Home Price Expectations and Spending: Evidence from a Field Experiment

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Abstract

How do households adjust their spending behavior in response to changes in home price expectations? We conduct a field experiment with a sample of Americans that links survey data on home price expectations to actual spending behavior as measured in a rich home-scanner dataset. In the experiment we exogenously vary households' home price expectations by providing them with different expert forecasts. Homeowners do not adjust their spending in response to exogenously higher home price expectations, consistent with wealth effects and higher expected housing costs offsetting each other. However, renters reduce their spending in response to an increase in home price expectations. We provide evidence that the effects on renters operate through an increase in expected rental costs and higher expected costs of a future home that many renters intend to buy. Our evidence has implications for the role of asset price expectations in business cycle dynamics and consumption inequality.

Keywords: Consumption, Expectations, Home prices, Homeowner, Information, Renter.

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1 Introduction

Housing is the most important asset on households' balance sheets, accounting for 28% of US households' net wealth as of 2020 (Hays and Sullivan, 2022). At the same time, expectations about the future development of home prices typically undergo large swings and have been hypothesized to be an influential driver of business cycle movements (Akerlof and Shiller, 2010; Kuchler et al., 2022; Milani, 2011). For example, Shiller (2015) argues that home price expectations played a key role in the 2008 US housing crisis. These expectations can shape aggregate outcomes through a variety of mechanisms, including their direct effects on housing markets (Armona et al., 2019; Bottan and Perez-Truglia, 2022) but potentially also their effects on households' spending decisions.

The impact of these expectations on spending decisions critically hinges on whether an economic agent owns or rents a home. Among homeowners, an increase in expected home prices could increase spending through anticipated wealth gains. However, if someone is currently renting but plans to buy a home in the future, an anticipated increase in home prices may cause them to reduce their current spending since an expected increase in prices would increase the future cost of buying a home, which is often the largest purchase a person makes in their lifetime.

Studying households' spending responses to home price expectations is challenging for several reasons. First, home price expectations are often unobserved, particularly in datasets that contain information about actual real-world spending behavior. Second, even if these expectations are observed, correlations between expectations and spending are potentially confounded by omitted variable bias, reverse causality and measurement error in expectations.

To address these challenges, we conduct a field experiment in which we link surveys that embed an information treatment to administrative spending data. We survey about 2,500 active members of the Nielsen Homescan panel. These panelists use scanners to track their actual shopping expenditures at home, enabling us to link their survey responses to their spending behavior.

In this experiment, we exogenously vary respondents' expected annual home price growth over the next ten years by randomly providing them with one of two different forecasts provided by different participants in a separate expert survey. Half of the

respondents in our Nielsen sample receive a forecast predicting an average annual home price growth of 6% (*high forecast*), while the other half of the respondents receive a lower forecast of an average annual home price growth of 1.5% (*low forecast*). In a first step, we study the effects of the information treatment on households' posterior home price expectations, which we measure both in the main survey and in a follow-up survey four weeks later. In a second step, we examine the effects of this treatment on actual spending behavior over the three months following the intervention.

We first confirm that the treatment generates a significant first stage on respondents' post-treatment home price expectations. Respondents in the *high forecast* treatment arm expect an average annual home price growth of 6.1%, while respondents in the *low forecast* treatment arm think that home prices will only grow by 4.7% per year. The wedge of 1.5 p.p. across treatment arms corresponds to a learning rate from the forecasts of one third. These changes in home price expectations in response to the intervention persist in the four-week follow-up survey, mitigating concerns related to numerical anchoring or experimenter demand effects (Haaland et al., 2023). We do not observe any differences in respondents' perceived uncertainty about future home price growth between the two treatment arms, suggesting that the treatment does not affect higher moments of respondents' subjective probability distributions of future home price growth.

We next analyze respondents' actual spending responses to the exogenous shift in their home price expectations. For this analysis, we use data on respondents' monthly household expenditures in the three months before and after our main survey. We document strong heterogeneity in treatment effects on spending between homeowners and renters. Homeowners do not adjust their spending as measured in the scanner data in response to higher home price expectations. The effects are statistically insignificant, small in size, and relatively precisely estimated, allowing us to rule out effect sizes of more than 2.8 p.p. at a power of 80%. However, renters significantly reduce their spending as measured in the scanner data by 7.6% when exposed to the high home price growth forecast instead of the low home price growth forecast. Scaling this effect by the first-stage effect on renters' home price expectations reveals that renters decrease their spending by 3.9 p.p. in response to a one p.p. higher expected house price growth rate. We also detect a significant decrease in the share of renters that purchase durable goods during the four weeks after the main survey. This suggests that the spending of renters, both on durable and nondurable goods, is elastic to changes in their expectations about

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future home prices.

Why do home price expectations have different effects on the spending of home-owners and renters? To shed light on this, we examine three mechanisms through which shifts in home price expectations may affect current spending decisions: wealth effects, housing costs, and borrowing constraints.

First, an increase in expected home prices should increase the expected wealth of owners of this asset. Indeed, we detect an increase in expected net household wealth among homeowners, while we find no effect on renters' expected future net wealth.

Second, higher home prices increase the cost of housing services, which should be relevant for both current renters and current owners. While current renters would be directly affected by higher rental costs or higher purchase prices of homes, current homeowners would be indirectly affected as realizing any wealth gains from higher home values would require them to find a new place to live, which has become more expensive. Empirically, we find that both homeowners' and renters' expectations about rental prices are significantly higher after receiving the high home price growth forecast. Moreover, spending reductions among renters in response to higher home price expectations are entirely driven by those who are arguably more likely to be affected by rising housing costs: those who plan to move in the next ten years. We also present a back-of-the-envelope calculation highlighting that the size of renters' spending adjustments partially offsets the higher down payment they expect to make when purchasing a home in the future. These patterns suggest that renters reduce their current spending to be able to afford a home in the future. For owners, higher expected future housing costs could largely offset any wealth effects from higher expected future home values.

Third, we detect no adjustments in expected future borrowing constraints among homeowners in response to the exogenous change in home price expectations. Thus, homeowners do not anticipate the empirically documented relaxation of collateral constraints in response to realized home price appreciation, which has been identified as a key mechanism linking realized home price changes to spending behavior (Aladangady, 2017). This may further contribute to the muted spending responses among homeowners.

To better understand the mechanisms at play, we conduct a tailored survey with a diverse and heterogeneous sample from the US. This survey enables us to provide direct

evidence on the considerations on top of individuals' minds when thinking about a hypothetical change in expected future home price growth on the expected future economic situation of their household. Based on open-ended data on people's considerations, we document that individuals tend to focus on changes in their own housing wealth and the cost of purchasing a home, while thoughts about changes in future collateral constraints are very rare – consistent with the evidence from the field experiment. We also detect differences in thoughts and predicted spending responses across renters and owners that are in line with our main experiment. Moreover, respondents' considerations are correlated with their reported spending responses in expected directions, and differences in considerations can account for up to 75% of the difference in self-reported spending adjustments between homeowners and renters. Using the hypothetical vignette, we also replicate our main findings on spending responses, including the differences between renters and homeowners. Finally, we confirm the relevance of the potential key mechanisms behind our findings based on the different recommendations that popular financial advice websites provide to homeowners and renters.

A large literature has studied households' spending responses to realized home price changes (Aladangady, 2017; Andersen and Leth-Petersen, 2021; Aruoba et al., 2022; Attanasio et al., 2009; Browning et al., 2013; Campbell and Cocco, 2007; Deng et al., 2022; Disney et al., 2010; Guren et al., 2021; Kaplan et al., 2020; Mian and Sufi, 2011; Mian et al., 2013; Piazzesi and Schneider, 2016; Stroebel and Vavra, 2019; Vestman et al., 2023). Most of these studies document small positive effects of home price appreciations on the spending of homeowners, with a one dollar increase in home prices increasing homeowners' spending by between 0 and 10 cents (see Vestman et al. (2023) for an overview of effect sizes across studies). The effects are often concentrated among small groups of owners close to their collateral constraint (Aladangady, 2017; Aruoba et al., 2022; Browning et al., 2013; DeFusco, 2018; Vestman et al., 2023). Only few studies have examined spending responses of renters. Aladangady (2017) documents an insignificant negative effect of higher home prices on renters' spending, while Campbell and Cocco (2007) find a muted relationship for this group. Disney et al. (2010) document that young renters in the UK report somewhat higher active saving in response to home price appreciations.[1]

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[1]The Nielsen Homescan data has been used by previous literature to study consumption responses to home price changes (Kaplan et al., 2020; Stroebel and Vavra, 2019), tax rebates (Broda and Parker, 2014) or inflation expectations (Coibion et al., 2021a,b). These studies suggest that the types of spending covered in the Nielsen data are elastic to changes in economic resources or expectations.

Our paper is the first to study the role of expected *future* house price developments on households' current spending decisions.[2] Expectations about future home prices are known to display large swings and their characteristics differ from those of realized home price changes (Kuchler et al., 2022), which implies that understanding their effects on spending decisions is of key interest. Moreover, as households' expectations about future home prices do not directly affect their current collateral constraints, the collateral constraints channel should be less important than for realized home price changes. In line with this notion, our findings suggest that expected home prices matter largely through wealth effects and expected future housing costs, leading to muted spending effects among homeowners and negative effects among renters. Studying effects of expected future instead of realized current home price changes opens up the possibility of using experimental approaches like ours. This in turn circumvents issues related to potential violations of the exclusion restriction in commonly used instrumental variable approaches, such as approaches relying on spatial variation in local housing supply elasticities (Davidoff, 2016).

Compared to previous studies, our study highlights a channel through which renters may exert a dampening effect on aggregate consumption that is counter-cyclical to swings of optimism and pessimism about future home price developments. If realized home price increases are associated with higher expected future home price growth – as is suggested by empirical evidence (Armona et al., 2019) – this channel may attenuate the business cycle effects of realized home price swings. At a more general level, our study showcases how asset price movements may differentially affect spending decisions across groups with differential exposure to the asset, thereby contributing to consumption inequality between different types of households. Our findings are in line with recent work showing that the welfare effects of asset price appreciations depend on whether someone is a prospective net buyer or seller of the asset (Fagereng et al., 2017).

We also contribute to a literature studying the formation and consequences of housing market expectations (Armona et al., 2019; Kuchler and Zafar, 2019; Kuchler et al., 2022). Home price expectations have been shown to be central to people's decisions about renting vs owning (Adelino et al., 2018; Bailey et al., 2018), to home selling decisions (Bottan and Perez-Truglia, 2022) and to mortgage leverage choices (Bailey et

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[2]Qian (2022a,b) study the relationship between subjective expectations about future home price growth and expected future spending growth, but does not directly look at the effects of expected future home price growth on current spending decisions.

al., 2019). Our findings illustrate that expected home prices also matter for non-housing outcomes – the spending decisions of renters.

From a methodological perspective, our paper adds to a growing literature that uses information provision experiments to study the formation of macroeconomic expectations and the role of these expectations in economic decision-making (Armantier et al., 2016; Binder and Rodrigue, 2018; Cavallo et al., 2017; D'Acunto et al., 2022; Haaland and Næss, 2023; Haaland et al., 2023; Laudenbach et al., 2023; Roth and Wohlfart, 2020). Only few other papers have linked information experiments shifting expectations with administrative data on spending decisions (Coibion et al., 2021a,b; Galashin et al., 2021), and these papers focus on inflation expectations. Our study is unique in that it investigates the effects of information about future home prices on real-world spending decisions.[3] Moreover, building on the approach in Bailey et al. (2019), our study demonstrates how one can use surveys with open-ended questions to better understand the behavioral mechanisms underlying findings obtained using administrative datasets.

2 Experimental design and data

2.1 Main survey

In the following we describe the main modules of our survey. The experimental instructions can be found in Appendix Section D.

Prior beliefs and information treatment   We start by eliciting our respondents' prior beliefs about the average annual growth rate of the value of a typical home in the US over the next ten years. Subsequently, we inform all respondents that they will receive a forecast of the average annual home price growth rate from an expert who regularly participates in the World Economic Survey (WES), an expert survey on macroeconomic forecasts.[4] A random half of the respondents are assigned to the *high forecast* treatment,

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[3]A related area of research explores the effects of media on spending behavior (Chopra, 2021).

[4]The WES used to be administered by the ifo Institute and covered experts from more than 110 countries, who made macroeconomic forecasts for their economies. We were allowed to include questions in the October 2019 wave. In 2022, the WES was replaced by the Economic Experts Survey (EES).

while the other half are assigned to the *low forecast* treatment.[5] Respondents in the *high forecast* treatment receive the following message:

> According to this expert forecast, the average annual growth rate of home prices in the US over the next ten years will be 6 percent. In the case where home prices increase by 6 percent in each of the next ten years, this would mean that a home worth $100,000 today will be worth about $179,085 in ten years from now.

Respondents in the *low forecast* treatment, in contrast, receive the following message:

> According to this expert forecast, the average annual growth rate of home prices in the US over the next ten years will be 1.5 percent. In the case where home prices increase by 1.5 percent in each of the next ten years, this would mean that a home worth $100,000 today will be worth about $116,054 in ten years from now.

The additional information on the implied value of a $100,000 home in ten years from now aims at making it easier for respondents to understand the cumulative effects of different annual home price growth rates. Thereby, we mitigate the potential effects of exponential growth bias on the perception of cumulative home price growth (Stango and Zinman, 2009).

A potential concern with our treatment is that it may not only shift expectations about home price growth, but also expectations about the overall rate of inflation. To keep inflation expectations as comparable as possible across the two treatment arms, all respondents receive an additional expert forecast that the average annual rate of inflation in the US over the next ten years will be 2.2% on the next page. In our analysis in Section 3.1 we also study potential spillover effects of our intervention on expectations about other macroeconomic and personal outcomes.

Post-treatment beliefs To study the effect of the different expert forecasts on respondents' beliefs, we subsequently elicit respondents' agreement with the statement "US home prices will increase strongly over the next ten years" on a five-point categorical

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[5] Our experiment does not involve deception given that the information treatments are based on actual forecasts of two different experts, a method commonly used to vary expectations (Haaland et al., 2023).

response scale. We also include qualitative measures of respondents' beliefs about the development of rental prices as well as their own net wealth over the next ten years. To gauge quantitative differences in post-treatment home price expectations across treatment arms, we measure respondents' subjective probability distribution over different potential realizations of the average growth rate of a typical home in the US over the next ten years (Manski, 2004). Respondents assign probabilities to different bins of potential future home price growth rates, which are mutually exclusive and collectively exhaustive. For each respondent, we then derive the implied mean and standard deviation of their home price expectations by using the midpoints of each bin.[6] We elicit some additional beliefs, such as respondents' beliefs about current and future borrowing constraints for their household or the subjective probability that they will buy a home over the next 12 months, as well as additional background characteristics, such as whether they own or rent the home they currently live in.

2.2   Follow-up survey

We conduct a follow-up survey four weeks after the main survey in which no additional treatments are administered. In the follow-up survey, we ask respondents some questions on their economic behavior during the time between the main intervention and the follow-up survey, e.g., their household's spending on durable goods over the last four weeks. These responses allow us to examine treatment effects on a spending category for which the coverage in the Nielsen Homescan data is less comprehensive. We also elicit a set of macroeconomic expectations, including expectations about the home price growth rate over the next ten years. This allows us to test for persistent effects of our treatment on home price expectations, which in turn mitigates concerns related to experimenter demand effects and numerical anchoring (Haaland et al., 2023). In addition, we elicit respondents' plans to search for a home to buy or to sell a home they own over the next five years as well as their long-term moving intentions.

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[6]The eight bins are: "less than -20 percent," "between -20 and -10 percent," "between -10 and -5 percent," "between -5 and 0 percent," "between 0 and 5 percent," "between 5 and 10 percent," "between 10 and 20 percent," and "more than 20 percent." For the bins of "less than -20 percent" and "more than 20 percent" we use the values -30% and 30% when calculating the mean and standard deviations, respectively.

