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Are Real Asset Owners Less Averse to Inflation? Evidence from Consumer Sentiments and Inflation Expectations*

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Abstract

Using data from the University of Michigan Surveys of Consumers, we document a significant negative association between consumer sentiment and inflation expectations, controlling for prevailing inflation in the economy. We further show that consumer sentiments of homeowners and stockowners are more sensitive to expected inflation than those of other consumers, a disparity at odds with the notion that owning such assets provides hedges against inflation. Leveraging data from the Survey of Consumer Expectations, we find three factors that help account for this difference. First, assets owners' outlook for the broad economy seems to be more sensitive to their inflation expectations than other consumers' outlook. Second, assets owners appear to expect income growth to lag spending growth by a wider margin than other consumers and that margin widens with inflation expectations. Third, homeowners' inflation expectations tend to be less variable and less volatile than those of renters, which may allow the former to have a greater bearing on consumer sentiments.

Keywords: Inflation expectations, consumer sentiments, homeownership, stockownership, rational inattention, inflation targeting

JEL Codes: D84, E31, E52, E58, G11, G41, R21

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1 Introduction

The notion that owning real assets (homes and stocks for example) provides a hedge against inflation dates back at least to Irving Fisher, and modern formulations are due to Bodie (1976) and Fama and Schwert (1977). Insofar as inflation is widely disliked (e.g. Shiller, 1997), real asset owners may be less averse to inflation because of this hedge. While the empirical merit of real assets as an inflation hedge has been a subject of active research, much less is known regarding the attitude toward inflation by asset ownership status. This paper attempts to bridge this gap in the literature and compare the dislike of inflation between real asset owners and other consumers. The results will in turn shed light on the perceived effectiveness of real assets as an inflation hedge. In addition, homeowners and stockowners account for the majority of aggregate income and consumption. A deeper understanding of how their sentiments react to inflation expectations may inform a range of monetary and economic policies.

Our analysis uses the University of Michigan Surveys of Consumers and follows the extant literature (e.g. Mishkin, 1978; Throop, 1992)in using consumer sentiments as a measure of the dislike of inflation. Inflation experienced by consumers can vary significantly because of their different locations, expenditure baskets, and shopping behaviors. Focusing only on the economy-wide inflation index will mask this important heterogeneity. Recent work surveyed in Weber et al. (2022) highlights how exposure to different price signals may lead to distinct inflation expectations.[1] In addition, Axelrod et al. (2018) show that consumers' inflation expectations largely reflect perceptions of the inflation they experienced. Accordingly, we study how consumers' sentiments comove with their own inflation expectations, as well as with the inflation in the economy.

We begin with an analysis of the general relationship between inflation expectations and consumer sentiment.[2] Consistent with the conventional wisdom that consumers dislike inflation, we find a pronounced negative association between an individual's inflation expectation and her sentiment even when accounting for the effect of the observed current inflation. In the simple model below that correlates monthly average consumer sentiments (ICS) with one-year ahead

[1]For example, D'Acunto et al. (2021a) document different price signal exposures by gender, and D'Acunto et al. (2021b) explore the link between consumers' grocery bundles and their perception on inflation.

[2]Some recent papers also explored the relationship between inflation expectations and other aspects of consumer expectations (for example, Candia et al., 2020; Kamdar, 2019).

inflation expectations ($E\pi^1$) in the survey and headline year-over-year inflation of the previous 12 months (π), a 1 percentage point increase in the one-year inflation expectation is associated with a 3.7-point (4.3 percent) lower consumer sentiment. The second line confirms the results in previous literature that higher inflation also leads to lower consumer sentiments (Throop, 1992; Mishkin, 1978). Note that when both $E\pi^1$ and π are included, only the coefficient of $E\pi^1$ remains statistically significant.

$$\begin{aligned}
\overline{ICS_t} &= \alpha - \underset{(0.29)}{3.68^{***}}\ \overline{E\pi_t^1} \\
&= \alpha - \underset{(0.18)}{2.06^{***}}\ \pi_t \\
&= \alpha - \underset{(0.64)}{3.50^{***}}\ \overline{E\pi_t^1} - \underset{(0.40)}{0.13}\ \pi_t.
\end{aligned}$$

More detailed analysis shows that such a relationship holds in consumer-level analysis as well even when controlling for an extensive array of demographic or socioeconomic variables that may also influence sentiments. Moreover, two additional patterns emerge from this analysis. First, the survey evidence also suggests that consumers dislike both the prospects of deflation and inflation, relative to zero or very modest inflation. Second, we show that the prospect of a 2-percent inflation rate did not appear to hit consumers' sweet spot, both before and after the central bank announced such an inflation target in 2012.

Turning to the gap by asset ownership, we find that homeowners' and stockowners' sentiments are *more* sensitive to their inflation expectations relative to other consumers' sentiments, controlling for observed inflation in the economy. This difference prevails across sub-sample periods between the early 1990s and 2022, holds consistently for subcomponents of the index of consumer sentiment (ICS), and remains significant when individual fixed-effects are taken into account. Our analysis indicates that the sensitivity gap is not driven by a selection effect where people more concerned about inflation buy homes and equity as a hedge. By contrast, it appears that the very act of purchasing a home (particularly young buyers) amplifies the sensitivity between sentiments and inflation expectations. We further demonstrate that the difference in sentiment-expectation sensitivity does not merely reflect asset owners' age, income, and education relative to other consumers.

This extra sensitivity among homeowners and stockowners is somewhat puzzling. It is not only at odds with such assets' possible role as an inflation hedge, but also suggests that well-to-

do households are more sensitive to the inflation outlook. Asset owners, on average, have higher income and net worth than non-owners, thereby more capable to weather adverse economic conditions brought by high inflation. Moreover, Carvalho and Nechio (2014) show that the average consumer seems to understand how monetary policy works and that higher inflation could harbinger tighter monetary policy as the central bank attempts to curb inflation. To the extent that such policy tends to disproportionately hurt poor consumers and exacerbate income and wealth inequality (Coibion et al., 2017), one may also expect sentiments of asset owners to be *less* sensitive to inflation expectations.

We take advantage of the Federal Reserve Bank of New York (New York Fed) Survey of Consumer Expectations (SCE) and present several distinctions between homeowners and renters expectations that may speak to this gap. First, relative to renters, homeowners tend to expect their own household income to grow at a slower pace than spending—a tendency Shiller (1997) described as a "sort of sticky-wage model"—and the margin widens with their inflation expectations. Second, while both homeowners and renters' labor and equity market prospects diminish with higher inflation expectations, the effects are consistently more pronounced for homeowners. Third, asset owners could be more attentive to economic news, including inflation dynamics. Our analysis shows that homeowners' inflation expectations appear to be less variable, less volatile, and demonstrate greater internal consistency within the survey. Thus, homeowners' sentiments being more sensitive to their inflation expectations is consistent with rational inattentive models (*a la* Sims, 2003) in which consumers choose how much to let inflation expectations weigh on their sentiments, taking into account the self-perceived reliability and consistency of their own expectations.

The fact that less attentive agents are not assigning a high weight to their own expectations can provide some comfort to central bankers regarding whether people pay attention to central bank communications and if they were well understood. Former Federal Reserve Chairman Ben S. Bernanke said in a recent Brookings lecture Bernanke (2022) that "*the question is whose inflation expectations matter... When I was a policy maker, I used to group respondents as high and low attention participants.*" If low-attention consumers nonetheless are equally confident about and act upon their expectations, they may have a sizable effect on the macroeconomy despite their less reliable expectations. Our results indicate that, instead, renters and non-

stock owners appear to be aware of their own low attention (or more noisy signal) and let their inflation expectations have a more limited bearing on sentiments.

We contribute to several research streams. First, our paper is related to the literature on people's attitudes towards inflation. In a seminal paper, Shiller (1997) conducted cross-country surveys and elicited responses that get to the economic rationale regarding the general dislike for inflation. Consistent with his results, we find that people whose sentiments are more sensitive to inflation tend to expect their income to grow at a lower rate than inflation (and expenses to grow at a faster rate than income). Our results are somewhat at odds with Easterly and Fischer (2001), who show that poor consumers dislike inflation more as their savings get hit harder and they have fewer hedges in place. By contrast, we find that assets owners, who tend to have greater wealth and income, are more sensitive to higher inflation expectations. Notably, Doepke and Schneider (2006) document the redistribution effect of inflation that shifts wealth from fixed-income asset holders to homeowners with mortgage debt. We find that borrowers who recently acquired a mortgage, arguably the unambiguous beneficiaries of such a redistribution, dislike inflation more than renters.

Second, our paper speaks to the merit of real estate and stock ownership as a hedge against inflation. A consensus appears to emerge from recent studies, indicating that owning real estate offers protection against inflation (see, for example, Sinai and Souleles, 2005), which Han (2010, 2013) notes as an important reason why people buy such properties. That said, whether stocks are as good a hedge remains an unsettled debate. Earlier empirical tests by Bodie (1976) and Fama and Schwert (1977) show that stock real returns are negatively correlated with inflation, denting stocks' potential as an inflation hedge. More recently, Cieslak and Pflueger (2023) show how supply- and demand-driven inflation may have different implications on asset returns, and Fang et al. (2022) show that stocks hedge against core inflation but not overall inflation. In addition, Bhamra et al. (2023) introduce a model that predicts higher expected inflation being associated with lower equity valuation. Regarding household portfolio choices, Yang (2022) shows that households with higher inflation expectations are more likely to invest in equity markets.[3] By contrast, Vellekoop (2023) shows that higher inflation expectations are associated with a lower equity investment share. These distinct results underscore the potential diverging

[3]These papers also provide extensive surveys of recent work in this area.

views among households regarding whether stocks work as an effective hedge of inflation, and our results indicate that they do not feel sufficiently hedged.

Third, this paper also belongs to the growing work that studies differences in the expectations of homeowners and renters. Favara and Song (2014) serves as an early theoretical study on the subject. A nascent literature subsequently emerged that examines the perception of house price volatility among homeowners and renters (see, for example, Adelino et al., 2018; Leombroni et al., 2020). More recently using German survey evidence Kindermann et al. (2021) show that the inflation forecasts of renters have a higher dispersion, and we find a similar pattern in the U.S. survey data.

Fourth, we note that in standard New Keynesian models, inflation expectations matter through their effects on future inflation. This paradigm recently received a skeptical review in Rudd (2021). If inflation expectations have a bearing on consumer sentiments independent of the realized inflation, they will affect contemporaneous (and future) consumption and savings through the channel of consumer sentiments (Barsky and Sims, 2012). For example, Vellekoop and Wiederhold (2019) show that households with higher inflation expectations save less and are more likely to buy expensive cars. By contrast, Coibion et al. (2023) show reduced inflation expectations lead to higher spending on durable goods by Dutch households. As homeowners and stockowners account for a large share of aggregate consumption, understanding how their sentiments react to inflation expectations is important for policy makers.[4]

We point out two recent papers related to our analysis. First, Ahn et al. (2022) explore the role of homeownership in how effective monetary policy is at altering households' expectations. They find that homeowners are more likely than renters to revise down near-term inflation expectations and labor market prospects in response to a rise in mortgage rates, a pattern they attribute to the former's attentiveness to economic news and monetary policy moves. Our findings are broadly consistent with Ahn et al. (2022) and focus on how expectations and sentiments are correlated. Second, Kamdar (2019) explores the broad linkage among household expectations on various aspects of personal and broad economic conditions and postulates sentiments as the underlying driver of consumer expectations. Different from this approach, we interpret

[4]Data from the Consumer Expenditure Survey suggest that homeowners account for nearly 80 percent of total consumption expenditures. Data on stockowners are hard to come by, but from the Survey of Consumer Finances, we know that roughly 50 percent of U.S. households hold stocks and account for roughly 60 percent of food consumption.

sentiments as an outcome that summarizes and reflects consumers' reading of economic news and their economic expectations. That said, we acknowledge that part of consumer sentiments can change independent of moves in economic news—the "animal spirit"—which may in turn affect consumer economic expectations.

