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Gender Roles and the Gender Expectations Gap

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LawFin Working Paper No. 16

Gender Roles and the Gender Expectations Gap

Francesco D'Acunto | Ulrike Malmendier | Michael Weber

Electronic copy available at: https://ssrn.com/abstract=3797091

Gender Roles and the Gender Expectations Gap

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Expectations about economic variables vary systematically across genders. In the domain of inflation, women have persistently higher expectations than men. We argue that traditional gender roles are a significant factor in generating this gender expectations gap as they expose women and men to different economic signals in their daily lives. Using unique data on the participation of men and women in household grocery chores, their resulting exposure to price signals, and their inflation expectations, we document a tight link between the gender expectations gap and the distribution of grocery shopping duties. Because grocery prices are highly volatile, and consumers focus disproportionally on positive price changes, frequent exposure to grocery prices increases perceptions of current inflation and expectations of future inflation. The gender expectations gap is largest in households whose female heads are solely responsible for grocery shopping, whereas no gap arises in households that split grocery chores equally between men and women. Our results indicate that gender differences in inflation expectations arise due to social conditioning rather than through differences in innate abilities, skills, or preferences.

Gender Gap | Expectations | Perceptions | Experiences | Social Conditioning

Beliefs about the future shape important lifetime decisions, such as retirement savings and housing choices, and they often differ systematically across genders.* For the case of beliefs about consumer prices, women have systematically higher inflation expectations than men. We label this phenomenon the "gender expectations gap."

The gender expectations gap can have detrimental consequences for women's economic choices and long-term wealth. Economic theory suggests that high inflation expectations cause individuals to save less than needed to finance retirement and to consume too much during their working lives. In addition, expecting high prices in the future can induce stress and affect women's happiness and well-being (5). The gender expectations gap might also hamper the effectiveness of economic policies in times of crisis (6). Yet, despite its relevance, the roots of the stark gender expectations gap are still unknown.

In this paper, we establish the role of traditional gender roles as a determinant of the gender expectations gap. Gender roles induce women and men to engage in different activities and to experience different environments in their daily lives. As a result, women and men are exposed to different signals about the economy that then lead to differences in perceptions and expectations (7).

Our analysis focuses on the role of grocery shopping and exposure to grocery prices. We argue, and show empirically, that exposure to grocery prices induces a divergence in beliefs between grocery shoppers and non-grocery shoppers, which – paired with traditional gender roles – can explain the gender expectations gap. The underlying mechanism consists of three steps. First, prior literature has shown that consumers are overly reliant on personally experienced price realizations when forming beliefs about future realizations (8). Second, research in social psychology, marketing, and economics has documented that price increases rather than decreases are more memorable to individuals (4, 9–14). Because grocery prices are highly volatile—so much so that they are excluded from the Core consumer price index (Core CPI) that the Federal Reserve uses to identify persistent inflation trends (15)—grocery shoppers are exposed to larger price increases than non-grocery shoppers, on average. As a result, grocery shoppers perceive inflation to be higher than non-grocery shoppers. This divergence in beliefs translates into gender differences because, complying with traditional gender roles, women still undertake the majority of grocery shopping for their households.† Their perception of current inflation and hence their expectations of future inflation are higher than men's, giving rise to the gender expectations gap.

To assess the relationship between gender-specific exposure to economic signals and expectations, we construct a novel data set that combines detailed information about a representative US sample's participation in their household's grocery chores (Kilts-Nielsen Consumer Panel) with individual-level elicitation of economic beliefs (Chicago Booth Expectations and Attitudes Survey, CBEAS). Our data set consists of de-identified survey data that have been determined to fall under exempt status for IRB review by the NBER IRB (FAW #00003692; IRB Protocol N. Ref#19_278).‡

*Cf. (1–4).

†See Pew Research Center (2019) analysis of the American Time Use Survey available here.

‡Following our paper, other researchers have started to elicit individual inflation expectations and labor-force participation in the Kilts-Nielsen Consumer Panel through customized surveys (see, e.g. (16), (17), and (18)).

Significance Statement

Women and men expect systematically different levels of future inflation. This gender expectations gap can be detrimental for women's economic choices and long-term wealth, because it might reduce the effectiveness of economic policies, induce stress, and affect women's well-being. Using novel data for a representative US population, we document that traditional gender roles, rather than innate characteristics, shape the gender expectations gap. By doing most of the grocery shopping for their households, women observe different price signals than men. Because grocery prices are volatile and positive price changes are especially memorable, women end up expecting systematically higher inflation than men. The gender expectations gap disappears if grocery chores are distributed equally within households.

All authors contributed equally to this work.

The authors have no conflicts of interest to declare

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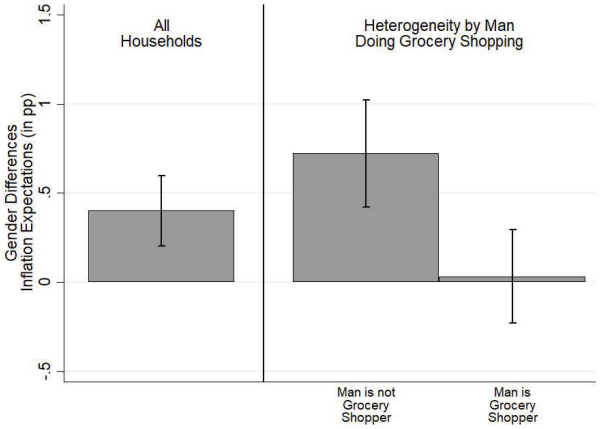
Fig. 1. Gender Expectations Gap within Households: Raw Data



The left bar of Figure 1 plots the average differences in the inflation expectations of women and men within all households in the customized *Chicago Booth Expectations and Attitudes Survey*, which we fielded in June of 2015 and 2016. The mid and right bars split the sample based on whether men in the household take part in grocery shopping. Error bars indicate 95% confidence intervals obtained from standard errors clustered at the household level.

Our data are the first to establish the gender expectations gap *within* households. That is, unlike prior research, our identification is robust to any systematic unobserved differences between households, such as different family structure, financial, or career choices. As shown in the left panel of Figure 1, the raw data indicate that within married couples, women have significantly higher inflation expectations than men. Although both women's and men's average inflation expectations (5.1% and 4.6%, respectively) exceed average realized inflation for the survey periods, which was 1.36%, the difference between expected and realized inflation is significantly larger among women.

