yes" and "No". If the respondent answers yes, they are asked if the new contributions were in equities (RA010), "Were any of these new contributions to your retirement accounts invested in stocks or stock mutual funds?" with answers "Yes" or "No". If they answer yes that they made new contribution in equity they are asked about whether they changed their exposure in their new contribution since the last long-form wave (RA012), "Since [time frame reference for when last taken RA002-RA015 questions], have you changed the percentage of your new contributions that were invested in stocks?" with answers, "Yes, increased", "Yes, decreased", and "No".

Wave 5 is unique in that the set of retirement questions (RA002-RA015) is also asked in the short-form wave 3. As a result, wave 5 has direct trading information between waves 2 and 3, waves 3 and 4, and waves 4 and 5, and retirement trading information between waves 2 and 3, and waves 3 and 5. Thus, for wave 5,

	investors are included in the trade sample if they report either (1) owning stock directly in waves 3, 4, or 5 and have a non-missing value for whether they traded or not (i.e., ST004/ST007) or report not owning stock but selling stock (i.e., allowing for the possibility they liquidated their portfolio), (2) report holding stock in their retirement account in either wave 3 or 5 and have non-missing trading of retirement sock data (RA008), and (3) report making a new contribution to their retirement account in equity and have non-missing data regarding changing their allocation (RA012) or report making a new contribution with none in stock and that they decreased their allocation. In total, there are seven trading variables: direct trades since previous wave in waves 3, 4, and 5, retirement account trades since previous long-form wave in waves 3 and 5, and new contributions since previous long-form wave in waves 3 and 5. We classify investors as non-traders (for wave 5) if they report non-trading (e.g., have not taken any action to change allocation to stocks) in at least one of those seven categories and not classified as a buyer or seller in any of the other six categories. Analogously, we classify investors as buyers if they report buying in any one of the seven categories and not as a seller in the other six categories. We classify investors as sellers if they report selling in one of the seven categories and not as a buyer in the other six categories. We classify investors as ambiguous if they report buying in at least one of the seven categories and selling in at least one of the other six categories. Waves 8-50: These waves are similar to wave 5, except that both prior waves are short form waves (e.g., waves 6 and 7) that do not ask the retirement questions (RA002-RA015) whereas for wave 5, one previous short form wave (wave 3) asked the retirement question and one previous short form wave did not (wave 4). As a result, the retirement questions in these waves ask about trades to retirement accounts since the last long form wave. Thus, rather than seven categories, these waves have five: three for direct trades (the current long-form wave and the two previous short-form waves), one for trading in retirement accounts (current long-form wave) and one for new allocations to retirement accounts (current long-form wave). Thus, we use a directly analogous algorithm to wave 5 (e.g., an investor is classified as a buyer is they report buying in any of the five categories and are not classified as a seller in any of the other four categories). Waves 51-61: After wave 50, ALP eliminated the short form waves. As a result, in waves 51-61, both direct trade questions and retirement trade questions are since the last (now all long-form) wave. As a result, there are three trade categories: direct trades, retirement trades, and new contributions trades. Again, we use a directly analogous algorithm (e.g., a buyer if they report buying in any of the three categories and not selling in the remaining two categories).
General comments	For many questions, respondents are prompted if they do not initially respond to a question. For instance, if respondents do not respond to the question regarding direct stock holdings, they are prompted, "[You did not answer. Your answers are important to us. Please answer the question to the best of your ability.] In the next set of questions we will ask you about stock holdings besides those that you may have already told us about. Do [you (and/or your husband/wife/partner)] have any shares of stock or stock mutual funds besides stock holdings that are part of an IRA, 401(k), Keogh or similar retirement accounts?" These responses generally show up as a second variable (e.g., no value for ST001, but a value for ST001_NR_DK) that we include in our analysis. Correspondingly, in some cases,

	respondents who do not report a faction are prompted to select a range. For example, respondents who do not answer the question (RA007) "About what fraction of the total value of these retirement accounts is invested in stocks or stock mutual funds" are prompted (RA007_NR_DK), "[You did not answer. Your answers are important to us. Please answer the question to the best of your ability.] About what fraction of the total value of these retirement accounts is invested in stocks or stock mutual funds" and respondents are given eight ranges (e.g., 51%-69%) from which to select. In these cases we use the range midpoint.
Panel B: HRS 2009 Internet Survey	
%Stock	The 2009 HRS Internet survey includes two tables where respondents are asked to select from four buttons, "Have the asset with stocks," "Have the asset, but no stock," "Do not have the asset," and "Don't know." These two tables include five assets: "401(k) or other retirement saving plan through an employe," "IRA or Keogh," "Trust," "Mutual funds purchased from a brokerage or mutual fund company," "Shares of individual firms purchased directly." Respondents are further asked "Do you have any other assets that are invested in stocks?" For each asset, respondents are asked the total value (e.g., total value of 401(k) or other employer retirement plan; if the respondent does not reply, they are prompted to select 1 of 9 choices such as $25,001-$50,000; in these cases we use the bucket midpoint except for the final category (more than $1,000,000) which we code as $1,000,000) and if they answered that at least some of the asset is invested in stock they are asked (for each asset) if all is invested in stocks or is it invested in a mix of stocks and other investments. If they choose the latter, they are prompted to provide a percentage invested in equities for that asset. If they fail to answer the percentage question, they are again selected to select one of nine buttons that provide ranges (e.g., 21-30%). In these cases, we again use the range midpoint. We compute the fraction of wealth invested in equity as the sum of the value of stock held in retirement accounts, Keogh/IRAs, trusts, mutual funds, direct holdings, and other holdings divided by the sum of assets in retirement accounts, Keoghs/IRAs, trusts, mutual funds, direct holdings, and other holdings.
Holds equity	As detailed in the above cell, respondents are asked if they "have the asset with stocks" for retirement plans, IRA/Keoghs, trusts, mutual funds, and directly purchased stocks. In addition, respondents are asked if holds any other assets in stocks. If the respondent answers yes to any of these questions, we classify them as holding equity. All other respondent are classified as not holding equity.
HRS respondent characteristics	The HRS 2009 Internet survey includes the respondent age, years of education, marital status (A008; we classify married and "living with a partner as if married" as married), whether they are working (A009) and whether they are retired (A009). We use the RAND 2018 longitudinal file to collect respondent gender, race, and 2008 income.
Panel C: Market characteristics measures	
Lag returns	We compute cumulative market returns over the previous six months or year using the value-weighted CRSP total return index.

Dividend yield and net payout ratio	We follow the method detailed in Michael Roberts' spreadsheet ("Updated Month TS" tab available at http://finance.wharton.upenn.edu/~mrrobert/styled-9/styled-13/index.html) to compute both monthly aggregate dividend yield and monthly aggregate net payout yield for non-financial ordinary firms (share codes 10 and 11). Following these authors, the natural logarithm of net payout ratio is given by ln(0.1+dy-ney) where dy is the dividend yield, and ney measures net equity issuance, both measured over the prior 11 months relative to current month market capitalization (see the referenced spreadsheet for greater detail).
Consumption-aggregate wealth ratio (*cay*)	The cay data were downloaded from Martin Lettau's website: https://sites.google.com/view/martinlettau/data
-ln(CAPE)	The CAPE data were downloaded from Robert Shillers' website: http://www.econ.yale.edu/~shiller/data.htm. We take the natural logarithm of the variable and multiply by -1 such that higher values imply higher expected returns.
Surplus consumption (traditional and option)	Both traditional and option implied surplus consumption ratios were provided by Alex Kontoghiorghes. Kontoghiorghes (2019) finds that the surplus consumption ratio estimated from options data overcomes issues with consumption data and better captures the consumption-based asset pricing factor.
VIX	VIX data were downloaded from the Chicago Board of Options Exchange website: https://www.cboe.com/tradable_products/vix/vix_historical_data/
Indv. crash risk	During our sample period, Shiller's individual investor survey is of "high-income Americans." Respondents are asked "What do you think is the probability of a catastrophic stock market crash in the U. S., like that of October 28, 1929 or October 19, 1987, in the next six months, including the case that a crash occurred in the other countries and spreads to the U. S.? (An answer of 0% means that it cannot happen, an answer of 100% means it is sure to happen.)" The index reports the fraction of respondents who report a crash risk probability less than 10%. As noted in the data discussion, we reverse score the variables so that higher values indicate the fraction of investors who report a probability of 10% or greater. Values are averaged over the previous six months, e.g., the value for January 2012 reflects the average of Shiller surveys from August 2011 to January 2012. Because our goal is to examine the relation between expectations and contemporaneous crash risk (i.e., rather than predict expectations), we "center" the Shiller data by moving it forward 2 months in merging with expectations, e.g., August 2011-January 2012 crash risk is merged with November 2011 expectations. See https://som.yale.edu/centers/international-center-for-finance/data/stock-market-confidence-indices/united-states for greater detail regarding the Shiller indices.
Inst. crash risk	Institutional crash risk is identical to individual crash risk except the sample is "from the investment managers section of the Money Market Directory of Pension Funds and Their Investment Managers."
Mutual fund flows and net exchanges	The investment company institute provided the raw data. We compute flows as the ratio of (new sales+exchanges in – redemptions - exchanges out) to total net assets. Following Baker and Wurgler (2007), fund styles included in the calculation are Aggressive Growth, Growth, Balanced, Growth and Income, Sector, Income Equity, Income Mixed, and Asset Allocation. Net exchanges is computed as the ratio of (exchanges in – exchanges out) to total net assets.
VC dollar value and VC num. deals	The raw data are downloaded from the National Venture Capital Association website: https://nvca.org/. We follow DeVault, Sias, and Starks (2019) and compute the percentage change in the dollar value of "cash for equity

	investments by professional venture capital community in private emerging companies in the US" and the change in the number of venture capital deals. Because the data are quarterly, we assume a linear extrapolation and assign 1/3 the quarterly value each month within a quarter.
AAII survey	Each week, the American Association of Individual Investors asks its members "Do you feel the direction of the stock market over the next six months will be up (bullish), no change (neutral), or down (bearish). Following Greenwood and Shleifer (2014), we use AAII's bull-bear spread defined as the difference between the fraction of respondents who report bullish and the fraction who report bearish. Specifically, we use the average value of the weekly bull-bear spread corresponding to the month of the ALP survey.