Relatedly, it is important to caveat that our analysis does not necessarily speak to a causal relationship between consumer expectations and sentiments—particularly when they are measured in the same household surveys. Our sentiment measure is a composite index summarizing consumer assessments on own and broad economic conditions. It is possible that these responses and their inflation expectations reflected some common underlying factors—similar to the underlying sentiments in Kamdar (2019).

The remainder of the paper proceeds as follows: Section 2 introduces the two survey datasets; Section 3 documents the baseline relationship between inflation expectations and consumer sentiments; Section 4 discusses the differences in this sensitivity between asset owners and other consumers; Section 5 explores the factors that can and cannot lead to such a sensitivity gap; and Section 6 concludes.

2 Data Description

2.1 University of Michigan Surveys of Consumers

We use the consumer sentiments and inflation expectations data collected in the Thomson Reuters/University of Michigan Surveys of Consumers (SCA), which is used to build the monthly ICS. Introduced in the late 1940s, this index has established itself as one of the most widely followed indicators of household sentiments about current and future economic and business conditions. Regarding inflation expectations, Ang, Bakaert, and Wei (2007) find that the mean inflation projection of the survey outperforms statistical time series and term structure forecast models.

Since 1978, the SCA has been conducting monthly surveys of a minimum of 500 consumers (more than 600 in recent years), the majority of whom were contacted within about two weeks. Our sample covers the period from 1978 to December 2022, containing nearly 45 years' worth of data. The long sample period enables us to study consumers' inflation aversion in different inflation environments. Each month, the SCA asks about 50 core questions broadly related to

consumers' assessments of current economic conditions and their expectations about the future economic conditions of both their households and the economy. Five of these questions are used in estimating the ICS, of which two are about personal finance situations and outlook, two about the economy, and one about durable goods purchase decisions.

1. $PAGO$. "Would you say that you (and your family living there) are better off or worse off financially than you were a year ago?"

2. $PEXP$. "Now looking ahead–do you think that a year from now you (and your family living there) will be better off financially, or worse off, or just about the same as now?"

3. $BUS12$. "Now turning to business conditions in the country as a whole—do you think that during the next twelve months we'll have good times financially, or bad times, or what?"

4. $BUS5$. "Looking ahead, which would you say is more likely—that in the country as a whole we'll have continuous good times during the next five years or so, or that we will have periods of widespread unemployment or depression, or what?"

5. DUR. "About the big things people buy for their homes–such as furniture, a refrigerator, stove, television, and things like that, generally speaking, do you think now is a good or bad time for people to buy major household items?"

Specifically, $PAGO$ and DUR are used to construct the index of current economic conditions (ICC), whereas $PEXP$, $BUS12$, and $BUS5$ are ingredients of the index of consumer expectations (ICE). The headline ICS combines the ICC and the ICE.[5]

In addition, the survey collects information on one- and five-year-ahead inflation expectations, key demographic characteristics, as well as homeownership and stockownership. The five-year inflation expectation data started in 1980 and have been consistently collected on a monthly frequency from 1991. The homeownership and stockownership data began in 1990 and 1997, with continuous monthly data available from 1993 and 1999, respectively. Another feature of the SCA is that 40 percent of the consumers interviewed for the first time were contacted again in six months, offering a short longitudinal structure that allow for controlling for individual fixed effects.

2.2 Survey of Consumer Expectations

In addition to the SCA data, we use the SCE conducted by the New York Fed. The SCE is an internet-based survey, the respondents of which are interviewed monthly for up to 12 consecutive

[5]See Ludvigson (2004) for a detailed discussion on the construction of the Michigan ICS.

months before being rotated out and new respondents added to the panel. The SCE collects a wide range of data on consumer expectations and behaviors. In addition to inflation, the SCE asks about consumer expectations on household spending and income growth over the next 12 months.

Regarding inflation expectations, besides the standard question on the inflation rate, the SCE asks respondents to provide probabilities over a support of 10 symmetrical bins of possible values of inflation, from which a parametric density function is derived, the variance of which illustrates the degree of uncertainty consumers have over the future inflation outlook. The SCE inflation data have two reference periods—one year ahead and three years ahead, and our analysis will focus on the one-year-ahead expectation to facilitate comparison with the SCA data.[6] Furthermore, because each consumer participates in this survey up to 12 months, we can infer how much individual inflation expectations evolve and change over time. Thus, the SCE data not only provide central tendency estimates of inflation expectations, but also their subject uncertainty and dynamic variability and dispersion (see Fermand et al. (2018) for a detailed discussion of the SCE data and the uncertainty measures of expectations). We use the SCE data from June 2013 to December 2022, covering nearly 10 years. We restrict the sample to those consumers with valid inflation, income growth, and spending growth expectations, and the sample has more than 126,000 observations, over 1,000 per month.

The weighted summary statistics of key variables on inflation expectations, sentiments, assets ownership, and demographics of the SCA and the SCE are shown in table 1. One caveat of using survey-based inflation expectation data is that surveys often contain extreme values. Accordingly, our analysis uses observations with inflation expectations within the range of -25 percent to +25 percent. That said, our main results are robust to outliers and various winsorizing thresholds. Comparing the first two rows of columns 4–5, there is an appreciable gap between $E\pi^1$ and the mean of the derived density function of $E\pi^1$, both in terms of the sample mean and median. Moreover, the variance of the derived density function is quite sizeable, suggesting consumers assign significant weights on a wide range of inflation scenarios.

In addition, figure 1 plots the standard deviations of the monthly cross-consumer distributions of the sentiment index and the one-year ahead inflation expectation, measuring the dis-

[6]The SCE added a five-year ahead inflation expectation amid heightened inflation in 2022, but the sample is currently too short for our analysis.

persions of these two survey responses. Interestingly, as the dispersion of inflation expectations jumped in recent years as inflation surged, the dispersion of consumer sentiments plummeted before rebounding somewhat in 2022. The diverging dynamics of the two dispersion series indicates heterogeneous relationships between inflation expectations and consumer sentiments. If the inflation expectation-sentiment link is uniform across consumers, we would expect these two dispersion series to move in the same direction.

3 Inflation Expectations and Consumer Sentiments

As discussed above, the monthly average $E\pi$ among surveyed consumers is negatively associated with $\overline{ICS}$ (the monthly average of ICS), even controlling for the prevailing inflation π. We proceed to estimate the following more elaborate model using consumer-level data to characterize this relationship

$$Sentiment_i = \alpha + \beta E\pi_i + \gamma\pi + \theta Z_i + Age_i + Year + Month + \varepsilon_i, \tag{1}$$

where Z is a vector of demographic controls that include race, gender, marital status, educational attainment, and log of real income. Age, $Year$, and $Month$ are respective fixed effects to control for lifecycle, business cycle, and seasonal factors. Note again that $E\pi_{i,t}$ is the expected one-year (five-year) inflation of the next year (five years).[7]

3.1 The baseline results

The results, as reported in table 2, confirm a significant negative correlation between inflation expectations and consumer sentiments—both their views of current economic conditions and outlook for the future. For example, as shown in column 1, if the one-year inflation expectation, $E\pi^1$, is 1 percentage point higher, the ICS is about 1.3 point lower (1.5 percent of the sample mean and 3.2 percent of the sample standard deviation). Similarly, when $E\pi^5$ is 1 percentage point higher, the ICS is 1 point lower (column 7). The results are qualitatively similar for the two components of the ICS. The estimated coefficient is larger for the ICE than for the ICC, consistent with inflation expectations affecting forward-looking sentiments more than contemporaneous sentiments. The models that control for the prevailing inflation in the economy

[7]Throughout the paper, we report standard errors clustered at the year-month level. The standard error estimates are not particularly sensitive to the level of clustering.

over the previous one and five years yield largely the same results across the three indexes. As reported in the even-numbered columns, the point estimates of $E\pi^1$ and $E\pi^5$ coefficients are little changed when controlling for π, and adding π lends little boost to the R-squared of the models. Overall, the baseline results demonstrate that consumers' inflation expectations have a strong statistical association with their sentiments, and this relationship appears to be above and beyond how prevailing inflation may affect consumer sentiments.

Looking at the estimated coefficients of other control variables, male consumers tend to report substantially higher sentiments than female consumers, married consumers have slightly lower sentiments, and sentiments rose with both education and income, consistently. Finally, the estimated age fixed effects (not shown) indicate that the average consumer sentiment declines considerable with age through 75, beyond which the estimates become more volatile.

3.2 Decomposing inflation expectations

We further decompose $E\pi^1$ into observed inflation and idiosyncratic shocks, in both a backward and a forward fashion. In the backward decomposition, we project $E\pi^1_{i,t}$ on contemporaneous and lagged one-year inflation of the previous three years:

$$E\pi^1_{i,t} = \psi_0\pi^1_t + \psi_1\pi^1_{t-12} + \psi_2\pi^1_{t-24} + \psi_3\pi^1_{t-36} + res^b_{i,t}, \tag{2}$$

and create the predicted $\widehat{E\pi^1_{i,t}}$ and the residual term, res^b. In the forward looking decomposition, we simply write

$$E\pi^1_{i,t} = \pi^1_{t+12} + res^f_{i,t}, \tag{3}$$

where π^1_{t+12} is the 12-month inflation rate observed at month $t+12$ that corresponds to the expected inflation. Put differently, π^1_{t+12} is the perfect-foresight component of $E\pi^1_t$ and $res^f_{i,t}$ is the idiosyncratic forecast error component.

We estimate equation 1, replacing $E\pi$ with the predictable and residual components. For the backward-looking decomposition, we find that consumer sentiment ICS responds to both the component that reflects recent observed inflation and the component that reflects idiosyncratic noise, and the sensitivity is much larger for the predictable component. In the forward-looking decomposition, consumer sentiment responds to both the perfect-foresight and the forecast-error

components with largely equal sensitivities.

$$Sentiment_i = \alpha \underset{(0.89)}{-3.18^{***}} \widehat{E\pi^1_{i,t}} \underset{(0.04)}{-1.30^{***}} res^b + \ controls,$$

and

$$Sentiment_i = \alpha \underset{(0.49)}{-1.22^{***}} \pi^1_{t+12} \underset{(0.04)}{-1.22^{***}} res^f + \ controls.$$

3.3 Subperiod analysis

While both the observed and expected inflation weighed down consumer sentiments in the whole sample, the effects of inflation expectations are more stable and statistically significant through various subsample periods. Figure 2 plots the β and γ coefficients in equation 1 estimated using five-year intervals from 1981 to 2020, with the last interval covering the most recent high-inflation era of 2021–22. We use the middle year to index each of the five-year intervals. As shown in the two left panels, both one- and five-year expectations have a consistent negative bearing on sentiments, with the size of the coefficients ballooning in the past three decades. By contrast, the association between observed inflation and consumer sentiments varied between negative and positive values and was often not statistically significant.

Several factors may have driven this difference. First, the headline inflation likely is correlated with other aspects of the macroeconomy and often ticked up during expansion episodes, when sentiments were higher. By contrast, higher inflation expectations may not result from consumers being confident about the economy. Relatedly, individual expectations may reflect personal experience, which can have a more direct influence on their own sentiments. Finally, inflation expectations collected in consumer surveys have sizeable cross-section variations, whereas the headline inflation has only time-series variations.