The economic magnitude of the gap, around 0.5 pp, is large, amounting to 25% of the US Federal Reserve's inflation target of 2%. Based on the Fisher equation—the equality between the nominal interest rate and the sum of the real interest rate and expected inflation—the divergent beliefs across genders also imply women will perceive real interest rates to be lower than men, because nominal interest rates are the same for everybody. Because nominal rates in the US economy were below 1.5% over recent years, the magnitudes we estimate imply that women's perceived real rates were up to 33% lower than men's. Lower perceived real interest rates, in turn, increase consumers' willingness to spend,[§] which might lead women to consume more and save less than men, thus resulting in lower lifetime wealth.

The raw data also reveal a second novel fact, which is the focus of our analysis: The gender expectations gap varies substantially based on which spouse does the grocery shopping. In households in which men do not grocery shop, the gender gap in inflation expectations almost doubles in size (cf. middle bar of Figure 1). In households in which spouses share grocery shopping chores more equally, we fail to detect any economically or statistically significant gender gap in inflation expectations (cf. right bar).

Our multivariate analysis further reveals that the difference between households with and without male participation in grocery chores cannot be explained by men and women's innate characteristics, which are the typical focus of studies about gender differences in economics: The gender gap is unaffected when we control for risk preferences, numeracy, or financial literacy at the individual level (19, 20). The results are also similar when we partial out income, education levels, and other demographics, such as unemployment status or ethnicity, which influence uncertainty in individual inflation expectations. Instead, as we saw in the raw data, no gender difference exists once we restrict the analysis to households in which both men and women do the grocery shopping. This result emphasizes the importance of studying gender roles above and beyond innate characteristics or preferences to understand expectations and choice.

To further corroborate our interpretation that exposure to different price signals due to gender roles drive the gender expectations gap, rather than innate cognitive differences across genders, we analyze the channel through which price signals translate into expectations. Earlier research has shown that observed price signals shape individuals' perceptions of current inflation, which in turn determine expectations about future inflation (21). We document that the mapping process from perceptions of current inflation to expectations of future inflation is virtually identical for men and women, regardless of whether they participate in grocery chores. This result excludes different cognitive processes across genders as an explanation. Instead, the perceived level of current inflation is what differs across genders. It is higher for women who are the sole grocery shoppers in their households.

To better understand the sources of different inflation perceptions across genders, in the second wave of our survey, we asked respondents what information sources they used when forming inflation expectations as well as the goods or services, if any, that came to mind during the expectations-formation process. First, we find that two thirds of our respondents mention their own shopping experiences as one of the three main sources of information for inflation. Moreover, we find that the gender gap does not arise when we compare men and women who mainly think about other information sources when forming expectations.

To corroborate the survey answers to the two questions, we show that both men and women who report thinking of shopping experiences as the primary source of information for forming inflation expectations, most frequently mention grocery goods such as milk, bread, and eggs, as specific goods whose prices they recall. Unconditionally, however, women are systematically more likely to report thinking about each of these goods. On the other hand, men are substantially more likely than women to refer to the price of gasoline. If the gender expectations gap were really driven by exposure to different price signals while shopping, rather than other unobservables correlated with gender, we should find that the gap is largest when comparing women who thought about grocery prices and men who thought about gas prices within their shopping bundles. And, indeed, we find this case to be true.

In the last part of the paper, we corroborate the external

[§] This result is known as the consumer Euler equation, and relates real consumption growth to real interest rates: Lower perceived real rates reduce the propensity to save and increase the propensity to spend.

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validity of our results in the *New York Fed Survey of Consumer Expectations* (SCE), a data set that is commonly used in economics research and in whose construction we were not involved. We first replicate our baseline results on the gender expectations gap over both a short-term and long-term horizon. The second step—linking the gender expectations gap to grocery price exposure—is harder to replicate directly, because the SCE lacks data on individuals' contribution to grocery chores. As an indirect approach, we consider two subsamples. The first subsample includes respondents from areas where a high share of men participates in their households' grocery shopping according to the CBEAS data. The second subsample includes respondents below 25 years of age, among whom the perception of traditional gender norms tends to be less stark (22, 23). In these two subsamples, the gender expectations gap is indeed lower for all measures of inflation.

Finally, the longer time series of the SCE data allows us to compute individual-level measures of volatility and uncertainty of inflation expectations. We find both are higher among women, which is consistent with our proposed mechanism: Women are more exposed to volatile signals about inflation through grocery prices, which change frequently, and hence have not only higher but also more volatile expectations.

Overall, our results support the conjecture that differences in women's and men's daily environments can have significant consequences for beliefs about economic variables. That is, traditional gender roles can shape beliefs beyond contexts that have been singled out as "gendered," such as beliefs about women's abilities in STEM disciplines or in leadership roles. Even in realms that have no gender connotation, such as expectations about economic variables, for example, inflation, differential exposure to signals in daily life due to gender roles leave an imprint on women's outlook.

Our findings on the gender expectations gap, as well as the underlying signal-exposure mechanism, have significant implications at both the aggregate and the individual level. At the aggregate level, inflation expectations are central to the effectiveness of economic policy (6), especially as low interest rates are becoming the norm in most industrialized countries, including the US since the 2008 financial crisis and again during the COVID-19 crisis (24). In such times, policies that aim to stabilize business cycles and to avoid prolonged economic crises need to manage consumers' inflation expectations. However, our findings suggest that inflation expectations cannot be managed using the same policies for men and women, because of the gender expectations gap.

At the micro level, inflation expectations that systematically differ from ex-post realizations can be detrimental to individual economic outcomes. Consumers who expect higher prices might make suboptimal consumption choices, not accumulate enough savings for retirement, and make non-optimal real-estate investments. Thus, the gender expectations gap can adversely affect women's financial decisions and wealth accumulation, which in turn increases gender inequality in wealth.