Table I
ALP Respondents

This table reports pooled cross-sectional time-series descriptive statistics of respondents in our sample. See Appendix A for variable construction details. Except for the bottom five rows, the sample period is November 2008 through January 2016 and includes 61 waves of the "Effects of the Financial Crisis" surveys. The sample for holds equity is limited to the 29 long-form waves and short-form wave 3; the sample for holds equity directly and has retirement accounts is limited to waves 3 and above; the sample for holds equity in their retirement account is limited to wave 3 and the 27 long-form waves subsequent to wave 3. The sample for %Equity is limited to six waves (Januarys 2011-2016), where ALP collected asset value data.

	Waves	N	Mean	25th percentile	Median	75th percentile	Standard deviation
Female	61	90,002	0.587	0.000	1	1	0.492
White race	61	90,134	0.872	1.000	1	1	0.334
Married	61	90,134	0.645	0.000	1	1	0.479
Working	61	90,119	0.591	0.000	1	1	0.492
Retired	61	90,119	0.229	0.000	0	0	0.420
Age	61	90,134	51.238	40.000	53	62	15.003
Years education	61	90,003	14.753	13.000	14	16	2.606
Income	61	89,736	68,058	32,500	55,000	87,500	50,718
Numeracy	61	45,741	4.323	3.000	4	6	1.763
Understand market	61	89,457	3.143	2.333	3.2	4	1.111
Financial literacy	61	32,102	0.762	0.615	0.846	0.923	0.205
Overconfidence	61	32,066	-0.049	-0.107	-0.050	0.000	0.093
Holds equity	30	44,132	0.550	0.000	1.000	1.000	0.497
Holds equity directly	59	85,879	0.287	0.000	0	1	0.453
Has retirement account	59	85,947	0.654	0.000	1	1	0.476
Holds retirement equity	28	25,201	0.790	1.000	1	1	0.407
%Equity	6	5,834	0.343	0.000	0.281	0.628	0.337

Table II
Beliefs Regarding Near- and Long-Term Stock Returns

This table reports descriptive statistics for the pooled cross-sectional time-series of American Life Panel Survey data between 2008 and 2016. The first three rows in Panel A report summary statistics for investor perceptions over the next 12 months regarding the likelihood the market rises, rises more than 20%, and falls by more than 20%. The next two rows report summary statistics for the implied expected return and standard deviation estimated from respondent probabilities from the likelihood of a 20% or greater gain and a 20% or greater loss over the next year. The second to last column reports the historical average (computed from the CRSP value-weighted index between 1926 and 2020). The final column reports the fraction of observations below the historical average. Panel B reports analogous statistics for the likelihood equity markets rise, rise by more than 20%, and fall by more than 20% over the next decade.

	N (waves)	*N* (obs.)	Mean	25th	Median	75th	Std. Dev.	Historical	%<Hist.
Panel A: Stock market expectations over next year									
P(market>0)	61	89,959	0.434	0.200	0.500	0.600	0.270	0.747	0.829
P(market>20%)	61	89,811	0.250	0.060	0.200	0.450	0.216	0.330	0.679
P(market<-20%)	61	89,724	0.237	0.100	0.200	0.400	0.200	0.063	0.237
$E_{i,t}(r_{1\ year})$	61	62,212	-1.039	-5.141	-2.041	3.830	10.266	0.093	0.861
$\sigma_{i,t}(r_{1\ year})$	61	62,212	29.939	15.819	22.452	33.820	21.277	0.201	0.443
Panel B: Stock market expectations over next decade									
P(market>0)	61	89,718	0.563	0.300	0.510	0.800	0.299	0.958	0.906
P(market>20%)	29	41,550	0.412	0.200	0.450	0.600	0.276	0.928	0.959
P(market<-20%)	29	41,536	0.220	0.050	0.150	0.400	0.197	0.014	0.143
$E_{i,t}(r_{10\ years})$	29	25,735	12.921	-2.041	3.154	18.232	25.423	0.962	1.000
$\sigma_{i,t}(r_{10\ years})$	29	25,735	42.114	17.822	29.139	50.674	36.153	0.474	0.714

Table III
Stock Market Participation and Beliefs

Panel A reports regressions of stock market participation on near- and long-term measures of expected return, standard deviation, and investor characteristics. Columns 1 to 5 report results for the ALP sample and columns 6 to 10 report results for the HRS sample. Column 1 reports results for the regression of stock market participation on the inferred expected return in the next year. Column 2 reports results for regressions against expected return for the next decade. Column 3 reports results for regressions for one- and ten-year expected returns. Column 4 adds the standard deviation of the one- and ten-year expected return distributions. Column 5 adds respondent characteristics including gender, race, married, working, retired, age, education, and income. Columns 6 to 10 report analogous results for the HRS sample. Expected returns and standard deviations in the next year or decade are standardized. Standard errors are clustered at the respondent level. The penultimate row reports *p*-values from a test of the hypothesis that the coefficient associated with the one-year expected return does not differ from the coefficient associated with the ten-year expected return. The bottom row reports *p*-values from an analogous test for the near- and long-term standard deviation. Panel B reports analogous results based on respondent beliefs regarding the likelihood of a market increase, or a market decrease of more than 20%. We report *t*-statistics in parentheses and significance at the one, five and ten percent levels are indicated by ***, **, and *, respectively.

Table III (Continued)
Stock Market Participation and Beliefs

	ALP Sample						HRS Sample			
	Panel A: Expected returns, risk, and stock market participation									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$E_{i,t}(r_{1\ year})$	0.055***		0.022***	0.022***	0.023***	0.043***		0.016	0.016	0.018
	(8.96)		(3.82)	(3.86)	(4.62)	(3.30)		(1.17)	(1.06)	(1.25)
$E_{i,t}(r_{10\ years})$		0.115***	0.109***	0.126***	0.062***		0.085***	0.080***	0.116***	0.080***
		(18.90)	(18.25)	(17.14)	(8.65)		(6.59)	(5.80)	(5.18)	(3.63)
$\sigma_{i,t}(r_{1\ year})$				-0.019***	-0.009*				-0.013	-0.013
				(-3.21)	(-1.80)				(-0.90)	(-0.94)
$\sigma_{i,t}(r_{10\ years})$				-0.024***	-0.009				-0.044**	-0.035
				(-3.68)	(-1.45)				(-1.98)	(-1.64)
Wave fixed effects	Yes		Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A
Resp. characteristics	No		No	No	Yes	No	No	No	No	Yes
N	22,735		22,735	22,735	22,607	1,252	1,252	1,252	1,252	1,222
R^2	0.025	0.066	0.068	0.072	0.262	0.009	0.034	0.035	0.040	0.141
p-value: $E_{i,t}(r_1)=E_{i,t}(r_{10})$			0.01***	0.01***	0.01***			0.01***	0.01***	0.05**
p-value: $\sigma_{i,t}(r_1)=\sigma_{i,t}(r_{10})$				0.55	0.93				0.31	0.47
	Panel B: Perceived likelihoods and stock market participation									
$P(R_{m,1\ year}>0)$	0.140***		0.039***	0.047***	0.039***	0.075***		0.025***	0.027***	0.018**
	(23.55)		(6.11)	(7.35)	(6.61)	(9.65)		(2.70)	(2.81)	(1.96)
$P(R_{m,10\ years}>0)$		0.173***	0.145***	0.137***	0.077***		0.102***	0.087***	0.083***	0.059***
		(28.35)	(20.81)	(19.79)	(11.72)		(13.13)	(9.20)	(8.49)	(6.12)
$P(R_{m,1\ year}<-0.2)$				-0.030***	-0.016***				-0.015*	-0.012
				(-5.93)	(-3.50)				(-1.67)	(-1.39)
$P(R_{m,10\ years}<-0.2)$				-0.035***	-0.017***				-0.014	-0.010
				(-7.02)	(-3.80)				(-1.47)	(-1.08)
Wave fixed effects	Yes	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A
Resp. characteristics	No	No	No	No	Yes	No	No	No	No	Yes
N	41,308	41,308	41,308	41,308	41,036	3,553	3,553	3,553	3,553	3,460
R^2	0.098	0.138	0.141	0.155	0.303	0.026	0.046	0.048	0.051	0.133
p-value: $R_1>0=R_{10}>0$			0.01***	0.01***	0.01***			0.01***	0.01***	0.02**
p-value: $R_1<-0.2=R_{10}<-0.2$				0.51	0.90				0.93	0.87

