Effects of monetary policy on household expectations: The role of investing households*

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October 28, 2026

Abstract

Holding stock investments gives households a reason to monitor monetary announcements, because these announcements move stock prices. This paper examines how stock-investing households adjust their inflation expectations in response to monetary policy shocks. Using the reinterview panel of the Michigan Survey of Consumers, I find that investors raise their one-year-ahead inflation expectations after an unexpected cut in the federal funds rate, whereas households without stock investments do not. The difference does not depend on the size of the portfolio, survives conditioning on homeownership, income and education, and is about three times larger during recessions. Investors report hearing news about interest rates about three times as often as non-investors. Consistent with these revisions, investor households in the Consumer Expenditure Survey raise their nondurable spending relative to non-investors after an expansionary shock. The findings indicate that stock ownership motivates households to adjust their expectations and consumption in response to conventional monetary policy, in line with its intended effects.

Keywords: inflation expectations, stock market participation, monetary policy, household attention
JEL Classification: D83, D84, E31, E52

*First draft: December 7, 2024. I am grateful to Vladislav Abramov, Hie Joo Ahn, Pedro Bento, Carlos Delgado, Li Gan, Jorge Hirs Garzon, Dennis Jansen, Yoon Jo, Nawon Kang, Yeon Jik Lee, Joonseok Oh, Geumbi Park, Andres Pinchao Rosero, Tatevik Sekhposyan, Yuzhe Zhang, and Sarah Zubairy, as well as seminar participants at the Midwest Econometrics Group 2024, the 2025 SNDE Symposium, and the Texas A&M Macro Mini-Conference 2025 for helpful suggestions and comments. All errors are my own.

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1 Introduction

Household expectations play a central role in the transmission of monetary policy. Changes in inflation expectations can alter the perceived real interest rate, thereby influencing households' consumption and saving decisions (Weber et al., 2022). Consequently, there is an extensive literature examining how inflation expectations, or expectations in general, are affected by policy changes. However, findings are inconclusive. Several empirical studies find that Federal Reserve announcements do not significantly affect household inflation expectations (Binder, 2017; Coibion, Gorodnichenko, et al., 2023; Coibion et al., 2020; Lamla & Vinogradov, 2019; Lewis et al., 2019). In contrast, recent studies have uncovered heterogeneity in expectation formation across households with different characteristics in response to monetary shocks (Ahn & Xie, 2024; Ahn et al., 2024; D'Acunto, Hoang, et al., 2023; Das et al., 2020; Jeong et al., 2025). These studies raise an important question: are some households more attentive to monetary policy? Addressing this question is crucial for validating the expectation-driven propagation of monetary policy shocks, which stands at the foundation of modern macroeconomic models.

In this study, I propose that households participating in the stock market are more attentive to monetary policy. I hypothesize that stock ownership increases households' incentives to seek information about monetary policy because of its effect on the value of their stock holdings. I use individual-level data from the University of Michigan Survey of Consumers (henceforth MSC) to identify households that hold stock market investments (investor households) and those that do not (non-investor households), and I track how investors' inflation expectations adjust relative to those of non-investors over the six-month interval between interviews, in relation to policy surprises accumulated over that interval. The MSC re-interviews about 40 percent of respondents six months after their first interview, which allows me to measure revisions at the household level rather than differences in levels across households.

The MSC data support this hypothesis. In response to an unexpected cut in the federal funds rate, investor households revise their one-year-ahead inflation expectations upward, while non-investor households do not. The difference between the two groups is about 0.2 percentage points per unit of the Swanson (2021) federal funds rate factor, it is statistically different from zero when standard

errors are clustered by survey month, and it is unchanged when survey-month fixed effects absorb everything that varies only over time. Three additional findings help characterize this response. First, the response does not scale with the size of the portfolio: households in the bottom quintile of reported stock holdings have larger point estimates than those in the top quintile, and households that enter or exit the stock market between the two interviews have responses that are not statistically distinguishable from those of households reporting stocks at both interviews. Second, the response is specific to stockholding. Conditioning on homeownership, which Ahn et al. (2024) identify as a separate source of attention to interest rates, the stockholding gap remains after accounting for homeownership, while the estimated homeowner gap is small and statistically indistinguishable from zero. Third, the response is larger for short-run inflation expectations: the estimated gap at the five-to-ten-year horizon is approximately half the one-year gap. However, while inflation expectations adjust, I find no detectable response in the probability that investors revise their unemployment expectations toward lower unemployment. This suggests that the inflation response need not reflect a general improvement in the economic outlook.

The response is also state dependent in a way that is consistent with attention being a choice. The investor gap in recessions is about three times its size in normal times, and the difference between the two states is statistically significant. Investors are also far more likely than non-investors to report having heard news about interest rates or credit conditions, and both groups' reports rise in the month after a large federal funds rate surprise. These patterns are consistent with stockholders monitoring monetary policy because it affects the value of their portfolios, in the spirit of the risk-hedging channel proposed by Ahn and Xie (2024) and the attention-dependent transmission of policy news in Jeong et al. (2025).

A related question is whether these expectation revisions are associated with differences in consumption and saving. In theory, inflation expectations can influence consumption through several channels. Higher subjective inflation expectations reduce the perceived real interest rate through the Fisher equation, thereby depressing the incentive to save and increasing current consumption, as predicted by the consumer Euler equation. Higher expected inflation also acts as a tax on nominal assets, with negative wealth and income effects that could offset the first channel. The empirical evidence is mixed. Burke and Ozdagli (2023) find a limited association between expectation changes

and spending in panel data, whereas Coibion et al. (2022), Coibion, Georgarakos, Gorodnichenko, and van Rooij (2023) and D'Acunto, Hoang, et al. (2023) find that exogenous changes in inflation expectations move spending in the direction the Euler equation implies.[1]

I extend my findings on expectations by asking whether the same heterogeneity appears in expenditures. Using the Consumer Expenditure Surveys (henceforth CEX), I find that households with financial-asset income raise their nondurable spending relative to households without such income after an unanticipated expansionary shock, after controlling for income and demographics to remove the main general-equilibrium effects. The relative response builds over roughly two years. The response of durable spending is noisier and only intermittently different from zero. I interpret these results as consistent with investor households adjusting their expectations and, in turn, their consumption in accordance with the Euler equation. The CEX evidence is suggestive rather than conclusive: the CEX has no expectations questions and its financial-income indicator differs from the MSC stock-ownership measure. I return to these limitations in Section 4.

Related Literature This paper contributes to several streams of literature. First, it adds to the literature on how economic agents form expectations. Several studies within this area focus on the sources of information households use when forming their expectations (Armantier et al., 2016; Cavallo et al., 2017; Coibion & Gorodnichenko, 2015; Coibion et al., 2022; D'Acunto et al., 2021; Dräger, 2015) or on whether specific events or experiences influence expectations (D'Acunto et al., 2022; Weber et al., 2023). Others examine the relevance of household characteristics to expectation formation (Ahn et al., 2024; Bruine de Bruin et al., 2010; D'Acunto, Hoang, et al., 2023). This study is most closely related to Ahn and Xie (2024), who show that stockholders in the MSC produce more accurate inflation forecasts and backcasts and disagree less, and who attribute the difference to stock-driven attention. Two recent papers are also close. Jeong et al. (2025) use the MSC panel to show that revisions of inflation expectations after monetary policy surprises are concentrated among attentive households, and that the pass-through strengthens in recessions and uncertain times; they measure attention from the accuracy of households' reading of business conditions. Morelli (2021) and Melcangi and Sterk (2025) study stock market participation as a source of heterogeneity in

[1] See D'Acunto, Malmendier, and Weber (2023) for further references.

the consumption and investment channels of monetary policy. Relative to these papers, I examine stockholding as a potential incentive for attention, document that the response does not increase with portfolio size and remains present after accounting for homeownership, show that it is specific to prices rather than to the outlook in general, and connect it to spending in a second data set.[2]

Second, this research contributes to the literature on the relationship between household expectations and monetary policy.[3] Studies of Federal Reserve communication during the zero lower bound period find little evidence that such communication reached households (Coibion, Georgarakos, Gorodnichenko, & Weber, 2023; D'Acunto et al., 2022). Consistent with this, I find no clear investor–non-investor difference in the response to forward guidance shocks. This paper emphasizes heterogeneity by stock ownership in households' responses to conventional policy surprises: unexpected changes in the federal funds rate move the inflation expectations of a well-defined and large group of households, which suggests that conventional monetary policy can also work through household expectations.

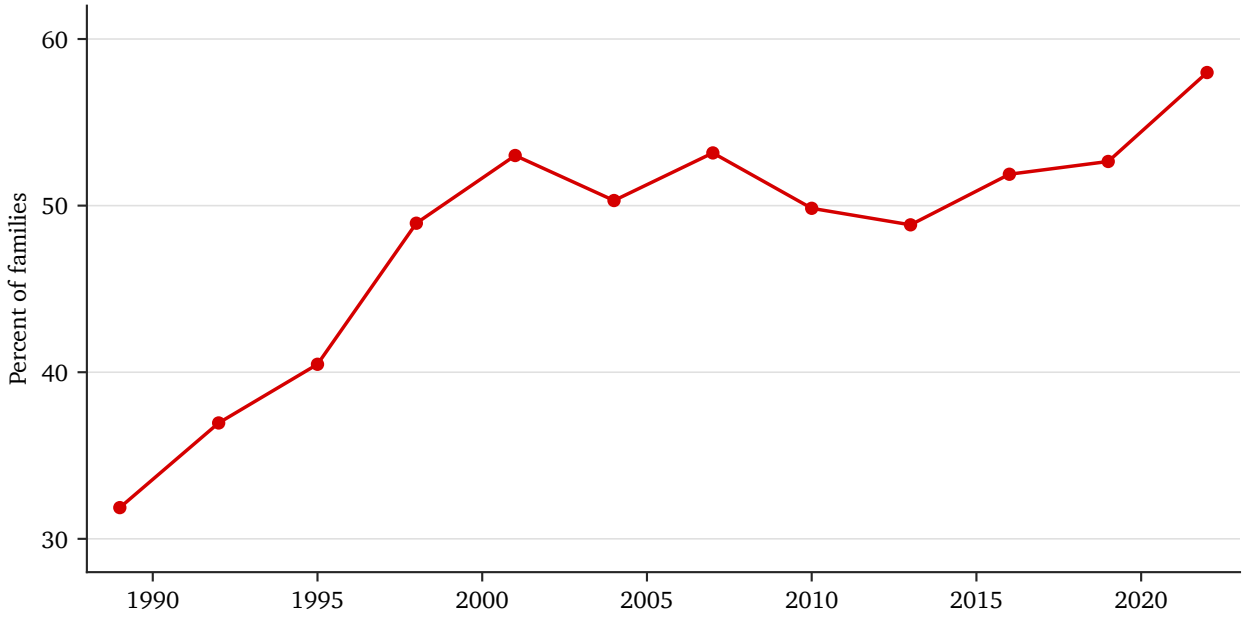
In terms of policy implications, the role of investing households in the transmission of monetary policy may be substantial given their growing share of the population (Figure 1). According to the Survey of Consumer Finances, the proportion of U.S. families with stock holdings, directly or through retirement accounts and funds, rose from 32 percent in 1989 to 58 percent in 2022. The share holding stocks directly rose by about 6 percentage points over 2019–2022 alone. In the context of this study, a growing share of investing households means a growing share of the population that is attentive to monetary announcements. A larger group of households adjusting their expectations and spending in the direction intended by the monetary authority would make conventional policy more effective at stabilizing the economy.