Earlier research has documented that gender roles affect women's preferences, beliefs, and outcomes in several domains (25–27), including their choices of fields of education and skills (28–30), occupations (31), career paths (32, 33), and investment decisions (23). In those areas, gender roles influence both women's own actions, as they conform to a prescribed gender role (34, 35), and the actions of others based on gender stereotyping (36–39). In all these cases, gender roles affect beliefs about women's ability to conduct male-connotated tasks, and outcomes that possess a gender-specific connotation. Our findings suggest that, even beyond decisions that are stereotypically gendered, seemingly innocuous differences in women's daily exposures to prices can have significant consequences for perceptions and expectations. The evidence in our paper highlights a relationship between gender roles and non-gendered beliefs and outcomes, which is subtle and hard to reduce through traditional policy interventions.

Data

Chicago Booth Expectations and Attitudes Survey. We utilize a novel source of data, the CBEAS. We designed this customized survey in March 2015 and fielded it online in two waves in June 2015 and June 2016. We invited all members of the Kilts-Nielsen Consumer Panel (KNCP) to participate, approximately 40,000-60,000 households per wave. The KNCP reports both static demographics, such as household size, income, ZIP code of residence, and marital status, and dynamic features of participants' grocery purchases, such as categorizations of the products purchased, information on the shopping outlets, and the per-unit price paid for each item. The prices are collected electronically through scanning by participating households. To ensure the accuracy of the data, Nielsen organizes monthly prize drawings, provides points for its gift catalog after each scanner-data submission, and is in ongoing communication with panel households. Not surprisingly given these incentives, the KNCP annual retention rate is above 80%.

Nielsen also administers smaller surveys of a subset of panelists on a regular basis and customized survey solutions on an ad-hoc basis, typically to pre-test new products and target group-specific marketing campaigns for producers of fast-moving consumer goods. The CBEAS follows the same protocol of these customized solutions: Surveys are administered online, and Nielsen sends an email to an address provided by the panelist household. After a household member consents to participate, the survey starts and the participant sees each question on a separate screen without possibility to return to previous questions. At the end of the survey, the online platform asks the respondent whether any other household member age 18 or above exists that has not yet participated in the survey, in which case, the initial survey link remains valid and additional household members can participate in the survey. Our survey elicits several demographic characteristics that allow us matching each response to the unique panelist profile of Nielsen.

The raw CBEAS sample includes 92,511 respondents, with 49,383 respondents from 39,809 unique households in the first wave (43% response rate) and 43,036 respondents from 36,758 unique households in the second wave (45% response rate). Of those, 15,104 participated only in the first wave, 7,269 only in the second wave, and 18,373 in both waves.[¶] We limit the sample to couples for which we observe responses of both the male and the female head of household.[‖] This sample

[¶] The average response time was 14 minutes and 49 seconds in the first wave and 18 minutes and 35 seconds in the second wave, which included a few more questions.

[‖] Nielsen allows households to designate up to two heads of household, one labeled as the "Male head" and one as the "Female head."

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restriction is necessary to estimate the gender expectations gap within households, which requires expectations data from two individuals of different genders who both make relevant decisions in the same household. In these households, we can compare men and women, keeping constant all household-level characteristics. This sample includes 20,866 observations of male and female household heads across both survey waves, which belong to 7,846 unique households.

The survey design builds on the Michigan Survey of Consumers (MSC) and the New York Fed Survey of Consumer Expectations (SCE), as well as the pioneering work of (40), (3), and (8). The full survey is copied in Online-Appendix B. Here, we briefly discuss some of the key questions for our analysis.

We first elicit demographic information the KNCP does not provide: narrow college major, employment status, occupation, income expectations, rent, mortgage, and medical expenses. We also ask respondents if they are the primary grocery shopper for their household, sometimes shop, or never do the shopping, and we record whether the female household head is a non-retired and non-unemployed homemaker ("stay-home mum"). Consistent with the notion that women are more likely to do the grocery shopping for the household, female heads declare that they are the main grocery shopper in 5,135 households (65%), whereas male heads do so only in 908 households (12%),[**] and other household members in the remaining 1,803 households (22%). Other household members who report being the main grocery shopper are typically female individuals whose age is higher than the age of both male and female heads, and who do not enter our analysis.

Finally, we elicit numerical values of perceived inflation (over the prior 12 months) and expected inflation (over the next 12 months), in terms of both point estimates and the full probability distribution. For expected inflation, we use the same question as in the SCE. Before we elicit responses for inflation-related questions, we have an introductory text introducing the concept of inflation: "We would like to ask you some questions about the overall economy and in particular about the rate of inflation/deflation (Note: inflation is the percentage rise in overall prices in the economy, most commonly measured by the Consumer Price Index and deflation corresponds to when prices are falling)." This text ensures survey respondents report expectations about a common target rather than their expectations about the inflation rate in their personal consumption bundle. We decided to elicit expectations about overall consumer price inflation for several reason. First, we can directly observe the ex-post realization and therefore compare expectations with outcomes. Second, CPI inflation is a key rate the Federal Reserve targets and attempts to influence via policy decisions. Third, we did not want to deviate from the benchmark-question wording in the SCE, which was developed through extensive pretesting and cognitive interviews headed by an interdisciplinary team of economists, psychologists, and marketing academics.

New York Fed Survey of Consumer Expectations. In our complementary analysis, we use SCE data from June 2013 to April 2018 to study the gender expectations gap for a longer period than available through the CBEAS waves. The SCE has become a key survey tool to study the effectiveness of monetary policy in the US.[††] It collects a broad set of economic expectations for a representative population, alongside demographic characteristics, as well as elicited mathematical and financial skills. The survey is a rotating panel in which the same respondent is interviewed every month for up to 12 months. We restrict the sample to respondents for whom we observe both expectations and financial skills (40,568 individual-month observations). The number of unique individuals in this sample is 6,052, of which 49.66% are women.

We define all the variables we use in the paper in Online-Appendix Table 1.

Inflation Data. Before moving to the results, we briefly discuss the macroeconomic environment in terms of realized core and food inflation during our sample period. Figure A.1 in Online-Appendix A plots the time series of core inflation and food and beverage inflation over the last 20 years. We define the inflation rate as the annual percent change in these price indices as published by the US Bureau of Labor Statistics. We retrieve the data from the FRED database of the Federal Reserve Bank of St. Louis.