Table IV
Fraction of Financial Assets in Equity and Beliefs

We report regressions of the fraction in financial assets held in equity on near- and long-term beliefs. Columns (1) to (5) report results for all ALP respondents, and columns (6) to (10) report comparable results for the subset of participants who participate in equity markets. Columns (1) and (6) report relations between participation and near-term beliefs. Columns (2) and (7) report results for long-term beliefs. Columns (3) and (8) report results for both near- and long-term beliefs. Columns (4), (5), (9), and (10) include measures of near- and long-term volatility, with or without respondent characteristics (gender, race, marital status, working, retired, age, years of education, and income). Expected returns and standard deviations in the next year or decade are standardized. Panel A reports results for expected returns and standard deviations, and Panel B reports results for comparable respondent probability beliefs. Standard errors are clustered at the respondent level. The penultimate row of each panel reports the *p*-values from a test of the hypothesis that the coefficient associated with the one-year expected return does not differ from the coefficient associated with the ten-year expected return. The bottom row reports *p*-values from an analogous test for near- and long-term standard deviation coefficients. The fraction of financial assets held in equities is limited to ALP's Effects of the Financial Crisis waves 23 (January 2011), 35 (January 2012), 47 (January 2013), 53 (January 2014), 57 (January 2015), and 61 (January 2016). We report *t*-statistics in parentheses and significance at the one, five and ten percent levels are indicated by ***, **, and *, respectively.

Table IV (Continued)
Fraction of Financial Assets in Equity and Beliefs

	Panel A: Expected returns and risky share									
	%Stock					%Stock				
	All respondents					Stock market participants				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$E_{i,t}(r_{1\ year})$	2.686***		0.674	0.612	1.150*	0.005		-0.965	-1.290*	-0.985
	(3.90)		(0.98)	(0.87)	(1.71)	(0.01)		(-1.35)	(-1.73)	(-1.33)
$E_{i,t}(r_{10\ years})$		6.964***	6.762***	7.722***	5.149***		3.214***	3.482***	4.031***	3.580***
		(10.34)	(9.74)	(8.41)	(5.77)		(4.87)	(5.13)	(4.19)	(3.69)
$\sigma_{i,t}(r_{1\ year})$				-0.447	-0.266				0.899	0.801
				(-0.64)	(-0.40)				(1.23)	(1.1)
$\sigma_{i,t}(r_{10\ years})$				-1.444	-0.801				-0.911	-0.814
				(-1.58)	(-0.92)				(-0.96)	(-0.85)
Wave fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Resp. characteristics	No	No	No	No	Yes	No	No	No	No	Yes
N	3,425	3,425	3,425	3,425	3,419	2,396	2,396	2,396	2,396	2,391
R^2	0.053	0.091	0.091	0.093	0.18	0.004	0.018	0.019	0.02**	0.036
p-value: $E_{i,t}(r_1)=E_{i,t}(r_{10})$			0.01***	0.01***	0.01***			0.01***	0.01***	0.01***
p-value: $\sigma_{i,t}(r_1)=\sigma_{i,t}(r_{10})$				0.46	0.67				0.19	0.25
	Panel B: Perceived likelihoods and risky share									
$P(R_{m,1\ year}>0)$	8.157***		2.643***	2.991***	2.661***	3.907***		1.620**	1.752**	1.756**
	(14.44)		(3.65)	(4.11)	(3.83)	(6.40)		(2.12)	(2.27)	(2.31)
$P(R_{m,10\ years}>0)$		9.861***	8.043***	7.528***	5.261***		4.486***	3.400***	3.273***	2.896***
		(16.95)	(10.64)	(9.94)	(6.98)		(7.13)	(4.26)	(4.03)	(3.51)
$P(R_{m,1\ year}<-0.2)$				-0.953	-0.349				1.311*	1.207*
				(-1.46)	(-0.55)				(1.88)	(1.74)
$P(R_{m,10\ years}<-0.2)$				-2.169***	-1.615**				-0.633	-0.497
				(-3.35)	(-2.57)				(-0.91)	(-0.72)
Wave fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Resp. characteristics	No	No	No	No	Yes	No	No	No	No	Yes
N	5,792	5,792	5,792	5,792	5,785	3,813	3,813	3,813	3,813	3,807
R^2	0.112	0.138	0.141	0.149	0.209	0.021	0.027	0.029	0.030	0.043
p-value: $R_1>0=R_{10}>0$			0.01***	0.01***	0.05**			0.21	0.29	0.42
p-value: $R_1<-0.2=R_{10}<-0.2$				0.29	0.26				0.11	0.16

Table V
Trading and Expectations

Panel A reports the time-series mean (over the 27 long-form waves) of the cross-sectional average fraction of respondents not changing their exposure to equities in their retirement accounts, in their direct accounts (for direct accounts not trading includes both those not trading and those buying and selling equally), and in any account. The next three columns report the fraction buying, selling, or cases where they trade but it is not known if they were net buyers or net sellers. The final four columns report, respectively, the time-series mean of the cross-sectional average fraction of respondents who report a change in at least three of their near-term expectations (chance market rises, rises more than 20%, and falls more than 20% over the next year), at least three of their long-term expectations, and those who change any of the six expectations. Panel B reports the fraction of investors who report not trading during the October 2008-March 2009 period (waves 1 and 2), the fraction reporting net buying over that period, the fraction reporting net selling over that period and the fraction where it is not clear if they were net buyers or net sellers (e.g., net buyer in wave 1 and net seller in wave 2). Panel C partitions respondents into two groups based on the volatility of their near-term expected returns (for those who have at least five observations of both near- and long-term expected returns) and reports the time-series mean of the cross-sectional averages of the same variables. Analogously, Panel D reports the values for respondents sorted by the volatility of their long-term expected returns.

	No trade	Net buy	Net sell	Ambiguous	ΔNear-term Expectations	ΔLong-term Expectations	ΔAny Expectations
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Post-March 2009 (*n*=18,813 respondent-wave observations; average trading window=93 days)							
Retirement accounts	85.18%	9.62%	4.88%	0.47%	90.88%	89.47%	94.09%
Direct accounts	73.25%	16.54%	9.15%	1.79%	91.61%	89.95%	94.75%
Any	74.80%	15.75%	7.53%	1.92%	90.44%	89.03%	93.72%
Panel B: Crisis period October 2008-March 2009 (*n*=1,458 investors, average trading window=133 days)							
Any	56.58%	28.53%	13.31%	1.58%	N/A	N/A	N/A
Panel C: Respondents sorted on volatility of near-term expectations							
Stable ($E(r_1)$)	75.44%	14.53%	8.25%	1.77%	93.46%	92.77%	96.45%
Volatile ($E(r_1)$)	72.72%	18.40%	7.00%	1.88%	94.82%	94.00%	97.06%
Panel D: Respondents sorted on volatility of long-term expectations							
Stable ($E(r_{10})$)	78.79%	12.83%	7.25%	1.13%	91.80%	91.26%	95.08%
Volatile ($E(r_{10})$)	71.07%	18.79%	7.87%	2.27%	95.61%	94.76%	97.83%

Table VI
Trading and Beliefs

We report multinomial logistic regression results to examine trading in relation to changes in near- and long-term beliefs. Panel A considers trading in relation to expected returns, and Panel B looks at trading in relation to probability beliefs. Columns (1) and (2) reports marginal effects for how near-term expected returns at the beginning of the trading window, and how changes in the respondent's expected return over the trading window impact buying (and selling). Columns (3) and (4) examine trading in relation to long-term beliefs in an analogous manner. Finally, columns (5) and (6) consider trading in relation to both near- and long-term beliefs jointly. All results also include controls for respondent characteristics including gender, race, marital status, working, retired, age, years of education, and income.

	Near-term expectations		Long-term expectations		Near- and long-term expectations	
	(1)	(2)	(3)	(4)	(5)	(6)
	Buy	Sell	Buy	Sell	Buy	Sell
Panel A: Trading and perceived near-term and long-term expected returns						
A: $E(r_{1\ year})_{-1}$	0.001	-0.003			-0.007	-0.009**
B: $E_{i,t}(r_{10\ years})_{-1}$			0.022***	0.014***	0.024***	0.017***
C: $\Delta E(r_{1\ year})$	0.005	-0.005			0.000	-0.009**
D: $\Delta E_{i,t}(r_{10\ years})$			0.011***	0.007**	0.012***	0.009***
Resp. Charac.	Yes		Yes		Yes	
N	8,841		8,841		8,841	
P-value H_0: *A=B*					0.01***	0.01***
P-value H_0: *C=D*					0.05**	0.01***
Panel B: Trading and perceived near-term and long-term likelihoods						
E: $P(R_{1\ year}>0_{-1})$	0.027***	-0.004			0.009	-0.016***
F: $P(R_{10\ years}>0_{-1})$			0.033***	0.007***	0.026***	0.018***
G: $\Delta P(R_{1\ year}>0)$	0.017***	-0.002			0.010*	-0.007**
H: $\Delta P(R_{10\ years}>0)$			0.012***	0.000	0.007*	0.004*
Resp. Charac.	Yes		Yes		Yes	
N	19,085		19,085		19,085	
P-value H_0: *E=F*					0.12	0.01***
P-value H_0: *G=H*					0.94	0.02**

Table VII
Extrapolation, Valuation, and Near- and Long-Term Perceived Stock Return Probabilities

This table reports coefficients from panel regressions of perceived respondent probabilities for the distribution of stock returns (in percent) over the next year and decade on lag market returns (Panel A), market valuation metrics (Panel B), mutual fund flows, AAII sentiment, and venture capital flows (Panel C), and perceived near-term risk (Panel D). Each coefficient represents the results of a univariate panel regression. Each regressor is demeaned by each respondent and then rescaled to unit variance to facilitate interpretation across variables. Sample sizes range from 89,718 to 89,959 observations in the first four columns and from 41,536 to 41,550 observations in the final two columns and the sample period is from November 2008 to January 2016. Standard errors are clustered at the respondent level and *t*-statistics are reported parenthetically. Statistical significance at the one, five and ten percent levels are indicated by ***, **, and *, respectively.