The remainder of the paper is structured as follows. Section 2 introduces the data. Section 3 presents the evidence on inflation expectations and Section 4 the evidence on expenditures. Section 5 discusses the mechanism and provides supplemental analysis of when and why investors pay attention.

[2] A growing literature documents who participates in the stock market and why; see Alan (2006), Brown et al. (2008), Bucher-Koenen et al. (2025), Grinblatt et al. (2011), Guiso and Jappelli (2005), and Hong et al. (2004). Several studies link participation to financial literacy (Almenberg & Dreber, 2015; Kadoya et al., 2017; M. van Rooij et al., 2011; M. C. J. van Rooij et al., 2012), which is one reason to expect investors to process policy news differently.

[3] See Coibion et al. (2020), D'Acunto, Malmendier, and Weber (2023) and Coibion and Gorodnichenko (2025) for reviews.

Figure 1: Share of U.S. families with stock holdings, 1989–2022



Notes: This figure plots the share of U.S. families with stock holdings in each Survey of Consumer Finances wave. Stock holdings are the sum of directly held stocks and indirect holdings through retirement accounts, pooled investment funds and other managed assets. All families, survey years 1989–2022 (31.9 percent in 1989, 52.6 percent in 2019, 58.0 percent in 2022). *Source*: Survey of Consumer Finances, Federal Reserve Board.

Section 6 concludes.

2 Data

This section describes the survey data and the monetary policy shocks used in this paper. The main analysis uses household expectations from the Michigan Survey of Consumers (MSC). To investigate the link between expectations and consumption, I incorporate expenditure data from the Consumer Expenditure Surveys (CEX). For monetary policy shocks, I adopt the measures of Swanson (2021).

2.1 Household expectations

The MSC is a monthly survey of U.S. consumer attitudes and expectations. During the sample period, the MSC was conducted monthly by telephone, collecting responses from over 500 households

representative of the U.S. population. The survey includes demographic information such as respondents' education level, age, and household income, allowing researchers to explore differences in economic outlook based on respondent characteristics. In 1990, the MSC began collecting data on respondents' stock market investments, though this was intermittently discontinued until it was fully integrated into the survey in 1998.[4] A key feature utilized in this study is the re-interview of about 40 percent of households six months after their initial interview.

Given the availability of the investment-status question and of the shock series, the sample consists of re-interview pairs whose second interview falls between March 1999 and July 2019, with both interviews conducted by telephone and the investment question answered in both waves. The one-year inflation regression sample contains 38,472 pairs, of which 26,809 (70 percent) report stock investments at the re-interview.[5] Investor households report lower inflation expectations on average (3.0 versus 3.7 percent one year ahead) and exhibit less dispersion than non-investors. They are also more highly educated, more likely to be married and to own a home, and disproportionately represented in the higher income quartiles: 40 percent of investors are in the top income quartile against 9 percent of non-investors. These differences are the reason every regression below conditions on demographics and income, and why Appendix B.3 checks directly whether the investor response is a proxy for homeownership. Detailed summary statistics are provided in Appendix A, Table A.1.

Within the MSC questionnaire, I focus on the questions that elicit respondents' numerical expectations of inflation over the next 12 months and over the next 5 to 10 years.[6] Because some households are contacted twice with a six-month interval, I can calculate six-month revisions of inflation expectations, defined as the answer at the re-interview minus the answer at the first interview. I also use the question on expected unemployment over the coming 12 months, to verify whether changes

[4] Specific questionnaire entries regarding stock market investments in the MSC are given as follows: *Do you (or any member of your family living there) have any investments in the stock market, including any publicly traded stock that is directly owned, stocks in mutual funds, stocks in any of your retirement accounts, including 401(K)s, IRAs, or Keogh accounts? Considering all of your (family's) investments in the stock market, overall about how much would your investments be worth today?*

[5] The Michigan investor share follows the trend in the SCF share of families holding stocks, apart from a level shift around May 2003, when the questionnaire was revised (Appendix Figure B.1). Results are unchanged when the sample starts after the revision (Appendix Table B.1).

[6] Specific questionnaire entries regarding inflation expectations are given as follows: *During the next 12 months, do you think that prices in general will go up, go down, or stay where they are now? What about the outlook for prices over the next 5 to 10 years? Do you think that prices in general will go up, go down, or stay where they are now?* Each is followed by a request for a numerical estimate.

in inflation expectations reflect a broader change in the economic outlook, and the open-ended question on news heard about business conditions, to measure exposure to interest-rate news.

2.2 Household expenditures

The CEX is one of the most comprehensive data sources on household consumption in the U.S. and is used to construct the weights of the Consumer Price Index (CPI). The CEX consists of two separate surveys: the Interview Survey and the Diary Survey. In this study, I use data exclusively from the Interview Survey, as the Diary Survey primarily covers expenditures on small, regularly purchased items. In contrast, the Interview Survey provides information on up to 95 percent of typical household consumption expenditures. Since 1980, the CEX has operated as a monthly rotating panel, collecting responses from 1,500 to 2,500 households representative of the U.S. population. Each household is interviewed once per quarter for a maximum of five consecutive quarters. Expenditure information is reported quarterly, while income information is recorded only in the first and last quarters. During each interview, households report expenditures for the three months preceding the interview month. The final sample used in this analysis covers July 1991 to June 2019, the period for which the monetary policy shocks are available.

To explore heterogeneous expenditure responses by stock investment status, I categorize households by their reported financial income, defined as income from dividends, royalties, estates, or trusts. Households are classified as investors if they report non-zero financial income in any of their interviews; households that do not answer the financial-income question are excluded. This indicator is an imperfect proxy for stock ownership: it may omit households holding stocks solely through tax-deferred accounts and may include households receiving royalties or estate and trust income without holding stocks. The CEX investors are therefore best thought of as a subset of the MSC investors, concentrated among direct stockholders, and the comparison across the two data sets should be read with this in mind. Because changes in expenditures after a monetary policy shock combine several channels, I construct a measure that filters out the main general-equilibrium effects by taking the residuals of a regression of expenditures on demographic characteristics and household income, all of which are available in the CEX. I discuss this step in Section 4.

2.3 Monetary policy shocks

I use the monetary policy shock measures developed by Swanson (2021). Extending the methods of Gürkaynak et al. (2005), Swanson (2021) identifies unanticipated changes in the federal funds rate, in forward guidance, and in large-scale asset purchases from the response of asset prices in a narrow window around FOMC announcements from July 1991 to June 2019. Among the three factors, the federal funds rate factor has the largest and most consistent effect on stock prices over the sample. I therefore focus on how investor households respond to unanticipated changes in the federal funds rate, and the results concern the effects of conventional monetary policy on household expectations and expenditures, which the literature has investigated less than communication at the zero lower bound. In Section 3.3, I also examine forward guidance and asset purchase shocks.

In the MSC analysis, the shock that a household faces is the sum of the factors at the scheduled FOMC meetings in the six months between its two interviews (months $t-6$ to $t-1$ for a re-interview in month t). I multiply the summed federal funds rate and forward guidance factors by -1, so that a positive shock is an easing, and keep the asset purchase factor in its published sign, so that a positive value is a purchase that lowers long-term yields. In the CEX analysis, which is at the monthly frequency, I use the monthly sum of the federal funds rate factor over all FOMC announcements, signed in the same way.

3 Effects of monetary policy shocks on household expectations

To estimate how households revise their inflation expectations in response to monetary policy shocks, I estimate

$$\begin{aligned}\mathbb{E}_{i,t}\pi^h - \mathbb{E}_{i,t-6}\pi^h = \alpha + \beta_0\, invest_{i,t} + \beta_1\, invest_{i,t} \times \left(-\sum_{j=t-6}^{t-1} mps_j\right) \\ + \beta_2\,(1 - invest_{i,t}) \times \left(-\sum_{j=t-6}^{t-1} mps_j\right) + \delta X_{i,t} + \gamma Z_t + \epsilon_{i,t},\end{aligned} \tag{1}$$

where the left-hand side is respondent i's revision of h-year-ahead inflation expectations ($h = 1$ or 5–10) between the first interview in month $t-6$ and the re-interview in month t; $invest_{i,t}$ is a dummy equal to one if the respondent reports stock investments at the re-interview; $\sum_{j=t-6}^{t-1} mps_j$ is the cumulative federal funds rate shock at scheduled FOMC meetings between the two interviews; $X_{i,t}$ contains sex, education, marital status, income quartile, age group, children, region and homeownership; and Z_t contains the six-month change in the unemployment rate, the six-month change in the retail gasoline price, and year fixed effects. Survey weights are applied, and standard errors are clustered by survey month, since the shock varies only across re-interview months.

I change the sign of the shock so that β_1 and β_2 are read as revisions associated with an *expansionary* shock. Because my interest lies in the difference between the two slopes, the specification omits the level effect of the shock and interacts it with both groups. Each table also reports the difference $\beta_1 - \beta_2$ from a second regression in which survey-month fixed effects replace year effects, the unemployment change and the gasoline change. The fixed effects absorb the shock and every other aggregate variable, so this row is the cleanest estimate of whether investors respond more than non-investors to the same policy surprise; the specifications with year effects are reported because they also show each group's slope.

The model follows Coibion and Gorodnichenko (2015) and Ahn et al. (2024), with three differences. Coibion and Gorodnichenko (2015) find that oil prices are a dominant driver of household inflation expectations; I therefore include the change in gasoline prices over the interview window in every regression, and in Appendix B.4 I replace it with the household's own revision of expected gasoline prices, which is available for a shorter sample, with the same results. Ahn et al. (2024) compare homeowners and renters and propose a mortgage refinancing channel through which homeowners respond to interest rates; I condition on homeownership here and test in Appendix B.3 whether it, rather than stockholding, carries the response. Finally, I use the cumulative sum of shocks between the two interviews rather than the contemporaneous shock, which matches the timing of the revision.

3.1 Baseline results

The first column of Table 1 presents the estimates for revisions of inflation expectations over the next 12 months. There is no average difference in revisions between investor and non-investor households: the investor dummy is 0.11 percentage points and not statistically different from zero. The coefficient on the investor interaction, however, is 0.21 and significant at the 1 percent level, whereas the non-investor coefficient is −0.01 and indistinguishable from zero. An F-test rejects equality of the two slopes ($F = 10.6$), and the survey-month fixed effects estimate of the gap, 0.20 with a standard error of 0.07, is essentially the same number. In words, a cumulative easing surprise of one unit of the Swanson factor leads investors to raise their one-year inflation expectations by 0.2 percentage points relative to non-investors.[7,8] This indicates that investors incorporate past federal funds rate surprises when forecasting inflation a year ahead, whereas households without stock holdings do not. Given Swanson's (2021) finding that federal funds rate surprises have large and consistent effects on stock prices, it is plausible that investors are incentivized to update their outlook in response to shocks that affect their financial wealth. The positive sign means that investors expect higher inflation after an unexpected cut, which is the direction intended by the policy.