2.3 Discussion of the experimental design

Long-run expectations In our experiment we focus on expectations about the average growth of home prices over the next ten years. The ten-year horizon allows us to abstract from the empirically occurring pattern of mean reversion in home prices over horizons of two to five years, which some respondents may anticipate (Armona et al., 2019). Formulating the belief elicitation and the information around a shorter horizon (e.g., 12 months) would complicate the interpretation of heterogeneous treatment effects across groups.

Active control design All respondents are provided with one of two different expert forecasts about future home price growth. An alternative design would provide a treatment group with an expert forecast, while a control group receives no information. Compared to this alternative design, our design has two key advantages. First, receiving information may not only shift the level of respondents' beliefs but could also have side-effects, such as reducing respondents' subjective uncertainty around their expectations or priming respondents on economic forecasts of experts. By providing all respondents with an expert forecast, such side-effects should be comparable across treatment arms in our design. Second, the identifying variation in the alternative design depends on the difference between the information and a respondent's prior belief. However, prior beliefs are not randomly assigned and are measured with error. This complicates the interpretation of heterogeneous treatment effects across groups, and potentially attenuates estimated treatment effects depending on the prior. By contrast, the identifying variation in our design depends only on the difference in the signals across the two treatment arms, which is orthogonal to respondents' priors. These issues are discussed in more detail in Haaland et al. (2023).

2.4 Sample

We conduct our survey among households that are members of the Nielsen Homescan (HMS) panel. The HMS panel consists of about 100,000 US households who record their shopping expenditures using a scanner that they are provided with by Nielsen. The data have been collected since 2004 and the sample is broadly nationally representative in terms of nine demographic characteristics, including age, education, household

income, race and ethnicity. The Nielsen panel is by now widely used in academic research to study households' spending behavior (Chopra, 2021; Coibion et al., 2021b; Stroebel and Vavra, 2019).

Sample The main survey was administered in November 2019. We recruited individuals from the Nielsen panel to participate in our survey, focusing only on panel members who indicate to be head of their household. 4,154 individuals completed our survey, out of which 2,642 (64%) completed the follow-up survey four weeks later. Our primary interest lies in the real-world spending behavior of our respondents. We therefore drop respondents without any linked administrative data in 2019. Moreover, we exclude respondents that drop out of the Nielsen Homescan panel within three months after our main survey to focus on respondents with high-quality spending records (Dubé et al., 2018). A pervasive concern in online surveys is that some respondents may not take the survey seriously and just quickly click through the questions (Haaland et al., 2023). To focus on attentive respondents, we therefore drop individuals who spend less than five seconds on the screen on which the treatment information is provided. Finally, we exclude respondents who indicate to neither own nor rent a home. These steps leave us with a final sample of 2,554 respondents for the main survey, out of which 1,702 complete the follow-up survey.

Spending data Our key outcome variable of interest is respondents' consumption expenditure as measured in the scanner data from the Nielsen Homescan panel. A key advantage of scanner data is that it is not subject to biases in households' recall of their own expenditures, which may lead to substantial measurement error in self-reported spending data (Bound et al., 2001; Browning et al., 2003). The dataset includes high-frequency data on monthly purchases at the Universal Product Code (UPC) level, indicating the price, quantity, and date of purchase. The products recorded in the dataset include all kinds of groceries (food and non-food), personal care and health products and general merchandise products (Malmendier and Shen, 2019). The consumption measure that can be constructed from the Nielsen data therefore consists primarily of retail spending on nondurable goods. We complement the Nielsen data with self-reported data on durable goods spending collected in the follow-up survey.

Summary statistics and integrity of randomization   Appendix Table B.1 provides summary statistics of our final sample, including benchmarks for the US population from the 2019 American Community Survey (ACS). Our sample is relatively close to the population in terms of average age (55 in our sample vs 48 in the population) and household income ($79,046 in our sample vs $79,517 in the population). The most important difference is a 16 p.p. higher share of women, reflecting differences in the within-household allocation of grocery shopping (D'Acunto et al., 2021). Another difference is a higher share of individuals with a college degree (47% in our sample vs 31% in the population), which is common even in established online panels that strive for national representativeness, such as the New York Fed's Survey of Consumer Expectations (Armantier et al., 2017).

Table B.2 presents a test of balance for the two treatment arms to assess the integrity of the randomization. To address slight imbalances across arms, we include a set of control variables in all specifications comparing levels of variables across treatment arms.[7] Turning to spending as recorded by Nielsen, Figure A.2 presents the cumulative distribution of average monthly household spending in the quarter prior to our main survey. The distribution of baseline monthly spending is virtually indistinguishable across treatment arms, both among homeowners (Panel A, Kolmogorov-Smirnov p-value = 0.78) and among renters (Panel B, Kolmogorov-Smirnov p-value = 0.49). This increases our confidence in the integrity of our randomization procedure.

3   Main results

3.1   Home price expectations

Pre-treatment beliefs   Before analyzing the effect of the treatment on respondents' posterior home price expectations, we briefly discuss respondents' prior beliefs. Panel A of Appendix Figure A.1 displays the distribution of prior point expectations about average annual home price growth over the next ten years, winsorized at the 95th percentile. There is a substantial amount of disagreement across respondents and, on average, respondents expect home prices to increase by 9.6% per year (median: 5%).

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[7]The control variables are: gender, age, log household income, prior home price expectations, household size and indicators for full-time employment, having a college degree or a higher level of education, race, ethnicity, region, presence of children and being a homeowner.

Thus, the signals from the expert forecasts provided in the two treatment arms (1.5% and 6%) both imply weaker home price growth than expected by the average respondent. Panel B shows that the distribution of prior expected home price growth is somewhat shifted to the right among renters compared to homeowners.

Post-treatment beliefs   Figure 1 displays the distributions of post-treatment beliefs about average annual home price growth rates over the next ten years – as measured by the means of respondents' subjective probability distribution – separately for each treatment arm. The figure highlights that beliefs are shifted towards the expert forecast provided in each treatment arm. As a result, the distribution of posteriors in the *high forecast* treatment arm first-order stochastically dominates the distribution of posteriors in the *low forecast* treatment arm.

Columns 1-3 of Table 1 quantify the first-stage effects of our treatment on respondents' beliefs about future home price growth. Specifically, we regress different measures of respondents' beliefs on a dummy variable taking value one if a respondent was randomly assigned to the *high forecast* arm, and zero otherwise. We also include a set of control variables. Panel A focuses on the full sample. Being exposed to the high home price growth forecast increases respondents' posterior expectations about average annual home price growth over the next ten years by 1.5 p.p. on average (Column 1, $p < 0.01$). Thus, our treatment generates a difference in posterior beliefs of one third of the difference in signals across the two arms ($6\% - 1.5\% = 4.5\%$). This learning rate is in the middle of the range of learning rates estimated in previous information provision experiments on macroeconomic expectations (Haaland et al., 2023).

There are no treatment effects on respondents' perceived uncertainty of future home price growth as measured by the standard deviation of a respondent's subjective probability distribution (Column 2). This suggests that our active control group design indeed generates clean exogenous variation in beliefs about future home prices, holding constant potential side-effects of information provision such as a reduction in uncertainty. Our treatment variation also changes respondents' agreement with a qualitative statement that house prices will increase strongly over the next ten years by 34% of a standard deviation (Column 3, $p < 0.01$). Panels B and C present first-stage estimates separately for homeowners and for renters. If anything, our treatment has somewhat larger effects on home price expectations among renters (2.2%) compared to those among owners (1.3%), although the differences in treatment effects are noisily

measured.

Persistence and cross-learning   One possible concern with our evidence is that the information treatment may only temporarily shift expectations. Appendix Table B.10 shows that respondents exposed to the high forecast exhibit significantly higher home price expectations in the follow-up survey conducted four weeks after the intervention. This evidence further mitigates concerns that changes in reported beliefs in response to the treatment reflect experimenter demand effects or numerical anchoring (Cavallo et al., 2017; de Quidt et al., 2018).

To better understand mechanisms underlying our treatment effects, we use the follow-up survey to shed light on cross-learning, i.e., updating of beliefs about other macroeconomic or personal economic outcomes in response to the expert forecasts.[8] We find some updating of expectations about future inflation in response to the treatment, but the effect is substantially smaller than for expected home price growth. Similarly, respondents somewhat update about future real GDP growth. However, we do not detect any significant effects on respondents' expectations about their own labor income. Therefore, cross-learning about the development of other macroeconomic variables or future personal income in response to the expert forecasts seems to be of limited quantitative importance.[9]

3.2   Spending behavior

We next turn to the effects of our intervention on respondents' spending behavior, covering both non-durable spending measured in the scanner data and durable good spending measured in self-reports in the follow-up survey.

3.2.1   Scanner data

For this analysis, we focus on the period from August 2019 to February 2020, covering three months before and after the treatment was administered in November 2019. We

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[8]This type of cross-learning could also be present in the real world when respondents learn about future home prices. It is a mechanism operating in all information experiments and is discussed in more depth in Haaland et al. (2023).

[9]The open-ended data on reasoning about home price changes, which we present in Section 5.1, suggests that the treatment did not ignite many thoughts about other variables unrelated to housing.

estimate the following model on our monthly panel of Nielsen households:

$$\text{Log expenditures}_{i,t} = \beta \text{High forecast}_i \times \text{Post}_t + \tau_i + \mu_t + \varepsilon_{i,t} \qquad (1)$$

where Log expenditures$_{i,t}$ indicates the log of respondent i's total household expenditure measured in the Nielsen scanner data in month t. High forecast$_i$ is a dummy variable taking value one for respondents exposed to the high home price growth rate forecast, and zero otherwise. Post$_t$ is a dummy variable taking value one for the month when the survey was administered – November 2019 – and all following months, and zero otherwise. τ_i and μ_t are respondent and month fixed effects. Robust standard errors clustered at the respondent level are reported and used for inference throughout the analysis.

Table 2 presents the treatment effects on respondents' expenditures as measured in the scanner data. Being exposed to the high forecast causes an insignificant reduction in expenditures by 1.5% when focusing on the full sample (Column 1, $p = 0.251$). When focusing on homeowners, the estimated treatment effects are very close to zero (Column 2, $p = 0.951$) relatively precisely estimated, allowing us to rule out effect sizes of more than 2.8 p.p. at a power of 80%. However, receiving the high forecast significantly reduces spending among renters by 7.6% (Column 3, $p = 0.020$). The difference in treatment effects between homeowners and renters is statistically significant ($p = 0.035$). Putting the estimate among renters in relation to the corresponding first-stage estimate shown in Panel C of Table 1 (Column 1), renters reduce their spending by 3.9% for a one p.p. increase in expected average annual home price growth over the next ten years. Reassuringly, we obtain similar spending elasticity estimates with respect to home price expectations using a two-stage least-squares approach. This analysis suggests that renters decrease their spending by 2.8% in response to a one p.p. increase in expected home price growth, as shown in Column 3 of Appendix Table B.3. Taken together, this suggests that renters' spending behavior is responsive to changes in home price expectations.

Robustness Table B.5 shows that the results are robust to performing the above analysis at the household-month-product category level. Appendix Table B.6 demonstrates robustness of the estimated effects in the full sample and among the subsamples of homeowners and renters to a range of sensitivity checks, such as focusing on households

with regular spending records in the Nielsen panel, excluding households with extreme levels of baseline expenditure, or excluding fixed effects. Appendix Table B.7 highlights robustness to restricting the sample period to one instead of three months before and after the treatment. Finally, Appendix Table B.8 shows that spending adjustments among renters are driven by a reduction in non-food expenditures.

3.2.2 Durable good purchases

We now turn to adjustments in respondents' expenditures on durable goods over the four weeks following the intervention, as measured in self-reports in the follow-up survey. This complements the analysis of the scanner data, which do not fully capture respondents' spending on durable goods. In Appendix Table B.9 we regress different measures of durable goods spending on a dummy variable indicating whether a respondent received the high house price forecast as well as a set of control variables. In some specifications we also control for respondents' prior planned spending on durable goods as elicited in the main survey before the treatment was administered.

We detect no significant adjustments in durable goods spending in the full sample (Panel A) or among homeowners (Panel B), neither at the extensive margin indicating whether a household made any durable good purchase at all (Columns 1 and 2), nor when focusing on the log of a household's overall spending on durable goods (Column 3 and 4).[10] However, renters are 12 p.p. less likely to report any durable good purchase when exposed to the high forecast (Columns 2 in Panel C, $p = 0.017$). This effect is sizable, given that 37% of renters in the *low forecast* treatment made at least one durable good purchase. These reductions in durable goods spending among renters are also reflected in a significantly lower spending volume on durables (Columns 3 and 4 in Panel C, $p = 0.077$ and $p = 0.040$).

4   Mechanisms

In this section, we shed light on the mechanisms through which changes in home price expectations may affect households' spending decision, focusing on three key channels according to consumption models with housing: (i) perceived wealth effects,

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[10]We add the value one to a household's spending on durable goods before taking logs to account for the many zeros in this variable.

(ii) changes in expected housing costs, and (iii) changes in expected future borrowing constraints. In particular, we discuss how these mechanisms could contribute to and partially explain the heterogeneous effects of home price expectations on spending behavior between homeowners and renters.

4.1 Wealth effects

Expecting higher future home prices should increase homeowners' expectations about their own net wealth. In our survey, we elicit respondents' expectations about the development of their household's net wealth over the next ten years on a 7-point qualitative response scale, which we z-score using the mean and the standard deviation in our sample. As shown in Column 1 of Table 3, we detect an increase in expectations about net wealth by 7.8% of a standard deviation when exposed to the high forecast in our full sample (Panel A, $p = 0.037$), which is driven by an increase by 8.9% of a standard deviation among homeowners (Panel B, $p = 0.031$). In contrast, renters do not differentially adjust their expectations about their own net wealth between the two treatment arms (Panel C, $p = 0.645$). Therefore, households that own a home indeed expect to be wealthier in the future when they are more optimistic about future home price growth, which should exert a positive influence on their current spending. This, in turn, may contribute to the difference in spending responses between homeowners and renters that we document above.

4.2 Housing costs

Households require a place to live, making housing costs a key component of their cost of living. Expecting higher house prices should therefore be reflected in an increase in households' expected cost of living. Among homeowners, higher expected housing costs should largely offset positive wealth effects from higher home price expectations (Aladangady, 2017; Sinai and Souleles, 2005). In particular, if homeowners decide to sell their home in the future, they need to move to a new place. However, house prices and rental prices have increased, so moving to a new place will be more expensive. Positive wealth effects and negative effects due to higher expected housing costs could jointly explain the muted effect of an increase in home price expectations on homeowners' spending. Among renters, in contrast, higher expected future housing

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costs cannot be offset by wealth effects. This could explain the negative effect of higher home price expectations on renters' spending.

Rental prices   In our main survey, we elicit respondents' expectations about future rental prices on a 5-point qualitative response scale. As shown in Column 2 of Table 3, respondents increase their expectations about future rental prices by 17.6% of a standard deviation in the full sample (Panel A, $p < 0.01$). The effect is almost twice as large among renters with 31% of a standard deviation (Panel C, $p < 0.01$), compared to a 15.8% of a standard deviation change among homeowners (Panel B, $p < 0.01$). This difference may reflect that renters have a better understanding of the link between home prices and rental prices than homeowners (Kindermann et al., 2022). Therefore, respondents indeed strongly update their expectations about future housing costs in response to the information.

Moving intentions   Changes in expected housing costs could play a particularly important role for spending decisions among renters that plan a transition to homeownership. Specifically, when such renters expect homes to become more expensive, they may feel a need to save more today to be able to afford a home in the future. Since housing needs partially reflect hard constraints, such as family size (Bailey et al., 2019), buying a smaller home when home prices are higher may not be an option for many renters, making the saving margin central.

To study heterogeneity by moving intentions, our survey elicits respondents' moving plans over the next ten years before the treatment. Table 4 presents treatment effects among groups with different moving intentions. Spending reductions are fully driven by those households that intend to move in the next ten years (Panel A, Column 2, $p = 0.054$), and in particular those who plan to move to a more expensive home (Panel A, Column 4, $p < 0.013$). These effects are concentrated among renters (Panel C, Columns 2 and 4, $p < 0.01$), while the effects are close to zero and statistically insignificant for the corresponding groups among homeowners (Panel B).[11] Therefore, expecting higher home prices indeed strongly reduces spending among renters who likely intend to buy a home in the near future.