	$P(R_{m,1\ year}>0)$	$P(R_{m,1\ year}>0.2)$	$P(R_{m,1\ year}<-0.2)$	$P(R_{m,10\ years}>0)$	$P(R_{m,10\ years}>0.2)$	$P(R_{m,10\ years}<-0.2)$
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Perceived probability coefficient estimates on lagged market returns						
$R_{m,-1\ to\ -12}$	0.551***	-0.929***	-0.623***	-1.657***	-2.944***	0.218**
$R_{m,-1\ to\ -6}$	1.044***	0.229***	-0.658***	-0.438***	-2.287***	0.107
Panel B: Perceived probability coefficient estimates on market valuations						
$\ln(D/P)_{-1}$	-0.449***	1.115***	0.754***	2.071***	3.022***	-0.270***
$\ln(\text{net payout}/P)_{-1}$	-0.277**	0.582***	0.704***	1.324***	2.756***	0.035
Cay_{-1}	-0.334***	0.440***	0.734***	1.418***	2.663***	-0.127
$-1*\ln(CAPE)_{-1}$	-0.601***	1.194***	0.737***	2.599***	3.823***	-0.598***
$-1*\text{Surplus cons.}_{-1}$	-0.423**	1.232***	0.466***	2.591***	3.398***	-0.740***
$-1*\text{Surplus cons.}_{-1}^{OPT}$	-0.716***	0.879***	0.778***	1.912***	3.165***	-0.332***
Panel C: Perceived probability coefficient estimates on flows and AAII sentiment						
Net exchanges	0.576***	-0.013	-0.461***	-0.598***	-2.316***	0.196**
Mutual fund flows	0.514***	0.351***	-0.425***	-0.082	-1.624***	0.072
AAII survey	0.290***	-0.526***	-0.609***	-0.903***	-1.729***	-0.034
ΔNum. VC deals	0.600***	0.065	-0.455***	0.023	-1.033***	-0.028
%ΔVC dollar value	0.566***	0.150***	-0.552***	-0.270***	-1.145***	-0.034
Panel D: Perceived probability coefficient estimates on risk						
Indiv. crash $risk_{+3\ to\ -3}$	-0.778***	-0.272***	0.761***	1.021***	2.280***	-0.250**
Inst. crash $risk_{+3\ to\ -3}$	-0.716***	0.380***	0.787***	1.448***	3.165***	-0.222**
VIX_{-1}	-0.998***	0.916***	0.762***	1.616***	3.533***	-0.282**

Table VIII
Extrapolation, Valuation, and Near- and Long-Term Expected Stock Returns and Volatilities

This table reports coefficients from panel regressions of perceived respondent beliefs for expected stock returns, premiums, and volatilities (in percent) over the next year and decade on lag market returns (Panel A), market valuation metrics (Panel B), mutual fund flows, AAII sentiment, and venture capital flows (Panel C), and perceived near-term risk (Panel D). Each coefficient represents the results of a univariate panel regression. Each regressor is demeaned by each respondent and then rescaled to unit variance to facilitate interpretation across variables. The sample period is from November 2008 to January 2016. Standard errors are clustered at the respondent level and *t*-statistics are reported parenthetically. Statistical significance at the one, five and ten percent levels are indicated by ***, **, and *, respectively.

	$E_{i,t}(r_{1\text{ year}})$	$E_{i,t}(r_{1\text{ year}} - r_{f,1\text{ year}})$	$\sigma_{i,t}(r_{1\text{ year}})$	$E_{i,t}(r_{10\text{ years}})$	$E_{i,t}(r_{10\text{ yrs}} - r_{f,10\text{ yrs}})$	$\sigma_{i,t}(r_{10\text{ years}})$
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Expected returns and uncertainty on lagged market returns						
$R_{m,-1\text{ to }-12}$	-0.146***	-0.078	-0.888***	-1.851***	-2.949***	-1.631***
$R_{m,-1\text{ to }-6}$	0.403***	0.442***	0.284***	-1.230***	-2.828***	-1.206***
Panel B: Expected returns and uncertainty on market valuations						
$\ln(D/P)_{-1}$	0.204***	0.126**	1.175***	1.913***	2.253***	1.874***
$\ln(\text{net payout}/P)_{-1}$	-0.074	-0.105**	0.699***	1.734***	3.565***	1.811***
Cay_{-1}	-0.139***	-0.174***	0.738***	1.666***	1.708***	1.437***
$-1*\text{CAPE}_{-1}$	0.257***	0.163**	1.229***	2.511***	0.677***	1.890***
$-1*\text{Surplus cons.}_{-1}$	0.422***	0.322***	1.051***	2.313***	-1.176***	1.500***
$-1*\text{Surplus cons.}_{-1}^{OPT}$	0.071	-0.022	1.058***	2.000***	1.113***	1.656***
Panel C: Expected returns and uncertainty on flows and AAII sentiment						
Net exchanges	0.157***	0.194***	-0.354***	-1.357***	-1.835***	-1.199***
Mutual fund flows	0.339***	0.356***	-0.117	-0.822***	-1.651***	-0.736***
AAII survey	0.019	0.069*	-0.713***	-0.895***	-1.559***	-0.877***
ΔNum. VC deals	0.261***	0.269***	-0.316***	-0.451***	-1.397***	-0.476**
%ΔVC dollar value	0.299***	0.309***	-0.326***	-0.382***	-1.851***	-0.358*
Panel D: Expected returns and uncertainty on sophisticated investor flows						
Indiv. crash $\text{risk}_{+3\text{ to }-3}$	-0.484***	-0.509***	0.274***	1.268***	1.861***	1.027***
Inst. crash $\text{risk}_{+3\text{ to }-3}$	-0.207***	-0.254***	0.741***	2.045***	2.521***	1.724***
VIX_{-1}	0.072	-0.030	1.008***	2.342***	1.650***	1.993***

Table IX
Extrapolation, Valuation, and Near- and Long-Term Perceived Stock Return Probabilities by Respondent Characteristic

This table reports coefficients from panel regressions of perceived respondent probabilities for the distribution of stock returns (in percent) over the next year and decade on lag market returns (columns (1) and (2)), the log of dividend yield (columns (3) and (4)), net exchanges (columns (5) and (6)), and perceived individual near-term crash risk (columns (7) and (8)). Results are reported for partitions of the data into groupings of respondents by education (Panel A), income (Panel B), stock market participation (Panel C), numeracy (Panel D), self-rated understanding of the stock market (Panel E), financial literacy (Panel F), and overconfidence (Panel G). Each coefficient represents the results of a univariate panel regression. Each regressor is demeaned by each respondent and then rescaled to unit variance to facilitate interpretation across variables. The sample period is from November 2008 to January 2016. Standard errors are clustered at the respondent level and *t*-statistics are reported parenthetically. Statistical significance at the one, five and ten percent levels are indicated by ***, **, and *, respectively.

Table IX (Continued)
Extrapolation, Valuation, and Near- and Long-Term Perceived Stock Return Probabilities by Respondent Characteristic