The second column reports revisions of expectations over the next 5 to 10 years. Neither group's slope is significant on its own, but the survey-month fixed effects gap is 0.10 with a standard error of 0.05, about half the one-year gap. Long-run expectations therefore move in the same direction but by less, which is consistent with the evidence that U.S. households' long-run inflation expectations have been relatively anchored since the late 1990s (Carvalho et al., 2023; Dräger & Lamla, 2013; Nautz et al., 2019). I treat the one-year result as the headline and the long-run result as supporting.

Table 1: Revisions of inflation expectations after a federal funds rate shock, by investor status

	1-year-ahead	5-10-year-ahead
Investor	0.110	-0.0387
	(0.0687)	(0.0543)
Investor×(-FFR)	0.208***	0.0418
	(0.0621)	(0.0297)
Non-investor×(-FFR)	-0.0102	-0.0539
	(0.0704)	(0.0477)
Constant	-0.416***	-0.133
	(0.140)	(0.144)
Controls	Yes	Yes
Observations	38,472	37,776
Adjusted R^2	0.034	0.003
F-test ($\beta_1 = \beta_2$)	10.56***	3.77*
Gap	0.204***	0.0982**
	(0.0662)	(0.0493)

Notes: This table reports weighted least squares estimates of equation (1). The sample consists of Michigan Survey of Consumers re-interview pairs whose second interview falls in March 1999–July 2019, with both interviews conducted by telephone and the stock-investment question answered in both waves. The dependent variable is the revision of the respondent's numerical inflation expectation between the two interviews (re-interview minus first interview), in percentage points, for the next 12 months (column 1) and the next 5 to 10 years (column 2). *Investor* equals one if the respondent reports stock investments at the re-interview. *−FFR* is the sum of the Swanson (2021) federal funds rate factors at scheduled FOMC meetings in the six months before the re-interview, multiplied by −1, so that a positive value is an unexpected easing; the two slope rows report β_1 (investors) and β_2 (non-investors). Controls are sex, education, marital status, income quartile, age group, presence of children, region, homeownership, the six-month change in the unemployment rate, the six-month change in the EIA U.S. regular retail gasoline price, and year fixed effects. *F-test* is the Wald statistic for $\beta_1 = \beta_2$. *Gap* is the investor-minus-non-investor slope from an otherwise identical regression in which survey-month fixed effects replace the year effects, the unemployment change and the gasoline-price change, all of which they absorb. Observations are weighted by the MSC household weight. Standard errors clustered by survey month are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

3.2 Portfolio size and changes in stockholding status

If investors respond because policy moves their wealth, one might expect households with larger portfolios to respond more. They do not. Appendix Table A.2 splits investors into quintiles of their reported stock holdings, formed within each survey year.[9] All five quintile coefficients are positive,

[7] Swanson (2021) normalizes the federal funds rate factor to have a unit standard deviation over July 1991–December 2008, the period of conventional policy before the zero lower bound. A one-unit shock raises the current federal funds rate by about 8.4 basis points, so a standard 25-basis-point surprise in the target corresponds to about three units.

[8] The investor coefficient remains positive under 1st–99th percentile trimming and Huber estimation, although the estimated differential response falls. The non-investor coefficient remains statistically insignificant (Appendix B.2, Table B.2).

[9] In 2018 the median reported value in the five groups was about $10,000, $40,000, $110,000, $300,000 and $1,000,000.

Table 2: Revisions of inflation expectations by stock market entry and exit

	1-year-ahead	5-10-year-ahead
Always investor×(-FFR)	0.194***	0.0488*
	(0.0660)	(0.0285)
Started investing×(-FFR)	0.319**	-0.0165
	(0.127)	(0.0962)
Stopped investing×(-FFR)	0.304**	-0.0856
	(0.144)	(0.0990)
Never investor×(-FFR)	-0.0763	-0.0471
	(0.0744)	(0.0562)
Controls	Yes	Yes
Observations	38,472	37,776
Adjusted R^2	0.034	0.003
F-test (all four slopes equal)	6.54***	1.77
Gap vs never: always	0.255***	0.0978*
	(0.0771)	(0.0585)
Gap vs never: started	0.390***	0.0409
	(0.121)	(0.110)
Gap vs never: stopped	0.384**	-0.0388
	(0.151)	(0.119)
F-test, gaps: started = always	1.16	0.33

Notes: This table re-estimates equation (1) with the investor dummy replaced by four mutually exclusive status dummies, each interacted with −FFR: *Always* = reports stock investments at both interviews; *Started* = at the re-interview only; *Stopped* = at the first interview only; *Never* = at neither. The status dummies themselves are included. *F-test (all four slopes equal)* is the Wald statistic for equality of the four interaction coefficients. *Gap vs never* rows report each group's slope minus the never-investor slope from the specification with survey-month fixed effects; the last row tests whether the gaps for started and always investors are equal. Sample, dependent variables, controls, weights and standard errors are as in Table 1.

with significance ranging from the 1 to the 10 percent level. Their point estimates decline with portfolio size, providing no evidence of a stronger response among households with larger portfolios.

Table 2 asks a related question using the panel structure. I replace the investor dummy with four status dummies: households that report stocks at both interviews (always), only at the re-interview (started), only at the first interview (stopped), and at neither (never). Households that always hold stocks revise by 0.19; households that started or stopped investing between the interviews revise by 0.32 and 0.30; never-investors revise by −0.08. The three investing groups are each different from never-investors at conventional levels, and the gap for starters is not statistically different from the gap for always-investors ($F = 1.16$). Two things follow. A positive response is also observed among households reporting stocks at only one of the two interviews. These households may have paid

particular attention around a change in stockholding status; their estimated responses are at least as large in point estimates as those of households reporting stocks at both interviews.

Together, the quintile and switcher results point away from an explanation in which the size of the wealth effect governs the revision and toward one in which stockholding changes what the household pays attention to. Section 5 presents additional evidence on this interpretation.

3.3 Did the behavior of household expectations change before, during and after the zero lower bound?

The sample includes the zero lower bound (ZLB) period, during which the federal funds rate was not the operative instrument. This raises two questions: whether the result in Table 1 holds outside the ZLB, and whether the unconventional tools used at the ZLB also moved household expectations. In Table 3, I divide the sample by re-interview month into a pre-ZLB period ending June 2009, a ZLB period from July 2009 to November 2015, and a post-ZLB period from December 2015 to the end of the sample.[10] To examine the unconventional tools, I add forward guidance (FG) and large-scale asset purchase (LSAP) shocks from Swanson (2021), each summed over the interview window and interacted with investor status in the same way as the federal funds rate shock. Table A.3 in Appendix A reports the same regressions for 5-to-10-year expectations.

The results are threefold. First, the full-sample federal funds rate result is most precisely estimated in the pre-ZLB subsample. In the pre-ZLB period the investor slope is 0.19, the non-investor slope is −0.02, and the gap is 0.21 with a standard error of 0.07, the same as in the full sample. During the ZLB period neither group responds to the federal funds rate factor in the direction of the full-sample estimate, which is expected since variation in the federal funds rate factor is limited during the ZLB period, reducing the precision of the estimated responses. In the post-ZLB period, investors' slopes are again positive and significant (0.31 with the federal funds rate alone, 0.49 with all three shocks), but with only 7,500 pairs and 44 re-interview months the gaps, 0.33 and 0.32, are not statistically different from zero. The post-ZLB point estimates are consistent with a renewed

[10] Swanson (2021), among others, dates the ZLB from January 2009 to November 2015. I shift the start by six months because the regressor is the sum of shocks over the preceding six months.

Table 3: Revisions of one-year inflation expectations before, during and after the zero lower bound

	Full sample	Pre-ZLB		ZLB		Post-ZLB	
Investor×(-FFR)	0.163***	0.190***	0.176***	-0.164	-0.705**	0.306*	0.493***
	(0.0607)	(0.0631)	(0.0610)	(0.250)	(0.297)	(0.169)	(0.142)
Non-investor×(-FFR)	-0.0167	-0.0186	-0.00828	0.0983	-0.318	-0.0345	0.157
	(0.0736)	(0.0734)	(0.0772)	(0.393)	(0.407)	(0.289)	(0.278)
Investor×(-FG)	-0.00384		0.0543		-0.214***		0.122*
	(0.0297)		(0.0374)		(0.0743)		(0.0703)
Non-investor×(-FG)	-0.0564*		0.00863		-0.251**		0.0682
	(0.0326)		(0.0414)		(0.1000)		(0.0874)
Investor×LSAP	0.148***		0.159*		0.125**		-0.0296
	(0.0472)		(0.0849)		(0.0517)		(0.181)
Non-investor×LSAP	0.0360		0.100		-0.0457		-0.113
	(0.0616)		(0.0857)		(0.0930)		(0.240)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	38,472	19,009	19,009	11,931	11,931	7,532	7,532
Adjusted R^2	0.035	0.053	0.053	0.014	0.016	0.015	0.015
F-test, FFR slopes equal	8.65***	9.71***	8.23***	0.35	0.88	1.98	1.64
Gap: FFR	0.167***	0.208***	0.182***	-0.291	-0.424	0.334	0.324
	(0.0610)	(0.0686)	(0.0656)	(0.441)	(0.413)	(0.243)	(0.266)

Notes: This table estimates equation (1) for one-year inflation expectations on the full sample and on three subperiods defined by the re-interview month: pre-ZLB (March 1999–June 2009), ZLB (July 2009–November 2015) and post-ZLB (December 2015–July 2019). Within each subperiod, the first column includes only the federal funds rate shock and the second adds the forward guidance (FG) and large-scale asset purchase (LSAP) factors of Swanson (2021), each summed over the six months before the re-interview and interacted with investor and non-investor status. −FFR and −FG are multiplied by −1, so a positive value is an easing; LSAP is in its published sign, so a positive value is a purchase that lowers long-term yields. *F-test, FFR slopes equal* tests equality of the two federal funds rate slopes; *Gap: FFR* is the investor-minus-non-investor federal funds rate slope with survey-month fixed effects. Controls, weights and standard errors are as in Table 1.

differential response, but the gap is too imprecisely estimated to establish this.

Second, the forward-guidance coefficients are similar across groups in the ZLB subsample. In the full sample both forward guidance slopes are close to zero. Within the ZLB period both groups' expectations fall after an easing in forward guidance (−0.21 for investors, −0.25 for non-investors), and the gap is zero. The negative coefficients differ from the positive inflation response predicted by a conventional expansionary policy channel, and it resembles the finding of Campbell et al. (2012) that forward guidance carries a "Delphic" signal about the state of the economy as well as an "Odyssean" commitment: households who hear that rates will stay low for longer may infer that the Fed expects weak demand and low inflation. Whatever the interpretation, the response is common to both groups, so it says nothing about stock-driven attention. These results are in line with Lewis et al. (2019), who find using daily Gallup data that forward guidance news does not move household

expectations, and with D'Acunto et al. (2022) and Coibion, Georgarakos, Gorodnichenko, and Weber (2023).

Third, the LSAP point estimates are larger for investors than for non-investors. In the full sample the investor slope on LSAP is 0.15 and significant at the 1 percent level while the non-investor slope is 0.04, and within the ZLB period the corresponding estimates are 0.13 and −0.05. Asset purchases moved long-term yields and, through them, equity prices, so a response concentrated among stockholders is what the attention hypothesis would predict.[11] For 5-to-10-year expectations (Table A.3) the only gap that is marginally significant is the pre-ZLB federal funds rate gap (0.09), and none of the unconventional-policy slopes is distinguishable from zero.