3.4 A nonlinear relationship

We then replace $E\pi$ with an array of bins corresponding to specific values of inflation expectations, with $E\pi = 0$ being the omitted group, and test if this relationship is monotonic and linear.[8] As shown in the top-left panel of figure 3, the estimated coefficients of these bins indicate

[8]SCA inflation expectations take integer values. These bins are constructed as <-5%, [-5%, -1%], 1%, 2%, 3%, 4%, 5%, [6%, 9%], 10%, [11%, 15%], >10%. Fewer consumers had negative inflation expectations, and we

that expectations of both deflation and inflation appear to be associated with lower sentiments. A deflation expectation greater than 5 percent is associated with an 8 point lower sentiment, and an inflation expectation greater than 5 percent on average implies sentiments to be 15 points lower. Note that, despite the 2 percent inflation targeting by the Federal Reserve, 0 and 1 percent inflation appeared to be consumers' sweetspots, associated with the highest sentiment levels. Interestingly, as illustrated in the top-right panel, compared with the 10 years (1992–2011) before the inflation target announcement, the sentiment response curve rotated steeper in the 2013–22 period. Moreover, the results on five-year inflation expectations, reported in bottom panels, are qualitatively similar.

4 Whose Sentiments Are More Sensitive to Inflation Expectations?

4.1 The role of asset ownership

We now turn to the question of whether the relationship between inflation expectations and consumer sentiments varies by consumer assets ownership. If consumers perceive holding real assets (e.g. homes and stocks) as providing a hedge against inflation, assets owners' sentiments will feel protected and insulated from inflation, thereby with their sentiments less responsive to their own inflation expectations, other factors hold constant. The results derived from estimating the model below suggest the opposite.[9]

$$\begin{aligned} Sentiment_i &= \alpha + \beta_1 E\pi_i + \beta_2 E\pi_i \times Homeowner_i \,(Stockowner_i) \\ &\quad + \theta Z_i + Age_i + Year + Month + \varepsilon_i, \end{aligned} \tag{4}$$

As shown in table 3, the estimated β_2 coefficients of the interaction term suggest that sentiments of both homeowners and stockowners are, on average, 40 percent more sensitive to their own one-year inflation expectations (columns 1 and 2). Specifically, a 1 percentage point increase in expectation is associated with 1.23 points lower in the ICS for renters, but homeowners'

use coarser bins in the negative territory. Number of consumers generally diminishes with the level of inflation expectation, with 10% being an exception likely because of bundling.

[9]The homeownership and stockownership data are available from the 1990s. In addition, to keep the model parsimonious, we do not include observed inflation as a control in the baseline model. Including it does not qualitatively change the results.

sentiments are a further 0.59 point lower. Similarly, a 1 percentage point increase in expectation is associated with 1.45 points lower in sentiment ICS for non-stock owners, but stock owners' sentiments are a further 0.64 point lower. Moreover, the sensitivity gap widens to 60–80 percent with respect to five-year expectations (columns 3 and 4). Homeowners, on average, have similar levels of sentiments as otherwise comparable renters, whereas stock owners have a significantly higher level of sentiments (5–6 points) than comparable nonowners. The same disparities hold for the ICC and the ICE as well (not shown).

4.2 This is a robust relationship

The results that homeowners' and stockowners' sentiments being more sensitive to their inflation expectations are robust. To begin, we estimate the model using shorter five-year subsamples to test whether the sensitivity gaps prevailed generally or concentrated only in certain periods.[10] As shown in figure 4, the gaps in sentiment sensitivity regarding inflation expectations between asset owners and nonowners largely prevailed through the sample period when ownership data are available, with the exception that in certain subperiods (such as 2006–10), the β coefficients become marginally insignificant. Overtime, the sensitivity gaps largely drifted wider. For example, the top-left panel indicates that the β coefficient estimated for homeowners' one-year expectations was -0.26 during 1991–95, and the gap, on net, widened to more than -0.8 during the 2021–22 period. Results of the ICE and the ICC are similar qualitatively (not shown).

Second, because the SCA sentiment index is a composite that summarizes consumer responses to five survey questions, we want to understand whether assets owners' higher sensitivity holds regarding the responses to all five questions. To do so, we estimate a modified equation 6, replacing the sentiment index with each of the five responses. Because these responses have categorical values, we estimate an ordered logit model, with a *positive* coefficient indicating an association with a more *pessimistic* response. For example, to answer the $PAGO$ question "Would you say that you (and your family living there) are better off or worse off financially than you were a year ago?" consumers may choose from three options—"better now," "same," and "worse now." In the order logit model, "same" is ranked as a more pessimistic response than "better now," and "worse now" is ranked as more pessimistic than the other two responses.

[10] Because of the availability of homeownership and stockownership data, the sample sizes are smaller in early subsample periods.

The estimated coefficients of $E\pi$ and $E\pi\times$ homeowner (stock owner) reported in table 4 are all positive across five questions and for both one- and five-year inflation expectations. The results therefore indicate a consistent negative relationship between inflation expectations and various ingredients of consumer sentiments and suggest that such a relationship is more pronounced among homeowners and stockowners. Taking the estimates in the $BUS12$ column as an example, the odds ratios implied by the estimated coefficients suggest that a 1 percentage point higher one-year inflation expectation is associated with 6.6 percent higher odds of having a more pessimistic response to the $BUS12$ question "Now turning to business conditions in the country as a whole—do you think that during the next twelve months we'll have good times financially, or bad times, or what?" and the likelihood for a more pessimistic response is an extra 2.6 percent higher among homeowners.

Third, we explore whether our results reflect an individual fixed effect. If for some reason assets owners tend to, on average, have higher inflation expectations and more bearish sentiments, we will have a negative β_2 coefficient that does not speak to the relationship between $E\pi$ and sentiments. To do so, we take advantage of the short-panel structure of the SCA and estimate the following model

$$\begin{aligned} \Delta ICS_i &= \alpha + \beta_1 \Delta E\pi_i + \beta_2 \Delta E\pi_i \times Homeowner_i \ (Stockowner_i) \\ &\quad + \gamma \Delta Z_i + Age_i + Year + Month + \varepsilon_i, \end{aligned} \tag{5}$$

where the six-month changes in sentiment, ΔICS, is projected with the changes in inflation expectations $\Delta E\pi$. The model also includes changes in marital status (remaining single, becoming married, and becoming divorced, with remaining married being the omitted group), income growth, and static demographic characteristics, such as race and education levels. The sample includes the consumers who were interviewed twice six months apart (roughly 40 percent of the survey) and had no change in homeownership and stockownership status in both interviews. The results, reported in table 5, also consistently indicate that homeowners' and stockowners' sentiments are more sensitive to the fluctuations of their own inflation expectations during a six-month period. For example, as shown in column 1, homeowners whose one-year inflation expectations increase one more percentage point during a six-month period will on average report an additional 0.23 point lower sentiment relative to comparable renters, whereas the margin widens to 0.38 point for five-year expectations (column 3). This pattern also holds for stock

owners relative to nonowners with respect to both one- and five-year expectations (columns 2 and 4).

4.3 Having a mortgage does not lower the sensitivity

More than 60 percent of U.S. homeowners have a mortgage, the vast majority of which are fixed-rate mortgages. The interest rates of these mortgages are fixed and not going to increase with market interest rates, which tend to rise with higher inflation. However, if market interest rates decline, fixed-rate mortgage borrowers have the option to refinance into mortgages with lower interest rates. Thus, having mortgages is often viewed as effectively insulating homeowners from the effects of inflation. Doepke and Schneider (2006) explore the redistribution effect of inflation that shifts wealth from fixed-income asset holders to homeowners with mortgage debt. Accordingly, we expect mortgage borrowers' sentiments to be less associated with their inflation outlooks, even without taking into account the effects of house price appreciation.

The SCA does not collect consistent mortgage information among homeowners, and we cannot test this hypothesis using a representative sample of mortgage borrowers. The SCA, however, collects refinancing information three times a year from 2005. From February 2005 to June 2022, we have a sample of 960 homeowners who had refinanced their mortgages within the six months before the survey. These homeowners are therefore most likely to continue to owe mortgages at the time of the survey. We replace the *homeowner* dummy and the interaction term in equation 6 with a $refi$ dummy to contrast the sensitivity between these mortgage borrowers and renters. We estimate the model using data from 2005 to 2022 and remove homeowners who did not refinance their mortgage, leaving a sample size of 22,800.

$$\underset{}{Sentiment_i} = \alpha \underset{(0.073)}{- 1.707^{***} E\pi_i} \underset{(0.345)}{- 0.673^{*} E\pi_i \times Refi_i} \underset{(1.881)}{+ 1.823 Refi} + \ controls.$$

As shown in the model above, the coefficient of the $E\pi \times Refi$ interaction term remains negative and statistically significant (p-value = 0.053), indicating that sentiments of mortgage borrowers who recently refinanced are more sensitive to inflation expectations than those of renters.

5 Factors That Lead to Different Levels of Sentiment Sensitivity

The standard theory points to the hedging value of real estate properties and stocks against inflation. The robust, pronounced sensitivity gap in how homeowners' and stockowners' sentiments are associated with their inflation expectations therefore prompted the question—"Why?"

5.1 This is not merely a selection effect

One possible factor accounting for the sensitivity gap is the selection bias, namely, individuals more concerned about inflation are more likely to buy homes and equity as a hedge. Should such assets provide only the hedging that partially offsets their concerns, their consumer sentiments may remain more sensitive to inflation expectations. To test the hypothesis of selection bias, we focus on the consumers who were surveyed twice and changed ownership status from renter to owners between the two interviews, whom we refer to as the buyers. We construct a sample of renters who were interviewed again in six months. We then estimate the following variation of equation 6 separately for the two interviews.

$$Sentiment_i^{\kappa} = \alpha + \beta_1 E\pi_i^{\kappa} + \beta_2 E\pi \times Buyer_i + \theta Z_i + Age_i + Year + Month + \varepsilon_i,$$

where κ indexes the first and second interviews. Note that buyers were renters in the first interview and became homeowners in the second.

Under the selection-bias hypothesis, β_2 should be negative in both interviews. The results, reported in table 6, show the opposite. In the entire renter-sample, the coefficient of $E\pi\times$ *Buyer* is an imprecisely estimated small, positive number in the first interview. In the second interview, after buyers became homeowners, the coefficient becomes a more sizeable, negative number. While remaining statistically insignificant, the t-statistic is about 1.57, with an implied p-value of 0.12. Focusing on a subsample of renters who were younger than 50, the first-interview coefficient of the interaction term becomes close to zero, whereas the second-interview coefficient has a larger magnitude and is statistically significant (p-value = 0.057). We also note that buying a home appears to boost sentiments to a certain extent as the coefficient of the *Buyer* dummy flipped to positive in the second interview. At the face value, these results appear to indicate that *becoming* a homeowner led a consumer's sentiment to be more closely linked to

the consumer's own inflation expectations.

5.2 This is not only driven by age, education, and income differences

Table 7 shows that the sensitivity differences documented above are not merely an age, education, or income effect, despite the correlation of homeownership and stockownership with these factors. We add to equation 6 interaction terms between $E\pi$ and brackets of age, educational attainment, and income quartile. Consumers younger than age 26, with below high-school education, and in the bottom income quartile are the respective omitted groups. While both $E\pi \times$ *homeowner* and $E\pi \times$ *stock owner* coefficients are somewhat smaller than in the baseline results (table 3), they remain negative when various interaction terms are included in the baseline model despite the inclusion of additional interaction terms.