The two time series show considerable variation over time. But the volatility of food inflation is substantially larger than the volatility of core inflation that excludes food and energy. We also see that core inflation was below 3% during the last two decades, starting in January 2000, whereas food and beverage inflation was as high as 6% during this period but also displays substantially larger swings and volatility.

Results

We first assess the conjecture that differences in men's and women's daily exposures to price signals help predict the extent of the gender expectations gap. As women undertake the majority of grocery shopping duties for their households, they are exposed to the volatile and large price changes of grocery goods more frequently than men. To the best of our knowledge, no earlier work, including other research by the authors of this paper, has studied how the differences in exposure to price signals within households shape differences in economic expectations across the members of the same household. This analysis is made possible by the unique within-household focus of the CBEAS, and the questions we consider in the rest of the paper have not been used in any other work.

As previewed in Figure 1 in the introduction, the raw data of the CBEAS reveal women's inflation expectations are, on average, 0.40 percentage points (pp) higher than those of men ($p < 0.01$). The average difference, however, masks substantial heterogeneity: Households in which men do not grocery shop exhibit a 0.64 pp ($p < 0.01$) gender difference in inflation expectations, compared to a small and insignificant difference of 0.10 pp ($p = 0.35$) in other households. A two-sided t-test for equality of gender differences between the two samples rejects the null at $p < 0.01$.[‡‡]

The economic magnitude of the gender difference is sizable: The average inflation target of the Federal Reserve is 2% per year, and realized inflation was less than 2% during our survey

[**] A two-sided t-test for whether the shares of grocery shoppers are equal across genders rejects the null hypothesis at standard levels of significance (p<0.01).

[††] (41) provide a detailed overview of the survey design, the sample construction, and summary statistics of the SCE.

[‡‡] The pattern is qualitatively similar in households with a "stay-home mum," in which the gender difference amounts to 0.58 pp, whereas it is 0.36 pp in other households, albeit with both differences being statistically significant ($p < 0.01$).

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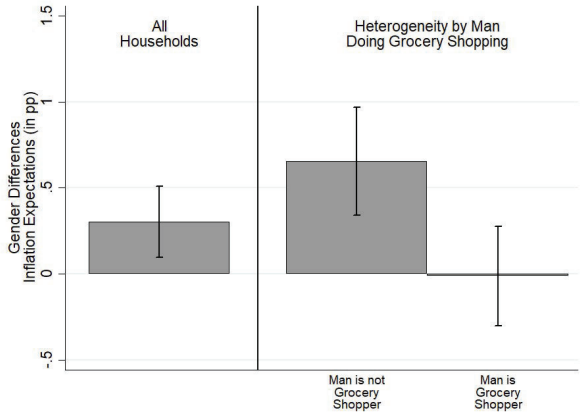
Fig. 2. Gender Expectations Gap within Households: Residuals



The leftmost bar of Figure 2 plots the average differences in the inflation expectations of women and men within all households headed by heterosexual couples in our sample based on the customized *Chicago Booth Expectations and Attitudes Survey*, which we fielded in June of 2015 and 2016, conditional on controls. Control variables include age, square of age, employment status, 16 income dummies, home ownership, marital status, college dummy, four race dummies, reported risk tolerance, household fixed effects, individual income expectations, expectations for aggregate US growth, and individual expectations about financial soundness. The two bars on the right propose a sample split based on whether men in the household take part in grocery shopping. Error bars indicate 95% confidence intervals obtained from standard errors clustered at the household level.

months. Hence, the gender expectations gap amounts to more than a quarter of both targeted and realized inflation in terms of economic magnitude.

We test whether these patterns from the raw data continue to hold in a multivariate setting in which we account for demographic variables and preferences that might affect gender differences in inflation expectations. We estimate a linear model regressing inflation expectations on gender and our proxy for gender roles, controlling for all demographics and individual characteristics available in our data, including age, square of age, employment status, 16 income dummies, home ownership, marital status, college dummy, four race dummies, reported risk tolerance, and the individual-level variance of the elicited probability distribution of inflation expectations as a proxy for uncertainty. Additionally, we control for a set of expectations about *other* economic variables that might predict inflation expectations, including expectations about individual income, individual financial soundness, and aggregate US growth. In the most restrictive specification, we include household fixed effects to ensure time-invariant systematic heterogeneity across households cannot drive our results.

Figure 2 displays the same gender differences as Figure 1, but based on the estimates from the multivariate analysis. The pattern is similar to the raw data. Within households, women's inflation expectations are, on average, 0.33 pp ($p<0.01$) higher than men's (left graph). However, in households in which men do not participate in grocery shopping, the difference amounts to 0.65 pp ($p<0.01$), versus -0.011 pp ($p=0.94$) in other households (right graph).

The pooled-sample analysis in Table 1 provides the same insight, including the disappearance of gender differences after controlling for grocery-price exposure. Columns 1 to 3 display the estimation results from three specifications: using an indicator for female as the independent variable (in column 1), using an indicator for being the main grocery shopper as the independent variable (in column 2), and including both variables (in column 3). Columns 4 to 6 show parallel estimations but within household.

Across households, women exhibit 0.29 pp ($p<0.01$) higher inflation expectations than men (column 1), and respondents who are the main grocery shopper for the household exhibit 0.47 pp ($p<0.01$) higher inflation expectations than other respondents (column 2). Most importantly, however, the specification in column 3 reveals that after controlling for participation in grocery shopping, no significant gender difference in inflation expectations is detectable, either economically or statistically (0.13 pp, $p=0.14$), whereas the coefficient on grocery shopping remains largely unchanged (0.41 pp, $p<0.01$). All findings continue to hold, and the coefficient estimates remain quantitatively similar when we restrict the estimation to variation within households (columns 4-6). Furthermore, the within-household estimates do not depend on whether we focus on households that appear only once in the sample or those for which we have two observations, one for each survey wave. When we restrict the analysis to the subset of households whose male and female head participate only once in our survey, and hence appear only once in the sample, we continue to estimate significantly positive coefficient estimates for the effect of Main Grocery Shopper of similar magnitudes: 0.474 in the specification without household fixed effects, mirroring column 3 of Table 1, and 0.868 in the specification with households fixed effects, mirroring column 6 of Table 1. The coefficient of the Female indicator in these specifications remains small and insignificant.