3.4 Summary

Households that report holding stock investments adjust their short-run inflation expectations in response to federal funds rate surprises, and households without investments do not. The difference is about 0.2 percentage points per unit shock, does not depend on the size of the portfolio or on the number of waves in which the household holds stocks, survives the removal of outliers, and is present before the ZLB and, in point estimates, after it. Forward guidance does not produce a difference between the groups; asset purchases do. The next section asks whether the same households spend differently.

4 Effects of monetary policy shocks on household expenditures

In this section, I examine whether households with different investment status also exhibit heterogeneous expenditure responses to monetary policy shocks. Using monthly CEX data, I construct series of mean expenditures for investor and non-investor households, defined by whether they report non-zero financial income from dividends, royalties, estates, or trusI divide expenditures into

[11] Swanson (2021) reports that the LSAP factor has a smaller and less consistent effect on the S&P 500 than the federal funds rate factor. A direct test of whether the investor gap scales with the stock-price impact of each factor would need the factor-by-factor stock responses, which I leave for future work.

nondurables, on a strict definition, and durable goods, both built from the summary expenditure variables of the Interview Survey and defined in Appendix C.[12]

To isolate the part of the expenditure response that works through expectations, I remove the observable channels that operate through income and household composition. Following Blundell et al. (2008) and Arellano et al. (2017), I construct each household's expenditure series as the residual from a pooled regression of log real per-capita expenditures log real nondurable expenditures per adult equivalent (for durables, which are zero in about 13 percent of interviews, the inverse hyperbolic sine of real spending per adult equivalent) on age, age squared, sex, race, education, log income, the number of children under 18 and of adults over 64, region, and month fixed effects. Filtering out the effect of income changes removes the wealth and income effects that a monetary expansion generates in general equilibrium, which leaves differences across the two groups more closely tied to differences in their expectations. The month fixed effects have a consequence that the reader should keep in mind: they absorb the aggregate expenditure response, so the exercise identifies the *difference* between investors' and non-investors' responses rather than each group's response on its own. The by-group lines in Figure 2 are relative to the month effect, and the panels that carry the result are the differences.

Since the MSC does not record expenditures and the CEX does not record expectations, I cannot link the investor households in the two surveys at the individual level, and the CEX investor flag identifies a narrower group than the MSC question (Section 2.2). The interpretation of this section therefore rests on the assumption that households with financial-asset income in the CEX behave like the stockholders in the MSC, or at least like the subset of them that holds stocks directly.

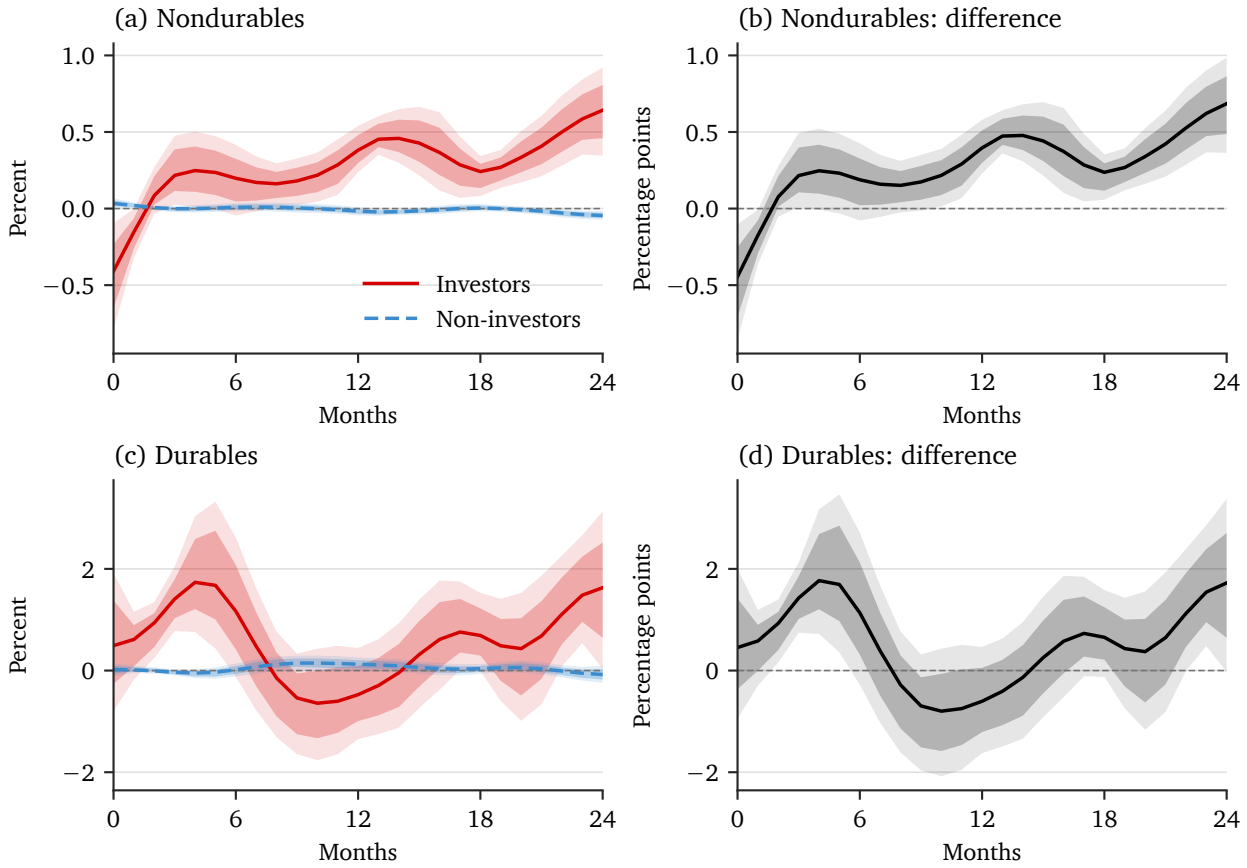
I estimate the response of expenditures to a monetary policy shock with local projections (Jordà, 2005):

$$y_{g,t+h} = \beta_{g,h}\, mps_t + \phi_{g,h}(L)\, Z_{g,t-1} + \varepsilon_{g,t+h}, \tag{2}$$

where y is the residualized expenditure of group g (investors, non-investors, or their difference), mps_t is the monthly federal funds rate factor of Swanson (2021) over all FOMC announcements

[12] Nondurables leave out shelter, health care, education and semi-durable goods such as apparel. Durables are the core NIPA durable goods: vehicles, furniture and furnishings, appliances, and video and audio equipment. The BLS publishes these categories only from 1994, so the durable series starts then.

Figure 2: Responses of household expenditures to an expansionary federal funds rate shock, by investor status



Notes: This figure plots smooth local projections (equation (2); Barnichon and Brownlees, 2019) of residualized monthly household expenditures in the CEX on the Swanson (2021) federal funds rate factor, all FOMC announcements, July 1991–June 2019, with twelve lags of the series and of the shock and month-of-year dummies. The shock is signed so that a positive value is an unexpected cut. Investors are households reporting non-zero financial income (dividends, royalties, estates or trusts) in any interview. Expenditures are residuals from a regression on demographics, log income, region and month fixed effects, so only the difference between the groups is identified. Panels (a) and (c): investors (red, solid) and non-investors (blue, dashed); panels (b) and (d): investor minus non-investor. Responses are 100 times the log response (nondurables) or the inverse-hyperbolic-sine response (durables) per unit of the shock, so approximately percent; the differences are in percentage points. Shaded areas are 90 and 68 percent bands from the smooth-LP standard errors.

from July 1991 to November 2010, signed so that a positive shock is an easing, and Z contains twelve lags of the dependent variable and of the shock together with month-of-year dummies. The impulse responses $\beta_{g,h}$ for $h = 0, \ldots, 24$ are smoothed with the smooth local projection method of Barnichon and Brownlees (2019); Appendix Figure B.2 shows the unsmoothed estimates with Newey–West bands for comparison.

Figure 2 displays the responses. Panel (a) plots nondurable expenditures of investor and non-investor households after an expansionary federal funds rate shock, and panel (b) the investor-minus-non-investor difference. Investor households raise their nondurable spending relative to non-investors: the difference is negative in the announcement month, which I read as noise rather than a response, turns positive by the third month, stays between roughly 0.15 and 0.5 percent per unit shock from month 3 to month 20, and reaches about 0.7 percent at the two-year horizon, with the 90 percent band excluding zero at most horizons after the first year. The dependent variable is a residual that has already been purged of income, so this is not the wealth effect of higher stock prices on spending in the usual sense. The pattern is instead what the Euler equation predicts for a household that revises its inflation expectations upward: it perceives a lower real interest rate and brings consumption forward. The timing is also sensible. The MSC measures revisions over six months and relates them to accumulated shocks over an approximate six-month window, and the spending difference is building over the same window and persists afterward.

Panels (c) and (d) show durable expenditures. The difference is noisier. It is positive in the first half-year after the shock, with the 90 percent band excluding zero at months 2 to 5, roughly zero through the following year, and positive again near the end of the horizon. The durable estimates are less stable across specifications. The positive nondurable response is more consistent across smooth and standard local projections.[13]

These results are consistent with the recent studies that connect inflation expectations to spending. Coibion, Georgarakos, Gorodnichenko, and van Rooij (2023) find in a randomized trial among Dutch households that exogenously higher inflation expectations raise spending on nondurable goods and services and lower spending on durables, and Coibion et al. (2022) find that U.S. households whose expectations are moved by information about monetary policy adjust their spending in the same direction. Morelli (2021) finds in the CEX that equity market participants' consumption responds more than non-participants' to monetary policy shocks, and Melcangi and Sterk (2025) show in a quantitative model that stock market participation changes the aggregate response to policy. I add to these the observation that the participants' larger consumption response coincides with a larger

[13] In the standard local projections of Appendix Figure B.2 the nondurable difference has a 90 percent band that excludes zero at 6 of 25 horizons and the durable difference at 4 of 25. The smooth estimates impose restrictions across horizons and produce a more regular response profile. The standard estimates provide a less restrictive comparison.

revision of their inflation expectations in a separate survey, which is the link the expectations channel requires.

5 Mechanisms

This section provides additional evidence on why investor households respond to federal funds rate shocks and non-investors do not, and discusses the mechanisms the literature offers. Section 5.1 shows that investors respond more during recessions and links this to the risk-hedging channel of Ahn and Xie (2024). Section 5.2 asks whether macroeconomic uncertainty, rather than the recession itself, is what raises attention, and reports a weaker result. Section 5.3 shows directly that investors are exposed to more news about interest rates and that their exposure responds to policy surprises. Section 5.4 shows that the revision is specific to inflation expectations: investors do not change their view of the labor market, and the pattern allows insight into the model of the economy that households use.

5.1 Risk-hedging in recessionary periods

I first examine whether households respond differently during recessions and in normal times, using the NBER dates. I estimate

$$\begin{aligned}\mathbb{E}_{i,t}\pi^h - \mathbb{E}_{i,t-6}\pi^h = \alpha + \beta_0\, invest_{i,t} + \theta\, rec_t + \psi\, invest_{i,t} \times rec_t \\ + \sum_{k\in\{inv,non\}} \sum_{l\in\{rec,normal\}} \beta_{k,l} \left(invest^k_{i,t} \times rec^l_t \times \left(- \sum_{j=t-6}^{t-1} mps_j \right) \right) + \delta X_{i,t} + \gamma Z_t + \epsilon_{i,t},\end{aligned} \tag{3}$$

where rec_t indicates whether the re-interview month t falls in a recession (April–November 2001 or January 2008–June 2009).[14] $\beta_{k,l}$ is the effect of an expansionary shock on the revisions of group k in state l; the coefficient on investors in normal times, for example, is the counterpart of β_1 in Table 1.