The estimated coefficients of the interaction terms, presented in figure 5, shed additional light on how the sensitivity between sentiments and inflation expectations differs across consumers. As shown in the top panel, relative to the youngest consumers, inflation expectations appear to have a more negative bearing on sentiments that peaks in the 55–65 age bucket before lessening somewhat for consumers over age 65. Because the model was not estimated using longitudinal data, we caution interpreting the result as a lifecycle effect. That said, the trend is broadly consistent with Doepke and Schneider (2006) in that inflation tends to redistribute wealth from older, fixed-income asset holders to younger cohorts. It is also noteworthy that our result indicates that the consumers about to retire and those early in retirement (56–75) are the most averse to inflation, suggesting that such an age differential partly reflects a concern over retirement. Indeed, the ICS-$E\pi$ sensitivity diminishes appreciably with the perceived chance of having adequate financial resources during retirement (not shown).[11] Turning to the bottom-left panel, there appears to be a steep education gradient, with sentiments of those with higher education being more sensitive to inflation expectations. Interestingly, the estimated coefficients are relatively flat across income quartiles (bottom-right panel). Even in a model not including age- or education-interaction terms, the estimated sensitivity is quite similar in the top three quartiles of the income distribution, which is only moderately lower than that estimated for the bottom quartile.

[11] The SCA asks "What do you think the chances are that (when you retire,) your income from Social Security and job pensions will be adequate to maintain your living standards?" (PSSA)

5.3 This is not an asset return effect

Another possible explanation is asset owners' concern that the returns they earn on their holdings are not catching up with inflation. Should this concern be true, we expect asset owners' additional dislike of expected inflation to subside when houses are appreciating in value or when their stock portfolio is doing well. We create dummy variables that indicate whether the homeowner was surveyed when the house price increase was particularly high or low—nationwide or in her own county.[12] For example, $High\Delta HPI^{Nat}$ indicates a month in the top quartile of the three-month national house price change distribution, whereas $High\Delta HPI^{Local}$ indicates the county in the top quartile of the house price increase distribution of a given month. Similarly, $Low\Delta HPI$ indicates bottom quartiles of respective distributions. We then add the triple-interaction term, $E\pi \times Homeowner \times High(Low)\ \Delta HPI$, to the baseline model.

Interestingly, the results in table 8 show that sentiments of homeowners experiencing higher national house price increases are even more sensitive to their inflation expectations. For example, the estimated coefficient of $E\pi \times\ High\ \Delta HPI^{Nat}$ is over -0.5 (column 1), suggesting that compared with months when national house price changes were in the three lower quartiles of the distribution, the sensitivity gap between homeowners and renters more than doubled in months when house price changes were in the top quartile. By contrast, the coefficient of $E\pi \times\ Low\ \Delta HPI^{Nat}$ is 0.4 (column 2), suggesting a narrower sensitivity gap in months of low house price appreciation. Moreover, while homeowners in high-house price growth counties do not have extra sensitivity (column 3), those in low-growth counties demonstrate significantly lower sensitivity (column 4). Further, interacting $E\pi$ with a survey-measure of expected house price changes that was collected for homeowners only and re-estimating the model using the homeowner subsample also yields results that indicate higher house price growth expectations being associated with greater sensitivity between $E\pi$ and consumer sentiments.[13] As shown in column 5, the coefficient of $E\pi$ estimated with the homeowner subsample is 2.08, appreciably higher than those in columns 1–4. While higher house price changes are associated with rosier sentiments, the coefficient on the interaction term $E\pi\ \times\ E\Delta HPI^{Local}$ is negative and statistically significant. These results suggest the sensitivity gap does not reflect homeowners' concerns

[12] We use the CoreLogic Home Prices Indexes.

[13] The SCA asks homeowners "By about what percent do you expect prices of homes like yours in your community to go (up/down), on average, over the next 12 months?"

on house price changes.

With respect to stockowners, the results regarding the S&P 500 index three-month returns (columns 5 and 6) are similar to those in columns 1 and 2. Sentiments of stockowners appear to be more sensitive to inflation expectations when S&P returns are high. Finally, as a placebo test, we find that the relationship between stock owners' sentiments and inflation expectations does not vary by local house price changes, low or high (columns 7 and 8). We also note that, in results not shown, defining the quartiles using real returns, the spreads between house or stock price changes and observed inflation, yields the same results qualitatively.

5.4 Views of the broad economy

Our analysis demonstrated that inflation expectations appear to have a larger drag on sentiments among homeowners and stockowners relative to other consumers, and results in table 4 confirm that the gap prevails across the five components of the composite sentiment index (ICS). These components mainly concern current and future personal and business conditions. We now ask whether the results reflect a similar gap with respect to consumers' outlook for more tangible aspects the economy. Specifically, we explore survey responses related to the labor, housing, and equity markets in both the Michigan SCA and the New York Fed SCE. The SCA asks "Do you think that there will be more unemployment than now, about the same, or less (during the coming 12 months?" The SCE collects data on consumers' self-reported "percent chance that 12 months from now the unemployment rate in the U.S. will be higher than it is now" and the percent chance that they will lose their jobs in the next 12 months. In addition, the SCE asks about "the percent chance that 12 months from now, on average, stock prices in the U.S. stock market will be higher than they are now" and the average home price change during the next 12 months. We estimate the relationship between $E\pi$ and $E\pi\times$ homeowner (stock owner) with these responses using models similar to equation 6 and the results are reported in table 9.

Columns 1–4 presents the ordered logit regression (similar to table 4) estimates of the Michigan SCA response on the unemployment direction. All coefficients of $E\pi$ are positive and statistically significant, suggesting that higher inflation expectations are correlated with more pessimistic outlooks on the labor market. Such a pattern is consistent with Kamdar (2019) and Candia et al. (2020), where the latter documented higher household inflation expectations being

associated with lower output growth expectations in major advanced economies. Furthermore, the coefficients of $E\pi\times$ homeowner (stock owner) are also positive and statistically significant, suggesting that the relationship is larger for assets owners. As an example, in column 1, the odds ratios implied by the estimated coefficients suggest that a 1 percentage point higher one-year inflation expectation is associated with 6.0 percent higher odds of having a more pessimistic response, and an additional 1.5 percent higher for homeowners.

Moving to the New York Fed SCE results, we focus on the differences between homeowners and renters because the survey does not consistently collect stock ownership information. We note that higher inflation expectations are correlated with higher expected chances of national unemployment going up (column 5), higher expected chances of losing one's job (column 6), and higher expected national house price changes (column 7), but lower expected chances of stock prices going higher (column 8)—all pessimistic outlooks. Higher inflation expectations of homeowners predict an additional pessimistic outlook for national unemployment but, interestingly, not for a homeowner's own job security. Moreover, higher inflation expectations of homeowners are also associated with more negative outlooks in the housing and equity markets. On balance, results in table 9 are consistent with the conjecture that homeowners' outlooks of the economy are more sensitive (pessimistically) to their inflation expectations. The results (not shown) are quite similar when we use the mean of the derived probabilistic distribution of inflation expectations, a unique feature of the SCE.

5.5 Household spending and income growth

In addition to outlooks pertinent to the national economy and markets, we turn to the expected growth of household spending and income available in the New York Fed SCE survey. Both (nominal) spending and income are likely to rise more when inflation runs high. If income outgrows spending, consumer sentiments may react less negatively to expected inflation and more negatively if spending is expected to outgrow income. We estimate the following model:

$$E\Delta C\%_{i,t} - E\Delta Y\%_{i,t} = \alpha + \beta_1 E\pi_{i,t} + \beta_2 E\pi_{i,t} \times Homeowner_i + \theta Z_i + Age_i + Year_t + Month_t + \varepsilon_{i,t}, \tag{6}$$

where $E\Delta C\% - E\Delta Y\%$ is the gap between expected household spending growth and expected household income growth over the next year, and other variables are defined as in previous

equations. The results are reported in table 10. The first four columns use the reported expected inflation rate and the latter four the estimated mean of the derived distribution of expected inflation. As shown in column 1, the expected spending and income growth gap is positively associated with inflation expectations. When consumers expect higher inflation in the next 12 months, they also tend to expect household spending to outgrow income by a higher margin. Both spending and income growth may vary over the lifecycle and with demographic and socioeconomic characteristics, and our control variables pick up such effects. Furthermore, this margin tends to be higher for homeowners than renters (column 2), consistent with the sentiment–inflation expectation sensitivity differentials.

The results are qualitatively the same when estimated using a sample of consumers between ages 20 and 65 (column 3), whose income is less likely to be retirement related or fixed-income based. Because the SCE expectations are about household (instead of individual) spending and income growth, we further estimate the model using a sample of consumers who are single—to better align individual expectations and household variables—and using expected salary growth instead of household income growth with a sample of workers. These results (columns 4 and 5) confirm the finding that homeowners' inflation expectations have a great bearing on the expected gap between spending and income growth over the next 12 months. Finally, all the results hold for the mean of the derived distribution of inflation expectations (columns 6–10).

Leveraging the SCE's longitudinal structure, the results also hold broadly when we replace the gap between expected spending and income growth with one-, three-, and six-month changes of the gap and replace inflation expectations with their changes in the same respective month-intervals. As shown in table 11, for both one- and six-month time intervals, larger increases in inflation expectations are associated with greater widening of the expected spending-income growth gap, and the estimated coefficients are statistically significant. Put differently, consumers who have a higher inflation expectation than, say, six months ago also report a wider gap between expected growth of spending and income, and the widening is more pronounced for homeowners than renters. For three-month changes, the estimates coefficients are positive but not statistically significant.

Overall, the analysis indicates that consumers generally expect income growth to fall short of spending growth with higher inflation. This result is consistent with recent work documented

in Hajdini et al. (2018), who use a different survey and estimate that the rate of pass-through from expected inflation to expected income growth is on the order of 20 percent.

5.6 The (self-perceived) reliability of inflation expectations

We now explore whether inflation expectations of homeowners and renters demonstrate different levels of uncertainty in a given month and greater dynamic variability over time. Following Fermand et al. (2018), we use the distribution variance and the inner-quartile range ($75^{th} - 25^{th}$) as measures of expectation uncertainty and intratemporal variability. Moreover, we use the difference between the expected inflation rate and the mean of derived-inflation expectation as a measure of intratemporal consistency. Large deviations of the reported expected inflation rate from the mean of the derived distribution indicate either a consumer's lack of a coherent view on the inflation outlook or a skewed distribution of future inflation. Regarding the second possibility, using the modal expectation instead of the distribution mean yields qualitatively similar results.

As in models above, we contrast homeowners with renters regarding the uncertainty and variability of their inflation expectations. As shown in table 12, our estimates consistently indicate that $E\pi$ of homeowners demonstrate less uncertainty and less inconsistency than renters during the same month (columns 1–3). In addition, we consider the dynamic variability, calculated as the maximum–minimum difference of inflation expectations reported by the same consumer during the time she participates in the survey (up to 12 months). As in the other results, the estimates in column 4 show homeowners demonstrate less volatility of their expectations to a significant extent.

We then show that the more subdued variability in inflation expectations of homeowners is not merely a result of homeowners being more financially savvy than renters. The SCE asks respondents to answer five questions to infer their understanding and knowledge on simple financial concepts (probability and compound interest, for example). These and similar survey questions have been used extensively in research of consumer financial literacy. We accordingly define a consumer as having high financial literacy if the individual has all five correct answers (41 percent of the sample). While a greater share of homeowners have high financial literacy, after we control for the socioeconomic and demographic factors, the gap becomes modest (2.8

percent). Controlling for levels of consumer financial literacy, as shown in columns 5–8, does not qualitatively change our results. While the high-literacy indicator is a potent predictor for inflation expectation variability, homeowners continue to have significantly lower intra- and inter-temporal variations in their expectations.

These results, taken together, support the notion that consumers have different levels of attentiveness on economic news and dynamics, which may lead to various levels of accuracy of economic expectations, including inflation expectations. Consumers are aware of the reliability of their own expectations and let them weigh on their sentiments to different extent accordingly.