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[11]Reassuringly, renters who plan to move to a more expensive home update similarly about future home prices in response to our treatment as renters that report no intentions of moving in the next ten years (as shown in Column 1 of Panel B of Appendix Table B.11). This implies that differential spending adjustments are not driven by a differential first-stage effect on respondents' home price expectations.

We provide further evidence for this channel in Appendix Table B.12. Specifically, we elicit respondents' subjective probability of buying a home in the next 12 months at the end of our main survey. As shown in Column 1 of Panel B, renters that plan to move to a more expensive home in the next ten years reduce their subjective probability of buying a home in the next 12 months by 8.6 p.p. ($p = 0.038$) in response to being exposed to the high forecast, while renters that do not intend to move do not respond ($p = 0.535$). As shown in Column 2, the treatment has no statistically significant effects on renters' plans to buy a home within the next five years, as measured in the follow-up survey. Thus, renters that plan to move seem to stick to their plans of becoming a homeowner in the long run, but postpone the time of their planned purchase once they expect a stronger home price growth. This is in line with a greater perceived need to save to be able to afford the home. Among homeowners, we detect no significant changes in their subjective probability of buying a home, neither among those who plan to move nor among those who do not plan to move (Panel A).

Finally, complementing the above analysis by moving intentions, we investigate heterogeneity in treatment effects by age. The channel operating through higher cost of a future home purchase should be less relevant for older renters, who should be more likely to plan on down-scaling to a smaller home and who may be less mobile. Appendix Table B.4 presents treatment effects from our main specification separately for respondents below or above the average retirement age of 65 in the US. In line with our hypothesis, spending reductions among renters are fully driven by respondents below retirement age (Panel A, Column 3).

4.3 Borrowing constraints

Realized appreciations in home prices have been shown to relax homeowners' borrowing constraints through a higher value of their collateral, which causes spending increases particularly among constrained households (Aladangady, 2017). In contrast to realized home price changes, changes in *expected* future home price growth generated by our intervention do not affect households' actual borrowing constraints. However, homeowners may perceive a lower probability of binding borrowing constraints in the future in response to higher home price expectations. This, in turn, may lead them to increase their spending today by alleviating precautionary savings motives. Similarly, if homeowners revise their beliefs about the current home price expectations of lenders in

response to our interventions, this may translate into lower perceived current borrowing constraints.

In our main survey we ask our respondents how difficult it would be for them to take out a $1,000 loan to finance a car repair (i) currently and (ii) in ten years from now. Responses are elicited on a 5-point qualitative response scale from "very difficult" to "very easy". We z-score responses using the sample mean and standard deviation for our analysis. As shown in Columns 3 and 4 of Table 3, we detect virtually no changes in respondents' perceived current or future borrowing constraints in response to the high forecast, neither in the full sample (Panel A), nor among homeowners (Panel B) or renters (Panel C). Thus, households do not anticipate any relaxation of their borrowing constraints in response to higher home price expectations, which may further contribute to the muted spending response among homeowners.[12]

4.4   Interpretation of magnitudes

Motivated by the above evidence suggesting a key role for renters' expectations about the cost of purchasing a home in the future, we conduct a back-of-the-envelope calculation to interpret the magnitude of renters' spending responses. The starting point for this exercise is the following question: If renters expect to purchase a home in the future at a price consistent with their home price expectations, to what extent is the size of the treatment effect on spending in line with the idea that renters increase their saving rate to offset the higher expected purchase costs?

We make three main assumptions for this exercise. First, we assume that renters expect to buy a home in the next ten years, with an expected purchase date assigning equal probability to each point in this time period. Second, respondents require liquidity for a down payment that is equivalent to 20% of the purchase price and use a mortgage to finance the remaining 80%. Third, we assume that our treatment effect on spending remains constant and does not diminish over time, such that renters in the *high forecast* treatment group are able to permanently increase their monthly savings by about $35

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[12]Moreover, we would expect spending responses to changes in expected future home prices to be driven by currently unconstrained households. In unreported regressions we found no differences in treatment effects according to proxies for current constraints (income, financial assets, net wealth). Given that these variables contain many missings, as Nielsen does not allow "force response" in the survey, and given that these variables are only imperfect proxies for borrowing constraints, these results should be interpreted cautiously.

per month relative to the *low forecast* treatment arm.

Table 5 presents the results. The average home value in the zip codes where the renters in our sample reside was about $259,000 when we conducted our main survey based on data from Zillow. Given our assumptions, the difference in average posterior home price expectations across respondents in the *high forecast* (6.3%) and *low forecast* treatment arms (4.2%) would imply that renters in the *low forecast* treatment arm face an expected down payment of $326,494 \times 0.2 = \$65,299$, while renters in the *high forecast* treatment arm should expect a down payment that is $8,104 higher. At the same time, renters in the *high forecast* treatment arm are able to save $35 more per month. This, in turn, translates into an expected cumulative savings difference of $2,314 across treatment arms at the time of home purchase in the future. This savings difference is equivalent to 28.6% of the difference in the expected down payment across treatment arms.

This exercise thus suggests that the observed spending response among renters in our experiment would be sufficient to offset about a quarter of the higher liquidity needed to make a down payment in the future given the exogenous change in home price expectations. However, we do not fully observe household spending: Dubé et al. (2018) estimate that the recorded purchases in the Nielsen data capture about a quarter of average annual household expenditures as measured by the Consumer Expenditure Survey. Thus, if renters would decrease their *unobserved* spending on expenditure categories that are not tracked by Nielsen in a way that is proportional to the decrease in observed spending, the cumulative savings difference across treatment arms would allow renters to fully compensate the difference in expected down payments.

Overall, the back-of-the-envelope calculation suggests that the size of renters' spending responses to our intervention is consistent with the idea that they increase their saving to compensate for the higher expected cost of buying a home in the future.

5 Reasoning about home price changes

5.1 Survey evidence

We conduct an additional survey on a separate sample to provide more direct evidence on the mechanisms behind the effect of home price expectations on spending decisions.

This survey uses open-ended questions to directly elicit the considerations on top of households' minds when thinking about the effects of higher future home price growth on their personal economic situation. Appendix D.3 provides the survey instructions.

Sample   The survey was conducted in November 2022 with 500 US respondents on Prolific, a provider widely used in social science research (Eyal et al., 2021). Appendix Table B.14 presents summary statistics. 49.4% of our respondents are female, 69.5% have at least a college degree and the median income of respondents in our sample is $62,500. 53% of respondents own a home and, among renters, 68.4% intend to buy a home over the next ten years.

Survey design   Our main object of interest are people's considerations when they think about changes in the future growth of home prices in the US. To elicit these considerations we ask our respondents to imagine the following hypothetical scenario:

> Imagine that you expect home prices to grow by 1.5% per year over the next 10 years. Now imagine that you increase your expectations about future home prices. You now expect home prices to increase by 6% per year over the next 10 years.

The home price growth expectations appearing in this hypothetical scenario are the same as the expert forecasts provided to respondents in the two treatment arms of our main experiment. We then ask our respondents how this change in their expectations about future home prices would affect their expectations about their household's future economic situation. Respondents can indicate whether their expectations about their own economic situation would (i) improve, (ii) remain unchanged, or (iii) worsen. Our key object of interest is our respondents' explanation for their response to this question, which we elicit using an open-text box.[13] This open-ended elicitation is useful as it provides a lens into people's spontaneous reasoning about the relevant mechanisms through which home price growth affects their economic circumstances. Different to more structured question formats, open-ended elicitations do not prime individuals on the mechanisms listed in the response options. They should therefore be less prone to concerns such as ex-post rationalization.

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[13]For a similar methodological approach, see for example Andre et al. (2022a,b); Chopra et al. (2022).

One downside of open-ended elicitations is that they potentially increase measurement error, as respondents may be reluctant to exert effort to fully describe their thoughts. We therefore complement this open-ended elicitation with a structured question on the subsequent survey screen. Respondents can select multiple factors from a structured list that contains all main economic mechanisms through which a change in home price expectations could plausibly affect expectations about people's economic circumstances.

To examine how the considerations on top of people's minds affect spending behavior, we then ask our respondents to consider the same hypothetical scenario as before. We ask them how the change in their expectations about future home prices would affect their household's current spending on consumption goods and services. Respondents indicate whether their spending would (i) increase, (ii) remain unchanged, or (iii) decrease in response to the change in their home price expectations.

Descriptive evidence on considerations   To analyze the open-ended explanations, two research assistants independently review and manually code the responses. They assign codes for thoughts of different mechanisms, allowing each open-text response to receive multiple codes. Specifically, we include codes for (i) changes in the value of housing currently owned by the household, (ii) changes in the rent of homes, (iii) changes in the costs of buying a home, (iv) changes in the ease of borrowing money against home equity owned by the household, (v) changes in overall household income, (vi) changes in interest rates, (vii) changes in inflation, and (viii) home price changes being irrelevant as the household does not plan to move. Conflicts are resolved through discussion between the two research assistants. If one coder assigns a code, there is an 82% chance that the other coder does so as well. 92% of the factors assigned by any of the two coders align with the final version. This suggests that the coding exhibits a high degree of reliability.

Appendix Table B.13 provides an example response for each code. Among homeowners, many respondents mention changes in the value of housing currently owned by their household, as illustrated by the following response:

> *We plan on selling our home in about 10 years when our mortgage would*
> *be completely paid off. We would be able to walk away with a higher profit,*
> *therefore more money in our pockets.*

In contrast, a large fraction of homeowners mention that wealth increases are irrelevant as they are not planning to sell their home, as depicted by the following response:

> *I don't intend to sell my home or purchase a new home in the future and am financially stable so this would have no effect on me.*

Another very common theme in the open-ended text responses, especially among renters, are considerations about the costs of buying a home. This is illustrated by the following example response:

> *It means I have to save more money in the future when Im getting a house. I might have to get another job in order to afford a house and might not be able to have enough money for my and my family's other needs.*

Moreover, renters also frequently talk about increases in rental prices, as illustrated by the example response below:

> *I am a renter, when home prices increase, rents tend to increase as well.*

Finally, a number of homeowners also mention multiple conflicting motives through which changes in expected home prices would affect their consumption. For example, the following respondent mentions both increases in the value of their home and the cost of buying a home:

> *My house going up in value is always a positive, but it wouldn't necessarily affect how much financial freedom I have unless we sell the house. Selling the house would still require us to buy a new house however, which would also presumably have gone up in value.*

We next turn to the frequency of different mechanisms through which a change in home price expectations may affect expectations about people's own situation are mentioned in the open-text data. Figure 2 shows that, among renters, 44% mention changes in the cost of buying a home, highlighting that plans about a future home purchase play a central role for renters. Moreover, 12% mention increases in rental prices, 8% mention changes in their household income, and 10% refer to changes in their own housing wealth.

Among homeowners the patterns are quite different: 49% mention effects on their own housing wealth, while 20% mention the cost of buying a home, consistent with the idea that offsetting mechanisms may operate for owners. 20% express that it would not affect their situation as they do not intend to sell their home. On the one hand, this could reflect an endogenous response to changes in respondents' own outcomes, such as their housing wealth, not being large enough, or different changes – such as higher housing wealth and higher housing costs – offsetting each other. On the other hand, this could reflect moving frictions, such as tight local housing markets, a preference for living in a certain area, or housing needs being driven by hard constraints such as family size (Bailey et al., 2019). Strikingly, changes in the ease of borrowing money against home equity are only mentioned by 3% of homeowners. This underscores the evidence from the field experiment suggesting that homeowners do not anticipate a relaxation of borrowing constraints in response to higher home prices.[14]

Spending responses We next turn to respondents' beliefs about the effect of higher home price expectations on their expected own economic situation and their spending plans. As shown in Panel A Figure 3, 43% of renters would decrease their spending, 42% would leave their spending unchanged, while the remaining 15% would increase their spending in response to increased home price expectations. Among homeowners, an overwhelming majority (69%) would not change their spending plans, while 18% would decrease their spending, and the remaining 13% would increase their spending. Panel B shows similar patterns for people's assessment of their household's future economic situation. In sum, the reported spending responses to a hypothetical increase in home price expectations align well with the findings from the field experiment.

Considerations and spending responses Figure 4 provides evidence on the relationship between different considerations, elicited using the open-text box, and the tendency to report a worsening of the expected future situation of the household or to report a reduction in current spending. It displays coefficient estimates from multivariate regressions of spending and expectation responses on dummy variables indicating the different considerations. We include controls for the respondents' age, gender, log household income and educational attainment.

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[14]Appendix Table B.16 shows that the hand-coded open-text measures and the structured measures are strongly correlated with each other.

As shown in Panel A, among owners, thinking about changes in their own housing wealth is associated with a lower tendency to plan a reduction in spending, while thoughts of increased cost of purchasing a home are associated with a higher tendency to plan spending reductions. This is consistent with the idea that homeowners' muted spending responses to changes in home price expectations are partially due to offsetting effects from changes in perceived wealth and changes in expected future housing costs. Homeowners who mention rental prices are less likely to plan a spending reduction. This could be due to homeowners renting out part of their property or at least facing the option of doing so in the future. Homeowners mentioning a loosening of collateral constraints report a lower tendency to reduce spending, but the effect is of relatively small size. Finally, those mentioning that the changes in home prices would not affect their economic situation are less likely to plan spending cuts. The patterns for changes in people's expected economic situation are broadly consistent with the findings on spending.

Panel B highlights that, among renters, especially those mentioning higher costs of purchasing a home tend to plan spending reductions. Thoughts about future rental prices are positively associated with planned spending reductions, but the relationship is noisily measured. Among renters, spending responses are unaffected by whether respondents mention changes in collateral constraints. Renters who consider changes in their own housing wealth or who report that changes in their own housing wealth would not affect their economic situation much are less likely to reduce their spending. These latter patterns may be driven by households renting their main residence but owning some property, and should be viewed cautiously in light of the small fractions of renters reporting such thoughts (see Figure 2). Again, the patterns for changes in respondents' future own economic situation are broadly aligned with the patterns for planned spending responses.

To what extent can differences in considerations account for differences in spending responses between homeowners and renters? To study this, we regress a dummy variable indicating whether a respondent reports spending cuts on a homeowner dummy, and step-by-step include dummy variables for mentioning different mechanisms. We focus on the three mechanisms we identified as most important in predicting spending responses: changes in the cost of purchasing a home, changes in own housing wealth, and reporting that home price changes would be irrelevant for one's economic situation.[15] As shown

[15]Moreover, thoughts of these mechanisms have comparable effects on spending responses of owners

in Appendix Table B.15, the coefficient estimate on the homeownership dummy shrinks in size by 75% and is no longer statistically significant when dummy variables for thoughts of these three mechanisms are added (Columns 1 and 5). This exercise shows that differences in considerations can explain a sizable share of the difference in spending responses between homeowners and renters.

Overall, this evidence on the relationship between the considerations respondents have in mind and their planned consumption responses is consistent with the mechanism evidence from the field experiment: while renters reduce their spending due to higher expected costs of purchasing a home, higher expected housing costs are offset by positive wealth effects for homeowners.

5.2   Evidence from financial advice websites

Using a similar approach as Bailey et al. (2019), we provide additional evidence from popular financial advice websites on the key mechanisms underlying the effects of expected home price appreciations on household spending. Since many individuals consult financial advice websites and blogs in matters related to their household's finances, the financial advice given on these websites is informative of the relevance of particular mechanisms in driving households' decisions (Choi, 2022; Chopra, 2021).

Advice for homeowners   For homeowners, many websites emphasize that rising home values do not necessarily make them better off, as housing costs rise in parallel with their own housing wealth. For instance, *Investopedia*[16] writes:

> "From a practical standpoint, even if your primary residence doubles in value, it probably just means that your real estate taxes have gone up. All of the gains you experience are on paper until you sell the property. Of course, for many homeowners, that's alright. A home that doubles in value is a nice asset to pass on to the kids and grandchildren.
>
> If you decide to sell and buy another home in the same area, remember that the prices of those other homes have probably risen, too. To truly book a

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and renters (Figure 4), making a "horse race" between a homeowner dummy and thoughts of these mechanisms straightforward to interpret.