[14] Pairs whose interviews straddle the start of a recession are classified by the re-interview month and so count as recession pairs; pairs that straddle the end count as normal. The alternatives, dropping straddling pairs or counting exits as recessions, give the same ranking of the two states. There are 26 recession and 217 normal re-interview months.

Table 4: Revisions of inflation expectations in recessions and in normal times

	1-year-ahead	5-10-year-ahead
Normal×Investor×(-FFR)	0.149**	0.00172
	(0.0659)	(0.0316)
Normal×Non-investor×(-FFR)	0.0108	-0.0572
	(0.0865)	(0.0538)
Recession×Investor×(-FFR)	0.353***	0.108*
	(0.130)	(0.0576)
Recession×Non-investor×(-FFR)	-0.0742	-0.0162
	(0.134)	(0.0981)
Controls	Yes	Yes
Observations	38,472	37,776
Adjusted R^2	0.034	0.003
F-test, slopes equal in normal months	3.11*	0.97
F-test, slopes equal in recessions	14.93***	1.63
F-test, gap differs by state	4.51**	0.32
Gap: normal months	0.132*	0.0705
	(0.0790)	(0.0598)
Gap: recessions	0.409***	0.121
	(0.110)	(0.0964)
Change in the gap in recessions	0.277**	0.0504
	(0.136)	(0.114)

Notes: This table reports estimates of equation (3). *Recession* equals one if the re-interview month is an NBER recession month (April–November 2001 or January 2008–June 2009) and *Normal* otherwise; the regression includes the recession dummy and its interaction with the investor dummy. The four slope rows are $\beta_{k,l}$, the response of group k in state l to −FFR. The three F-tests are Wald statistics for equality of the investor and non-investor slopes in normal months, for the same equality in recessions, and for equality of the investor-minus-non-investor gap across the two states. *Gap* rows report the investor-minus-non-investor slope in each state from the specification with survey-month fixed effects, and *Change in the gap* is the recession gap minus the normal-month gap. Sample, dependent variables, controls, weights and standard errors are as in Table 1.

Table 4 reports the estimates. In normal times, investors revise one-year expectations by 0.15 per unit shock and non-investors by 0.01, a gap of 0.13 that is significant at the 10 percent level. In recessions the investor slope rises to 0.35 and the non-investor slope stays at zero; the gap is 0.41 with a standard error of 0.11, and the change in the gap between the two states, 0.28, is significant at the 5 percent level. For 5-to-10-year expectations the recession slope for investors is 0.11 and marginally significant, but the gaps are not. The investor–non-investor gap, in other words, is about three times as large in recessions as in normal times, and the non-investor responses are not statistically distinguishable from zero in either state.

One mechanism for this pattern is the risk-hedging channel proposed by Ahn and Xie (2024): house-

holds acquire economic information to hedge the risks of holding stocks, so that information acquisition is itself a hedging instrument. The value of such a hedge rises when the stock market is volatile, and recessions are periods of high volatility. The same logic underlies the rational attention allocation model of Kacperczyk et al. (2016), in which investors shift attention toward aggregate shocks in recessions because aggregate shocks become more volatile relative to idiosyncratic ones, and the attention-gated transmission of Jeong et al. (2025), in which the pass-through of policy news to beliefs strengthens in recessions. Non-investors have no such stake and no such reason to shift attention, which is what Table 4 shows.

5.2 Macroeconomic uncertainty

If perceived volatility is a key driver of attention, responses may vary with uncertainty even outside recessions, and uncertainty varies in normal times as well. Table 5 repeats the exercise of Table 4 with the recession indicator replaced by an indicator for high macroeconomic uncertainty, defined as a six-month average of the Jurado et al. (2015) one-month uncertainty index over the shock window above its sample median. Appendix B.5, Table B.6, reports the same regression with the three-month and twelve-month indices and with the VIX. Every recession month is a high-uncertainty month under every measure, so these tables ask whether the recession result extends to uncertain periods outside recessions.

The answer is only partly. The investor gap is significant in the high-uncertainty state (0.23 with a standard error of 0.07) and small and imprecise in the low-uncertainty state (0.14 with a standard error of 0.18). The two states are not, however, statistically distinguishable: the change in the gap is 0.09 with a standard error of 0.19, and the same holds for the three- and twelve-month indices in Table B.6. Under the VIX the point estimates go the other way, with a larger gap in low-VIX windows, though again the difference is not significant. The low-uncertainty state contains few large shocks, which is why its estimates are imprecise, and this limits what the test can show. I therefore read Tables 4 and 5 together as follows: the investor response is reliably present whenever the economy is in a recession or uncertainty is high, it may well be present in calm periods too, and the data cannot say whether calm periods are different. The sharper statement, that attention rises with uncertainty

Table 5: Revisions of inflation expectations in high- and low-uncertainty periods

	1-year-ahead	5-10-year-ahead
Low×Investor×(-FFR)	0.0839	0.0555
	(0.114)	(0.0594)
Low×Non-investor×(-FFR)	-0.0789	0.0350
	(0.152)	(0.0987)
High×Investor×(-FFR)	0.239***	0.0380
	(0.0742)	(0.0356)
High×Non-investor×(-FFR)	0.00193	-0.0780
	(0.0819)	(0.0542)
Controls	Yes	Yes
Observations	38,472	37,776
Adjusted R^2	0.034	0.003
F-test, slopes equal in the low state	0.90	0.04
F-test, slopes equal in the high state	10.60***	4.51**
F-test, gap differs by state	0.16	0.68
Gap: low	0.138	0.0441
	(0.176)	(0.104)
Gap: high	0.231***	0.111**
	(0.0719)	(0.0551)
Change in the gap, high minus low	0.0927	0.0669
	(0.190)	(0.118)

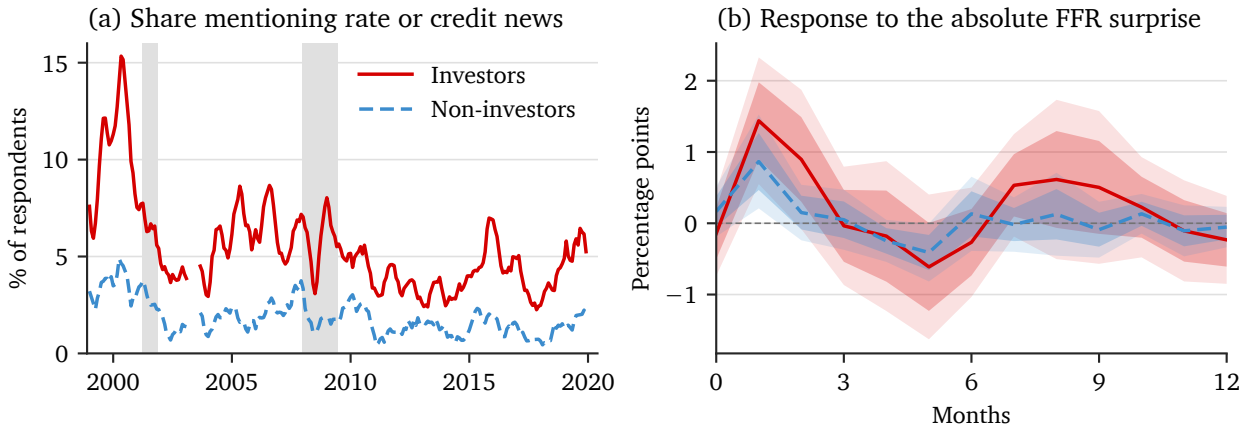
Notes: This table estimates equation (3) with the recession indicator replaced by an uncertainty indicator. *High* equals one if the mean of the Jurado et al. (2015) one-month macroeconomic uncertainty index (FRED series JLNUM1M) over the six months before the re-interview is above its median across re-interview months, and *Low* otherwise; the regression includes the high-uncertainty dummy and its interaction with the investor dummy. Rows and statistics are defined as in Table 4, with the high and low states in place of recessions and normal months. Sample, dependent variables, controls, weights and standard errors are as in Table 1.

as such, is supported by the point estimates under the macroeconomic uncertainty measures but not established.

5.3 Heterogeneity in policy-related news exposure

The attention explanation has a direct implication: investors should hear more about interest rates. The MSC asks every respondent, "During the last few months, have you heard of any favorable or unfavorable changes in business conditions? What did you hear?", and codes up to two answers. I classify a respondent as having heard interest-rate or credit news if either answer is coded as favorable or unfavorable news about tight money and high rates or about easier money and low

Figure 3: Exposure to interest-rate news, by investor status



Notes: This figure documents exposure to interest-rate news by investor status. Panel (a): monthly weighted share of MSC respondents who mention interest-rate or credit news when asked "During the last few months, have you heard of any favorable or unfavorable changes in business conditions? What did you hear?" (first or second answer coded as favorable or unfavorable news about tight money and high interest rates, or as easier money and low interest rates), by investor status at the interview; all telephone interviews with the investment question answered, 1999–2019, six-month centered moving average. The gap in 2003 is May 2003, when the investment question was not asked. Shaded areas are NBER recessions. Panel (b): local projections of each group's monthly share on the month's absolute federal funds rate surprise (the sum of absolute Swanson (2021) federal funds rate factors at scheduled meetings, zero if none), with six lags of the share and of the surprise, for 0 to 12 months after the meeting month; shocks January 1999–June 2019. Month 0 is partial because a meeting can fall after some of the month's interviews. Newey–West standard errors with $h+1$ lags; bands are 90 percent (light) and 68 percent (dark).

rates. Because the question is open-ended, the indicator captures spontaneously recalled interest-rate or credit news rather than prompted recognition of the Federal Reserve.

Figure 3(a) plots the monthly weighted share of respondents who mention rate or credit news, by investor status, over 1999–2019. Investors mention it about three times as often as non-investors: 5.4 percent of investors on average against 1.8 percent of non-investors, with the investor share above the non-investor share in every year of the sample. The shares co-move, peaking during the 1999–2000 tightening cycle at 15 percent for investors and 5 percent for non-investors and rising again around the 2004–2006 and 2015–2018 hiking cycles, although magnitudes differ across groups. The level difference is the pattern a model of stock-driven attention predicts: both groups report interest-rate news, but investors are more likely to recall it.

Figure 3(b) asks whether the shares respond to monetary policy surprises. I estimate local projections of each group's monthly share on the absolute size of the month's federal funds rate surprise,

with six lags of the share and of the surprise, and plot the responses for 0 to 12 months after the meeting. Both groups mention rate news more in the month after a large surprise, investors by 1.4 percentage points per unit of the absolute surprise and non-investors by 0.9. The investor response is larger in absolute terms; relative to each group's average share it is, if anything, smaller, so the surprise itself reaches both groups. The response fades by the third month. Interest-rate news recall rises in both groups after larger policy surprises. Investors have higher average recall and a larger estimated inflation-expectation response, although the analysis does not directly link these outcomes within households.