	$R_{m,-1 \text{ to } -12}$		$\ln(D/P)_{-1}$		Net exchanges		Indiv. crash risk$_{+3 \text{ to } -3}$	
	$P(R_{1 \text{ year}}>0)$	$P(R_{10 \text{ years}}>0)$	$P(R_{1 \text{ year}}>0)$	$P(R_{10 \text{ years}}>0)$	$P(R_{1 \text{ year}}>0)$	$P(R_{10 \text{ years}}>0)$	$P(R_{1 \text{ year}}>0)$	$P(R_{10 \text{ years}}>0)$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Education								
More education	0.887***	-1.483***	-0.796***	1.899***	0.799***	-0.509***	-1.051***	0.886***
Less education	0.080	-1.838***	0.048	2.268***	0.251**	-0.651***	-0.391***	1.124***
Difference	0.807***	0.354*	-0.843***	-0.369*	0.548***	0.142	-0.660***	-0.238
Panel B: Income								
High income	0.682***	-1.440***	-0.645***	1.796***	0.818***	-0.357***	-1.017***	0.869***
Low income	0.527***	-1.629***	-0.396***	2.070***	0.439***	-0.625***	-0.637***	1.016***
Difference	0.155	0.189	-0.249	-0.274	0.379***	0.268**	-0.379**	-0.147
Panel C: Stock market participation								
Owns equity	0.981***	-2.430***	-1.029***	2.585***	1.178***	-0.853***	-1.473***	1.488***
Does not own	0.755***	-2.047***	-0.717***	2.416***	0.769***	-0.727***	-0.992***	1.694***
Difference	0.226	-0.383	-0.312	0.169	0.410*	-0.127	-0.481*	-0.206
Panel D: Numeracy								
High numeracy	1.159***	-1.340***	-1.154***	1.646***	1.000***	-0.497***	-1.343***	0.613***
Low numeracy	0.583***	-1.791***	-0.587***	2.054***	0.571***	-0.726***	-0.684***	0.880***
Difference	0.576**	0.451	-0.567*	-0.408	0.429**	0.229	-0.660***	-0.267
Panel E: Self-rated understanding of stock market								
High understanding	0.594***	-1.635***	-0.479***	2.010***	0.685***	-0.590***	-0.967***	0.886***
Low understanding	0.504***	-1.695***	-0.415**	2.175***	0.401***	-0.608***	-0.495***	1.217***
Difference	0.089	0.060	-0.064	-0.165	0.284**	0.018	-0.472***	-0.331*
Panel F: Financial literacy								
High fin. literacy	1.247***	-1.568***	-1.305***	1.733***	0.968***	-0.609***	-1.288***	0.869***
Low fin. literacy	0.258	-1.683***	-0.083	2.125***	0.603***	-0.428**	-0.560**	0.523**
Difference	0.989***	0.115	-1.222***	-0.393	0.365	-0.181	-0.728***	0.345
Panel G: Overconfidence								
Overconfident	0.804**	-1.555***	-0.789**	1.828***	0.679***	-0.511**	-1.010***	0.717**
Not overconfident	0.918***	-1.645***	-0.887***	1.886***	0.883***	-0.544***	-1.047***	0.703***
Difference	-0.115	0.090	0.098	-0.058	-0.204	0.033	0.037	0.014

Internet Appendix for

"Long-Term Beliefs"

Richard Sias, Laura Starks, and Harry Turtle

I. Alternative expected return and variance estimation

We follow previous work (e.g., Ben-David, Graham and Harvey, 2013; Amromin and Sharpe, 2014) and estimate perceived expected return distributions from the two outside return likelihoods—the likelihood of a 20% gain and the likelihood of a 20% loss in the stock market. In this section we repeat the analysis using these same respondent perceptions about large gains or losses, as well as respondent perceptions about a positive market return in the coming year or decade. These latter, three-point estimates (based on the likelihood the market increases, increases more than 20%, or declines by more than 20%), infer the mean and standard deviation by minimizing the total sum of square errors in a non-linear fitting of continuously compounded returns to a normal distribution.

Table IA.I reports the winsorized (at the 5% and 95% level) summary statistics for the two- and three-point estimates of the inferred mean and standard deviation for the perceived distributions of near- (Panel A) and long-term (Panel B) expected returns. For comparison purposes, we limit the sample to respondents whose answers allow us to estimate both two- and three-point estimates. The results reveal that the two- and three-point estimates exhibit near identical distributional statistics and correlations ranging from 0.84 to 0.92.

[Insert Table IA.I about here]

II. Correlation between beliefs

Table IA.II reports the pooled cross-sectional times-series correlations between near- and long-term quantile estimates, inferred near- and long-term expected returns and standard deviations. The results reveal consistency across horizons—individuals with higher near-term forecasts also tend to have higher long-term forecasts. Similarly, respondents who view near-term returns as more uncertain also tend to view long-term returns as more uncertain.

[Insert Table IA.II about here]

III. Stock market participation: Logistic regressions

Table IA.III reports marginal effects (and associated *t*-statistics) from logistic regressions of stock market participation on perceived expected returns, standard deviations, and respondent

characteristics. Reported marginal effects and significance levels yield identical conclusions when compared to the analogous linear probability model results reported in Table III.

[Insert Table IA.III about here]

IV. Risky share decision: Tobit regressions

Table IA.IV reports tobit regression results to examine the fraction of financial assets invested in equity in relation to respondent beliefs and characteristics. Results are reported in an analogous manner to Table IV and the findings are qualitatively similar to the linear probability model.

[Insert Table IA.IV about here]

V. Fraction of Financial Assets in Equity and Beliefs for the HRS sample

We replicate our analysis of the fraction of financial assets in equity from Table IV using the available data for %Stock in the 2009 Health and Retirement Internet survey. Results are reported in Table IA.V. We find highly similar results for the HRS sample. Because the HRS fraction of financial assets in equity is only available for a single wave, standard errors are not clustered.

[Insert Table IA.V about here]

VI. Epistemic Uncertainty: Excluding "just unsure" respondents

As noted in the discussion, it is possible that when individuals have no idea regarding a probability, they respond 50% (Bruine de Bruin, Fischhoff, Millstein, and Halpern-Felscher, 2000). ALP data allows us to address this issue. Specifically, for respondents who report a 50% chance markets rise in the next year, ALP asks "*Do you think it is equally likely the shares will be worth more in a year as it is they will be worth less or are you just unsure about the chances?*" ALP asks an analogous question about returns over the next decade (in all but the first ALP financial crisis survey) for respondents who report a 50/50 chance markets will rise in the next decade. Thus, to examine this issue, we eliminate all respondents who report their 50/50 perceived probability indicates they are just unsure about the chances.

We replicate the analysis in Tables III, IV, V, VI, and VII after eliminating respondents that indicate their 50/50 perceived responses indicates they are just unsure (denoted ambiguous respondents). Revised results appear largely unchanged and are reported in Tables IA.VI, IA.VII, IA.VIII, IA.IX and IA.X.

[Insert Tables IA.VI, IA.VII, IA.VIII, IA.IX and IA.X about here]

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Table IA.I
Comparing Two- and Three- Point Estimates of Mean and Variance for Near- and Long-Term Expected Stock Return Distributions

We report descriptive statistics summarizing the imputed mean and standard deviation for the next year and decade from the pooled cross-sectional time-series of American Life Panel Survey data between 2008 and 2016. Two-point estimates are based on investor perceptions regarding the likelihood the market rises more than 20%, or falls by more than 20%. Three-point estimates generate the mean and standard deviation by minimizing the total sum of squares based on the likelihood the market rises, rises more than 20%, or falls by more than 20%. The bottom two rows in each panel report the correlation between the two- and three-point expected return estimates and standard deviation estimates. Panel B reports analogous statistics for the next decade. All two- and three-point estimates are winsorized at the 5% and 95% levels. The sample is limited to respondents with sufficient data to estimate both two- and three-point expected return distributions.

	N	Mean	25th	Median	75th	Std. Dev.
Panel A: Stock market expectations over next year						
2 point $E(r_{1\ year})$	41,049	-0.015	-0.046	-0.020	0.022	0.083
3 point $E(r_{1\ year})$	41,049	-0.016	-0.086	-0.011	0.048	0.087
2 point $\sigma(r_{1\ year})$	41,049	0.239	0.151	0.191	0.273	0.141
3 point $\sigma(r_{1\ year})$	41,049	0.211	0.112	0.178	0.273	0.122
Correlation in $E(r_{1\ year})$ estimates	0.840					
Correlation in $\sigma(r_{1\ year})$ estimates	0.918					
Panel B: Stock market expectations over next decade						
2 point $E(r_{10\ year})$	13,389	0.067	-0.020	0.022	0.115	0.165
3 point $E(r_{10\ year})$	13,389	0.050	-0.070	0.015	0.123	0.146
2 point $\sigma(r_{10\ year})$	13,389	0.283	0.161	0.225	0.330	0.181
3 point $\sigma(r_{10\ year})$	13,389	0.252	0.128	0.215	0.331	0.154
Correlation in $E(r_{10\ year})$ estimates	0.921					
Correlation in $\sigma(r_{10\ year})$ estimates	0.912					

Table IA.II
Correlations Between Respondent Beliefs

This table reports correlations for the pooled cross-sectional time-series of American Life Panel Survey data between 2008 and 2016. The first three rows and columns report correlations for investor perceptions over the next 12 months regarding the likelihood the market rises, rises more than 20%, and falls by more than 20%. The next two rows and columns report correlations for the implied expected return and standard deviation estimated from respondent probabilities from the likelihood of a 20% or greater gain and a 20% or greater loss over the next year. The final five rows and columns report correlations for respondent beliefs over the next decade.