[16]`https://www.investopedia.com/articles/mortages-real-estate/11/the-truth-about-the-real-estate-market.asp`

gain from your sale, you will likely need to move to a smaller home in the same area, or move out of the area and find a less expensive place to live."

A similar argument is made on the website *The Motely Fool*[17]:

"The problem with selling a home in today's market is that what you gain in the form of a higher sale price, you stand to lose when you buy a replacement home. You may have to pay a premium when you buy."

Advice for renters   Many websites advise prospective homebuyers to start saving more when homes become less affordable. For instance, *realtor.com*[18] writes:

"Continue to save. If you decide to hit the pause button on your search, keep saving. [. . .] So create a budget to help you increase your down payment. A budget will help you see where you spend your money each month and where you can save."

Home Bay[19] recommends the following to prospective buyers who are "priced out of the housing market":

"Make a Plan to Save While Renting. We recognize that renting is often as much as (if not more than) a mortgage payment and that makes it hard to save while renting. However, you usually won't have to pay maintenance costs, property taxes, or the cost of replacing large appliances, so you might be able to put at least some of that money toward saving for a down payment. If you have the means, budget to save a goal amount each month."

Taken together, this evidence from popular financial advice websites supports two key mechanisms potentially underlying our main findings. Appendix Section C provides further examples for these arguments from financial advice websites.

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[17]https://www.fool.com/the-ascent/mortgages/articles/home-values-are-up-he
res-how-to-use-that-to-your-advantage/

[18]https://www.realtor.com/advice/buy/cant-afford-the-home-you-could-a-year
-ago-heres-what-to-do/

[19]https://homebay.com/priced-out-housing-market/

6   Discussion and conclusion

We conduct a field experiment linking information treatments with scanner data to study the role of home price expectations in households' spending decisions. We generate exogenous variation in respondents' expected home price growth over the next ten years through the provision of different expert forecasts. Homeowners do not adjust their spending in response to exogenously higher home price expectations. However, renters significantly reduce their spending on both durable and nondurable goods when they expect future home prices to be higher. We provide evidence that the muted effects among homeowners are likely due to offsetting effects of higher expected net wealth and higher expected housing costs. Spending reductions among renters seem to be driven by higher expected rental prices and higher expected costs of homes that many renters plan to buy in the future. We confirm the importance of these mechanisms in driving spending decisions with a tailored survey that directly elicits respondents' reasoning about the effects of expected home price growth on their own future economic situation.

Our paper has important implications for the role of housing in business cycle dynamics and consumption inequality. Our findings highlight that swings in home price expectations can have a dampening effect on aggregate consumption through their effects on the spending behavior of renters. Given the pro-cyclicality of home price expectations, the channel supported by our findings could potentially stabilize the business cycle. The strength of this channel depends on the housing market structure in an economy, specifically the ratio of homeowners to renters.

Our study builds on previous research documenting that realized changes in housing wealth can impact homeowners' spending behavior (Aladangady, 2017; Andersen and Leth-Petersen, 2021; Stroebel and Vavra, 2019). As home price expectations are extrapolative in nature (Armona et al., 2019; Kuchler and Zafar, 2019), the channel we document likely dampens the aggregate consumption effects of realized changes in home prices.

Moreover, our findings demonstrate how expected asset price movements can have a heterogeneous impact on spending levels across different groups of households. Our findings on renters demonstrate that expected asset price appreciations can even reduce spending among certain groups. This points to a role for expectations about future asset values, such as home prices or stock prices, in shaping consumption inequality. In this context, our findings relate to recent work on the welfare effects of asset price

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appreciations (Fagereng et al., 2022). Similarly to the welfare effects of swings in asset prices, the consumption responses we document in our paper depend on whether someone is a prospective net buyer or seller of the asset: renters who plan to buy a home in the future reduce their spending in response to higher expected home price growth, while homeowners – most of which do not plan to buy or sell in the near future – do not respond.

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Main exhibits

Figure 1: Posterior beliefs about the house price growth rate

Panel A: All respondents

Panel B: Homeowners

Panel C: Renters
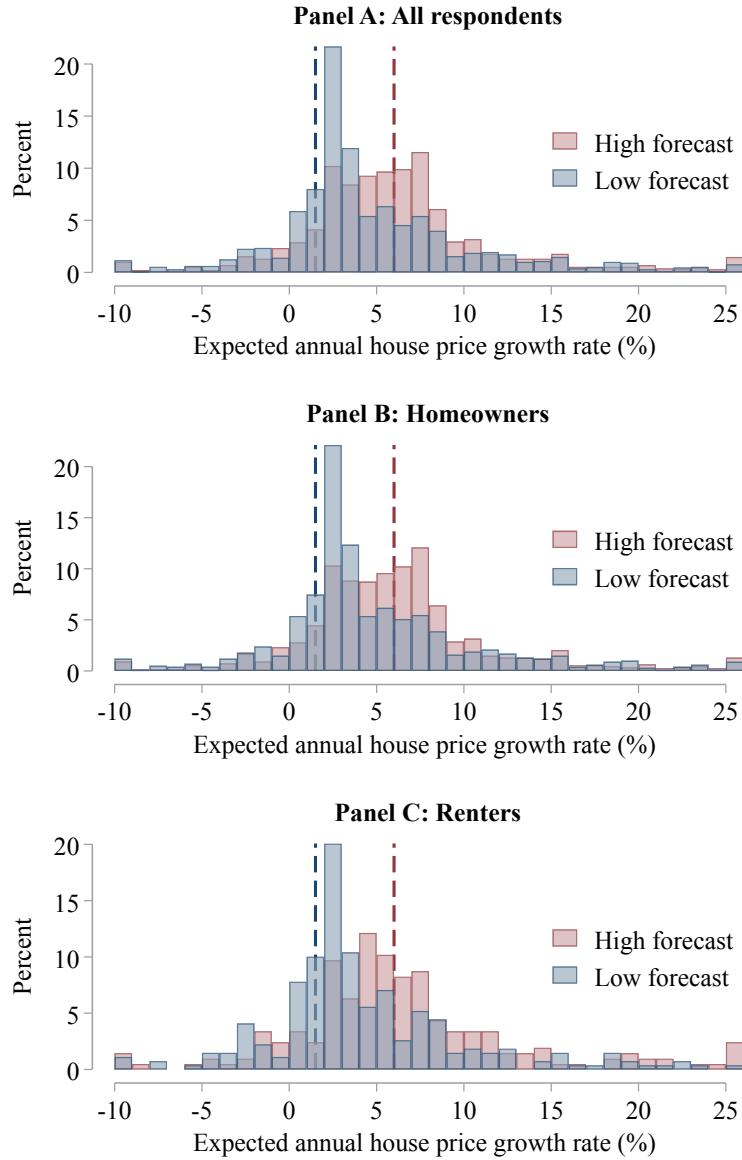
Note: This figure plots the distribution of the mean of respondents' subjective probability distribution of the expected average annual home price growth rate over the next ten years in bins with a width of one. Panel A shows the distribution in the full sample, while Panel B and C restrict to homeowners and renters, respectively. Each panel displays the distribution separately for respondents in the *high forecast* and the *low forecast* treatment arm. The mean of respondents' subjective probability distribution is winsorized at the 1st and 99th percentile for ease of visualization. The dashed vertical lines indicate the low and the high forecast used as part of the information treatment.

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Figure 2: Mechanism experiment: Open-ended responses on how higher home price growth affects one's personal economic situation
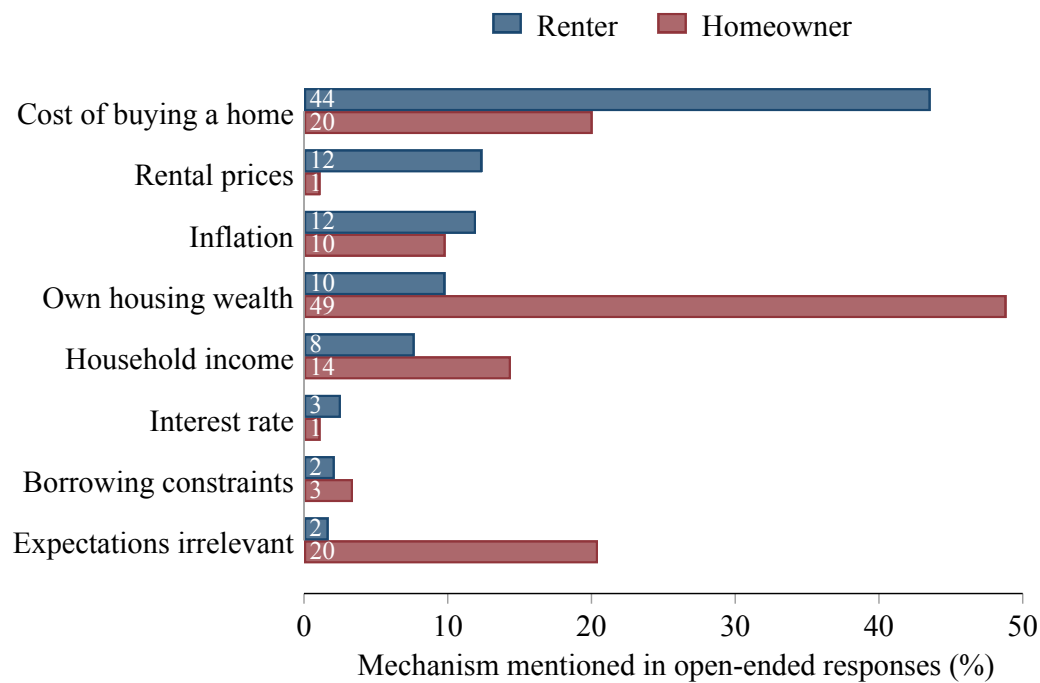
Note: This figure uses open-ended responses from the mechanism experiment. Respondents are asked to explain how an increase in future home prices will affect their economic situation in an open-ended question. Responses are then classified by trained research assistants using a fixed coding scheme. This figure displays the frequency of different codes. Open-ended responses can be assigned multiple codes. The figure displays the frequencies separately for renters and homeowners.

Figure 3: Mechanism experiment: Beliefs about the effect of home price changes on one's future economic situation and planned current spending

A: Change in planned current spending

B: Change in future economic situation
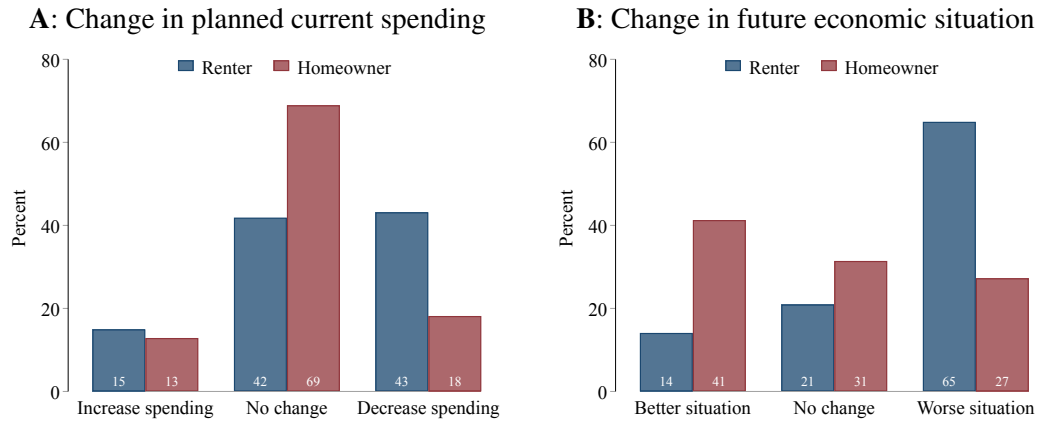
Note: This figure shows respondents' beliefs about how their households' expected future economic situation and their planned current spending would change in response to higher house price expectations. We use observations from the mechanism experiment. Respondents were asked to imagine that they expect home prices to increase by 1.5% on average over the next ten years. They were then asked to imagine that they would increase their expectations and expect home prices to increase by 6% on average over the next ten years. Panel A shows respondents' expectations about changes in their future spending behavior resulting from this change in their home price expectations. Panel B shows respondents' expectations about changes in their future economic situation resulting from this change in their home price expectations.

Figure 4: Mechanism experiment: Open-ended responses are correlated with planned behaviors and economic outlook

● Plans to decrease current spending ● Expects worse future economic situation
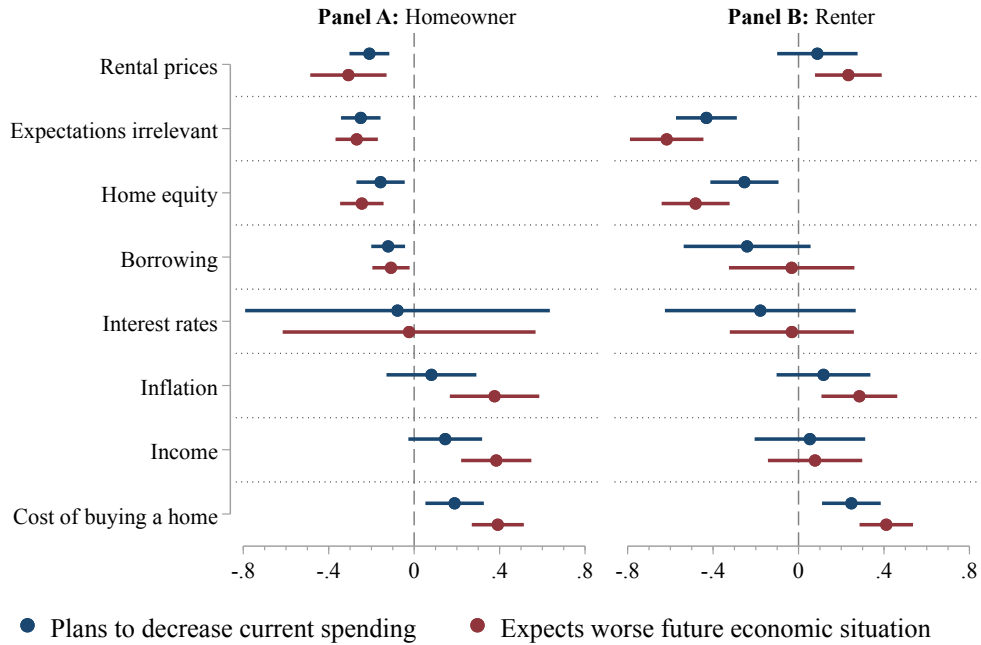
Note: This figure shows multivariate regression coefficients using data from the mechanism experiment. The dependent variables are a binary indicator taking value one for respondents who report that they would plan to decrease their current household spending in response to higher home prices, and a binary indicator taking value one for respondents who expect their household's future economic situation to become worse in response to higher home prices. The dependent variables are regressed on a set of indicators for whether respondents mentioned specific mechanisms in their response to the open-ended question on how higher home prices would affect their household. Panel A shows results for homeowners, while Panel B presents estimates for renters. All regressions include the following set of controls: age in yeas, female indicator, college indicator, log household income.