This evidence connects to work on the role of news in expectation formation. Carroll (2003) models households as absorbing professional forecasts from the news media at a rate governed by the intensity of coverage, and Lamla and Lein (2014) and Dräger and Lamla (2017) find that media coverage of inflation moves consumers' expectations and their accuracy. Chahrour et al. (2021) show that what the media choose to cover shapes which shocks agents react to. Figure 3 adds a demand-side element: with the same supply of news, households that have a financial reason to follow interest rates recall more of it. Ahn and Xie (2024) report, in the same survey, that stockholdersrevise their outlook more strongly in response to news in general; the present evidence narrows this to news about the policy instrument itself.

5.4 Do investors revise their view of the labor market?

The revisions in Section 3 could reflect either a change in investors' beliefs about prices specifically or a general change in their view of the economy after a policy surprise. The MSC asks whether the respondent expects more, about the same, or less unemployment over the coming 12 months. Table 6 estimates the baseline specification with the dependent variable equal to one if the answer moved toward less unemployment between the two interviews and zero if it stayed or moved toward more.

There is no difference between the groups. Investors' and non-investors' slopes are 0.010 and 0.012, neither different from zero, and the survey-month fixed effects gap is −0.001 with a standard error of 0.008. Investors who expect higher inflation after an unexpected cut do not expect lower

Table 6: Revisions of unemployment expectations after a federal funds rate shock, by investor status

	Expected unemployment: I(less unemployment)
Investor	0.00169
	(0.00671)
Investor×(-FFR)	0.00984
	(0.00751)
Non-investor×(-FFR)	0.0116
	(0.00772)
Constant	0.250***
	(0.0141)
Controls	Yes
Observations	44,272
Adjusted R^2	0.012
F-test ($\beta_1 = \beta_2$)	0.05
Gap	-0.000683
	(0.00767)

Notes: This table estimates equation (1) with the dependent variable replaced by an indicator equal to one if the respondent's answer to "How about people out of work during the coming 12 months—do you think that there will be more unemployment than now, about the same, or less?" moved toward "less" between the two interviews, and zero if it stayed the same or moved toward "more"; pairs with a missing answer in either wave are dropped, which is why the sample is larger than in Table 1, where numerical inflation answers are required. Coefficients are changes in the probability of an optimistic revision per unit of −FFR. Sample, controls, weights, standard errors, the F-test and the gap row are as in Table 1.

unemployment.

This result is informative about how households think monetary policy works. A household reasoning with the textbook model would expect an unexpected cut to raise inflation and lower unemployment together, that is, to move the economy along a Phillips curve. Existing evidence suggests that many households do not report theory-consistent joint expectations. Dräger et al. (2016) find in the MSC that only about a third of respondents give answers consistent with a Phillips curve, that the share falls in recessions, and that only 6 percent are consistent with the Phillips curve, the Taylor rule and the Fisher relation at once. Kamdar (2019) shows that household beliefs in the MSC are strongly associated with a common sentiment factor along which optimism about unemployment goes with *lower* expected inflation, the opposite of the Phillips curve sign. Andre et al. (2022) ask a representative sample directly how an interest rate hike affects inflation and unemployment and find that a large fraction of households expect a hike to raise inflation, which experts do not, and that households' predictions about unemployment and inflation are formed by different reasoning rather

than by one model. Carvalho and Nechio (2014) find that some households' answers are consistent with a Taylor rule, but mainly in periods of labor market weakness and not among low-income respondents.

Against that background, the pattern in Tables 1 and 6 is coherent. Investors revise the variable that their stock holdings give them a reason to follow, the price level, and do so in the direction that a lower policy rate implies. They do not extend the inference to the labor market, which the textbook model would have them do but which most households do not appear to do. The response is therefore better described as attention to a specific piece of policy news than as a change in the household's model of the economy. It also means that the revision in Section 3 should not be interpreted as investors becoming more optimistic in general; investors become more optimistic about *prices*, which is what matters for the Euler equation and for the spending response in Section 4.

6 Conclusion

Recent changes that have lowered the cost of entering the stock market, such as commission-free trading and the availability of fractional-share trading, have contributed to the rise in stock market participation (Da et al., 2025; Tripathi & Rengifo, 2023). This study proposes that stock market participants play a distinct role in the propagation of monetary policy. Using the MSC panel, I show that investing households revise their one-year inflation expectations upward after an unexpected cut in the federal funds rate and that non-investing households do not. The difference is about 0.2 percentage points per unit shock, does not increase with portfolio size and remains after controlling for homeownership, income, and education, and is roughly three times larger during recessions. Investors hear news about interest rates about three times as often as non-investors. Using the CEX, I show that households with financial-asset income raise their nondurable spending relative to other households after an expansionary shock. The direction of both revisions is the one the consumer Euler equation implies, which links the expectations channel of textbook models to household-level data.

Two features of the evidence constrain the interpretation. The expectations response is confined to prices: investors do not revise their view of the labor market, so a policy surprise changes what attentive households believe about inflation without changing their model of the economy. And the consumption evidence identifies only the gap between investors and non-investors in a survey whose investor flag is narrower than the MSC's. A data set with both expectations and spending for the same households, such as the spending module of the Survey of Consumer Expectations, would allow a direct test of whether the households that revise are the households that spend, though the length of the sample is more limited.

While communication tools such as forward guidance have been studied extensively since the ZLB, my findings suggest that conventional policy also moves the expectations and spending of a large and growing subset of households. Policies that broaden stock market participation may therefore raise the share of the population through which conventional monetary policy works. Whether that is desirable depends on the distributional side of the same fact: attentive households adjust in the intended direction, and inattentive households are left to adjust later, if at all.

One aspect of household expectations not addressed here is their level. Household inflation expectations are more volatile, more dispersed and more uncertain than those of professional forecasters, whose expectations incorporate information from the Fed quickly (Coibion et al., 2020). Since investors adjust their expectations in line with policy, it would be worth asking whether their expectation formation comes to resemble that of professionals over time. I leave this for future research.

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Appendices

A Additional tables

Table A.1: Summary statistics of the regression sample, by investor status

Variable (Category)	Investors		Non-investors	
Continuous (mean (sd))				
1-year ahead inflation expectations (%)	3.04	(3.37)	3.66	(4.18)
5-10-year ahead inflation expectations (%)	2.92	(2.30)	3.31	(3.20)
Revision in 1-year ahead inflation expectations (%p)	-0.16	(4.18)	-0.23	(5.21)
Revision in 5-10-year ahead inflation expectations (%p)	-0.12	(2.71)	-0.13	(3.90)
Categorical (count (%))				
Gender				
Male	14746	55.0%	5666	48.6%
Female	12063	45.0%	5997	51.4%
Age				
40 or younger	6110	22.8%	3244	27.8%
41 to 59	11556	43.1%	3811	32.7%
60 or older	9143	34.1%	4608	39.5%
Education				
High school or less	4666	17.4%	4953	42.5%
Some college	6861	25.6%	3568	30.6%
College degree and above	15282	57.0%	3142	26.9%
Marital status				
Married/partner	19353	72.2%	5860	50.2%
Divorced	3021	11.3%	2367	20.3%
Widowed	1639	6.1%	1488	12.8%
Never married	2796	10.4%	1948	16.7%
Children in household				
Without children	18308	68.3%	8318	71.3%
With children	8501	31.7%	3345	28.7%
Home ownership				
Owns or is buying	23389	87.2%	7636	65.5%
Rents	3420	12.8%	4027	34.5%
Region				
West	5770	21.5%	2486	21.3%
North Central	7389	27.6%	2983	25.6%

Table A.1, continued

Variable (Category)	Investors		Non-investors	
Northeast	4897	18.3%	1853	15.9%
South	8753	32.6%	4341	37.2%
Income quartile				
Bottom 25%	1957	7.3%	4575	39.2%
26-50%	5488	20.5%	3701	31.7%
51-75%	8639	32.2%	2332	20.0%
Top 25%	10725	40.0%	1055	9.0%
Investment volume				
Bottom 20%	4023	15.0%		
21-40%	4339	16.2%		
41-60%	4660	17.4%		
61-80%	4869	18.2%		
Top 20%	5228	19.5%		
Amount not reported	3690	13.8%		
No investments			11663	100.0%
Total	26809	100.0%	11663	100.0%

Notes: This table reports summary statistics for the one-year inflation regression sample of Table 1 (38,472 re-interview pairs: 26,809 investors and 11,663 non-investors), unweighted. Investor status, inflation expectations and household characteristics are measured at the re-interview; revisions are the re-interview answer minus the first-interview answer. Means for 5-to-10-year expectations use the pairs that answer that question. Investment volume is the quintile of the reported value of stock investments within the survey year among investors; 13.8 percent of investors report holding stocks but give no amount. Marital status has four categories because the extract has no "separated" code for 1999–2019.

Table A.2: Revisions of inflation expectations by the size of stock holdings

	1-year-ahead	5-10-year-ahead
Bottom 20%×(-FFR)	0.316**	0.0629
	(0.124)	(0.0645)
21-40%×(-FFR)	0.280***	0.00647
	(0.104)	(0.0652)
41-60%×(-FFR)	0.243**	0.146**
	(0.118)	(0.0616)
61-80%×(-FFR)	0.180**	0.0792
	(0.0858)	(0.0481)
Top 20%×(-FFR)	0.161*	0.0609
	(0.0832)	(0.0406)
Non-investor×(-FFR)	-0.0141	-0.0532
	(0.0715)	(0.0473)
Controls	Yes	Yes
Observations	34,782	34,208
Adjusted R^2	0.035	0.003

Notes: This table estimates equation (1) with the investor dummy replaced by five dummies for the quintile of the respondent's reported value of stock investments at the re-interview, formed within each survey year among investors (weighted). Each quintile dummy and the non-investor indicator is interacted with −FFR; the quintile dummies themselves are included. Investors who report holding stocks but give no amount are excluded, which is why the sample is smaller than in Table 1. Sample, dependent variables, controls, weights and standard errors are otherwise as in Table 1.