6 Concluding Remarks

Inflation is back. Does owning real estate and stocks make people feel protected and insulated from inflation? Our analysis points to the opposite. Sentiments of homeowners and stockowners appear to be more sensitive to their own inflation expectations than other consumers. Such a sensitivity gap is not driven by selection biases and cannot be accounted for by differences in age, education, and income between asset owners and nonowners. The gap appears to reflect, instead, asset owners' personal and broad-economy outlook being more closely linked to their inflation outlook. For example, homeowners appear to expect their income growth to drift further behind expenditure growth with higher inflation expectations. Moreover, inflation expectations given by homeowners involve less uncertainty and are less volatile over time than those of renters. Should they see their expectations as more reliable, owners may let it carry a greater bearing on their sentiments.

An important caveat about interpreting our results is that both sentiments and inflation expectations are measured in the same household surveys, and some unobserved factors may have influenced consumers' responses to both questions. Therefore, more work is needed to establish a causal relationship in this context. In addition, our work should only be taken as a first step in understanding how inflation expectations may influence sentiments and confidence differently across consumers, thereby leading to heterogeneous consumption and saving reactions.

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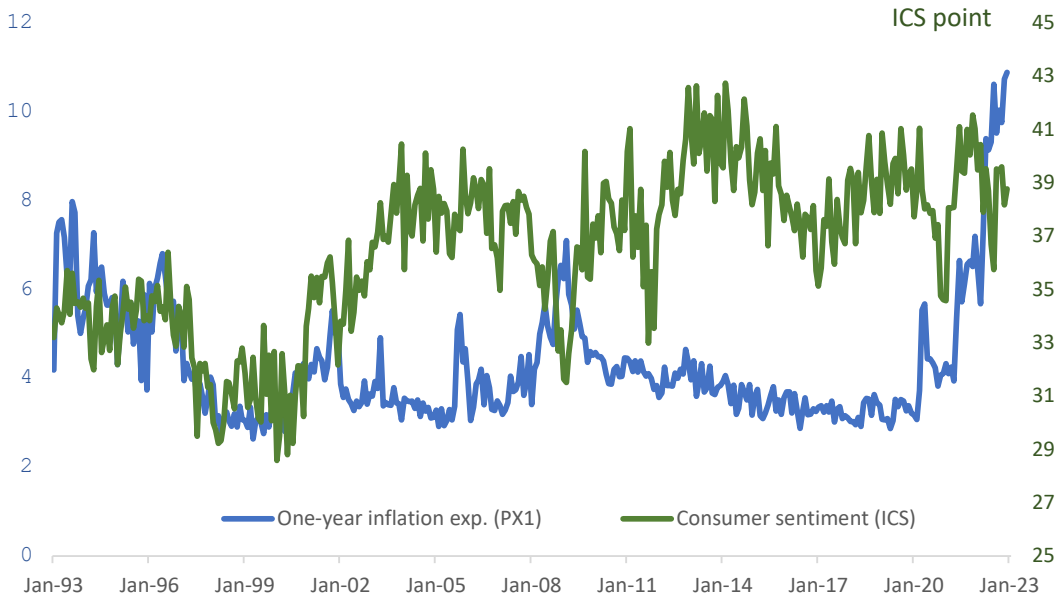
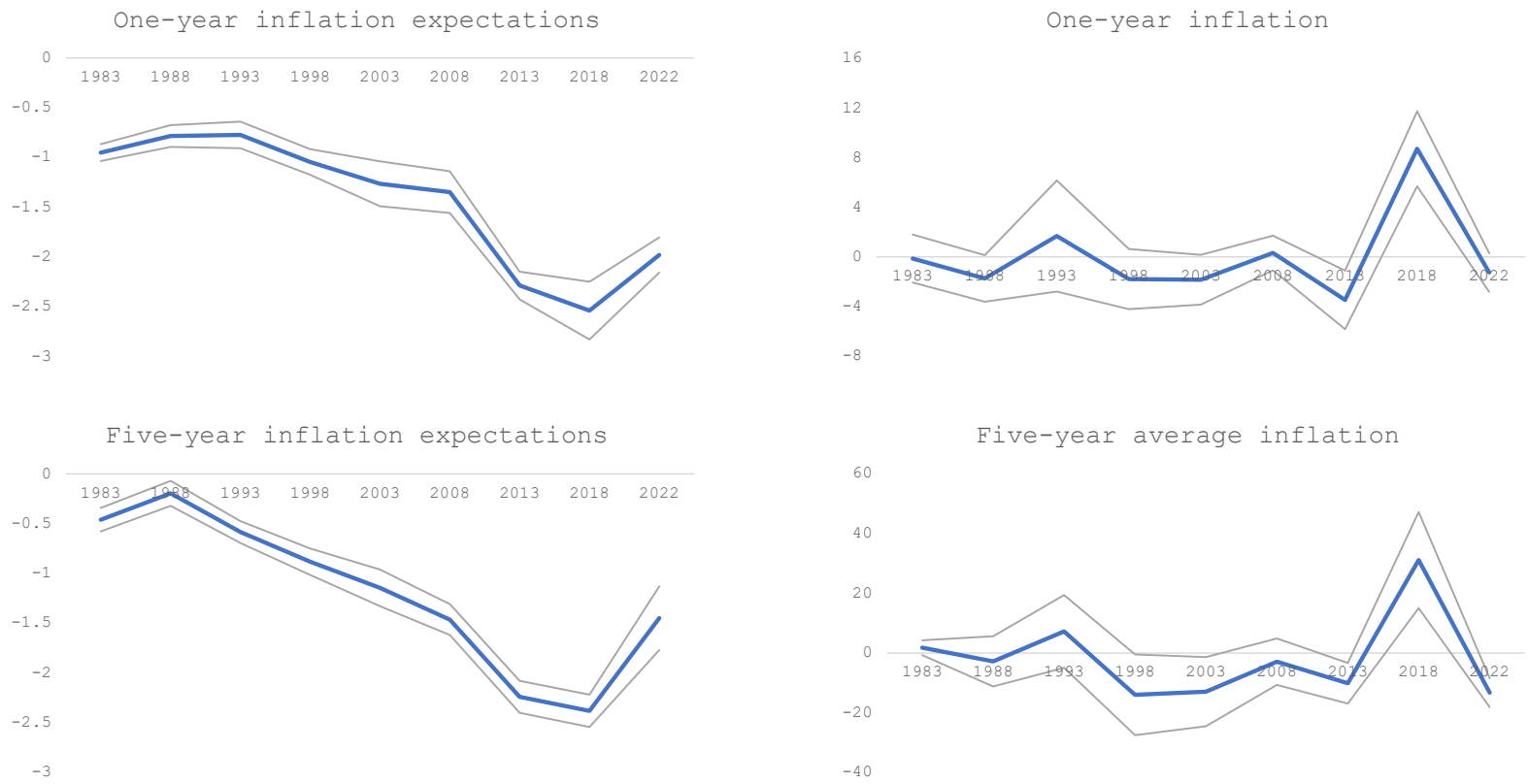
Figure 1: Dispersion of Inflation Expectations and Consumer Sentiments



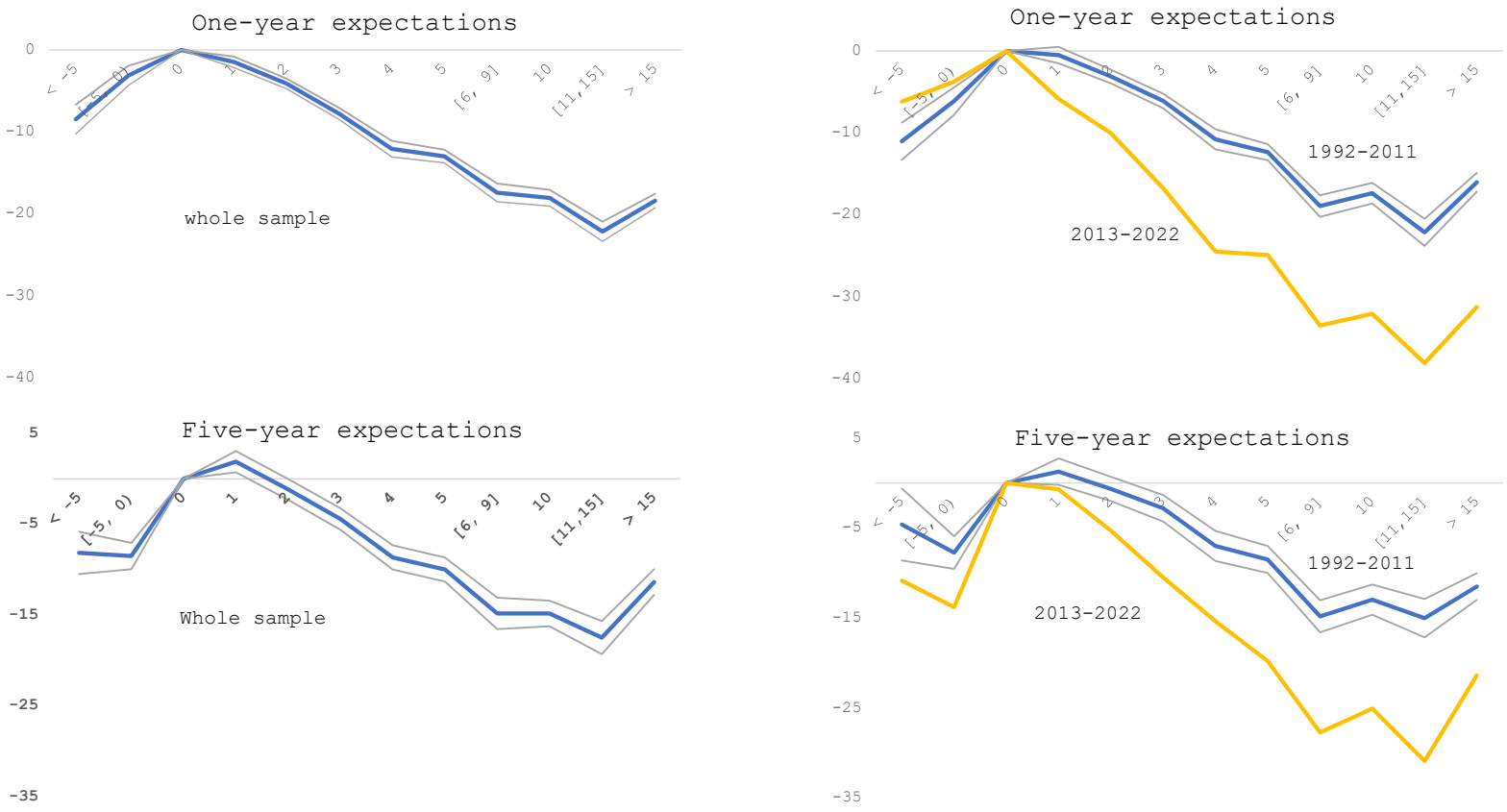
Note: Standard deviations of monthly sample of one-year inflation expectations ($PX1$) and consumer sentiments (ICS) in the University of Michigan Survey of Consumers.

Figure 2: Inflation Expectations, Headline Inflation, and Consumer Sentiments



Note: Estimated β (left column) and γ (right column) coefficients of equation 6 for one-year (upper row) and five-year (lower row) inflation expectations. Lighter lines plot the 95 percent confidence intervals.