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Table 1: Treatment effects on home price expectations

	Dependent variable: House price growth		
	Quantitative measure		Qualitative measure
	(1)	(2)	(3)
	Mean (%)	Std. dev.	House prices will increase strongly
Panel A: All			
High forecast	1.480***	0.160	0.344***
	(0.238)	(0.221)	(0.038)
N	2,554	2,554	2,554
Dep. var. mean	5.408	7.836	0
Controls	Yes	Yes	Yes
z-scored			Yes
Panel B: Homeowners			
High forecast	1.327***	0.105	0.335***
	(0.257)	(0.241)	(0.042)
N	2,079	2,079	2,079
Dep. var. mean	5.48	7.646	-.023
Controls	Yes	Yes	Yes
z-scored			Yes
Panel C: Renters			
High forecast	2.168***	0.428	0.414***
	(0.618)	(0.555)	(0.091)
N	475	475	475
Dep. var. mean	5.095	8.666	.102
Controls	Yes	Yes	Yes
z-scored			Yes

Note: This table presents regression estimates of the treatment effect of receiving a high forecast rather than a low forecast about future home price growth. The dependent variables in Columns 1 and 2 are the mean and standard deviation of respondents' subjective probability distribution of the expected average annual home price growth rate over the next ten years. Column 3 shows effects on respondents' z-scored agreement with the statement that "US home prices will increase strongly over the next ten years." Panel A uses the full sample, while Panel B and C restrict to homeowners and renters, respectively. All regressions include the following set of control variables: gender, age, log household income, prior home price expectations, household size and indicators for full-time employment, having a college degree or above, race, ethnicity, region, children and being a homeowner.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Table 2: Treatment effects on monthly scanner expenditures

	Dependent variable: Log expenditures		
	(1) All respondents	(2) Homeowners	(3) Renters
High forecast x Post	-0.015	-0.001	-0.076**
	(0.013)	(0.014)	(0.033)
	[0.251]	[0.951]	[0.020]
N	17,877	14,552	3,325
R^2	0.727	0.724	0.725
Households	2,554	2,079	475
Household FEs	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes

Note: This table presents two-way fixed effects regression estimates. The dependent variable is log monthly scanner expenditures. "High forecast x Post" is the interaction between a binary indicator taking value one for respondents in the *high forecast* treatment arm and a binary indicator taking value one in the month a respondent participated in the main survey and all following months, and zero otherwise. All regressions include household and month fixed effects and include observations from the three months before and after a respondent participated in the main survey. Column 1 presents estimates on the full sample, while Columns 2 and 3 present estimates for homeowners and renters, respectively. Robust standard errors clustered at the respondent level are shown in round parentheses, while *p*-values are shown in square brackets.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3: Treatment effects on expected wealth, rental prices, and borrowing constraints

	Wealth effects	Rental prices	Borrowing constraints	
	(1)	(2)	(3)	(4)
	Net wealth changes (qualitative)	Rent prices will increase strongly (qualitative)	Currently: Take out $1,000 loan	In 10 years: Take out $1,000 loan
Panel A: All				
High forecast	0.078**	0.176***	0.006	0.006
	(0.038)	(0.039)	(0.035)	(0.036)
N	2,554	2,554	2,554	2,554
Controls	Yes	Yes	Yes	Yes
z-scored	Yes	Yes	Yes	Yes
Panel B: Homeowners				
High forecast	0.089**	0.158***	-0.018	-0.003
	(0.041)	(0.043)	(0.037)	(0.040)
N	2,079	2,079	2,079	2,079
Controls	Yes	Yes	Yes	Yes
z-scored	Yes	Yes	Yes	Yes
Panel C: Renters				
High forecast	0.042	0.310***	0.083	0.018
	(0.091)	(0.098)	(0.096)	(0.091)
N	475	475	475	475
Controls	Yes	Yes	Yes	Yes
z-scored	Yes	Yes	Yes	Yes

Note: This table presents regression estimates of the treatment effect of receiving a high forecast rather than a low forecast about future home price growth. "High forecast" is a binary indicator taking value one for respondents assigned to the *high forecast* treatment arm. Panel A uses the full sample, while Panel B and C restrict to homeowners and renters, respectively. All dependent variables are z-scored using the mean and standard deviation in the full sample. The dependent variable in Column 1 is respondents' perceived change in total net wealth over the next ten years measured on a 7-point Likert scale. The dependent variable in Column 2 is respondents' agreement with the statement that "rent on homes/apartments in the US will increase strongly over the next ten years" and measured on a 5-point Likert scale. The dependent variables in Columns 3 and 4 are respondents' perceived ability to obtain a $1,000 loan either now (Column 3) or in 10 years from now (Column 4), measured on a 5-point Likert scale. All regressions include the set of controls described in detail in Table 1.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Table 4: Treatment effects on monthly scanner expenditures: Heterogeneity by moving intentions in the next 10 years

	Dependent variable: Log scanner expenditures			
	(1) No plans to move in the next 10 years	(2) Plans to move in the next 10 years	(3) Plans to move to a cheaper home	(4) Plans to move to a more expensive home
Panel A: All				
High forecast x Post	0.015	-0.031*	0.002	-0.051**
	(0.023)	(0.016)	(0.026)	(0.020)
N	6,131	11,746	4,382	7,364
R^2	0.730	0.725	0.735	0.718
Household FEs	Yes	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes	Yes
Panel B: Homeowners				
High forecast x Post	0.014	-0.011	-0.002	-0.016
	(0.023)	(0.018)	(0.029)	(0.023)
N	5,788	8,764	3,493	5,271
R^2	0.728	0.721	0.715	0.723
Household FEs	Yes	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes	Yes
Panel C: Renters				
High forecast x Post	0.024	-0.089***	0.011	-0.133***
	(0.115)	(0.034)	(0.057)	(0.042)
N	343	2,982	889	2,093
R^2	0.747	0.723	0.771	0.701
Household FEs	Yes	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes	Yes

Note: This table presents two-way fixed effects regression estimates. "High forecast x Post" is the interaction between a binary indicator taking value one for respondents in the *high forecast* treatment arm and a binary indicator taking value one in the month a respondent participated in the main survey and all following months, and zero otherwise. All regressions include household and month fixed effects and include observations from the three months before and after a respondent participated in the main survey. The dependent variable is log monthly scanner expenditures. Panel A uses the full sample, while Panel B and C restrict to homeowners and renters, respectively. Column 1 restricts to respondents who do not plan to move to a new home in the next ten years, while Column 2 restricts to those who plan to move. Columns 3 and 4 restrict to respondents that plan to move to a cheaper or more expensive home, respectively. Robust standard errors clustered at the respondent level are shown in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Back-of-the-envelope calculation: Cumulative savings among renters and expected down payment differences across treatments

	Renter	
Panel A:		
Average home value (in zip code, Zillow HPI)	$258,713	
Treatment effect on monthly spending	-$35	
	High forecast:	*Low forecast:*
Home price expectations (%)	4.2%	6.3%
Expected purchase price (assuming uniform purchase date within 10 years)	$367,013	$326,494
Expected down payment (20% of home value)	$73,403	$65,299
Panel B:		
Δ(Down payment) across treatment arms	$8,104	
Expected cumulative savings difference from spending changes until home purchase	$2,314	
Cumulative savings relative to Δ(Down payment)	28.6%	

Note: This table presents a back-of-the-envelope calculation that compares the implied cumulative savings from differences in spending across treatment arms to the difference in the expected down payment requirements for purchasing a home in the next 10 years among renters. The calculations assume that renters will purchase a home within the next 10 years. The time of purchase is drawn from a uniform distribution over $\{1, \ldots, 10\}$. Based on the average posterior home price expectations among respondents in the high forecast and *low forecast* treatment arm, we obtain the expected purchase price. Here, we use data from Zillow to obtain the average value of homes in the zip codes of our respondents in November 2019. We assume that renters target a down payment of 20% of the home value. Panel B then compares the difference in the down payment across treatments to the cumulative savings across treatments up until the moment of purchase. Here, we assume that renters in the *high forecast* treatment arm save $35 per month more than those in the *low forecast* treatment arm. We can then calculate the cumulative savings difference across treatment arms and compare the savings difference to the difference in the expected down payments across treatment arms.

For online publication only:

Home Price Expectations and Spending:
Evidence from a Field Experiment

Felix Chopra, Christopher Roth, and Johannes Wohlfart

Summary of the online appendix

Section A contains additional figures.

Section B contains additional tables.

Section C provides examples of financial advice given to renters and homeowners on popular financial advice websites and blogs.

Section D contains the experimental instructions for the core survey modules.

A Additional figures

Figure A.1: Pre-treatment expected home price growth

Panel A: All respondents

Panel B: Homeowners vs. renters
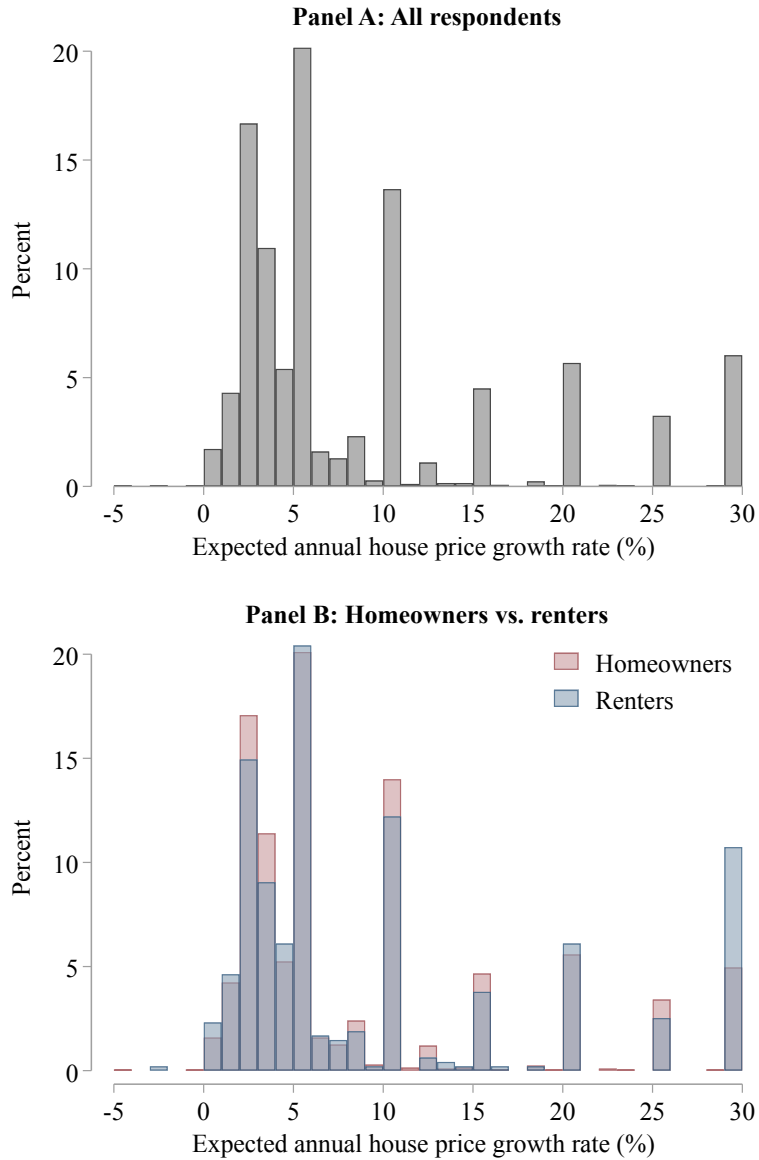
Note: This figure plots the distribution of respondents' prior point beliefs about the expected average annual home price growth rate over the next ten years in bins with a width of one. Panel A shows the distribution in the full sample, while Panel B separately plots the distribution for homeowners and renters. Beliefs are winsorized at the 95th percentile for ease of visualization.

Figure A.2: Test of balance: Pre-treatment average monthly expenditures

Panel A: Homeowners

Kolmogorov-Smirnov test: $p = 0.78$
Two-sided t-test: $p = 0.92$

Panel B: Renters

Kolmogorov-Smirnov test: $p = 0.49$
Two-sided t-test: $p = 0.93$
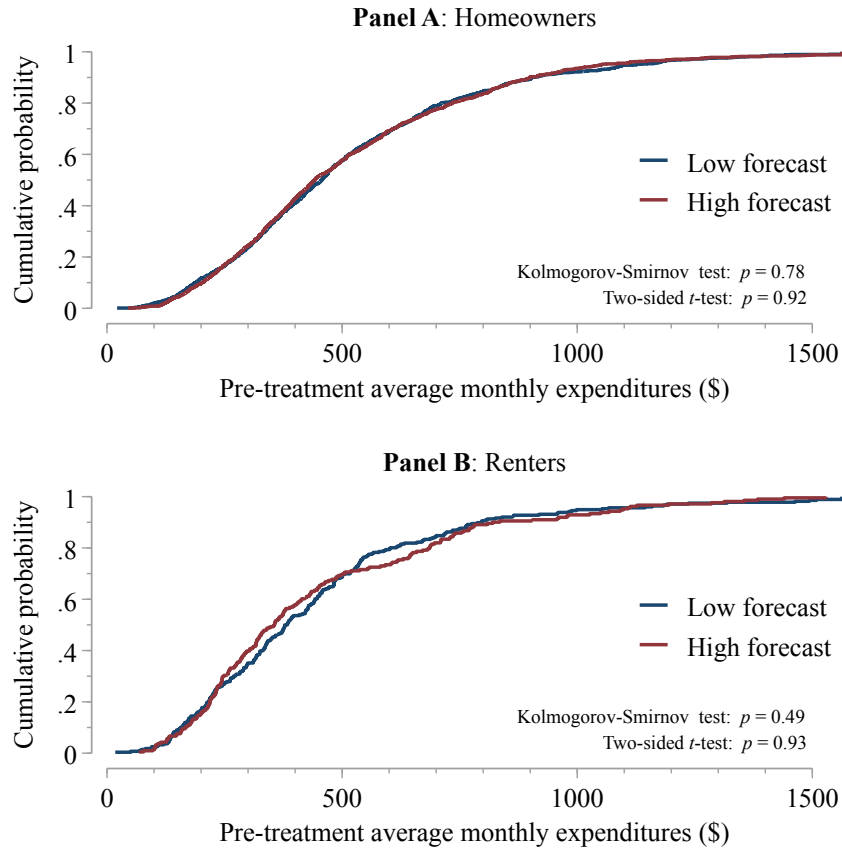
Note: This figure plots the distribution of pre-treatment average monthly expenditures in the three months before respondents participated in the main survey. Panel A and B plot the distribution for homeowners and renters, respectively. Each panel displays the distribution separately for respondents assigned to the *high forecast* treatment arm and the *low forecast* treatment arm. The p-value of a Kolmogorov-Smirnov test for equality of distribution across treatment arms and the p-value of a two-sided t-test for equality of means across treatment arms are shown in each panel.

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B   Additional tables

Table B.1: Summary statistics

| | Mean (std. dev.) | | | General population |
	All	Homeowners	Renters	ACS 2019
Female	0.774	0.774	0.775	0.513
	(0.418)	(0.418)	(0.418)	
Age	54.587	55.487	50.661	47.779
	(11.534)	(11.117)	(12.484)	
Household income	79,046.977	84,362.438	55,781.051	79,517.289
	(45,406.293)	(45,561.762)	(36,634.145)	
College degree or above	0.468	0.474	0.440	0.306
	(0.499)	(0.499)	(0.497)	
Employed	0.715	0.720	0.693	0.620
	(0.451)	(0.449)	(0.462)	
Northeast	0.374	0.381	0.343	0.174
	(0.484)	(0.486)	(0.475)	
Midwest	0.256	0.262	0.227	0.208
	(0.436)	(0.440)	(0.420)	
South	0.262	0.262	0.261	0.380
	(0.440)	(0.440)	(0.440)	
Ethnicity: White	0.823	0.846	0.722	0.736
	(0.382)	(0.361)	(0.448)	
Ethnicity: Black/African American	0.101	0.083	0.179	0.125
	(0.301)	(0.276)	(0.384)	
Hispanic	0.060	0.055	0.080	0.164
	(0.237)	(0.228)	(0.272)	
Household size	2.414	2.452	2.248	2.772
	(1.273)	(1.248)	(1.368)	
Children in household (below 18)	0.235	0.227	0.269	0.356
	(0.424)	(0.419)	(0.444)	
Prior: House price growth, next 10 years	9.578	9.161	11.403	
	(12.631)	(11.905)	(15.292)	
Observations	2,555	2,079	475	

Note: This table presents the mean and standard deviation of a range of background variables for the full sample and the subset of homeowners and renters, respectively. The final column presents the corresponding means in the general population based on data from the 2019 American Community Survey (ACS). "Female" is a binary indicator taking value one for female respondents. "Age" is the respondents' numerical age. "Household income" is the total pre-tax household income from all sources (in US dollars, top-coded at $150,000). "College degree of above" is a binary indicator for having completed a college degree. "Northeast," "Midwest" and "South" are binary region indicators. "Employment" is a binary indicator for working at least thirty hours per week. "Ethnicity: White" is a binary indicator for white respondents. "Ethnicity: Black/African American" is a binary indicator for Black/African American respondents. "Hispanic" is a binary indicator for respondents of Hispanic origin. "Household size" is the respondent's total household size. "Children in household (below 18)" is a binary indicator for the presence of at least one child below the age of 18 in the household. "Prior: House price growth, next 10 years" is the prior point belief about the average annual home price growth rate over the next ten years.