Table A.3: Revisions of 5-to-10-year inflation expectations before, during and after the zero lower bound

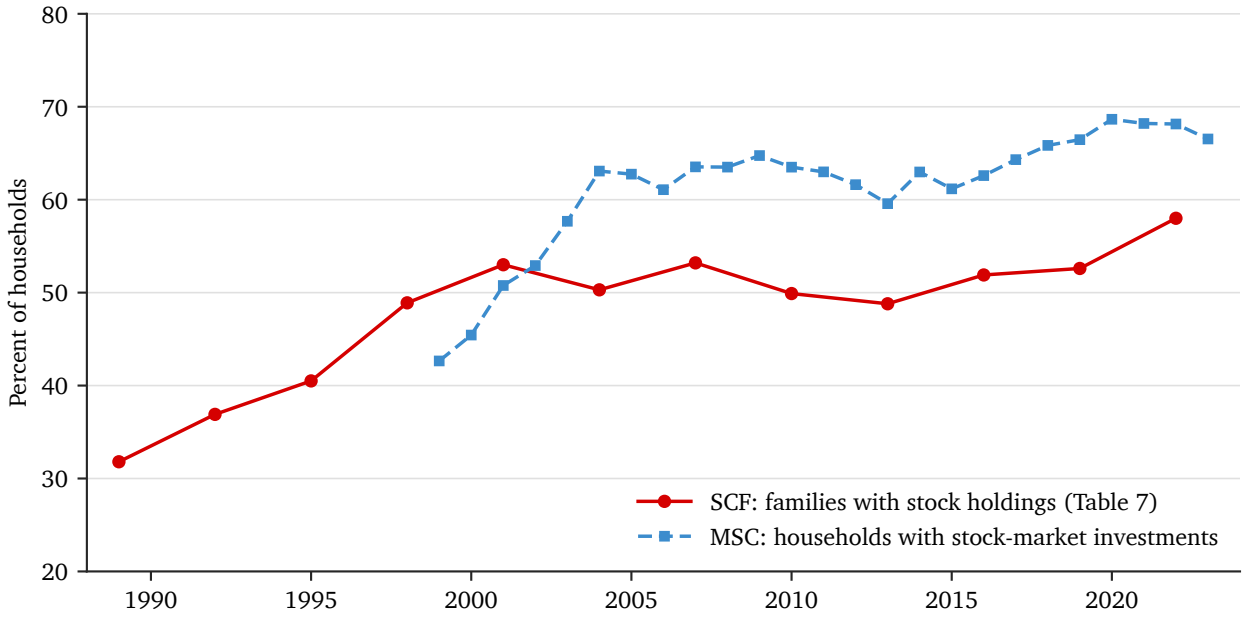
	Full sample	Pre-ZLB		ZLB		Post-ZLB	
Investor×(-FFR)	0.0319	0.0330	0.0183	-0.0669	-0.154	-0.137	-0.154
	(0.0309)	(0.0288)	(0.0305)	(0.160)	(0.202)	(0.115)	(0.133)
Non-investor×(-FFR)	-0.0450	-0.0502	-0.0451	-0.406*	-0.464*	-0.285	-0.438**
	(0.0501)	(0.0486)	(0.0518)	(0.231)	(0.241)	(0.214)	(0.216)
Investor×(-FG)	0.00835		0.00198		-0.0349		-0.00457
	(0.0163)		(0.0197)		(0.0553)		(0.0526)
Non-investor×(-FG)	-0.0328		-0.0421		-0.0668		-0.0360
	(0.0232)		(0.0264)		(0.0699)		(0.0660)
Investor×LSAP	0.0213		0.0284		-0.00214		0.0247
	(0.0231)		(0.0362)		(0.0314)		(0.131)
Non-investor×LSAP	-0.0241		0.0000763		-0.0668		0.326
	(0.0375)		(0.0550)		(0.0571)		(0.217)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	37,776	18,581	18,581	11,737	11,737	7,458	7,458
Adjusted R^2	0.003	0.005	0.005	0.003	0.003	0.002	0.002
F-test, FFR slopes equal	2.25	2.75*	1.37	1.69	1.53	0.52	1.51
Gap: FFR	0.0808	0.0944*	0.0762	0.304	0.282	0.150	0.278
	(0.0512)	(0.0501)	(0.0535)	(0.261)	(0.251)	(0.205)	(0.232)

Notes: This table repeats Table 3 with the revision of 5-to-10-year inflation expectations as the dependent variable. Subperiods, shock definitions, F-tests, gap rows, controls, weights and standard errors are as in Tables 1 and 3.

B Robustness checks

B.1 Change in the MSC stock-investment question

Figure B.1: Share of households with stock holdings: SCF and Michigan Survey of Consumers



Notes: SCF: share of families with stock holdings, held directly or indirectly through retirement accounts, pooled investment funds and other managed assets, in each survey wave, 1989–2022. MSC: weighted share of telephone respondents who report stock investments, annual averages, 1999–2023. The MSC question was not asked in May 2003, when the questionnaire was revised. *Sources*: Survey of Consumer Finances, Federal Reserve Board; University of Michigan Surveys of Consumers.

Figure B.1 compares the share of Michigan respondents who report stock investments with the SCF share of families holding stocks. The two series follow the same trend, but the Michigan share rises by about 10 percentage points around May 2003, when the questionnaire was revised, and stays above the SCF share afterwards. Because the revision may change who is classified as an investor, Table B.1 re-estimates the baseline regression on re-interview pairs in which both interviews follow the revision. The results are essentially unchanged. Investors still revise their inflation expectations more than non-investors after an easing. The one-year gap is 0.22, compared with 0.20 in the full sample, and the gaps for both horizons are significant at the 5 percent level.

Table B.1: Revisions of inflation expectations after a federal funds rate shock: sample after the 2003 questionnaire revision

	1-year-ahead	5-10-year-ahead
Investor	0.0719	-0.0221
	(0.0821)	(0.0640)
Investor×(-FFR)	0.249***	0.0571
	(0.0833)	(0.0432)
Non-investor×(-FFR)	0.0224	-0.0842
	(0.0930)	(0.0707)
Constant	0.359	0.272*
	(0.247)	(0.152)
Controls	Yes	Yes
Observations	30,166	29,762
Adjusted R^2	0.039	0.004
F-test ($\beta_1 = \beta_2$)	6.02**	4.77**
Gap	0.218**	0.145**
	(0.0933)	(0.0640)

Notes: Estimates of equation (1) as in Table 1, on re-interview pairs whose second interview falls in December 2003–July 2019, so that both interviews follow the May 2003 revision of the questionnaire. Standard errors clustered by survey month are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

B.2 Sensitivity to outliers

Revisions of numerical inflation expectations have fat tails. Table B.2 re-estimates Table 1 with the dependent variable trimmed at its 1st and 99th percentiles within the estimation sample, and with a Huber M-estimator. Both reduce the investor slope, to 0.13 and 0.15, and leave it significant at the 1 percent level; the non-investor one-year coefficients remain statistically insignificant. For 5-to-10-year expectations the gaps are 0.10 and 0.07, both significant.

B.3 Investors versus homeowners

Ahn et al. (2024) show that homeowners revise inflation expectations in response to mortgage rate changes, and investors are disproportionately homeowners (87 percent against 66 percent of non-investors, Table A.1). Tables B.3 and B.4 separate the two. Among homeowners only, the investor slope is 0.18 and the non-investor slope 0.02; among investors only, the estimated responses are 0.20 for homeowners and 0.35 for renters; equality is not rejected. In the full sample with four investor-

Table B.2: Robustness of the baseline estimates to outliers

	1-year-ahead		5-10-year-ahead	
	Trim 1/99	Huber	Trim 1/99	Huber
Investor	0.0938	0.0474	-0.00924	-0.00777
	(0.0591)	(0.0344)	(0.0436)	(0.0252)
Investor×(-FFR)	0.126***	0.145***	0.0477*	0.0253*
	(0.0442)	(0.0351)	(0.0256)	(0.0141)
Non-investor×(-FFR)	0.00643	0.0487	-0.0487	-0.0398*
	(0.0616)	(0.0419)	(0.0416)	(0.0227)
Constant	-0.313**	-0.260***	-0.101	-0.183***
	(0.125)	(0.0851)	(0.120)	(0.0613)
Controls	Yes	Yes	Yes	Yes
Survey weights	Yes	No	Yes	No
Observations	37,918	38,472	37,300	37,776
F-test ($\beta_1 = \beta_2$)	3.65*	7.95***	5.60**	7.37***
Gap	0.114*	0.0948***	0.0962**	0.0696***
	(0.0628)	(0.0337)	(0.0407)	(0.0253)

Notes: This table re-estimates the baseline under two treatments of outliers. *Trim 1/99* re-estimates equation (1) after dropping observations whose revision lies below the 1st or above the 99th percentile of the Table 1 estimation sample ($[-15, 14]$ percentage points for one-year expectations, $[-10, 10]$ for 5-to-10-year expectations). *Huber* is a Huber M-estimator computed by iteratively reweighted least squares ($k = 1.345$, scale equal to the median absolute deviation of the residuals divided by 0.6745), unweighted, with standard errors from the final weighted step clustered by survey month and treating the Huber weights as fixed; about 27 percent of observations receive a weight below one. The gap row uses the same estimator with survey-month fixed effects. Controls and the F-test are as in Table 1.

by-tenure cells, investing renters respond by 0.34 and non-investing homeowners by 0.03. When the investor and homeowner interactions enter one survey-month fixed effects regression, the investor gap is 0.21 with a standard error of 0.06 and the homeowner gap is −0.01 with a standard error of 0.07. Stock ownership, not homeownership, carries the response to federal funds rate surprises in this sample. The two results are not in conflict: Ahn et al. (2024) study mortgage rate changes, to which homeowners have a direct payment exposure, while the federal funds rate factor moves stock prices on the day of the announcement and reaches homeowners' mortgage costs only indirectly. For 5-to-10-year expectations (Table B.4) the investor gap in the full sample is 0.10 and marginally significant, and the homeowner gap is again zero.

Table B.3: Revisions of one-year inflation expectations by investor status and homeownership

	Homeowners	Investors	All households
Investor×(-FFR)	0.179***		
	(0.0568)		
Non-investor×(-FFR)	0.0205		
	(0.0830)		
Homeowner×(-FFR)		0.197***	
		(0.0550)	
Renter×(-FFR)		0.350***	
		(0.129)	
Investor & homeowner×(-FFR)			0.189***
			(0.0572)
Investor & renter×(-FFR)			0.338**
			(0.132)
Non-investor & homeowner×(-FFR)			0.0295
			(0.0847)
Non-investor & renter×(-FFR)			-0.0857
			(0.118)
Controls	Yes	Yes	Yes
Observations	31,025	26,809	38,472
Adjusted R^2	0.035	0.040	0.034
F-test (see notes)	4.75**	2.10	4.83**
F-test, inv. = non-inv. among renters			5.67**
F-test, owner = renter among investors			2.03
Investor gap	0.133*		0.206***
	(0.0723)		(0.0639)
Homeowner gap		-0.156	-0.0110
		(0.108)	(0.0747)

Notes: This table separates investor status from homeownership. Column (1) estimates equation (1) on homeowners only; column (2) estimates the same equation on investors only, with homeowner and renter dummies in place of the investor dummies; column (3) uses all households and interacts –FFR with the four investor-by-tenure cells, including the cell dummies. The row *F-test (see notes)* reports, for column (1), the test that the investor and non-investor slopes are equal; for column (2), that the homeowner and renter slopes are equal; for column (3), that the investor and non-investor slopes are equal among homeowners. The next two rows test, in column (3), the same equality among renters and the equality of the homeowner and renter slopes among investors. *Investor gap* and *Homeowner gap* are the investor-minus-non-investor and homeowner-minus-renter slopes from the specification with survey-month fixed effects; in column (3) both interactions enter one regression. Controls, weights and standard errors are as in Table 1.