These estimates reveal that innate (or otherwise induced) gender-specific variation does not generate the gender difference in beliefs, because the indicator for gender is not a significant predictor after controlling for grocery-price exposure. Instead, exposure to different price signals predicts the gender differences in beliefs.

We complement these results with estimations based on sample splits and on the alternative stay-home proxy. First, we split the full sample into the subsample of households whose female heads do not participate in grocery shopping at all and the complementary subsample in which the female head does at least some grocery shopping. As shown in column 1 of Table 2, the sign of the coefficient estimate for female heads becomes negative, though insignificant, when we restrict the sample to females who do not participate in grocery shopping. Note this subsample is small—it constitutes only 8.7% of the full representative sample. By contrast, the gender expectations gap between female and male heads is positive and significant in the remainder of the sample (column 2).[§§] The pooled-sample specification in column 3 confirms the difference is significant: When we include a dummy for observations in the complementary sample (in which women do at least some shopping) interacted with the indicator for a female respondent, the female dummy is insignificant and the interaction effect is significantly positive.[¶¶] Hence, intrinsic characteristics related to gender are unlikely to drive the gender expectations gap;

[§§] This subsample also reveals that our main results hold irrespective of whether the main grocery shopper is the female head, the male head, or a third household member.

[¶¶] Note the non-interacted subsample indicator is absorbed by the household fixed effect, because it has the same value for both female head and male head within the household.

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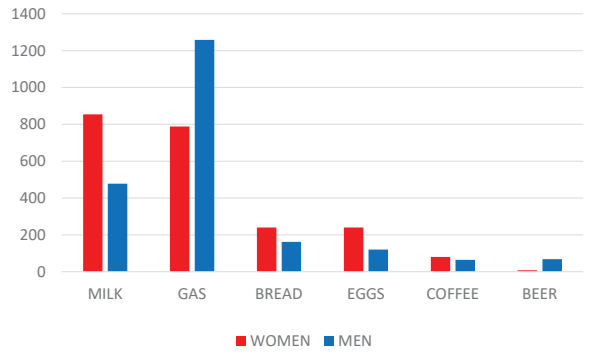
Fig. 3. Goods Women and Men Think of when Forming Expectations



This figure reports the absolute frequency (number of respondents, y-axis) with which the men and women surveyed in the customized *Chicago Booth Attitudes and Expectations Survey*, which we fielded in June of 2015 and 2016, report specific goods as the first item whose price changes come to their mind when asked to provide their inflation expectations. We report the five most frequently reported goods for men and the five most frequently reported goods for women. The two quintuplets overlap except for one good.

instead, participation in grocery shopping predicts inflation expectations independent of gender.

Columns 4-6 of Table 2 confirm these findings qualitatively using the stay-home mum proxy for traditional gender norms and exposure to different price signals in daily life. We find that the gender expectations gap is larger for the subsample of households in which the female head is a homemaker (columns 5) than for households in which the female head is employed in the formal labor market (column 4). The difference remains statistically (marginally) significant in the pooled-sample specification where we interact the female and subsample indicators (column 6).

Mechanisms

Our research hypothesis posits that the large and volatile price changes of groceries generate divergent beliefs between the grocery shoppers and the non-grocery shoppers in a household, which in turn leads to the gender differences in beliefs when women do most of the grocery shopping. The underlying mechanism can be broken down into three parts: First, because women are exposed to grocery prices more often than men, they are more likely than men to think about grocery prices when forming beliefs about aggregate inflation. Second, because grocery prices are more volatile than other prices and positive price changes are more memorable to consumers than negative price changes (4, 8–14),[***] the differential exposure to grocery prices generates higher inflation perceptions among women.[†††] Third, the gender differences in perceptions of (current) inflation map into differences in expectations about (future) inflation independent of gender.

To assess the first part of the mechanism in the raw data, we exploit the fact that in the second wave of our survey, after eliciting aggregate inflation expectations, we asked respondents to indicate the information sources they used when forming inflation expectations out of a list of nine pre-specified sources whose order was randomized, including traditional media, social media, own shopping, family and friends, or other sources (Question 19 in Online-Appendix B). In a separate question (Question 20 of Online-Appendix B), we also elicited the goods or services that came to respondents' minds, if any, when we asked about their expectations. For the goods and services, we provided no pre-specified options, and respondents needed to type the name of the good and service. In Figure 3, we report the number of respondents for the five most common answers of men and, separately calculated, for women, which amount to six items overall: milk, gas, bread, eggs, coffee, and beer.[‡‡‡]

Two facts emerge. First, the most common type of response is a grocery good, and women tend to report each of them more frequently than men (with the notable exception of beer). Second, men are disproportionally more likely than women to think about gasoline prices. Therefore, even when thinking about own shopping experience, most men and women consider price signals coming from different types of goods.

We leverage these two survey responses to assess the first part of the mechanism more formally. If our mechanism is correct, we should observe that the gender expectations gap does not arise when comparing men and women who do *not* think primarily about their own shopping experiences when forming expectations. If it did arise, unobservables correlated with gender, grocery shopping, and expectations would be a plausible alternative explanation for our results. Moreover, within the subset of men and women who think about their shopping experiences—and hence keep constant the exposure to prices as a source of information to form inflation expectations—the men and women who think about different goods' prices, such as groceries versus gas, are the ones who should drive the gender expectations gap. Instead, the men and women who think about the same goods' prices should form similar inflation expectations.

[***] Auxiliary analyses on our individual-level survey data confirm that higher perceived volatility of price changes is strongly correlated with higher inflation expectations, even in the subsample of non-grocery shoppers, for whom any confounds associated with the act of grocery shopping are muted. Figure A.2 in Online-Appendix A reports this result graphically.

[†††] In an auxiliary analysis of shoppers who appear to actively hunt for bargains and discounts, we show that the resulting gap in expectations is diminished, cf. Online-Appendix Table A.2. We thank the anonymous editor for this excellent suggestion.