Table B.2: Test of balance

	All	Homeowners	Renters
	High vs low forecast	High vs low forecast	High vs low forecast
Female	0.005	0.019	-0.057
	(0.747)	(0.293)	(0.144)
Age	-0.024	-0.283	-0.207
	(0.958)	(0.562)	(0.858)
Log income	-0.028	-0.044	-0.082
	(0.306)	(0.122)	(0.212)
College degree or above	0.001	0.008	-0.040
	(0.960)	(0.715)	(0.388)
Fulltime employment	-0.027	-0.008	-0.101**
	(0.174)	(0.708)	(0.028)
Ethnicity: White	0.035**	0.037**	-0.006
	(0.021)	(0.021)	(0.877)
Ethnicity: Black/African American	-0.025**	-0.019	-0.025
	(0.036)	(0.113)	(0.490)
Hispanic	-0.010	-0.017*	0.030
	(0.297)	(0.085)	(0.231)
Northeast	-0.016	-0.021	-0.006
	(0.391)	(0.319)	(0.893)
Midwest	0.023	0.037*	-0.050
	(0.189)	(0.055)	(0.198)
South	-0.010	-0.011	-0.007
	(0.556)	(0.563)	(0.870)
Household size	-0.029	-0.042	-0.027
	(0.562)	(0.438)	(0.830)
Children in household (below 18)	-0.003	0.006	-0.030
	(0.856)	(0.758)	(0.465)
Prior: House price growth, next 10 years	-0.564	-0.312	-1.078
	(0.259)	(0.550)	(0.447)
p-value of joint F-test	0.530	0.256	0.383
Observations	2,554	2,079	475

Note: This table shows a test of balance for the main experiment. Columns 1–3 show differences in means between the groups indicated in the column header with p-values of a t-test for differences in means in parentheses. "Female" is a binary indicator taking value one for female respondents. "Age" is the respondents' numerical age. "Log income" is the log of the midpoint of the respondent's household income. "College degree of above" is a binary indicator for having completed a college degree. "Full-time employment" is a binary indicator for working at least thirty hours per week. "Ethnicity: White" is a binary indicator for white respondents. "Ethnicity: Black/African American" is a binary indicator for Black/African American respondents. "Hispanic" is a binary indicator for respondents of Hispanic origin. "Northeast," "Midwest" and "South" are binary region indicators. "Household size" is the respondent's total household size. "Children in household (below 18)" is a binary indicator for having at least one child below the age of 18. "Prior: House price growth, next 10 years" is the prior point belief about the average annual home price growth rate over the next ten years. The p-values of the joint F-test are determined by regressing the treatment indicator on the vector of covariates. The F-test tests the joint hypothesis that none of the covariates predicts treatment assignment.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.3: 2SLS estimates of the effect of home price expectations on consumption

	Dependent variable: Log expenditures		
	(1) All respondents	(2) Homeowners	(3) Renters
House price expectations	-0.009	-0.001	-0.028*
	(0.008)	(0.010)	(0.015)
	[0.262]	[0.951]	[0.067]
N	17,877	14,552	3,325
Households	2,554	2,079	475
Household FEs	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes
Estimation	IV	IV	IV

Note: This table presents two-stage least squares estimates of a two-way fixed effects model. All regressions include household and month fixed effects and include observations from the three months before and after a respondent participated in the main survey. "House price expectations" varies at the respondent-month level and is equal to respondents' prior point expectations about average annual home price growth rates for all months before a respondent participated in the main survey. Afterwards, it is equal to the mean of the posterior subjective belief distribution of future home price growth. We instrument "House price expectations" with the excluded binary indicator "High forecast x Post", which is the interaction between a binary indicator taking value one for respondents in the *high forecast* treatment arm and a binary indicator taking value one in the month a respondent participated in the main survey and all following months, and zero otherwise. The dependent variable in all specifications are log monthly scanner expenditures. Columns 1 uses all respondents, while Columns 2 and 3 restrict to homeowners and renters, respectively. Robust standard errors clustered at the respondent level are shown in round parentheses, while *p*-values are shown in square brackets.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.4: Treatment effects on monthly scanner expenditures: Heterogeneity by retirement age

	Dependent variable: Log expenditures		
	(1) All respondents	(2) Homeowners	(3) Renters
Panel A: Below retirement age			
High forecast x Post	-0.030**	-0.014	-0.091**
	(0.015)	(0.016)	(0.036)
N	14,440	11,563	2,877
R^2	0.731	0.730	0.723
Household FEs	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes
Panel B: Above retirement age			
High forecast x Post	0.047	0.050	0.023
	(0.029)	(0.032)	(0.067)
N	3,437	2,989	448
R^2	0.709	0.701	0.740
Household FEs	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes

Note: This table presents two-way fixed effects regression estimates. Panel A focuses on the subset of respondents below age 65, while Panel B uses respondents who are aged 65 or above. The dependent variable is log monthly scanner expenditures. "High forecast x Post" is the interaction between a binary indicator taking value one for respondents in the *high forecast* treatment arm and a binary indicator taking value one in the month a respondent participated in the main survey and all following months, and zero otherwise. All regressions include household and month fixed effects and include observations from the three months before and after a respondent participated in the main survey. Column 1 presents estimates on the full sample, while Columns 2 and 3 present estimates for homeowners and renters, respectively. Robust standard errors clustered at the respondent level are shown in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.5: Treatment effects on scanner expenditures: Disaggregated by product category

| | Dependent variable: Log expenditures | | | | | |
| | All respondents | | Homeowners | | Renters | |
	(1)	(2)	(3)	(4)	(5)	(6)
High forecast x Post	-0.019	-0.017	-0.008	-0.003	-0.067**	-0.065**
	(0.012)	(0.012)	(0.013)	(0.013)	(0.029)	(0.031)
	[0.103]	[0.152]	[0.515]	[0.803]	[0.021]	[0.037]
N	146,784	146,784	120,177	120,177	26,607	26,607
R^2	0.528	0.536	0.529	0.538	0.520	0.549
Households	2,554	2,554	2,079	2,079	475	475
Household FEs	Yes	Yes	Yes	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes	Yes	Yes	Yes
Product category x Month FEs	Yes	Yes	Yes	Yes	Yes	Yes
DMA x Month FEs		Yes		Yes		Yes

Note: This table presents two-way fixed effects regression estimates. The unit of observation is a household-month-product category. There are 10 product categories. The dependent variable are log monthly scanner expenditures in the respective product category. "High forecast x Post" is the interaction between a binary indicator taking value one for respondents in the *high forecast* treatment arm and a binary indicator taking value one in the month a respondent participated in the main survey and all following months, and zero otherwise. All regressions include household and month fixed effects and include observations from the three months before and after a respondent participated in the main survey. We also include product category-specific time trends in all specifications. Columns 2, 4 and 6 include flexible time trends at the Designated Market Area (DMA) level. Observations are weighted by the expenditure share of the product category in the household's total expenditure. Columns 1 and 2 present estimates on the full sample, Columns 3 and 4 present estimates for homeowners, and Columns 4 and 5 present estimates for renters. Robust standard errors clustered at the respondent level are shown in round parentheses, while *p*-values are shown in square brackets.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.6: Robustness: Treatment effect on scanner expenditures

	Dependent variable: Log expenditures							
	Baseline		Households with regular spending records		Trimmed sample based on baseline expenditures		No fixed effects	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: All								
High forecast x Post	-0.015	-0.016	-0.015	-0.017	-0.018	-0.019	-0.015	-0.016
	(0.013)	(0.013)	(0.013)	(0.013)	(0.014)	(0.014)	(0.013)	(0.013)
High forecast							0.014	0.014
							(0.024)	(0.023)
Post							0.034***	0.034***
							(0.009)	(0.009)
N	17,877	17,877	16,926	16,926	16,372	16,372	17,877	17,877
R^2	0.727	0.720	0.735	0.728	0.650	0.651	0.089	0.089
Household FEs	Yes	Yes	Yes	Yes	Yes	Yes		
Month FEs	Yes	Yes	Yes	Yes	Yes	Yes		
Winsorized		Yes		Yes		Yes		Yes
Controls							Yes	Yes
Panel B: Homeowners								
High forecast x Post	-0.001	-0.002	-0.001	-0.002	-0.006	-0.007	-0.001	-0.002
	(0.014)	(0.014)	(0.014)	(0.014)	(0.015)	(0.015)	(0.014)	(0.014)
High forecast							0.010	0.010
							(0.026)	(0.025)
Post							0.026***	0.026***
							(0.010)	(0.010)
N	14,552	14,552	13,790	13,790	13,334	13,334	14,552	14,552
R^2	0.724	0.717	0.732	0.725	0.644	0.645	0.083	0.083
Household FEs	Yes	Yes	Yes	Yes	Yes	Yes		
Month FEs	Yes	Yes	Yes	Yes	Yes	Yes		
Winsorized		Yes		Yes		Yes		Yes
Controls							Yes	Yes
Panel C: Renters								
High forecast x Post	-0.076**	-0.078**	-0.079**	-0.080**	-0.073**	-0.073**	-0.076**	-0.078**
	(0.033)	(0.033)	(0.033)	(0.032)	(0.034)	(0.034)	(0.033)	(0.033)
High forecast							0.010	0.013
							(0.059)	(0.058)
Post							0.066***	0.065***
							(0.022)	(0.022)
N	3,325	3,325	3,136	3,136	3,038	3,038	3,325	3,325
R^2	0.725	0.718	0.734	0.728	0.657	0.657	0.082	0.080
Household FEs	Yes	Yes	Yes	Yes	Yes	Yes		
Month FEs	Yes	Yes	Yes	Yes	Yes	Yes		
Winsorized		Yes		Yes		Yes		Yes
Controls							Yes	Yes

Note: This table presents two-way fixed effects regression estimates. Panel A, B and C present estimates using all respondents, only homeowners, and only renters, respectively The dependent variable is log monthly scanner expenditures. "High forecast" is a binary indicator taking value one for respondents in the *high forecast* treatment arm, and zero otherwise. "Post" is a binary indicator taking value one in the month a respondent participated in the main survey and all following months, and zero otherwise. All regressions include observations from the three months before and after a respondent participated in the main survey. Columns 2, 4, 6, and 8 present estimates where the dependent variable is winsorized at the 95th percentile. Columns 3 and 4 present estimates for the subset of respondents who have at most one missing month of spending records. Columns 5 and 6 trim the sample at the 5th and 95th percentile of the distribution average monthly expenditures before the month a respondent participated in the main survey. Columns 7 and 8 present estimates without household and month fixed effects, but instead include the set of controls described in detail in Table 1. Robust standard errors clustered at the respondent level are shown in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.7: Robustness: Treatment effect on scanner expenditures with a two-period difference-in-differences model

	Dependent variable: Log expenditures							
	Baseline		Households with regular spending records		Trimmed sample based on baseline expenditures		No fixed effects	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Homeowners								
High forecast x Post	0.018	0.014	0.014	0.009	0.006	0.004	0.018	0.014
	(0.025)	(0.024)	(0.025)	(0.024)	(0.026)	(0.026)	(0.025)	(0.024)
High forecast							-0.010	-0.007
							(0.029)	(0.028)
Post							0.034**	0.035**
							(0.017)	(0.016)
N	4,158	4,158	3,940	3,940	3,810	3,810	4,158	4,158
R^2	0.838	0.835	0.839	0.836	0.789	0.789	0.084	0.084
Household FEs	Yes	Yes	Yes	Yes	Yes	Yes		
Month FEs	Yes	Yes	Yes	Yes	Yes	Yes		
Winsorized		Yes		Yes		Yes		Yes
Controls							Yes	Yes
Panel B: Renters								
High forecast x Post	-0.110**	-0.114**	-0.083*	-0.087*	-0.118**	-0.122**	-0.110**	-0.114**
	(0.048)	(0.047)	(0.047)	(0.046)	(0.049)	(0.048)	(0.048)	(0.047)
High forecast							0.069	0.071
							(0.064)	(0.063)
Post							0.072**	0.070**
							(0.030)	(0.029)
N	950	950	896	896	868	868	950	950
R^2	0.876	0.875	0.882	0.882	0.846	0.847	0.102	0.102
Household FEs	Yes	Yes	Yes	Yes	Yes	Yes		
Month FEs	Yes	Yes	Yes	Yes	Yes	Yes		
Winsorized		Yes		Yes		Yes		Yes
Controls							Yes	Yes

Note: This table presents two-way fixed effects regression estimates. Panel A and B present estimates for the subsample of homeowners and renters, respectively. All regressions restrict to observations in the month before (October) and after the intervention. The dependent variable is log monthly scanner expenditures. "High forecast" is a binary indicator taking value one for respondents in the *high forecast* treatment arm, and zero otherwise. "Post" is a binary indicator taking value one in the month a respondent participated in the main survey and all following months, and zero otherwise. Columns 2, 4, 6, and 8 present estimates where the dependent variable is winsorized at the 95th percentile. Columns 3 and 4 present estimates for the subset of respondents who have at most one missing month of spending records. Columns 5 and 6 trim the sample at the 5th and 95th percentile of the distribution average monthly expenditures before the month a respondent participated in the main survey. Columns 7 and 8 present estimates without household and month fixed effects, but instead include the set of controls described in detail in Table 1. Robust standard errors clustered at the respondent level are shown in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

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Table B.8: House price treatment and scanner expenditures on food and non-food items

| | Dependent variable: Log expenditures | | | | | |
| | All respondents | | Homeowners | | Renters | |
	(1) Food	(2) Non-food	(3) Food	(4) Non-food	(5) Food	(6) Non-food
High forecast x Post	-0.011	-0.016	-0.004	0.010	-0.047	-0.127**
	(0.016)	(0.024)	(0.017)	(0.027)	(0.040)	(0.058)
N	17,878	17,878	14,553	14,553	3,325	3,325
R^2	0.687	0.654	0.679	0.649	0.698	0.669
Household FEs	Yes	Yes	Yes	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table presents two-way fixed effects regression estimates. "High forecast x Post" is the interaction between a binary indicator taking value one for respondents in the *high forecast* treatment arm and a binary indicator taking value one in the month a respondent participated in the main survey and all following months, and zero otherwise. All regressions include household and month fixed effects and include observations from the three months before and after a respondent participated in the main survey. The dependent variables in Columns 1, 3 and 5 are log monthly scanner food expenditures. The dependent variables in Columns 2, 4 and 6 are log monthly scanner non-food expenditures. Columns 1 and 2 use all respondents, Columns 3–4 restrict to homeowners, and Columns 5–6 restrict to renters. Robust standard errors clustered at the respondent level are shown in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B.9: Treatment effects on self-reported durable good spending in the follow-up survey

	Dependent variable: Spending behavior in the past four weeks			
	Any durable good spending		Log durable good expenditures	
	(1)	(2)	(3)	(4)
Panel A: All				
High forecast	0.008	0.002	0.106	0.065
	(0.024)	(0.022)	(0.140)	(0.133)
N	1,702	1,702	1,702	1,702
R^2	0.024	0.109	0.030	0.123
Dep. var. mean	0.382	0.382	2.185	2.185
Controls	Yes	Yes	Yes	Yes
Pre-plan controls		Yes		Yes
Panel B: Homeowners				
High forecast	0.036	0.030	0.245	0.203
	(0.026)	(0.025)	(0.161)	(0.154)
N	1,374	1,374	1,374	1,374
R^2	0.019	0.098	0.021	0.109
Dep. var. mean	0.397	0.397	2.320	2.320
Controls	Yes	Yes	Yes	Yes
Pre-plan controls		Yes		Yes
Panel C: Renters				
High forecast	-0.108**	-0.117**	-0.464*	-0.504*
	(0.052)	(0.049)	(0.274)	(0.257)
N	328	328	328	328
R^2	0.058	0.178	0.066	0.192
Dep. var. mean	0.320	0.320	1.622	1.622
Controls	Yes	Yes	Yes	Yes
Pre-plan controls		Yes		Yes