B.4 Gasoline price expectations

The regressions in the baseline estimation control for the realized change in the retail gasoline price over the interview window, following Coibion and Gorodnichenko (2015) and Coibion and Gorodnichenko (2025). Table B.5 instead controls for the household's own revision of expected

Table B.4: Revisions of 5-to-10-year inflation expectations by investor status and homeownership

	Homeowners	Investors	All households
Investor×(-FFR)	0.0173		
	(0.0276)		
Non-investor×(-FFR)	-0.0277		
	(0.0668)		
Homeowner×(-FFR)		0.0308	
		(0.0289)	
Renter×(-FFR)		0.153*	
		(0.0841)	
Investor & homeowner×(-FFR)			0.0264
			(0.0280)
Investor & renter×(-FFR)			0.142*
			(0.0849)
Non-investor & homeowner×(-FFR)			-0.0178
			(0.0690)
Non-investor & renter×(-FFR)			-0.118
			(0.0842)
Controls	Yes	Yes	Yes
Observations	30,457	26,465	37,776
Adjusted R^2	0.003	0.003	0.003
F-test (see notes)	0.46	2.26	0.45
F-test, inv. = non-inv. among renters			4.59**
F-test, owner = renter among investors			2.03
Investor gap	0.0482		0.101*
	(0.0706)		(0.0557)
Homeowner gap		-0.119	-0.0125
		(0.0815)	(0.0732)

Notes: This table repeats Table B.3 with the revision of 5-to-10-year inflation expectations as the dependent variable. Columns, tests, gap rows, controls, weights and standard errors are as in Tables 1 and B.3.

gasoline prices one year ahead (columns (1) and (4)), five years ahead (columns (2) and (5)), or both (columns (3) and (6)).[15] Two points stand out. First, changes in gasoline price expectations are strongly associated with changes in inflation expectations, consistent with the literature on the salience of gasoline prices in household beliefs (Coibion & Gorodnichenko, 2015; D'Acunto et al., 2021); the one-year gasoline revision matters more for one-year inflation expectations and the five-year revision more for 5-to-10-year expectations. Second, the investor result is unchanged. The investor slope for one-year expectations is 0.21–0.25 across the three specifications and the non-

[15] Revisions of one-year gasoline price expectations are available from April 2006; revisions of five-year expectations are available intermittently from the beginning of the sample and reliably from December 2004, which is why the samples in Table B.5 are smaller than in Table 1.

Table B.5: Baseline estimates with household gasoline price expectations as controls

	1-year-ahead			5-10-year-ahead		
	(1)	(2)	(3)	(4)	(5)	(6)
1-year gas price exp.	0.0115***		0.0101***	0.00522***		0.00197**
	(0.00103)		(0.00126)	(0.000735)		(0.000831)
5-year gas price exp.		0.00358***	0.00163***		0.00371***	0.00340***
		(0.000463)	(0.000591)		(0.000321)	(0.000399)
Investor×(-FFR)	0.247***	0.214***	0.230***	0.0449	0.0294	0.0378
	(0.0830)	(0.0609)	(0.0791)	(0.0431)	(0.0295)	(0.0448)
Non-investor×(-FFR)	-0.0368	0.00613	-0.0307	-0.0672	-0.0451	-0.0220
	(0.0954)	(0.0718)	(0.0899)	(0.0792)	(0.0505)	(0.0844)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	25,127	33,979	24,218	24,843	33,615	24,057
Adjusted R^2	0.048	0.038	0.048	0.007	0.011	0.013
F-test ($\beta_1 = \beta_2$)	6.17**	6.87***	6.03**	2.10	2.14	0.53
Gap	0.271**	0.194**	0.246**	0.116	0.0755	0.0631
	(0.116)	(0.0783)	(0.107)	(0.0768)	(0.0510)	(0.0814)

Notes: This table estimates equation (1), additionally .controlling for the respondent's own revision between the two interviews of the expected change in gasoline prices over the next year (columns (1), (3), (4) and (6)) and over the next five years (columns (2), (3), (5) and (6)), both in cents per gallon. Samples are restricted to pairs for which the relevant gasoline question was answered in both waves. The remaining controls, the F-test, the gap row, weights and standard errors are as in Table 1.

investor slope is zero; the survey-month fixed effects gap is 0.19–0.27 and significant at the 5 percent level in each column. For 5-to-10-year expectations the gaps are positive but not significant in these shorter samples.

B.5 Alternative uncertainty measures

Table B.6 reports the specification of Table 5 with four state variables: the VIX and the Jurado et al. (2015) macroeconomic uncertainty index at one-, three- and twelve-month horizons, each averaged over the shock window and split at its median. Under the three macroeconomic uncertainty measures the high-uncertainty gap is 0.23–0.25 and significant at the 1 percent level, and the low-uncertainty gap is 0.00–0.14 and imprecise; the difference between states is positive but not significant under any of them. Under the VIX, the estimated gap is larger in low-volatility than in high-volatility windows, although the difference is not statistically significant. The VIX measures expected equity volatility over the next month, while the macroeconomic uncertainty indices measure the unforecastable component of a broad set of macroeconomic series, so the two need not agree;

Table B.6: Revisions of one-year inflation expectations under alternative uncertainty measures

	VIX	JLN, 1 mth	JLN, 3 mths	JLN, 12 mths
Low×Investor×(-FFR)	0.192**	0.0839	-0.0182	0.0655
	(0.0865)	(0.114)	(0.112)	(0.134)
Low×Non-investor×(-FFR)	-0.203	-0.0789	-0.0833	0.0512
	(0.158)	(0.152)	(0.160)	(0.182)
High×Investor×(-FFR)	0.204***	0.239***	0.260***	0.242***
	(0.0703)	(0.0742)	(0.0734)	(0.0715)
High×Non-investor×(-FFR)	0.0258	0.00193	0.00436	-0.0230
	(0.0772)	(0.0819)	(0.0815)	(0.0779)
Controls	Yes	Yes	Yes	Yes
Observations	38,472	38,472	38,472	38,472
Adjusted R^2	0.034	0.034	0.034	0.034
F-test, slopes equal in the low state	6.77***	0.90	0.14	0.01
F-test, slopes equal in the high state	5.99**	10.60***	12.50***	14.08***
F-test, gap differs by state	1.64	0.16	1.03	1.54
Gap: low	0.398***	0.138	0.0556	0.00228
	(0.150)	(0.176)	(0.179)	(0.193)
Gap: high	0.160**	0.231***	0.248***	0.254***
	(0.0716)	(0.0719)	(0.0713)	(0.0696)
Change in the gap, high minus low	-0.238	0.0927	0.193	0.252
	(0.166)	(0.190)	(0.192)	(0.205)

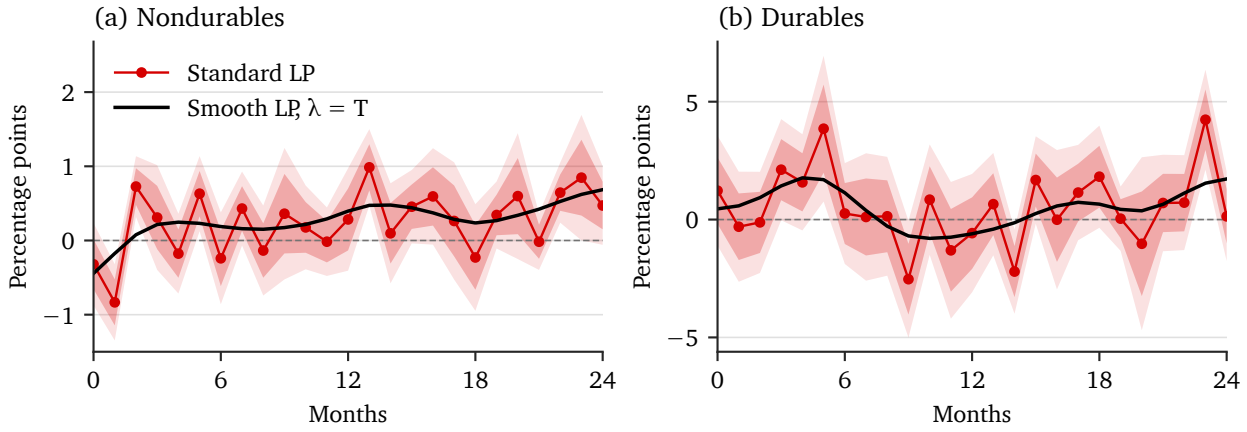
Notes: This table reports the specification of Table 5 under alternative uncertainty measures. Each column estimates it for one-year inflation expectations with a different state variable: the CBOE VIX (FRED series VIXCLS, monthly average) and the Jurado et al. (2015) macroeconomic uncertainty index at the one-, three- and twelve-month horizons (FRED series JLNUM1M, JLNUM3M and JLNUM12M). *High* equals one if the mean of the index over the six months before the re-interview is above its median across re-interview months. Rows and statistics are defined as in Table 4; sample, controls, weights and standard errors are as in Table 1.

but the disagreement is a reason to treat the uncertainty results in Section 5.2 as suggestive.

B.6 Standard local projections for expenditures

Figure B.2 plots the investor-minus-non-investor expenditure difference from standard local projections (Jordà, 2005) with the same lags and controls as Figure 2, with Newey–West standard errors, and overlays the smooth-LP estimate from Figure 2. The standard estimates are noisy and alternate in sign from month to month, particularly for durables; the 90 percent band excludes zero at 6 of 25 horizons for nondurables and at 4 of 25 for durables. The smooth estimates summarize the broad pattern of the noisier standard estimates; they are not an independent replication.

Figure B.2: Investor-minus-non-investor expenditure responses: standard and smooth local projections



Notes: This figure compares standard and smooth local projections of the expenditure gap. Red lines with markers are standard local projections (equation (2)) of the investor-minus-non-investor difference in residualized expenditures on the federal funds rate factor, with Newey–West standard errors using $h + 1$ lags; bands are 90 percent (light) and 68 percent (dark). The black line is the smooth local projection of Figure 2. Sample, definitions, sign convention and units are as in Figure 2. Vertical scales differ between the two panels.

C Definitions of expenditures

Both categories are built from the summary expenditure variables of the Interview Survey family files. Each interview reports spending over the three months before the interview month; I use that three-month total, the sum of the BLS "previous quarter" and "current quarter" parts of each variable.

Nondurable consumption Nondurable consumption is the sum of expenditures on food at home and away from home, alcoholic beverages, tobacco and smoking supplies, gasoline and motor oil, utilities, fuels and public services (natural gas, electricity, fuel oil and other fuels, telephone, and water and other public services), personal care, public and other transportation, and household operations (domestic services, including child care, and other household expenses). Shelter, health care, education, apparel, entertainment, reading, vehicle purchases and maintenance, insurance and pensions, and cash contributions are excluded.

Durable consumption Durable consumption is the sum of expenditures on new and used cars and trucks (net outlay), other vehicles, furniture, floor coverings, major appliances, small appliances and miscellaneous housewares, televisions, radios and sound equipment, and miscellaneous household equipment. The BLS publishes these categories from 1994 onward, so the durable series starts in 1994. The definition is narrower than that of Coibion et al. (2017), which also includes mortgage payments, property taxes, pensions, cash contributions, health care and education.

Deflation and units Each nondurable component is deflated by its CPI-U index (not seasonally adjusted, U.S. city average), averaged over the three months the interview covers: food, alcoholic beverages, tobacco and smoking products, gasoline, fuels and utilities, personal care, and public transportation. Household operations are deflated by the index for household furnishings and operations, because the index for household operations begins only in December 1997. Durables are deflated by the CPI-U for durables. Real spending is in 1982–84 dollars and is divided by the OECD equivalence scale (1 for the first adult, 0.7 for each additional adult and 0.5 for each child under

18). Nondurables enter in logs; durables enter as the inverse hyperbolic sine, which keeps the interviews with no durable purchases. The BLS changed the definition of food at home in the second quarter of 2007. The month fixed effects in the first-stage regression absorb level shifts common to all households, so the break affects the investor-minus-non-investor difference only if it differs between the two groups.