Figure 3: Nonlinear Relationship between Inflation Expectations and Consumer Sentiments

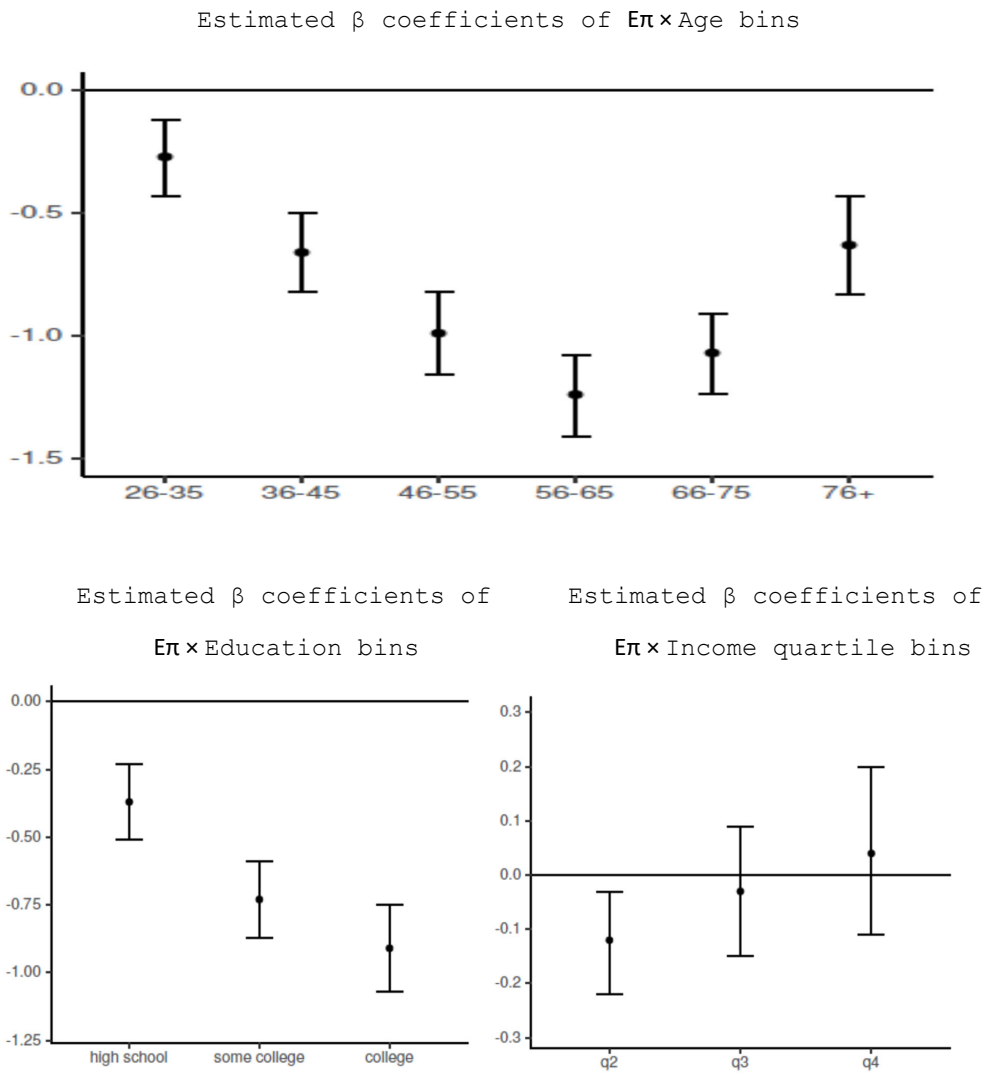


Note: Estimated β coefficients of an array of inflation expectation bins in equation 1. The left panels plot coefficients estimated using the entire sample. The right panels contrast those estimated with data of 1992–2011 and 2013–2022, before and after the announcement of a 2 percent inflation target. Lighter lines plot the 95 percent confidence intervals of the 1992–2011 estimates.

Figure 4: Extra Sentiment Sensitivity of Asset Owners

Note: Estimated β_2 coefficients in equation 6. Lighter lines plot the 95 percent confidence intervals.

Figure 5: Sentiment Sensitivity to Inflation Expectations by Age, Education and Income



Note: The estimated coefficients on interaction terms between inflation expectations and age, education, and income quartile bins. The whiskers plot the 95 percent confidence intervals.

Table 1: Summary Statistics

	University of Michigan Surveys of Consumers Jan. 1978 – Jun. 2022			Federal Reserve Bank of New York Surveys of Consumer Expectations Jun. 2013 – Jun. 2022		
	Mean (1)	Median (2)	Std. Dev. (3)	Mean (4)	Median (5)	Std. Dev. (6)
Inflation expectations						
$E\pi^1$ (%)	4.12	3.00	4.83	4.97	4.00	6.82
Mean of $E\pi^1$ Dist. (%)				4.19	3.00	5.49
Variance of $E\pi^1$ Dist.				20.69	3.31	43.17
$E\pi^5$ (%)	3.67	3.00	3.83			
Consumer sentiment indexes						
Overall sentiment (ICS)	84.7	90.8	38.9			
Expectations (ICE)	77.1	74.9	45.9			
Current conditions (ICC)	96.6	115.5	48.7			
Age	48.5	47	17.4	51.1	52	15.6
Real income (2021$)	87,588	68,003	85,823	110,099	62,953	168,317
Assets ownership and demographics (%)						
Home owner	71.4			71.5		
Stock owner	61.1					
White(%)	82.0			85.5		
Male(%)	46.2			51.3		
Married(%)	61.4			63.5		
Below high school(%)	11.6			3.0		
High school(%)	28.6			31.6		
Some college(%)	24.3			31.1		
College(%)	35.5			34.3		

Note: The University of Michigan Surveys of Consumers sample covers January 1978–December 2022. The five-year inflation expectations measure $E\pi^5$ began 1980, but on a consistent monthly basis only after 1990. The home and stock ownership data began 1990 and 1997 and were collected on a consistent monthly basis after 1993 and 1999, respectively. The Federal Reserve Bank Survey of Consumer Expectations sample covers June 2013–June 2022. Mean and variance of $E\pi^1$ Dist. refers to the statistics of the survey staff-imputed beta-distribution of expected inflation using the self-reported probability associated with each scenario of expected inflation.

Table 2: Inflation Expectations and Consumer Sentiments: Baseline Cross-Section Analysis

	one-year inflation expectations						five-year inflation expectations					
	ICS		ICE		ICC		ICS		ICE		ICC	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$E\pi$	-1.253***	-1.243***	-1.646***	-1.633***	-0.641***	-0.636***	-1.039***	-1.037***	-1.399***	-1.396***	-0.478***	-0.477***
	(0.037)	(0.037)	(0.044)	(0.045)	(0.032)	(0.032)	(0.048)	(0.048)	(0.058)	(0.058)	(0.043)	(0.043)
π		-1.210***		-1.563***		-0.660		-1.084**		-1.551***		-0.358
		(0.404)		(0.452)		(0.406)		(0.489)		(0.541)		(0.495)
White	0.917**	0.917**	0.214	0.215	2.011***	2.011***	-0.402	-0.402	-1.242**	-1.243**	0.906**	0.906**
	(0.387)	(0.387)	(0.504)	(0.505)	(0.341)	(0.341)	(0.460)	(0.461)	(0.608)	(0.609)	(0.379)	(0.379)
Male	6.794***	6.810***	8.006***	8.027***	4.907***	4.916***	7.024***	7.028***	8.231***	8.237***	5.144***	5.146***
	(0.185)	(0.185)	(0.242)	(0.241)	(0.199)	(0.199)	(0.225)	(0.225)	(0.294)	(0.294)	(0.239)	(0.239)
Married	-0.771***	-0.772***	-1.002***	-1.003***	-0.411*	-0.412*	-0.742***	-0.744***	-0.903***	-0.906***	-0.491*	-0.492*
	(0.188)	(0.188)	(0.227)	(0.227)	(0.227)	(0.227)	(0.225)	(0.225)	(0.271)	(0.271)	(0.263)	(0.263)
High school	3.653***	3.670***	3.196***	3.218***	4.363***	4.373***	3.291***	3.302***	2.723***	2.739***	4.176***	4.180***
	(0.311)	(0.308)	(0.376)	(0.373)	(0.384)	(0.383)	(0.401)	(0.401)	(0.489)	(0.488)	(0.468)	(0.468)
Some college	5.853***	5.856***	6.394***	6.398***	5.010***	5.012***	5.453***	5.452***	5.928***	5.927***	4.714***	4.714***
	(0.340)	(0.339)	(0.407)	(0.406)	(0.430)	(0.430)	(0.422)	(0.422)	(0.513)	(0.513)	(0.505)	(0.505)
College	6.727***	6.740***	6.685***	6.703***	6.792***	6.799***	6.629***	6.635***	6.689***	6.699***	6.535***	6.537***
	(0.370)	(0.369)	(0.444)	(0.442)	(0.449)	(0.448)	(0.471)	(0.471)	(0.582)	(0.581)	(0.515)	(0.515)
Log(income)	5.438***	5.443***	3.680***	3.686***	8.176***	8.179***	5.528***	5.529***	3.930***	3.931***	8.015***	8.016***
	(0.143)	(0.143)	(0.155)	(0.155)	(0.181)	(0.181)	(0.161)	(0.161)	(0.177)	(0.177)	(0.203)	(0.203)
R-squared	0.184	0.185	0.139	0.139	0.131	0.131	0.167	0.168	0.116	0.116	0.130	0.130
N	254,337	254,337	254,337	254,337	254,337	254,337	191,632	191,632	191,632	191,632	191,632	191,632

Note: The table shows the statistical relationship between one- and five-year inflation expectations and various measures of consumer sentiments (ICS, ICE, and ICC). The model was estimated using the University of Michigan Surveys of Consumers. The estimates show a consistent, negative effect of inflation expectations on consumer sentiments. Notably, controlling for current inflation does not change the results. All models control for age, year, month fixed effects, and standard errors are clustered at the year-month level. *, **, and *** indicate the estimates are statistically significant at the 90, 95, and 99 percent level, respectively.

Table 3: Consumer Sentiments and Inflation Expectations: Role of Asset Ownership

	One-year expectation		Five-year expectation	
	(1)	(2)	(3)	(4)
$E\pi$	-1.228***	-1.453***	-0.994***	-1.200***
	(0.054)	(0.052)	(0.056)	(0.060)
$E\pi\times$ Home owner	-0.586***		-0.624***	
	(0.060)		(0.061)	
Home owner	0.084		0.001	
	(0.334)		(0.354)	
$E\pi\times$ Stock owner		-0.639***		-0.918***
		(0.072)		(0.076)
Stock owner		4.986***		5.953***
		(0.401)		(0.386)
White	-1.074**	-2.266***	-1.203**	-2.233***
	(0.457)	(0.552)	(0.484)	(0.580)
Male	6.123***	6.100***	6.622***	6.649***
	(0.240)	(0.283)	(0.247)	(0.289)
Married	-0.581**	-0.865***	-0.626**	-0.922***
	(0.243)	(0.290)	(0.247)	(0.290)
High school	2.758***	2.356***	2.748***	2.246***
	(0.441)	(0.514)	(0.458)	(0.516)
Some college	4.397***	3.598***	4.404***	3.543***
	(0.449)	(0.518)	(0.464)	(0.517)
College	5.092***	3.757***	5.534***	4.221***
	(0.519)	(0.614)	(0.540)	(0.622)
Log(income)	5.147***	4.322***	5.607***	4.741***
	(0.171)	(0.184)	(0.177)	(0.188)
Controlling for				
Age, year, month FE	Yes	Yes	Yes	Yes
R-squared	0.186	0.195	0.171	0.178
N	162,538	128,959	159,250	127,733

Note: The table shows the difference in the inflation–consumer sentiments relationship between homeowners and renters and between consumers who own and do not own stocks. The model was estimated using the University of Michigan Surveys of Consumers. The estimates show that homeowners' and stockowners' sentiments are consistently more negatively associated with inflation expectations. All models control for age, year, month fixed effects, and standard errors are clustered at the year-month level. *, **, and *** indicate the estimates are statistically significant at the 90, 95, and 99 percent level, respectively.