[‡‡‡] Because respondents could type freely, we created homogeneous broad categories for each good. For instance, answers such as "Milk," "one gallon milk," and "one gallon low fat vitamin D milk" are all coded as "Milk."

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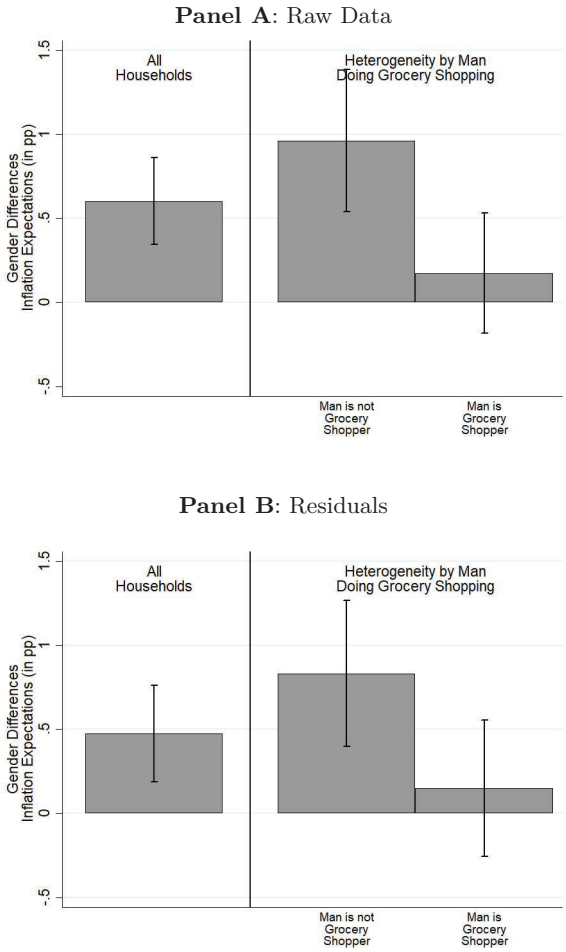
Fig. 4. Gender Gap in Inflation Perceptions within Households



The leftmost bar of Figure 4 Panel A plots the average differences in the inflation perceptions of women and men for all households in our sample based on the customized *Chicago Booth Expectations and Attitudes Survey*, which we fielded in June of 2015 and 2016. The two bars on the right propose a sample split based on whether men in the household take part in grocery shopping. Error bars indicate 95% confidence intervals obtained from standard errors clustered at the household level. Figure 4 Panel B presents gender differences defined as above conditional on controls. Control variables include age, square of age, employment status, 16 income dummies, home ownership, marital status, household size, college dummy, four race dummies, reported risk tolerance, household fixed effects, individual income expectations, expectations for aggregate US growth, and individual expectations about financial soundness.

In Table 3, we provide empirical evidence consistent with both conjectures. Indeed, the gender expectations gap is fully driven by men and women who think primarily about shopping (columns 1-3), and disappears for men and women who also think about sources of information unrelated to shopping (columns 4-6).[§§§] In particular, the gap is largest for men and women who think about different goods, namely, groceries for women, whose prices are highly volatile, and gas for men (column 3).

An important caveat is that the extent of exposure of men to gas prices may correlate with unobservables such as commuting times, and one might worry that these differences contribute directly to the formation of inflation expectations. Although we cannot fully partial out those influences, the proxy does capture households in which price exposure of men and women are more or less different. The fact that the gender expectations gap is higher for couples whose price exposure differs most helps pin down the mechanism.

Moving to the second part of the mechanism, Figure 4 provides direct evidence consistent with it. Panel A displays the gender gap in the perception of current inflation (the percentage change in consumer prices over the last 12 months) in the raw data. In line with the results for inflation expectations, women perceive current inflation to be higher than do men (left bar), and this gender difference only occurs in households in which men do not participate in grocery shopping (middle and right bars). As with inflation expectations, these results also hold conditional on all observables we discussed before (Panel B).

We assess the third part of the proposed mechanism in Figure 5. The binscatter plot maps expectations of future inflation against perceptions of current inflation, with men's observations shown as triangles and women's as circles. Panel A documents a strong correlation between perceptions and expectations. Moreover, this correlation does not vary systematically across genders as the plots for males and females overlap tightly.

Panel B of Figure 5 shows that the tight mapping holds independent of men's and women's participation in grocery shopping: The mapping between inflation perceptions and expectations is very similar whether we focus on men or women who do or do not go grocery shopping. The latter findings rule out that selection distorts the mapping between perceptions and expectations.

The uniform mapping between perceived and expected inflation also holds up when estimated in a multivariate linear regression using inflation expectations as the dependent variable, and inflation perceptions, the indicator for being female, and their interaction as independent variables, conditional on the same controls discussed above. Inflation perceptions are a strong predictor of inflation expectations, whereas both the coefficient on the interaction of inflation perceptions with the gender dummy (-0.052, p=0.527) and the gender coefficient (-0.284, p=0.321) are insignificant.

In summary, women do not have a different mapping function of inflation perceptions into expectations than men, and hence, innate cognitive gender-specific characteristics are unlikely to play a role in the process of mapping inflation perceptions into expectations. Instead, higher exposure to grocery-price inflation predicts higher perceptions, which in turn map into higher expectations.

[§§§] The subsample in columns 1-3 only includes respondents who reported thinking about own shopping as the first of the three options they could choose for information sources. Columns 4-6 include those whose first option was not shopping, and who might have not mentioned shopping at all or mentioned shopping as the second or third option. Overall, as discussed above, about two thirds of the sample chose shopping as the first, second, or third option. The finding that own shopping experiences are the most common source of information is direct evidence for the channel we propose and explains why variation in grocery shopping impacts average inflation expectations in the data.