	$P(r_{1\ year}>0)$	$P(r_{1\ year}>0.2)$	$P(r_{1\ year}<-0.2)$	$E(r_{1\ year})$	$\sigma(r_{1\ year})$	$P(r_{10\ year}>0)$	$P(r_{10\ year}>0.2)$	$P(r_{10\ year}<-0.2)$	$E(r_{10\ year})$	$\sigma(r_{10\ year})$
$P(r_{1\ year}>0)$	1.000									
$P(r_{1\ year}>0.2)$	0.558	1.000								
$P(r_{1\ year}<-0.2)$	0.008	0.302	1.000							
$E(r_{1\ year})$	0.394	0.668	-0.555	1.000						
$\sigma(r_{1\ year})$	0.283	0.719	0.635	0.132	1.000					
$P(r_{10\ year}>0)$	0.698	0.352	-0.004	0.265	0.177	1.000				
$P(r_{10\ year}>0.2)$	0.561	0.495	0.149	0.267	0.286	0.733	1.000			
$P(r_{10\ year}<-0.2)$	0.021	0.276	0.654	-0.242	0.383	-0.106	0.067	1.000		
$E(r_{10\ year})$	0.426	0.304	-0.062	0.302	0.137	0.589	0.868	-0.275	1.000	
$\sigma(r_{10\ year})$	0.317	0.383	0.333	0.089	0.436	0.374	0.622	0.480	0.583	1.000

Table IA.III
Logit Model of Stock Market Participation and Beliefs

Panel A reports marginal effects for logit regressions of stock market participation on near- and long-term measures of expected return, standard deviation, and investor characteristics. Columns 1 to 5 report results for the ALP sample and columns 6 to 10 report results for the HRS sample. Column 1 reports results for the regression of stock market participation on the inferred expected return in the next year. Column 2 reports results for regressions against expected return for the next decade. Column 3 reports results for regressions for one- and ten-year expected returns. Column 4 adds the standard deviation of the one- and ten-year expected return distributions. Column 5 adds respondent characteristics including gender, race, married, working, retired, age, education, and income. Columns 6 to 10 report analogous results for the HRS sample. Expected returns and standard deviations in the next year or decade are standardized. Standard errors are clustered at the respondent level. The penultimate row reports *p*-values from a test of the hypothesis that the coefficient associated with the one-year expected return does not differ from the coefficient associated with the ten-year expected return. The bottom row reports *p*-values from an analogous test for the near- and long-term standard deviation. Panel B reports analogous results based on respondent beliefs regarding the likelihood of a market increase, or a market decrease of more than 20%. We report *t*-statistics in parentheses and significance at the one, five and ten percent levels are indicated by ***, **, and *, respectively.

Table IA.III (Continued)
Logit Model of Stock Market Participation and Beliefs

	ALP Sample						HRS Sample			
	Panel A: Expected returns, risk, and stock market participation									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$E_{i,t}(r_{1\ year})$	0.055***		0.020***	0.019***	0.020***	0.044***		0.015	0.013	0.018
$E_{i,t}(r_{10\ years})$		0.132***	0.124***	0.139***	0.064***		0.099***	0.093***	0.128***	0.087***
$\sigma_{i,t}(r_{1\ year})$				-0.019***	-0.008				-0.012	-0.013
$\sigma_{i,t}(r_{10\ years})$				-0.022***	-0.009				-0.042*	-0.034
Wave fixed effects	Yes		Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A
Resp. characteristics	No		No	No	Yes	No	No	No	No	Yes
N	22,735		22,735	22,735	22,607	1,252	1,252	1,252	1,252	1,222
p-value: $E_{i,t}(r_1)=E_{i,t}(r_{10})$			0.01***	0.01***	0.01***			0.01***	0.01***	0.03**
p-value: $\sigma_{i,t}(r_1)=\sigma_{i,t}(r_{10})$				0.72	0.95				0.33	0.48
	Panel B: Perceived likelihoods and stock market participation									
$P(R_{m,1\ year}>0)$	0.137***		0.040***	0.051***	0.038***	0.077***		0.027***	0.029***	0.020**
$P(R_{m,10\ years}>0)$		0.164***	0.136***	0.127***	0.065***		0.098***	0.083***	0.079***	0.055***
$P(R_{m,1\ year}<-0.2)$				-0.030***	-0.013***				-0.015*	-0.012
$P(R_{m,10\ years}<-0.2)$				-0.037***	-0.017***				-0.015*	-0.011
Wave fixed effects	Yes	Yes	Yes	Yes	Yes	N/A	N/A	N/A	N/A	N/A
Resp. characteristics	No	No	No	No	Yes	No	No	No	No	Yes
N	41,308	41,308	41,308	41,308	41,036	3,553	3,553	3,553	3,553	3,460
p-value: $R_1>0=R_{10}>0$			0.01***	0.01***	0.01***			0.01***	0.01***	0.04**
p-value: $R_1<-0.2=R_{10}<-0.2$				0.38	0.57				0.99	0.92

Table IA.IV
Tobit Model of the Fraction of Financial Assets in Equity and Beliefs

The table reports marginal effects for tobit regressions of the fraction in financial assets held in equity on near- and long-term beliefs. Columns (1) to (5) report results for all ALP respondents, and columns (6) to (10) report comparable results for the subset of participants who participate in equity markets. Columns (1) and (6) report relations between participation and near-term beliefs. Columns (2) and (7) report results for long-term beliefs. Columns (3) and (8) report results for both near- and long-term beliefs. Columns (4), (5), (9), and (10) include measures of near- and long-term volatility, with or without respondent characteristics (gender, race, marital status, working, retired, age, years of education, and income). Expected returns and standard deviations in the next year or decade are standardized. Panel A reports results for expected returns and standard deviations, and Panel B reports results for comparable respondent probability beliefs. Standard errors are clustered at the respondent level. The penultimate row of each panel reports the p-values from a test of the hypothesis that the coefficient associated with the one-year expected return does not differ from the coefficient associated with the ten-year expected return. The bottom row reports p-values from an analogous test for near- and long-term standard deviation coefficients. The fraction of financial assets held in equities is limited to ALP's Effects of the Financial Crisis waves 23 (January 2011), 35 (January 2012), 47 (January 2013), 53 (January 2014), 57 (January 2015), and 61 (January 2016). We report t-statistics in parentheses and significance at the one, five and ten percent levels are indicated by ***, **, and *, respectively.

Table IA.IV (Continued)
Tobit Model of the Fraction of Financial Assets in Equity and Beliefs

	Panel A: Expected returns and risky share									
	All respondents					Stock market participants				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$E_{i,t}(r_{1\ year})$	4.502***		1.667**	1.776**	2.527***	-0.040		-0.985*	-1.308**	-1.004
$E_{i,t}(r_{10\ years})$		9.802***	9.320***	10.621***	6.624***		3.123***	3.396***	3.850***	3.417***
$\sigma_{i,t}(r_{1\ year})$				-1.338	-0.900				0.920	0.811
$\sigma_{i,t}(r_{10\ years})$				-1.889*	-0.873				-0.771	-0.681
Wave fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Resp. characteristics	No	No	No	No	Yes	No	No	No	No	Yes
N	3,425	3,425	3,425	3,425	3,419	2,396	2,396	2,396	2,396	2,391
p-value: $E_{i,t}(r_1)=E_{i,t}(r_{10})$			0.01***	0.01***	0.01***			0.01***	0.01***	0.01***
p-value: $\sigma_{i,t}(r_1)=\sigma_{i,t}(r_{10})$				0.75	0.99				0.18	0.23
Panel B: Perceived likelihoods and risky share										
$P(R_{m,1\ year}>0)$	12.949***		4.001***	4.428***	3.980***	3.926***		1.710***	1.843***	1.838***
$P(R_{m,10\ years}>0)$		15.846***	13.084***	12.230***	8.406***		4.436***	3.289***	3.177***	2.839***
$P(R_{m,1\ year}<-0.2)$				-2.208***	-1.021				1.414**	1.287**
$P(R_{m,10\ years}<-0.2)$				-3.244***	-2.285***				-0.568	-0.438
Wave fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Resp. characteristics	No	No	No	No	Yes	No	No	No	No	Yes
N	5,792	5,792	5,792	5,792	5,785	3,813	3,813	3,813	3,813	3,807
p-value: $R_1>0=R_{10}>0$			0.01***	0.01***	0.01***			0.18	0.26	0.40
p-value: $R_1<-0.2=R_{10}<-0.2$				0.51	0.41				0.08*	0.12

Table IA.V
Fraction of Financial Assets in Equity and Beliefs for the HRS sample

We report regressions of the fraction in financial assets held in equity on near- and long-term beliefs for the Health and Retirement sample. Columns (1) to (5) report results for all respondents, and columns (6) to (10) report comparable results for the subset of participants who participate in equity markets. Columns (1) and (6) report relations between participation and near-term beliefs. Columns (2) and (7) report results for long-term beliefs. Columns (3) and (8) report results for both near- and long-term beliefs. Columns (4), (5), (9), and (10) include measures of near- and long-term volatility, with or without respondent characteristics (gender, race, marital status, working, retired, age, years of education, and income). Expected returns and standard deviations in the next year or decade are standardized. Panel A reports results for expected returns and standard deviations, and Panel B reports results for comparable respondent probability beliefs. The penultimate row of each panel reports the *p*-values from a test of the hypothesis that the coefficient associated with the one-year expected return does not differ from the coefficient associated with the ten-year expected return. The bottom row reports *p*-values from an analogous test for near- and long-term standard deviation coefficients. The HRS %Stock variable is constructed from the 2009 HRS Internet Survey as described in the Appendix A. We report *t*-statistics in parentheses and significance at the one, five and ten percent levels are indicated by ***, **, and *, respectively.