Table 4: Detailed Survey Responses Analysis
Marginal Effects Estimated with Ordered Logit Models

	PAGO	PEXP	BUS12	BUS5	DUR
	(1)	(2)	(3)	(4)	(5)
			Home ownership		
			One-year expectation		
$E\pi$	0.028***	0.031***	0.066***	0.067***	0.017***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
$E\pi\times$ Home owner	0.011***	0.027***	0.026***	0.022***	0.015***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Home owner	0.037**	0.189***	-0.066***	-0.080***	-0.002
	(0.016)	(0.017)	(0.018)	(0.016)	(0.020)
N	162,357	159,193	149,464	155,503	156,544
			Five-year expectation		
$E\pi$	0.017***	0.027***	0.047***	0.062***	0.013***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
$E\pi\times$ Home owner	0.015***	0.023***	0.030***	0.024***	0.013***
	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)
Home owner	0.029*	0.213***	-0.076***	-0.079***	0.011
	(0.017)	(0.018)	(0.019)	(0.017)	(0.021)
N	159,082	156,104	146,722	152,642	153,652
			Stock ownership		
			One-year expectation		
$E\pi$	0.034***	0.042***	0.076***	0.078***	0.022***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
$E\pi\times$ Stock owner	0.014***	0.026***	0.029***	0.020***	0.013***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Stock owner	-0.174***	-0.062***	-0.186***	-0.202***	-0.149***
	(0.017)	(0.017)	(0.019)	(0.017)	(0.021)
N	128,846	126,371	119,748	123,790	124,556
			Five-year expectation		
$E\pi$	0.023***	0.033***	0.059***	0.076***	0.014***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
$E\pi\times$ Stock owner	0.024***	0.033***	0.040***	0.034***	0.016***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Stock owner	-0.207***	-0.084***	-0.230***	-0.254***	-0.159***
	(0.018)	(0.019)	(0.020)	(0.018)	(0.022)
	127,623	125,254	118,756	122,787	123,541

Note: Ordered logit estimates of $E\pi$ is associated with the responses to the five questions that are components of the consumer sentiment index (ICS). A positive marginal effect indicates that a higher value of the variable is associated with a greater likelihood of selecting a more pessimistic response to these questions. All models control for race, marital status, gender, educational attainments, and log income, the same set of control variables as in equation 6. In addition, all models control for age, year, and month fixed effects, and standard errors are clustered at the year-month level. *, **, and *** indicate the estimates are statistically significant at the 90, 95, and 99 percent level, respectively.

Table 5: Panel Analysis: Changes in Sentiments (ICS) and Changes in Inflation Expectations

	One-year expectation		Five-year expectation	
	(1)	(2)	(3)	(4)
$\Delta E\pi$	-0.459***	-0.544***	-0.275***	-0.367***
	(0.061)	(0.056)	(0.077)	(0.076)
$\Delta E\pi\times$ Home owner	-0.225***		-0.375***	
	(0.070)		(0.092)	
Home owner	-0.707*		-0.454	
	(0.383)		(0.391)	
$\Delta E\pi\times$ Stock owner		-0.152**		-0.456***
		(0.071)		(0.101)
Stock owner		-0.349		-0.415
		(0.390)		(0.397)
Became married	2.775**	1.574	3.154**	2.084
	(1.229)	(1.468)	(1.244)	(1.475)
Remained single	0.469	0.728**	0.528	0.685*
	(0.327)	(0.361)	(0.334)	(0.368)
Became divorced	-1.298	1.521	0.205	2.855
	(1.438)	(1.684)	(1.475)	(1.740)
Δlogincome	-0.770*	-1.005**	-0.823**	-0.950**
	(0.405)	(0.451)	(0.411)	(0.456)
White	0.071	-0.045	-0.279	-0.376
	(0.293)	(0.329)	(0.299)	(0.335)
Male	1.755***	1.876***	1.555***	1.968***
	(0.359)	(0.425)	(0.367)	(0.433)
High school	0.451	0.458	0.373	0.701
	(0.775)	(0.951)	(0.813)	(0.993)
Some college	0.895	1.103	0.611	1.112
	(0.774)	(0.947)	(0.811)	(0.989)
College	0.254	0.633	0.076	0.648
	(0.756)	(0.940)	(0.792)	(0.981)
Controlling for				
Age, year, month FE	Yes	Yes	Yes	Yes
R-Squared	0.038	0.038	0.035	0.035
N	61,572	49,127	59,579	47,777

Note: The table shows the estimated coefficients of how six-month changes in consumer sentiments are correlated with changes in inflation expectations, its interaction with home and stock owner dummies, and other demographics. In addition, all models control for age, year, and month fixed effects, and standard errors are clustered at the year-month level.

Table 6: Renters' Sensitivity Increases after Buying a Home

	All renters		Renters younger than 50	
	first	second	first	second
	(1)	(2)	(3)	(4)
$E\pi$	-1.300***	-1.242***	-1.083***	-0.993***
	(0.084)	(0.077)	(0.097)	(0.093)
$E\pi\times$ Buyer	0.137	-0.355	0.033	-0.537*
	(0.242)	(0.226)	(0.260)	(0.281)
Buyer	-1.289	2.579**	0.013	3.163**
	(1.334)	(1.211)	(1.431)	(1.444)
Controlling for				
Demo., edu., and inc.	Yes	Yes	Yes	Yes
Age, year, month FE	Yes	Yes	Yes	Yes
R-Squared	0.167	0.181	0.137	0.160
N	14,667	15,082	9,860	10,136

Note: The table shows the estimated coefficients of how home buyers' inflation expectation sensitivity change before and after buying a home, relative to other renters. The models are estimated using renters that were surveyed again, six months after the first. In addition, all models control for race, gender, education, marital status, log income. The models also control for age, year, and month fixed effects, and standard errors are clustered at the year-month level. *, **, and *** indicate the estimates are statistically significant at the 90, 95, and 99 percent level, respectively.

Table 7: Homeowners' Sentiment Sensitivity Gap Does Not Merely Reflect Age, Education, or Income Effects

	Homeownership		Stock ownership	
	One-year	Five-year	One-year	Five-year
	(1)	(2)	(3)	(4)
$E\pi\times$ Homeowner	-0.312***	-0.279***		
	(0.057)	(0.061)		
Homeowner	-0.880**	-1.195***		
	(0.329)	(0.352)		
$E\pi\times$ Stock owner			-0.407***	-0.572***
			(0.067)	(0.085)
Stock owner			4.172***	4.843***
			(0.379)	(0.406)
Controlling for				
$E\pi\times$ age bins	Yes	Yes	Yes	Yes
$E\pi\times$ education bins	Yes	Yes	Yes	Yes
$E\pi\times$ income quartile bins	Yes	Yes	Yes	Yes
Race, gender, marital status	Yes	Yes	Yes	Yes
Education, log(income)	Yes	Yes	Yes	Yes
Age, year, month FE	Yes	Yes	Yes	Yes
R-squared	0.180	0.167	0.189	0.173
N	162,538	159,250	130,703	128,158

Note: The table shows that the results home and stock owners' sentiments being more sensitive to inflation expectations cannot be entirely accounted for by difference in age, education, and income between home/stock owners and other consumers. Including interaction terms between inflation expectations and dummies of age, education, and income quartiles does not qualitatively change the baseline results. All models control for age, year, and month fixed effects, and standard errors are clustered at the year-month level. *, **, and *** indicate the estimates are statistically significant at the 90, 95, and 99 percent level, respectively.

Table 8: Do Higher Returns Matter?

	Homeownership					Stock ownership			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$E\pi$	-1.234***	-1.226***	-1.554***	-1.554***	-2.083***	-1.452***	-1.450***	-1.604***	-1.605***
	(0.054)	(0.054)	(0.072)	(0.072)	(0.084)	(0.052)	(0.053)	(0.058)	(0.058)
$E\pi\times$ Home owner	-0.450***	-0.719***	-0.595***	-0.629***					
	(0.067)	(0.065)	(0.086)	(0.083)					
$E\pi\times$ Home owner $\times$ *High* ΔHPI^{Nat}	-0.489***								
	(0.090)								
$E\pi\times$ Home owner $\times$ *Low* ΔHPI^{Nat}		0.338***							
		(0.109)							
$E\pi\times$ Home owner $\times$ *High* ΔHPI^{Local}			-0.094						
			(0.089)						
$E\pi\times$ Home owner $\times$ *Low* ΔHPI^{Local}				0.141					
				(0.090)					
$E\pi\times$ $E\Delta HPI^{Local}$					-0.044***				
					(0.005)				
$E\Delta HPI^{Local}$					1.237***				
					(0.055)				
$E\pi\times$ Stock owner						-0.635***	-0.782***	-0.633***	-0.641***
						(0.084)	(0.071)	(0.082)	(0.080)
$E\pi\times$ Stock owner $\times$ *High S&PReturn*						-0.018			
						(0.141)			
$E\pi\times$ Stock owner $\times$ *Low S&PReturn*							0.393***		
							(0.142)		
$E\pi\times$ Stock owner $\times$ *High* ΔHPI^{Local}								-0.056	
								(0.102)	
$E\pi\times$ Stock owner $\times$ *Low* ΔHPI^{Local}									0.002
									(0.104)
R-Squared	0.186	0.186	0.179	0.179	0.220	0.196	0.196	0.180	0.180
N	162,538	162,538	107,096	107,096	66,488	128,959	128,959	106,512	106,512

Note: The table shows that the results home and stock owners' sentiments being more sensitive to inflation expectations is not driven by how home and stock price changes affect home and stock owners' sentiments. Sentiments of homeowners living in high house price-appreciation time/locality tend to be more sensitive to their own inflation expectations. Similar results hold for stock owners. As a placebo test, local house price changes appear having no effect on the sensitivity of stock owners' sentiments. All models control for age, year, and month fixed effects, and standard errors are clustered at the year-month level. *, **, and *** indicate the estimates are statistically significant at the 90, 95, and 99 percent level, respectively.