Note: This table presents regression estimates of the treatment effect of receiving a high forecast rather than a low forecast about future home price growth. Panel A uses the respondents who participated in the follow-up survey, while Panel B and C restrict to homeowners and renters, respectively. "High forecast" is a binary indicator taking value one for respondents assigned to the *high forecast* treatment arm. The dependent variables in Columns 1 and 2 are a binary indicator for having reported to have made any durable good purchases in the past four weeks. The dependent variables in Columns 3 and 4 are the log of one plus self-reported total durable good spending over the past four weeks. Durable expenditures are winsorized at the 95th percentile. All regressions include the set of controls described in detail in Table 1. Columns 2 and 4 further include a binary indicator for planning to make any durable good purchases and the log of planned total durable good spending over the next four weeks as measured in the main survey as controls.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Table B.10: Treatment effects on expectations: Follow-up survey

	Dependent variable: 10-year avg. annual percent change						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Interest rate	Inflation rate	House price growth	Labor income growth	Stock market returns	Real GDP growth	Rental price growth
High forecast	0.111*	0.437***	1.117***	0.196	0.376	0.409**	0.495
	(0.067)	(0.162)	(0.317)	(0.325)	(0.238)	(0.170)	(0.333)
N	1,702	1,702	1,702	1,702	1,702	1,702	1,702
Dep. var. mean	1.713	4.367	8.173	5.599	6.539	4.378	8.127
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table presents regression estimates of the treatment effect of receiving a high forecast rather than a low forecast about future home price growth using respondents who participated in the follow-up survey. "High forecast" is a binary indicator taking value one for respondents assigned to the *high forecast* treatment arm. The dependent variables in Columns 1–8 are the average annual interest rate, inflation rate, house price growth rate, household labor income growth rate, stock market return, real GDP growth rate and rent price growth rate over the next ten years, respectively. The dependent variables in all specifications are winsorized at the 5th and 95th percentile. All regressions include the set of controls described in detail in Table 1.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Table B.11: Treatment effects on expectations: Heterogeneity by moving intentions

	Dependent variable: House price growth		
	Quantitative measure		Qualitative measure
	(1)	(2)	(3)
	Mean (%)	Std. dev.	House prices will increase strongly
Panel A: Homeowners			
High forecast	1.122**	0.223	0.261***
	(0.458)	(0.449)	(0.070)
High forecast x Cheaper home	-0.128	-0.167	0.006
	(0.673)	(0.660)	(0.113)
High forecast x More expensive home	0.577	-0.386	0.200**
	(0.593)	(0.599)	(0.099)
N	2,079	2,079	2,079
Controls	Yes	Yes	Yes
Panel B: Renters			
High forecast	1.791	0.859	0.112
	(1.765)	(2.016)	(0.291)
High forecast x Cheaper home	1.385	-1.157	0.323
	(2.188)	(2.310)	(0.346)
High forecast x More expensive home	-0.030	-0.515	0.288
	(1.924)	(2.133)	(0.312)
N	475	475	475
Controls	Yes	Yes	Yes

Note: This table presents regression estimates of the treatment effect of receiving a high forecast rather than a low forecast about future home price growth. "High forecast" is a binary indicator taking value one for respondents assigned to the *high forecast* treatment arm. "Cheaper home" is a binary indicator for those who plan to move to a cheaper home. "More expensive home" is a binary indicator for those who plan to move to a more expensive home. The dependent variables in Columns 1 and 2 are the mean and standard deviation of respondents' subjective probability distribution of the expected average annual home price growth rate over the next ten years. Column 3 shows effects on respondents' z-scored agreement with the statement that "US home prices will increase strongly over the next ten years." Panel A and Panel B present estimates for homeowners and renters, respectively. All regressions include the set of controls described in detail in Table 1.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Table B.12: Plans to buy a home

	Dependent variable: Plan to buy a home	
	(1) Next 12 months (%)	(2) Next 5 years (binary)

Panel A: Homeowners

High forecast	0.875 (0.749)	-0.007 (0.013)
High forecast x Cheaper home	-1.041 (1.539)	-0.033 (0.045)
High forecast x More expensive home	-2.012 (1.755)	0.037 (0.041)
N	2,079	1,374
Controls	Yes	Yes
Dep. var. mean	5.412	0.146

Panel B: Renters

High forecast	1.453 (2.343)	-0.088 (0.092)
High forecast x Cheaper home	-6.127 (5.225)	0.021 (0.133)
High forecast x More expensive home	-8.588** (4.135)	0.104 (0.117)
N	475	328
Controls	Yes	Yes
Dep. var. mean	11.909	0.360

Note: This table presents regression estimates of the treatment effect of receiving a high forecast rather than a low forecast about future home price growth. "High forecast" is a binary indicator taking value one for respondents assigned to the *high forecast* treatment arm. "Cheaper home" is a binary indicator for those who plan to move to a cheaper home. "More expensive home" is a binary indicator for those who plan to move to a more expensive home. Panel A and B restrict to homeowners and renters, respectively. The dependent variable in Column 1 is the percent chance of purchasing a home in the next 12 months (measured in the main survey) and winsorized at the 1th and 99th percentile. The dependent variable in Column 2 is a binary indicator for planning to search for a home to buy in the next five years (measured in the follow-up survey). All regressions include the set of controls described in detail in Table 1.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Table B.13: Coding scheme for open-ended responses with examples

Category	Explanation	Example
Housevalue	Changes in the value of housing currently owned by my household	"We plan on selling our home in about 10 years when our mortgage would be completely paid off. We would be able to walk away with a higher profit, therefore more money in our pockets."
Rent	Changes in the rent of homes	"It would worsen for me because I do not yet own any form of real estate in my own name and rent would only continue rising."; "I am a renter, when home prices increase, rents tend to increase as well."
Costbuyhome	Changes in the costs of buying a home	"It means I have to save more money in the future when Im getting a house. I might have to get another job in order to afford a house and might not be able to have enough money for my and my family's other needs."; "This is because the predicted increase in home price will mean that more money would be needed to purchase a house. This same increase might not reflect on my household income."
Borrowing	Changes in the ease of borrowing money against my home equity	"I own investment properties. Even though I plan to never sale them, I would be able to borrow more against them if I needed/wanted to."
Income	Changes in my household's over-all income	"I would be making more than I am currently, so maybe I would still be able to buy a house."
Interest	Changes in interest rates	"I predict that my situation would get worse because I currently do not own a home and am looking to buy when I can. This means it will be harder for me to buy because prices are increasing. This also means, interest rates could be getting higher, making it harder to pay off a new home when I do buy one."
Inflation	Changes in inflation	"Currently, the price of everything is increasing day by day in all areas, but there is no change in the income of the public. Home prices will increase but incomes will remain unchanged."; "Typically, when the cost of housing is increasing, it is increasing in tandem with other goods and services. A jump from 1.5% to 6% could be due to demand, but it is also likely due to inflation."
Expectations irrelevant	Expectations irrelevant b/c not planning to sell or move	"I don't intend to sell my home or purchase a new home in the future and am financially stable so this would have no affect on me."; "We do not plan to move out of the house we live in any time soon."; "I don't plan on moving so wouldn't really be affected. If I did sell, I would make more, but buying would cost more."

Note: This table provides an overview of the different categories used in our coding scheme. The examples are taken from the data collection for the mechanism survey in November 2022.

Table B.14: Mechanism experiment: Summary statistics

	Mean (std. dev.)		
	All	Homeowner	Renter
Age (in years)	38.468	42.587	33.821
	(13.424)	(13.135)	(12.195)
Female	0.494	0.477	0.513
	(0.500)	(0.500)	(0.501)
College degree	0.695	0.739	0.645
	(0.461)	(0.440)	(0.479)
Log income	11.000	11.227	10.737
	(0.797)	(0.676)	(0.846)
Numeracy score (0-5)	4.211	4.284	4.128
	(0.894)	(0.884)	(0.899)
Plan to buy	0.498	0.333	0.684
	(0.500)	(0.472)	(0.466)
Plan to sell	0.217	0.333	0.085
	(0.413)	(0.472)	(0.280)
Observations	498	264	234

Note: This table presents the mean and standard deviation of a range of background variables for the full sample and the subset of homeowners and renters in the mechanism experiment. "Age (in years)" is the respondents' numerical age. "Female" is a binary indicator taking value one for female respondents. "College degree of above" is a binary indicator for having completed a college degree. "Log income" is the log of the midpoint of the respondent's household income. "Numeracy" is the number of correctly solved numeracy questions (0 to 5). "Plan to buy" is a binary indicator taking value one for respondents who plan to buy a home in the next ten years. "Plan to sell" is a binary indicator taking value one for respondents who plan to sell a home in the next ten years.

Table B.15: Mechanism experiment: Thoughts explain differential planned current spending responses to changes in home price expectations

	Dep. var.: Planned decrease in current spending (binary)				
	(1)	(2)	(3)	(4)	(5)
Homeowner	-0.250***	-0.195***	-0.176***	-0.138***	-0.062
	(0.040)	(0.041)	(0.043)	(0.043)	(0.047)
Cost of buying a home		0.234***		0.213***	0.191***
		(0.047)		(0.047)	(0.047)
Home equity			-0.189***	-0.157***	-0.225***
			(0.040)	(0.040)	(0.043)
Expectations irrelevant					-0.296***
					(0.040)
Constant	0.432***	0.330***	0.450***	0.354***	0.376***
	(0.032)	(0.037)	(0.033)	(0.038)	(0.038)
Explained homeowner effect:		22%	30%	45%	75%
N	498	498	498	498	498
R^2	0.074	0.126	0.104	0.146	0.182

Note: This table presents regression estimates using data from the mechanism experiment. The dependent variable is a binary indicator taking value one for respondents who plan to decrease their current household spending in response to higher home price expectations, and zero otherwise. "Homeowner" is a binary indicator for respondents who own the home they are living in. "Cost of buying a home" is a binary indicator taking value one for respondents who mentioned changes in the cost of buying a home in their responses to the open-ended question on how an increase in home price expectations would affect their household's economic situation. "Home equity" and "Expectations irrelevant" are analogously defined binary indicators based on the responses to the open-ended question (e.g. whether respondents mentioned changes in their home equity and whether they mentioned that expectations are irrelevant).

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Table B.16: Mechanism experiment: Open-ended responses predict motives elicited with an unstructured question format

	Structured question:						
	(1) Borrowing	(2) Cost of buying a home	(3) Home equity	(4) Income	(5) Inflation	(6) Interest rate	(7) Rental prices
Borrowing	0.51***	-0.25**	-0.07	-0.22**	-0.21	-0.13	0.16
	(0.12)	(0.12)	(0.12)	(0.11)	(0.13)	(0.12)	(0.13)
Cost of buying	0.07*	0.37***	-0.13***	-0.00	0.09*	0.11**	0.08*
	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Home equity	0.14***	-0.10**	0.48***	-0.19***	-0.20***	-0.22***	-0.11**
	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.04)
Income	0.03	-0.14**	0.14**	0.33***	0.02	0.08	-0.05
	(0.06)	(0.07)	(0.06)	(0.06)	(0.07)	(0.07)	(0.06)
Inflation	0.02	-0.04	-0.13*	0.21***	0.38***	0.09	0.05
	(0.06)	(0.07)	(0.07)	(0.07)	(0.05)	(0.08)	(0.07)
Interest rates	0.24	0.15**	-0.20***	0.10	0.07	0.33***	-0.11
	(0.17)	(0.06)	(0.07)	(0.15)	(0.17)	(0.12)	(0.14)
Rental prices	-0.05	0.10	-0.07	-0.05	0.01	-0.04	0.65***
	(0.06)	(0.07)	(0.08)	(0.09)	(0.10)	(0.09)	(0.05)
N	468	468	468	468	468	468	468
R^2	0.080	0.208	0.274	0.127	0.131	0.094	0.162

Note: This table presents regression estimates using data from the mechanism experiment. The dependent variables are binary indicators taking value one if respondents selected a particular motive (indicated by the column header), and zero otherwise. "Borrowing" is a binary indicator taking value one for respondents who mentioned borrowing constraints in their responses to the open-ended question on how an increase in home price expectations would affect their household's economic situation. "Cost of buying", "Home equity", "Income", "Inflation", "Interest rates", and "Rental prices" are analogously defined binary indicators based on the responses to the open-ended question.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

C Financial advice websites

This section provides additional examples of financial advice from popular finance websites and blogs that complement the examples discussed in Section 5.2. We focus on advice to homeowners and renters as a result of changes in home prices.

C.1 Advice for homeowners

Investopedia

- Because home prices tend to rise over time, buying a home has traditionally been viewed as a safe investment. Still, an important point to consider when looking at a home as an investment is that it won't ever pay off unless you sell it. From a practical standpoint, even if your primary residence doubles in value, it probably just means that your real estate taxes have gone up. All of the gains you experience are on paper until you sell the property. Of course, for many homeowners, that's alright. A home that doubles in value is a nice asset to pass on to the kids and grandchildren.

- If you decide to sell and buy another home in the same area, remember that the prices of those other homes have probably risen, too. To truly book a gain from your sale, you will likely need to move to a smaller home in the same area, or move out of the area and find a less expensive place to live.

Link: `https://www.investopedia.com/articles/mortages-real-estate/11/the-truth-about-the-real-estate-market.asp`

Fool The problem with selling a home in today's market is that what you gain in the form of a higher sale price, you stand to lose when you buy a replacement home. You may have to pay a premium when you buy. But if your home's value has spiked and you've been thinking of downsizing, now may be a good time to do so. Depending on how the numbers shake out, it's conceivable you could sell your home at a high enough price to buy a smaller property outright (meaning, without a mortgage).

Link: `https://www.fool.com/the-ascent/mortgages/articles/home-values-are-up-heres-how-to-use-that-to-your-advantage/`

Nerdwallet The average-priced home is up 42% since the start of the pandemic, and the average homeowner with a mortgage can now tap over $207,000 in equity, according to Black Knight Inc., a mortgage and real estate data analysis company. Spending that wealth can be tempting. Proceeds from home equity loans or lines of credit can fund home improvements, college tuition, debt consolidation, new cars, vacations — whatever the borrower wants. But just because something can be done, of course, doesn't mean it should be done. One risk of such borrowing should be pretty obvious: You're putting your home at risk. If you can't make the payments, the lender could foreclose and force you out of your house. Also, as we learned during the Great Recession of 2008-2009, housing prices can go down as well as up. Borrowers who tapped their home equity were more likely to be "underwater" — or owe more on their houses than they were worth — than those who didn't have home equity loans or lines of credit, according to a 2011 report by CoreLogic, a real estate data company.

[...]

It's rarely, if ever, a good idea to borrow money for pure consumption, such as vacations or electronics. Ideally, we should only borrow money for purchases that will increase our wealth: a mortgage to buy a home that will appreciate, for example, or a student loan that results in higher lifetime earnings. If you're planning to borrow home equity to pay for something that won't increase in value, at least ensure that you aren't making payments long after its useful life is over. If you're using home equity to buy a vehicle, consider limiting the loan term to five years so that you're not facing big repair bills while still paying down the loan.

Link: `https://www.nerdwallet.com/article/finance/3-reasons-not-to-tap-your-home-equity-right-now`

C.2 Advice for renters

Realtor If you decide to hit the pause button on your search, keep saving. As frustrating as that is, patiently putting away money for a more significant down payment can be your best move in the long run. "If you can't afford a home now, then you shouldn't buy one," says Dan Belcher, founder and CEO of Mortgage Relief. "Sacrifice a little more and a little longer." Sure, you can put down as little as 3.5% with an FHA loan. But keep in mind that borrowers with less than the typical 20% down payment

must pay for private mortgage insurance. So create a budget to help you increase your down payment. A budget will help you see where you spend your money each month and where you can save. You can also work on raising your credit score by paying off as much existing debt as possible.