Table IA.V (Continued)
Fraction of Financial Assets in Equity and Beliefs for the HRS sample

	Panel A: Expected returns and risky share									
	All respondents					Stock market participants				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$E_{i,t}(r_{1\ year})$	4.827***		2.708**	2.082*	2.000*	3.692***		2.887**	1.675	1.498
	(4.55)		(2.44)	(1.75)	(1.68)	(3.21)		(2.37)	(1.23)	(1.08)
$E_{i,t}(r_{10\ years})$		7.279***	6.380***	8.693***	6.046***		3.353***	2.375***	2.938	2.321
		(6.95)	(5.75)	(4.79)	(3.32)		(2.91)	(1.95)	(1.36)	(1.05)
$\sigma_{i,t}(r_{1\ year})$				1.149	0.987				2.986**	2.775**
				(0.98)	(0.84)				(2.25)	(2.02)
$\sigma_{i,t}(r_{10\ years})$				-2.938	-2.199				-0.856	-0.837
				(-1.63)	(-1.24)				(-0.40)	(-0.39)
Resp. characteristics	No	No	No	No	Yes	No	No	No	No	Yes
N	1,144	1,144	1,144	1,144	1,117	751	751	751	751	736
R^2	0.018	0.041	0.046	0.048	0.106	0.014	0.011	0.019	0.025	0.033
p-value: $E_{i,t}(r_1)=E_{i,t}(r_{10})$			0.05**	0.01***	0.11			0.80	0.67	0.79
p-value: $\sigma_{i,t}(r_1)=\sigma_{i,t}(r_{10})$				0.10*	0.20				0.18	0.22
	Panel B: Perceived likelihoods and risky share									
$P(R_{m,1\ year}>0)$	6.596***		2.433***	2.468***	1.775**	3.112***		1.463*	1.382*	1.204
	(10.43)		(3.18)	(3.21)	(2.31)	(4.48)		(1.76)	(1.65)	(1.40)
$P(R_{m,10\ years}>0)$		8.613***	7.208***	7.061***	5.529***		3.786***	2.976***	3.262***	3.112***
		(13.78)	(9.43)	(8.93)	(6.93)		(5.46)	(3.58)	(3.78)	(3.35)
$P(R_{m,1\ year}<-0.2)$				-0.648	-0.417				0.413	0.586
				(-0.90)	(-0.57)				(0.53)	(0.72)
$P(R_{m,10\ years}<-0.2)$				-0.51	-0.296				0.877	0.994
				(-0.69)	(-0.40)				(1.08)	(1.20)
Resp. characteristics	No	No	No	No	Yes	No	No	No	No	Yes
N	3,231	3,231	3,231	3,231	3,147	2,043	2,043	2,043	2,043	1,998
R^2	0.033	0.056	0.059	0.059	0.103	0.010	0.014	0.016	0.017	0.028
p-value: $R_1>0=R_{10}>0$			0.01***	0.01***	0.01***			0.31	0.21	0.22
p-value: $R_1<-0.2=R_{10}<-0.2$				0.92	0.93				0.74	0.77

Tabel IA.VI
Stock Market Participation and Beliefs (excluding ambiguous respondents)

This table reports regressions of stock market participation on near- and long-term measures of expected return, standard deviation, and investor characteristics for the ALP sample after eliminating all respondents who report their 50/50 perceived probability indicates they are just unsure about the chances. Column 1 reports results for the regression of stock market participation on the inferred expected return in the next year. Column 2 reports results for regressions against expected return for the next decade. Column 3 reports results for regressions for one- and ten-year expected returns. Column 4 adds the standard deviation of the one- and ten-year expected return distributions. Column 5 adds respondent characteristics including gender, race, married, working, retired, age, education, and income. Expected returns and standard deviations in the next year or decade are standardized. Standard errors are clustered at the respondent level. The penultimate row reports *p*-values from a test of the hypothesis that the coefficient associated with the one-year expected return does not differ from the coefficient associated with the ten-year expected return. The bottom row reports *p*-values from an analogous test for the near- and long-term standard deviation. We report *t*-statistics in parentheses and significance at the one, five and ten percent levels are indicated by ***, **, and *, respectively.

Panel A: Expected returns, risk, and stock market participation					
	(1)	(2)	(3)	(4)	(5)
$E_{i,t}(r_{1\ year})$	0.059***		0.024***	0.024***	0.025***
	(9.25)		(4.02)	(4.04)	(4.78)
$E_{i,t}(r_{10\ years})$		0.118***	0.110***	0.127***	0.063***
		(18.52)	(17.73)	(16.16)	(8.24)
$\sigma_{i,t}(r_{1\ year})$				-0.014**	-0.007
				(-2.27)	(-1.34)
$\sigma_{i,t}(r_{10\ years})$				-0.025***	-0.009
				(-3.24)	(-1.30)
Wave fixed effects	Yes		Yes	Yes	Yes
Resp. characteristics	No		No	No	Yes
N	20,490	20,490	20,490	20,490	20,374
R^2	0.026	0.068	0.070	0.073	0.263
p-value: $E_{i,t}(r_1)=E_{i,t}(r_{10})$			0.01***	0.01***	0.01***
p-value: $\sigma_{i,t}(r_1)=\sigma_{i,t}(r_{10})$				0.36	0.90
Panel B: Perceived likelihoods and stock market participation					
$P(R_{m,1\ year}>0)$	0.156***		0.050***	0.053***	0.042***
	(24.20)		(6.89)	(7.31)	(6.31)
$P(R_{m,10\ years}>0)$		0.184***	0.147***	0.144***	0.084***
		(27.94)	(18.99)	(18.49)	(11.29)
$P(R_{m,1\ year}<-0.2)$				-0.016***	-0.009*
				(-3.02)	(-1.85)
$P(R_{m,10\ years}<-0.2)$				-0.023***	-0.012**
				(-4.52)	(-2.53)
Wave fixed effects	Yes	Yes	Yes	Yes	Yes
Resp. characteristics	No	No	No	No	Yes
N	34,483	34,483	34,483	34,483	34,250
R^2	0.117	0.153	0.158	0.163	0.302
p-value: $R_1>0=R_{10}>0$			0.01***	0.01***	0.01***
p-value: $R_1<-0.2=R_{10}<-0.2$				0.35	0.69

Table IA.VII
Fraction of Financial Assets in Equity and Beliefs (excluding ambiguous respondents)

We report regressions of the fraction in financial assets held in equity on near- and long-term beliefs after eliminating all respondents who report their 50/50 perceived probability responses indicate they are just unsure about the chances. Columns (1) to (5) report results for all ALP respondents, and columns (6) to (10) report comparable results for the subset of participants who participate in equity markets. Columns (1) and (6) report relations between participation and near-term beliefs. Columns (2) and (7) report results for long-term beliefs. Columns (3) and (8) report results for both near- and long-term beliefs. Columns (4), (5), (9), and (10) include measures of near- and long-term volatility, with or without respondent characteristics (gender, race, marital status, working, retired, age, years of education, and income). Expected returns and standard deviations in the next year or decade are standardized. Panel A reports results for expected returns and standard deviations, and Panel B reports results for comparable respondent probability beliefs. Standard errors are clustered at the respondent level. The penultimate row of each panel reports the *p*-values from a test of the hypothesis that the coefficient associated with the one-year expected return does not differ from the coefficient associated with the ten-year expected return. The bottom row reports *p*-values from an analogous test for near- and long-term standard deviation coefficients. The fraction of financial assets held in equities is limited to ALP's Effects of the Financial Crisis waves 23 (January 2011), 35 (January 2012), 47 (January 2013), 53 (January 2014), 57 (January 2015), and 61 (January 2016). We report *t*-statistics in parentheses and significance at the one, five and ten percent levels are indicated by ***, **, and *, respectively.

Table IA.VII (Continued)
Fraction of Financial Assets in Equity and Beliefs (excluding ambiguous respondents)

	Panel A: Expected returns and risky share									
	%Stock						%Stock			
	All respondents						Stock market participants			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$E_{i,t}(r_{1\ year})$	3.168***		1.052	0.917	1.414**	0.262		-0.739	-1.096	-0.779
	(4.41)		(1.45)	(1.23)	(2.01)	(0.37)		(-1.01)	(-1.44)	(-1.03)
$E_{i,t}(r_{10\ years})$		6.961***	6.621***	7.701***	5.247***		3.220***	3.435***	4.170***	3.657***
		(9.98)	(9.17)	(7.79)	(5.47)		(4.72)	(4.86)	(4.14)	(3.60)
$\sigma_{i,t}(r_{1\ year})$				-0.159	0.049				0.930	0.801
				(-0.22)	(0.07)				(1.24)	(1.17)
$\sigma_{i,t}(r_{10\ years})$				-1.588	-1.107				-1.183	-1.088
				(-1.61)	(-1.17)				(-1.19)	(-1.09)
Wave fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Resp. characteristics	No	No	No	No	Yes	No	No	No	No	Yes
N	3,119	3,119	3,119	3,119	3,113	2,224	2,224	2,224	2,224	2,219
R^2	0.052	0.087	0.088	0.089	0.176	0.004	0.018	0.019	0.02	0.037
p-value: $E_{i,t}(r_1)=E_{i,t}(r_{10})$			0.01***	0.01***	0.01***			0.01***	0.01***	0.01***
p-value: $\sigma_{i,t}(r_1)=\sigma_{i,t}(r_{10})$				0.32	0.40				0.15	0.19
	Panel B: Perceived likelihoods and risky share									
$P(R_{m,1\ year}>0)$	8.935***		3.172***	3.328***	2.953***	4.044***		1.545*	1.713**	1.740**
	(14.51)		(3.85)	(4.01)	(3.72)	(6.19)		(1.85)	(2.03)	(2.08)
$P(R_{m,10\ years}>0)$		10.314***	8.034***	7.770***	5.503***		4.665***	3.595***	3.398***	3.058***
		(16.59)	(9.56)	(9.14)	(6.48)		(7.04)	(4.20)	(3.89)	(3.44)
$P(R_{m,1\ year}<-0.2)$				-0.908	-0.410				1.239*	1.126*
				(-1.33)	(-0.61)				(1.74)	(1.59)
$P(R_{m,10\ years}<-0.2)$				-1.593**	-1.331**				-0.751	-0.637
				(-2.32)	(-2.01)				(-1.05)	(-0.90)
Wave fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Resp. characteristics	No	No	No	No	Yes	No	No	No	No	Yes
N	4,916	4,916	4,916	4,916	4,909	3,364	3,364	3,364	3,364	3,358
R^2	0.118	0.141	0.146	0.15	0.207	0.023	0.03	0.032	0.033	0.043
p-value: $R_1>0=R_{10}>0$			0.01***	0.01***	0.09*			0.19	0.28	0.40
p-value: $R_1<-0.2=R_{10}<-0.2$				0.58	0.44				0.12	0.16