Table 9: Labor, Housing, and Equity Markets Outlook and Inflation Expectations

	University of Michigan Survey of Consumers Ordered logit regression				Federal Reserve Bank of New York Survey of Consumer Expectations Linear regressions			
	One-year inflation exp.		Five-year inflation exp.		One-year expected inflation rate			
	Direction of unemp. changes positive coeff. more pessimistic				Prob. (national unemp. ↑)	Prob. (own unemp.)	$\Delta National\ HP$ percent	Prob. (stock price↑)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$E\pi$	0.060***	0.067***	0.044***	0.053***	0.348***	0.074**	0.257***	-0.146***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.030)	(0.032)	(0.014)	(0.027)
$E\pi\times$ Home owner	0.015***		0.023***		0.159***	0.040	-0.050***	-0.160***
	(0.003)		(0.003)		(0.037)	(0.040)	(0.017)	(0.034)
Home owner	-0.039**		-0.065***		-3.000***	-2.599***	0.070	-0.602
	(0.016)		(0.017)		(0.406)	(0.424)	(0.118)	(0.413)
$E\pi\times$ Stock owner		0.019***		0.036***				
		(0.003)		(0.004)				
Stock owner		-0.137***		-0.199***				
		(0.017)		(0.018)				
White	0.021*	0.045***	0.026**	0.046***	1.742***	-0.396	-0.523***	2.931***
	(0.013)	(0.014)	(0.013)	(0.014)	(0.417)	(0.425)	(0.127)	(0.425)
Male	-0.089***	-0.089***	-0.110***	-0.111***	2.581***	0.900***	-0.314***	7.365***
	(0.010)	(0.011)	(0.010)	(0.011)	(0.291)	(0.307)	(0.080)	(0.294)
Married	-0.025**	-0.037***	-0.020*	-0.033***	-0.287	0.129	-0.039	-1.593***
	(0.011)	(0.012)	(0.011)	(0.012)	(0.334)	(0.372)	(0.092)	(0.340)
High school	0.010	0.029	0.006	0.018	1.481	-1.027	-0.302	0.315
	(0.024)	(0.029)	(0.024)	(0.029)	(1.364)	(1.745)	(0.455)	(1.447)
Some college	-0.013	0.004	-0.019	-0.008	3.605***	0.267	-0.481	3.713***
	(0.024)	(0.029)	(0.025)	(0.029)	(1.319)	(1.695)	(0.440)	(1.403)
College	-0.040*	-0.009	-0.063**	-0.041	5.474***	0.846	-0.751*	7.913***
	(0.024)	(0.030)	(0.025)	(0.030)	(1.316)	(1.691)	(0.440)	(1.402)
Logincome	-0.076***	-0.056***	-0.093***	-0.073***	0.220	-1.245***	-0.338***	1.976***
	(0.007)	(0.008)	(0.007)	(0.008)	(0.177)	(0.212)	(0.048)	(0.177)
R-squared					0.032	0.022	0.079	0.079
N	161,551	128,197	158,372	127,032	131,675	79,179	130,956	131,147

Note: The table shows that in the University of Michigan Surveys of Consumers data, higher inflation expectations implies a more pessimistic expectation among home and stock owners on the unemployment outlook. The survey asks whether the respondent expects unemployment to go up, stay the same, or go down. The table reports estimated coefficients of ordered logit models, with positive coefficients be associated with more pessimistic responses. In addition, in the Federal Reserve Bank of New York Survey of Consumer Expectations data, higher inflation expectations implies a more pessimistic expectation among home owners on national unemployment, national house prices, and stock market outlook. The survey collects data on self-reported probability of national unemployment rate going up, becoming unemployed oneself, national house prices going up, and stock price going up, respectively. The table reports linear regression coefficients. Interestingly, while higher inflation expectations are correlated with higher expected probability oneself becoming unemployed, there is no significant difference between homeowners and renters on this relationship. All models control for age, year, and month fixed effects, and standard errors are clustered at the year-month level. *, **, and *** indicate the estimates are statistically significant at the 90, 95, and 99 percent level, respectively.

Table 10: Gaps between Spending and Income Growth Expectations—A Static Analysis

	Expected inflation rate				Mean of imputed distribution of expected inflation			
	Whole sample		Prime age	Singles	Whole sample		Prime age	Singles
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$E\pi$	0.118***	0.082***	0.079***	0.080***	0.207***	0.160***	0.159***	0.156***
	(0.006)	(0.009)	(0.010)	(0.012)	(0.010)	(0.016)	(0.017)	(0.022)
$E\pi$ × Homeowner		0.058***	0.064***	0.051***		0.071***	0.078***	0.062**
		(0.012)	(0.013)	(0.018)		(0.020)	(0.022)	(0.030)
Homeowner	0.754***	0.447***	0.387***	0.170	0.743***	0.449***	0.379**	0.141
	(0.123)	(0.130)	(0.142)	(0.183)	(0.123)	(0.138)	(0.151)	(0.195)
White	0.590***	0.581***	0.594***	1.285***	0.469***	0.473***	0.481***	1.208***
	(0.145)	(0.145)	(0.154)	(0.228)	(0.146)	(0.145)	(0.154)	(0.228)
Male	-0.286***	-0.280***	-0.216**	-0.317**	-0.324***	-0.322***	-0.252**	-0.367**
	(0.097)	(0.097)	(0.108)	(0.160)	(0.097)	(0.097)	(0.108)	(0.160)
Married	-0.131	-0.127	-0.170		-0.138	-0.136	-0.172	
	(0.113)	(0.113)	(0.128)		(0.113)	(0.113)	(0.128)	
High school	0.051	0.030	0.180	0.293	0.058	0.043	0.156	0.225
	(0.517)	(0.517)	(0.627)	(0.898)	(0.528)	(0.529)	(0.635)	(0.903)
Some college	-0.147	-0.162	-0.029	0.278	-0.210	-0.219	-0.132	0.194
	(0.503)	(0.504)	(0.612)	(0.878)	(0.514)	(0.515)	(0.619)	(0.883)
College	-0.217	-0.228	-0.084	-0.046	-0.296	-0.303	-0.196	-0.184
	(0.503)	(0.503)	(0.611)	(0.880)	(0.513)	(0.514)	(0.618)	(0.884)
Log(income)	-0.276***	-0.274***	-0.232***	-0.130	-0.303***	-0.301***	-0.262***	-0.171
	(0.061)	(0.061)	(0.069)	(0.107)	(0.061)	(0.061)	(0.068)	(0.108)
R-Squared	0.046	0.047	0.037	0.052	0.049	0.049	0.040	0.055
N	132,307	132,307	106,091	46,199	130,114	130,114	104,798	45,155

Note: The table shows that in the Federal Reserve Bank of New York Survey of Consumer Expectations data, consumers expected a wider gap of how much income growth will lag spending growth next year with a greater inflation expectations. This gap is more sensitive for homeowners than renters. This effect holds among prime-aged and single consumers. All models control for age, year, and month fixed effects, and standard errors are clustered at the year-month level. *, **, and *** indicate the estimates are statistically significant at the 90, 95, and 99 percent level, respectively.

Table 11: Gaps between Spending and Income Growth Expectations—A Dynamic Analysis

	1-month changes		3-month changes		6-month changes	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta E\pi$	0.023*		0.073***		0.071***	
	(0.013)		(0.017)		(0.021)	
$\Delta E\pi \times$ Homeowner	0.050***		0.022		0.055**	
	(0.016)		(0.020)		(0.026)	
$\Delta E\pi_{dist.\ mean}$		0.044***		0.084***		0.104***
		(0.016)		(0.020)		(0.026)
$\Delta E\pi_{dist.\ mean} \times$ Homeowner		0.039**		0.027		0.056*
		(0.020)		(0.024)		(0.031)
Homeowner	-0.092**	-0.089*	-0.008	-0.010	0.099	0.112
	(0.047)	(0.047)	(0.083)	(0.083)	(0.155)	(0.155)
White	0.008	0.004	0.084	0.086	-0.011	0.144
	(0.060)	(0.059)	(0.101)	(0.101)	(0.185)	(0.183)
Male	0.021	0.073**	0.139**	0.138**	0.191	0.282**
	(0.035)	(0.036)	(0.063)	(0.064)	(0.119)	(0.120)
Married	-0.023	-0.036	0.049	0.021	0.095	0.044
	(0.041)	(0.041)	(0.072)	(0.072)	(0.135)	(0.136)
High School	0.016	0.119	0.550*	0.449	1.020	0.891
	(0.196)	(0.221)	(0.332)	(0.333)	(0.744)	(0.713)
Some College	0.026	0.180	0.496	0.431	0.957	0.986
	(0.190)	(0.216)	(0.321)	(0.322)	(0.730)	(0.698)
College	0.099	0.251	0.647**	0.590*	1.171	1.220*
	(0.189)	(0.215)	(0.320)	(0.320)	(0.727)	(0.695)
Logincome	0.063***	0.065***	0.076*	0.091**	0.076	0.118
	(0.023)	(0.023)	(0.040)	(0.041)	(0.076)	(0.077)
R-squared	0.002	0.002	0.005	0.004	0.010	0.011
N	102,272	101,800	67,317	67,122	35,401	35,362

Note: The table shows that the results of table 10, which are estimated using a cross-section sample, hold also in a dynamic context. Taking advantage of the longitudinal structure of the Federal Reserve Bank of New York Survey of Consumer Expectations data, we correlate the changes in inflation expectations and the changes in the gap of much income growth was expected to lag spending growth next year. The changes are measured for 1, 3, and 6 months apart. We find that the cross-sectional results hold broadly in the longitudinal sample, with the exception the 3-month changes results being no longer statistically significant. All models control for age, year, and month fixed effects, and standard errors are clustered at the year-month level. *, **, and *** indicate the estimates are statistically significant at the 90, 95, and 99 percent level, respectively.

Table 12: Variability of Inflation Expectations and Financial Literacy

	Variance (1)	IQR (2)	Divergence (3)	12-month Range (4)	Variance (5)	IQR (6)	Divergence (7)	12-month Range (8)
Home owner	-2.089***	-0.299***	-0.364***	-0.498**	-1.985***	-0.284***	-0.342***	-0.429**
	(0.359)	(0.055)	(0.059)	(0.209)	(0.356)	(0.054)	(0.059)	(0.208)
High fin. lit.					-4.553***	-0.649***	-0.952***	-2.537***
					(0.231)	(0.038)	(0.038)	(0.150)
$E\pi$	0.817***	0.148***	0.216***		0.803***	0.146***	0.213***	
	(0.026)	(0.004)	(0.007)		(0.026)	(0.004)	(0.007)	
White	-6.772***	-0.891***	-1.300***	-2.170***	-6.193***	-0.809***	-1.180***	-1.832***
	(0.492)	(0.072)	(0.079)	(0.261)	(0.485)	(0.071)	(0.078)	(0.260)
Male	-4.413***	-0.707***	-1.001***	-3.227***	-3.700***	-0.605***	-0.853***	-2.814***
	(0.268)	(0.042)	(0.046)	(0.160)	(0.268)	(0.042)	(0.045)	(0.161)
Married	1.251***	0.203***	0.281***	0.441**	1.208***	0.197***	0.272***	0.416**
	(0.314)	(0.048)	(0.052)	(0.192)	(0.312)	(0.048)	(0.051)	(0.191)
High school	-3.547*	-0.524*	-0.350	0.374	-3.625*	-0.535*	-0.370	0.344
	(1.984)	(0.285)	(0.308)	(1.042)	(1.964)	(0.282)	(0.304)	(1.038)
Some college	-9.179***	-1.298***	-1.284***	-1.913*	-8.784***	-1.242***	-1.205***	-1.677*
	(1.914)	(0.275)	(0.296)	(1.003)	(1.895)	(0.273)	(0.292)	(1.000)
College	-13.497***	-1.956***	-2.115***	-3.892***	-12.452***	-1.807***	-1.900***	-3.266***
	(1.902)	(0.274)	(0.294)	(1.001)	(1.883)	(0.271)	(0.290)	(0.998)
Log income	-2.952***	-0.476***	-0.520***	-1.243***	-2.628***	-0.430***	-0.452***	-1.065***
	(0.163)	(0.025)	(0.027)	(0.095)	(0.162)	(0.025)	(0.027)	(0.094)
R-Squared	0.168	0.207	0.208	0.099	0.176	0.213	0.217	0.113
N	131,672	131,619	131,688	15,772	131,672	131,619	131,688	15,772

Note: The table compares several metrics of inflation expectation variability between homeowners and renters in the Federal Reserve Bank of New York Survey of Consumer Expectations. Three of the metrics are static—1. the variance of the distribution of inflation expectation imputed from self-reported probabilities of various scenarios of inflation, 2. the inner-quartile range (IQR), and 3. the difference between the expected inflation rate and the mean of the imputed distribution. The fourth metric is dynamic, indicating the range of inflation expectation in the twelve months the consumers were in the sample. The table shows that inflation expectations of homeowners tend to have smaller variability than renters, with and without controlling for their levels of financial literacy. The dummy of high financial literacy is defined as having correct answers on five questions in the survey about financial knowledge. *, **, and *** indicate the estimates are statistically significant at the 90, 95, and 99 percent level, respectively.