Link: `https://www.realtor.com/advice/buy/cant-afford-the-home-you-could-a-year-ago-heres-what-to-do`

Homebay We recognize that renting is often as much as (if not more than) a mortgage payment and that makes it hard to save while renting. However, you usually won't have to pay maintenance costs, property taxes, or the cost of replacing large appliances, so you might be able to put at least some of that money toward saving for a down payment. If you have the means, budget to save a goal amount each month. If it's an option for you, it can be a good idea to live with family or get a roommate to lessen rent prices and further increase your savings.

Link: `https://homebay.com/priced-out-housing-market/`

Nerdwallet Nobody can truly predict interest rates nor inflation, nor the appreciation rate of homes in a relatively short period of time," Eric Lefkowitz, president and chief operating officer of Motto Mortgage Mint in San Diego, said via email. "But we can be certain that buyers should be saving for strong down payment options. This will ensure they can get the best available interest rate when the time comes.

Link: `https://www.nerdwallet.com/article/mortgages/advice-for-renters-priced-out-of-homebuying`

Dave Ramsey Let's cut to the chase. If you don't have the money, you shouldn't buy a house. Period. That's just asking Murphy to show up and bring his three cousins—Broke, Desperate and Stupid! But you can start saving. Now, if you live in an unaffordable market, it'll probably take you longer to be financially ready to buy a home. Maybe you're still trying to pay off debt or save up a down payment. Maybe you live in an area where your home-buying budget can't support a mortgage just yet. That's okay. Renting helps you build up your savings—and patience. Plus, you get to call the landlord when something breaks instead of spending your hard-earned money to fix it! If you want to buy a home in an expensive market, waiting may be your smartest move.

In the meantime, keep saving. Your area may seem more affordable three years from now when you have a hefty down payment saved!

Link: `https://www.ramseysolutions.com/real-estate/cant-afford-housing-market`

D Experimental instructions

This section contains the experimental instructions for the core modules of the main survey and the follow-up survey.

D.1 Main survey (November 2019)

D.1.1 Introduction

In this research study we plan to better understand how people make important economic choices and how they form their expectations.

Your participation is completely voluntary. You can withdraw at any time, and for any reason, simply by closing your browser. However, we are only able to award points to you if you complete the survey.

[Page break]

In this survey we will ask you various times about things related to your household, such as the total income of your household. By household we mean all family members living with you in your main residence, but excluding roommates and renters.

In some of the following questions, we will ask you to think about the percent chance of something happening in the future. Your answers can range from 0 to 100, where 0 means there is absolutely no chance, and 100 means that it is absolutely certain.

For example, numbers like:

- 2 or 5 percent may indicate "almost no chance."
- 18 percent or so may mean "not much chance."
- 47 or 52 percent chance may be a "pretty even chance."
- 83 percent or so may mean a "very good chance."
- 95 or 98 percent chance may be "almost certain."

[Page break]

D.1.2 Durable good spending: Pre-plans

What do you think your household's total spending on purchases of durable goods will be over the next four weeks?

Durable goods are goods that last in time, including for instance cars, electronics, kitchen appliances, furniture, house maintenance, jewelries etc.

Please exclude purchases of houses, apartments, etc.

Please provide an answer in dollars.

- $ __
- My household does not have plans to buy durables over the next four weeks.

[Page break]

D.1.3 Moving intentions

What is the percent chance that your household will move to a different home within the next ten years? __ percent.

[Page break]

If your household moves to a different home within the next ten years, do you think it will move to a cheaper or to a more expensive home?

- My household would move to a cheaper home
- My household would move to an equally expensive home
- My household would move to a more expensive home

[Page break]

D.1.4 Prior beliefs

We would now like you to think about the value of a typical home in the US.

What do you expect the average annual growth rate of the value of a typical home in the US to be over the next ten years?

Note: This average annual growth rate of home prices is the change in value, in percent, that you expect each year on average over the next ten years.

_____ percent per year, over the next ten years.

[Page break]

How confident are you about your answer to the question about home prices that you were just asked?

- Extremely confident
- Very confident
- Somewhat confident
- Not very confident
- Not at all confident

[Page break]

D.1.5 Information treatment

On the next slide, we will provide you with information on the view of a professional forecaster on the average growth rate of the value of a typical home in the US over the next ten years.

We would like to ask you to take a moment to review the information carefully.

Note: The information will be shown to you only once and you will not be able to come back to it.

[Respondents are randomly assigned in equal proportion to either the "high forecast" or the "low forecast" treatment arm at this stage in the survey.]

[Page break]

[Shown only to respondents in the "high forecast" treatment arm.]

We now would like to provide you with a forecast of home price growth from an expert who regularly participates in the World Economic Survey, an expert survey on macroeconomic forecasts.

According to this expert forecast, the average annual growth rate of home prices in the US over the next ten years will be 6 percent.

In the case where home prices increase by 6 percent in each of the next ten years, this would mean that a home worth $100,000 today will be worth about $179,085 in ten years from now.

[Page break]

[Shown only to respondents in the "low forecast" treatment arm.]

We now would like to provide you with a forecast of home price growth from an expert who regularly participates in the World Economic Survey, an expert survey on macroeconomic forecasts.

According to this expert forecast, the average annual growth rate of home prices in the US over the next ten years will be 1.5 percent.

In the case where home prices increase by 1.5 percent in each of the next ten years, this would mean that a home worth $100,000 today will be worth about $116,054 in ten years from now.

[Page break]

[Shown to all respondents. The instructions in the remainder of the survey are identical across treatment arms from now on.]

We now would like to provide you with a forecast of inflation from an expert who regularly participates in the Survey of Professional Forecasters. According to this expert forecast, the average annual rate of inflation in the US over the next ten years will be 2.2 percent.

[Page break]

D.1.6 Qualitative posterior

To what extent do you agree with the following statements?

Rent on homes/apartments in the US will increase strongly over the next ten years.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

US home prices will increase strongly over the next ten years.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

[Page break]

How do you think that the total net wealth of your household will change over the next ten years?

- Increase very strongly
- Increase strongly
- Increase somewhat
- Neither increase nor decrease
- Decrease somewhat
- Decrease strongly
- Decrease very strongly

[Page break]

D.1.7   Quantitative posterior: Home price expectations

In this question we present you with eight possible scenarios for the average annual growth rate of the value of a typical home in the US, over the next ten years.

Please let us know how likely you think it is that each scenario will occur.

Please type in the number to indicate the probability, in percent, that you attach to each scenario. The probabilities of the eight scenarios have to sum up to 100 percent.

The average growth rate of the value of a typical home in the US over the next ten years will be...

- Scenario 1: . . . more than 20 percent.   ____ percent.
- Scenario 2: . . . between 10 and 20 percent.   ____ percent.
- Scenario 3: . . . between 5 and 10 percent.   ____ percent.
- Scenario 4: . . . between 0 and 5 percent.   ____ percent.
- Scenario 5: . . . between -5 and 0 percent.   ____ percent.
- Scenario 6: . . . between -10 and -5 percent.   ____ percent.
- Scenario 7: . . . between -20 and -10 percent.   ____ percent.
- Scenario 8: . . . less than -20 percent.   ____ percent.

Total: *[automatically calculated]* percent

[Page break]

D.1.8   Perceived constraints

Assume that your household wanted to increase its spending to finance a vacation that costs $1,000. How difficult would it be for your household to come up with money to finance this vacation...

. . . currently?

- Very difficult
- Somewhat difficult
- Neither easy nor difficult
- Somewhat easy
- Very easy

. . . in ten years from now?

- Very difficult
- Somewhat difficult
- Neither easy nor difficult
- Somewhat easy
- Very easy

[Page break]

Assume that your household's car broke down and the repair costs $1,000. How difficult would it be for your household to take out a loan to finance this repair...

...currently?

- Very difficult
- Somewhat difficult
- Neither easy nor difficult
- Somewhat easy
- Very easy

...in ten years from now?

- Very difficult
- Somewhat difficult
- Neither easy nor difficult
- Somewhat easy
- Very easy

[Page break]

D.1.9   Additional background characteristics

Next we would like to ask you which member of your household has the best overview of the household's finances. By that we mean things such as income, savings and checking accounts, pensions, and real estate.

Who among the household members living in your household knows the most about the household's finances?

- I know most about the household's finances.
- My spouse knows most about the household's finances.
- My spouse and I are equally knowledgeable about the household's finances.
- Someone else.

[Page break]

Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?

1 – Unwilling to take risk
2

...
9
10 – Fully prepared to take risk

<div align="center">[Page break]</div>

Are you generally a patient person or an impatient person?

1 – Very patient
2
...
9
10 – Very impatient

<div align="center">[Page break]</div>

What is your year of birth?

[Dropdown list]

<div align="center">[Page break]</div>

Do you own or rent your current main residence?

- Owner
- Renter
- Other

<div align="center">[Page break]</div>

In which of the following industries do you work in your main job? If you currently do not have a job, please select the industry you worked in in your most recent job.

- Construction
- Durable manufacturing (lumber and wood products, furniture, metal industries, machinery and computing equipment, electrical machinery, transportation equipment, professional equipment, other durable goods)
- Finance, insurance and real estate
- Health and education
- Nondurable manufacturing (food, textiles, apparel, paper products, printing and publishing, chemicals, petroleum and coal products, plastics products, leather products, other nondurable goods), agriculture and fishing, or mining
- Retail and wholesale

<div align="center">31</div>

- Services (business and repair services, personal services, entertainment and recreation services, professional services and legal services)
- Transportation, communications and other public utilities
- Other (please specify)
- I have never had a job.

[Page break]

Are you. . .

- Male
- Female

[Page break]

D.2 Follow-up survey (December 2019)

D.2.1 Introduction

In this research study we plan to better understand how people make important economic choices and how they form their expectations. Your participation is completely voluntary. You can withdraw at any time, and for any reason, simply by closing your browser. However, we are only able to award points to you if you complete the survey.

[Page break]

In this survey we will ask you various times about things related to your household, such as the total income of your household. By household we mean all family members living with you in your main residence, but excluding roommates and renters.

[Page break]

The next questions are about your household's spending and saving behavior over the four weeks before taking this survey.

[Page break]

D.2.2 Durable spending: Past behavior

What was your household's total spending on purchases of durable goods over the last four weeks?

Durable goods are goods that last in time, including for instance cars, electronics, kitchen appliances, furniture, house maintenance, jewelries, etc.

Please exclude purchases of houses, apartments, etc.

Please provide an answer in dollars.

☐ My household did not buy any durables over the last four weeks.
☐ $ __

[Page break]

D.2.3 Economic expectations

Now we would like to ask you about your views on the development of different economic indicators over the next ten years.

Over the next ten years, what do you think will be

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☐ ... the average annual interest rate on a savings account: __ percent.
☐ ... the average annual inflation rate: __ percent.
☐ ... the average annual change in home prices:__ percent.
☐ ... the average annual change in your total household labor income: __ percent.
☐ ... the average annual return of the US stock market: __ percent.
☐ ... the average annual growth rate of US real (inflation-adjusted) GDP:__ percent.
☐ ... the average annual change in rent on homes/apartments: __ percent.

[Page break]

D.2.4 Long-run plans

The next questions are about your expectations regarding your household's intended behavior over the next five years.

[Page break]

Over the next five years, does your household plan to search for a home to buy? Please include main and second homes, and any other real estate.

- Yes
- No

[Page break]

Over the next five years, does your household plan to sell any home your household owns? Please include main and second homes, and any other real estate owned by your household.

- Yes
- No

[Page break]

D.2.5 Additional measures

To what extent do you agree with the following statements?

I usually pay attention to movements of the US stock market.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree

- Somewhat disagree
- Strongly disagree

I usually pay attention to movements of the US housing market.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

[Page break]

In which of the following occupations do you work in your main job? If you currently do not have a job, please select your most recent occupation.

[List of occupations]

[Page break]

Who is the main earner in your household?

- I am the main earner in my household.
- My spouse is the main earner in my household.
- My spouse and I have similar earnings.
- Someone else is the main earner in my household.

[Page break]

D.2.6 Numeracy

Next we would like to ask you three questions to see how people use numbers in everyday life. Please answer the following questions by filling in the blank.

In a sale, a shop is selling all items at half price. Before the sale, a sofa costs $300. How much will it cost in the sale?

$ _____

Let's say you have $200 in a savings account. The account earns ten per cent interest per year. Interest accrues at each anniversary of the account. If you never withdraw money or interest payments, how much will you have in the account at the end of two years?

$ _____

If the chance of getting a disease is 10 percent, how many people out of 1,000 would be expected to get the disease?

$ _____

D.3 Auxiliary mechanism survey (November 2022)

The next question is about the following problem. In questionnaires like ours, sometimes there are participants who do not carefully read the questions and just quickly click through the survey. This means that there are a lot of random answers which compromise the results of research studies. To show that you read our questions carefully, please choose both "Very strongly interested" and "Not at all interested" as your answer in the next question Given the above, how interested are you in sports?

- Very strongly interested
- Very interested
- A little bit interested
- Almost not interested
- Not at all interested

[Page break]

Imagine you expect home prices to grow by 1.5% per year over the next 10 years. Now imagine that you increase your expectations about future home prices. You now expect home prices to increase by 6% per year over the next 10 years. How would this change in your expectations about future home prices affect your expectations about your household's future economic situation?

- My household's future economic situation would improve because of this change.
- My household's future economic situation would be unaffected by this change.
- My household's future economic situation would worsen because of this change.

Please explain why. Respond in full sentences.
[Open-text box]

[Page break]

Which of the following factors did you consider when thinking about how the change in your expectations about future home prices would affect your expectations about your household's future economic situation? Please click on all factors that apply.

- Changes in the value of housing currently owned by my household
- Changes in the rent of homes
- Changes in the costs of buying a home
- Changes in the ease of borrowing money against my home equity
- Changes in my household's overall income
- Changes in interest rates
- Changes in inflation
- None of the above

[Note: Item order randomized, except for "None of the above"]

[Page break]

Please think again about the previous scenario. Imagine you expect home prices to grow by 1.5% per year over the next 10 years. Now imagine that you increase your expectations about future home prices. You now expect home prices to increase by 6% per year over the next 10 years. How would this change in your expectations about future home prices affect your household's current spending on consumption goods and services?

- My household would spend more because of this change.
- My household spending would be unaffected by this change.
- My household would spend less because of this change.

[Page break]

Do you own the place you are currently living in?

- Yes
- No

Do you intend to buy a home in the next 10 years?

- Yes
- No

Do you intend to sell a home in the next 10 years?

- Yes
- No

[Page break]

What is your gender?

- Male
- Female
- Other

What state do you live in?
[drop-down list]

How old are you (in years)?
[drop-down list]

What is the highest level of school you have completed or the highest degree you have received?

- Less than high school degree
- High school graduate (high school diploma or equivalent including GED)
- Some college but no degree
- Associate degree in college (2-year)
- Bachelor's degree in college (4-year)
- Master's degree
- Doctoral degree
- Professional degree (JD, MD)

What was your total household income before taxes during the past 12 months?

- Less than $25,000
- $25,000-$49,999
- $50,000-$74,999
- $75,000-$99,999
- $100,000-$149,999
- $150,000 or more
- Prefer not to say

[Page break]

Next we would like to ask you five questions to see how people use numbers in everyday life. Please answer the following questions by filling in the blank.

In a sale, a shop is selling all items at half price. Before the sale, a sofa costs $300. How much will it cost in the sale?
[Open text field]

Let's say you have $200 in a savings account. The account earns ten per cent interest per year. Interest accrues at each anniversary of the account. If you never withdraw money or interest payments, how much will you have in the account at the end of two years?

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[Open text field]

If the chance of getting a disease is 10 percent, how many people out of 1,000 would be expected to get the disease?
[Open text field]

Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After one year, how much would you be able to buy with the money in this account?

- More than today
- Exactly the same
- Less than today

Please tell me whether this statement is true or false: Buying a single company's stock usually provides a safer return than a stock mutual fund.

- True
- False