Table IA.VIII
Trading and Expectations (excluding ambiguous respondents)

We report trading results in relation to changes in beliefs after eliminating all respondents who report their 50/50 perceived probability responses indicate they are just unsure about the chances. Panel A reports the time-series mean (over the 27 long-form waves) of the cross-sectional average fraction of respondents not changing their exposure to equities in their retirement accounts, in their direct accounts (for direct accounts not trading includes both those not trading and those buying and selling equally), and in any account. The next three columns report the fraction buying, selling, or cases where they trade but it is not known if they were net buyers or net sellers. The final four columns report, respectively, the time-series mean of the cross-sectional average fraction of respondents who report a change in at least three of their near-term expectations (chance market rises, rises more than 20%, and falls more than 20% over the next year), at least three of their long-term expectations, and those who change any of the six expectations. Panel B reports the fraction of investors who report not trading during the October 2008-March 2009 period (waves 1 and 2), the fraction reporting net buying over that period, the fraction reporting net selling over that period and the fraction where it is not clear if they were net buyers or net sellers (e.g., net buyer in wave 1 and net seller in wave 2). Panel C partitions respondents into two groups based on the volatility of their near-term expected returns (for those who have at least five observations of both near- and long-term expected returns) and reports the time-series mean of the cross-sectional averages of the same variables. Analogously, Panel D reports the values for respondents sorted by the volatility of their long-term expected returns.

	No trade	Net buy	Net sell	Ambiguous	ΔNear-term Expectations	ΔLong-term Expectations	ΔAny Expectations
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Post-March 2009 (n=18,813 respondent-wave observations)							
Retirement accounts	84.90%	9.89%	4.88%	0.56%	92.95%	91.35%	95.78%
Direct accounts	72.27%	17.29%	9.27%	1.98%	93.60%	91.58%	96.20%
Any	74.12%	16.27%	7.60%	2.00%	92.61%	91.00%	95.46%
Panel B: Crisis period October 2008-March 2009 (n=1,458 investors)							
Any	56.72%	28.80%	13.11%	1.38%	N/A	N/A	N/A
Panel C: Respondents sorted on volatility of near-term expectations							
Stable ($E(r_1)$)	75.22%	15.16%	7.86%	1.76%	93.33%	92.20%	96.19%
Volatile ($E(r_1)$)	71.89%	18.73%	7.35%	2.03%	96.45%	95.34%	98.12%
Panel D: Respondents sorted on volatility of long-term expectations							
Stable ($E(r_{10})$)	78.18%	13.55%	7.13%	1.14%	92.89%	92.01%	95.78%
Volatile ($E(r_{10})$)	70.68%	19.07%	7.90%	2.35%	96.13%	94.91%	98.02%

Table IA.IX
Trading and Beliefs (excluding ambiguous respondents)

We report multinomial logistic regression results to examine trading in relation to changes in near- and long-term beliefs after eliminating all respondents who report their 50/50 perceived probability responses indicate they are just unsure about the chances. Panel A considers trading in relation to expected returns, and Panel B looks at trading in relation to probability beliefs. Columns (1) and (2) reports marginal effects for how near-term expected returns at the beginning of the trading window, and how changes in the respondent's expected return over the trading window impact buying (and selling). Columns (3) and (4) examine trading in relation to long-term beliefs in an analogous manner. Finally, columns (5) and (6) consider trading in relation to both near- and long-term beliefs jointly. All results also include controls for respondent characteristics including gender, race, marital status, working, retired, age, years of education, and income.

	Near-term expectations		Long-term expectations		Near- and long-term expectations	
	(1)	(2)	(3)	(4)	(5)	(6)
	Buy	Sell	Buy	Sell	Buy	Sell
Panel A: Trading and perceived near-term and long-term expected returns						
A: $E(r_{1\ year})_{-1}$	0.003	-0.002			-0.005	-0.008*
B: $E_{i,t}(r_{10\ years})_{-1}$			0.022***	0.014***	0.023***	0.016***
C: $\Delta E(r_{1\ year})$	0.004	-0.003			0.000	-0.007*
D: $\Delta E_{i,t}(r_{10\ years})$			0.010**	0.006**	0.010**	0.007**
Resp. Charac.	Yes		Yes		Yes	
N	7,636		7,636		7,636	
P-value H_0: *A*=*B*					0.01***	0.01***
P-value H_0: *C*=*D*					0.10*	0.02**
Panel B: Trading and perceived near-term and long-term likelihoods						
E: $P(R_{1\ year}>0_{-1})$	0.027***	-0.001			0.007	-0.013**
F: $P(R_{10\ years}>0_{-1})$			0.033***	0.008***	0.028***	0.017***
G: $\Delta P(R_{1\ year}>0)$	0.015***	0.000			0.008	-0.005
H: $\Delta P(R_{10\ years}>0)$			0.010**	0.001	0.006	0.004
Resp. Charac.	Yes		Yes		Yes	
N	15,187		15,187		15,187	
P-value H_0: *E*=*F*					0.11	0.01***
P-value H_0: *G*=*H*					0.99	0.09**

Table IA.X
Extrapolation, Valuation, and Near- and Long-Term Perceived Stock Return Probabilities (excluding ambiguous respondents)

This table reports coefficients from panel regressions of perceived respondent probabilities for the distribution of stock returns (in percent) over the next year and decade on lag market returns (Panel A), market valuation metrics (Panel B), mutual fund flows, AAII sentiment, and venture capital flows (Panel C), and perceived near-term risk (Panel D). We eliminate respondents who report their 50/50 perceived probability responses indicate they are just unsure about the chances. Each coefficient represents the results of a univariate panel regression. Each regressor is demeaned by each respondent and then rescaled to unit variance to facilitate interpretation across variables. Sample sizes range from 89,718 to 89,959 observations in the first four columns and from 41,536 to 41,550 observations in the final two columns and the sample period is from November 2008 to January 2016. Standard errors are clustered at the respondent level and *t*-statistics are reported parenthetically. Statistical significance at the one, five and ten percent levels are indicated by ***, **, and *, respectively.

	$P(R_{m,1\ year}>0)$	$P(R_{m,1\ year}>0.2)$	$P(R_{m,1\ year}<-0.2)$	$P(R_{m,10\ years}>0)$	$P(R_{m,10\ years}>0.2)$	$P(R_{m,10\ years}<-0.2)$
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Perceived probability coefficient estimates on lagged market returns						
$R_{m,-1\ to\ -12}$	0.621***	-1.003***	-0.569***	-1.647***	-3.051***	0.192*
$R_{m,-1\ to\ -6}$	1.095***	0.165**	-0.703***	-0.442***	-2.376***	0.005
Panel B: Perceived probability coefficient estimates on market valuations						
$\ln(D/P)_{-1}$	-0.473***	1.268***	0.758***	2.095***	3.209***	-0.235**
$\ln(\text{net payout}/P)_{-1}$	-0.329***	0.624***	0.662***	1.314***	2.851***	0.110
Cay_{-1}	-0.354***	0.548***	0.803***	1.383***	2.762***	0.004
$-1*\ln(CAPE)_{-1}$	-0.624***	1.397***	0.767***	2.549***	4.013***	-0.523***
$-1*\text{Surplus cons.}_{-1}$	-0.410**	1.453***	0.524***	2.513***	3.572***	-0.670***
$-1*\text{Surplus cons.}_{-1}^{OPT}$	-0.744***	1.055***	0.854***	1.894***	3.316***	-0.210*
Panel C: Perceived probability coefficient estimates on flows and AAII sentiment						
Net exchanges	0.558***	-0.118*	-0.491***	-0.611***	-2.393***	0.156
Mutual fund flows	0.522***	0.301***	-0.435***	-0.083	-1.652***	0.036
AAII survey	0.321***	-0.572***	-0.578***	-0.898***	-1.786***	0.033
ΔNum. VC deals	0.659***	0.045	-0.494***	0.055	-1.008***	-0.129*
%ΔVC dollar value	0.602***	0.108*	-0.559***	-0.269***	-1.136***	-0.081
Panel D: Perceived probability coefficient estimates on risk						
Indiv. crash $risk_{+3\ to\ -3}$	-0.790***	-0.172**	0.803***	0.980***	2.304***	-0.159
Inst. crash $risk_{+3\ to\ -3}$	-0.773***	0.484***	0.818***	1.394***	3.245***	-0.096
VIX_{-1}	-1.064***	1.061***	0.802***	1.557***	3.617***	-0.144