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Fig. 5. Mapping of Perceptions into Expectations by Gender and Grocery Shopping

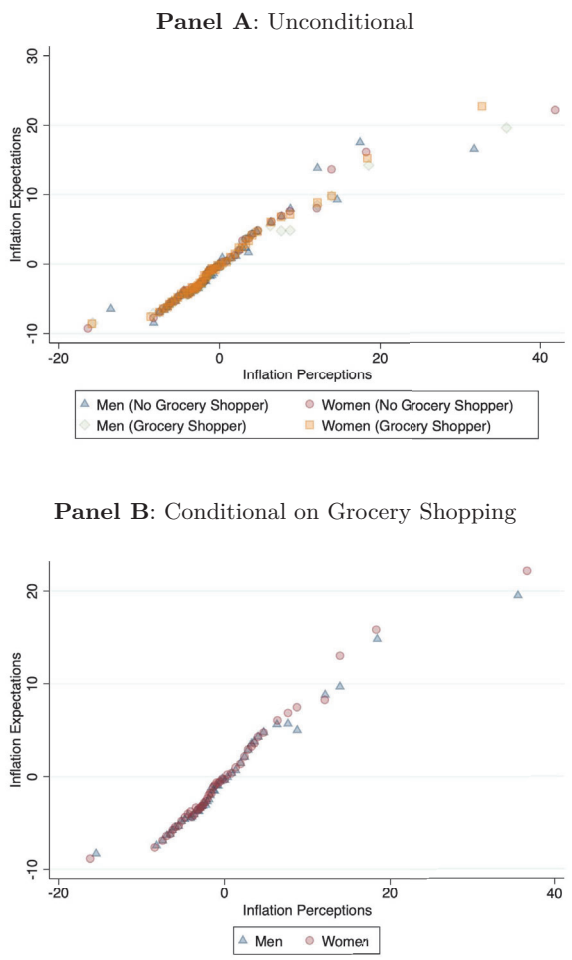
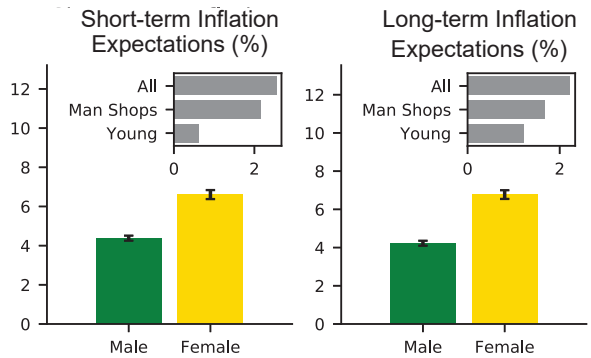


Figure 5, Panel A, is a binscatter plot mapping inflation perceptions into inflation expectations by gender and Panel B also conditions on grocery-shopping behavior. Inflation perceptions and expectations are based on the customized *Chicago Booth Expectations and Attitudes Survey*, which we fielded in June of 2015 and 2016.

Fig. 6. Gender Gap in Inflation Expectations: Replication in the New York Survey of Consumer Expectations



The vertical bars in Figure 6 report the estimated mean for men (green, left bar) and women (yellow, right bar) of short-run and long-run inflation expectations elicited by the *New York Fed Survey of Consumer Expectations* (see (41)). Black segments are 95% confidence intervals. Grey horizontal bars indicate the difference between the expectations of women and men for three groups: *"All"* includes the full sample; *"Man Shops"* includes only respondents in the top 25% of US states based on the share of men who are the main grocery shopper in the household, which we compute in the *Chicago Booth Expectations and Attitudes Survey*; *"Young"* includes only respondents below 25 years of age; the two latter subsamples capture groups in which gender norms might be less stark than in the full sample.

External Validity and Replication

In the last step, we corroborate the external validity of our results using a different dataset, the New York Fed SCE, which is commonly used in economics research and in whose construction we had no role. We cannot construct the same gender-role proxy in the SCE as in the CBEAS, because the CBEAS data are unique in containing both expectations data and participation in grocery chores, even within households. To provide indirect evidence for the SCE, we study specific subsamples that are likely to differ in their compliance with traditional gender roles. The first subsample approximates involvement in grocery chores based on geography, using our CBEAS sample. We consider respondents from states where a high share of men do at least some grocery shopping for their households (the top 25% US states), which we label "Man Shops.' The second subsample consists of respondents below 25 years of age ("Young"), among whom the perception of traditional gender norms has become less stark than among older cohorts (22, 23).

The horizontal bars in Figure 6 indicate the corresponding gender differences. The top bar plots the difference in expectations for the full sample ("All"). The next two bars in each graph, labeled "Man Shops" and "Young" show the corresponding gender differences for the first and the second subsample. Consistently, the gender gap in inflation expectations is lower in the subsample with male involvement in grocery chores and the subsample of young couples, where traditional gender roles are likely less stark. This result holds for both short-term and long-term inflation expectations.

We also use the SCE to assess the robustness of our results when controlling for individual characteristics we do not observe in the CBEAS, such as numeracy and financial skills. We confirm our results when partialling out these characteristics in the full sample as well as when restricting the analysis only to respondents who answer correctly all the questions about numeracy, probability literacy, and financial literacy in the SCE (see Online-Appendix Table 3, which reports coefficients from standardized regressions to ensure comparability across columns). Based on these results, potential systematic differences in numeracy, probability literacy, or financial literacy across genders cannot explain the gender expectations gap.

Finally, because the SCE has a panel component in which we observe several inflation-expectations elicitations within respondent, we can compute measures of uncertainty and volatility of expectations within individual, which is impossible in the CBEAS that only includes two waves. We find that women's inflation expectations are more uncertain and volatile than men's (see Online-Appendix Table 4), which is consistent with the mechanism we propose for the effect of gender roles in the gender expectations gap.

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Discussion

Traditional gender roles expose women to different signals about prices than men. This differential exposure generates divergent beliefs about future inflation and contributes to explaining the gender expectations gap. One implication of our findings is that gender roles shape beliefs not only in contexts that have been singled out as "gendered," such as beliefs about the ability to perform in STEM disciplines or in leadership roles, but also in realms that have no gender connotation, such as inflation expectations.

These subtle effects of gender roles are hard to tackle with targeted policy interventions. Policies that have been implemented around the world include support for women in STEM disciplines (42) or gender quotas on the boards of large companies (43). However, to reduce the gap in economic expectations, and hence improve women's economic and financial choices relative to men's, women's exposure to a wider range of economic signals and environments would need to be fostered, which seems difficult to enforce through legislation or regulation.

Another relevant angle is the recent tendency of shopping outlets to move to online retail, a phenomenon that has been accelerated during the COVID-19 crisis. This development is interesting both because it individualizes shopping experiences, which might become even easier to trace, and because it might affect the ways in which men and women are differentially exposed to price changes, inflation perceptions, and expectations. Our findings imply that such technologically induced changes in norms about shopping will affect the gender expectations gap going forward.

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Table 1. Inflation Expectations: Gender and Grocery Shopping

	(1)	(2)	(3)	(4)	(5)	(6)
	Across Households			Within Households		
Female	0.291***		0.134	0.330***		0.162
	(0.081)		(0.092)	(0.106)		(0.119)
Main Grocery Shopper		0.474***	0.413***		0.516***	0.415***
		(0.106)	(0.118)		(0.132)	(0.149)
Demographics	X	X	X	X	X	X
Expectations	X	X	X	X	X	X
Household FE				X	X	X
R^2	0.107	0.108	0.108	0.616	0.616	0.611
Obs.	20,866	20,866	20,866	20,866	20,866	20,866

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

Table 1 reports ordinary-least-squares coefficients and standard errors clustered at the household level (in parentheses). Observations are the responses of male and female heads of household in the customized *Chicago Booth Expectations and Attitudes Survey*, which we fielded in June of 2015 and 2016. In all columns, the outcome variable is respondents' 12-month-ahead numerical inflation expectations. *Female* is an indicator for female heads; *Main Grocery Shopper* is an indicator equal to 1 for the respondents who declare they are the main grocery shopper for the household; *Demographics* include age, square of age, employment status, 16 income dummies, home ownership, marital status, college dummy, four race dummies, reported risk tolerance, and confidence in inflation-expectations accuracy. *Expectations* include dummies for respondents' 12-month-ahead qualitative income expectations, 12-month-ahead individual financial soundness, and 12-month-ahead aggregate US growth.

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Table 2. Inflation Expectations: Subsamples and Stay-Home Mums

	(1)	(2)	(3)	(4)	(5)	(6)
Sample	Female No Groceries	Female Some Groc.	Full Sample	Female Worker	Female Home	Full Sample
Female	-0.186	0.382^{***}	-0.486	0.249^{**}	0.648^{**}	0.241^{**}
	(0.357)	(0.111)	(0.336)	(0.113)	(0.322)	(0.111)
Female × Female Some Groc./ Female Stays Home			0.716^{**}			0.506^{*}
			(0.321)			(0.287)
Demographics	X	X	X	X	X	X
Expectations	X	X	X	X	X	X
Household FE	X	X	X	X	X	X
R^2	0.657	0.615	0.616	0.624	0.614	0.616
Obs.	1,806	19,060	20,866	17,289	3,577	20,866

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

Table 2 reports ordinary-least-squares coefficients and standard errors clustered at the household level (in parentheses). Observations are the responses of male and female heads of household in the customized *Chicago Booth Expectations and Attitudes Survey*, which we fielded in June of 2015 and 2016. In all columns, the outcome variable is respondents' 12-month-ahead numerical inflation expectations. Column (1) restricts the sample to households whose female head does not do any grocery shopping. Columns (2) uses the complementary sample of households whose female head does at least some grocery shopping, that is, she is the main grocery shopper or does some grocery shopping. Column (4) restricts the sample to households whose female head is employed in the formal labor market. Column (5) uses the complementary sample of households whose female head is a homemaker. In columns (3) and (6), the indicators *Female Head Some Groc.* and *Female Head Stays Home* equal 1 for both male and female heads of households whose female head does some grocery shopping or is a homemaker, respectively. (The levels of these household-level indicators are fully absorbed by the household fixed effect.) *Female* is a dummy variable that equals 1 for female heads, and 0 otherwise. *Demographics* include age, square of age, employment status, 16 income dummies, home ownership, marital status, college dummy, four race dummies, reported risk tolerance, and confidence in inflation expectations. *Expectations* include dummies for respondents' 12-month-ahead qualitative income expectations, 12-month-ahead individual financial soundness, and 12-month-ahead aggregate US growth.

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Table 3. Inflation Expectations: Own Shopping vs. Other Information Sources

	(1)	(2)	(3)	(4)	(5)	(6)
Source of Information:		**Own Shopping**			**Other Information Sources**	
	All	All	M: Gas F: Groceries	All	All	Nobody Gas or Groceries
Main Grocery Shopper	0.866***			−0.053		
	(0.288)			(0.192)		
Female		1.209***	1.705***		−0.222	-0.166
		(0.252)	(0.548)		(0.153)	(0.202)
Demographics	X	X	X	X	X	X
Expectations	X	X	X	X	X	X
R^2	0.123	0.126	0.200	0.079	0.080	0.090
Obs.	2,325	2,325	499	5,774	5,774	3,384

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

Notes. Table 3 reports ordinary-least-squares coefficients and standard errors clustered at the household level (in parentheses). Observations are the responses of male and female heads of household in the customized *Chicago Booth Expectations and Attitudes Survey*, which we fielded in June of 2016. In columns (1)-(3), we only consider the subsample of respondents who argue that their main source of information to form inflation expectations is their own shopping (which we only observe in the 2016 wave), whereas in columns (4)-(6), we consider the respondents who report other sources of information. In column (3), we further restrict the sample to households whose male head reports that he thought about gas prices when forming expectations, whereas the female head reported thinking about grocery prices. In column (6), we instead restrict the sample to male and female household heads who report explicitly the goods/services they thought about, which do not include either gas or groceries. In all columns, the outcome variable is respondents' 12-month-ahead numerical inflation expectations. *Main Grocery Shopper* is an indicator for the respondents who are the main grocery shoppers for their households; *Female* is an indicator for female heads; *Demographics* include age, square of age, employment status, 16 income dummies, home ownership, marital status, college dummy, four race dummies, reported risk tolerance, and confidence in inflation-expectations accuracy. *Expectations* include dummies for respondents' 12-month-ahead qualitative income expectations, 12-month-ahead individual financial soundness, and 12-month-ahead aggregate US growth.

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Online Appendix:
Gender Roles and the Gender Expectations Gap

Francesco D'Acunto, Ulrike Malmendier, and Michael Weber

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Online-Appendix A: Additional Figures and Tables

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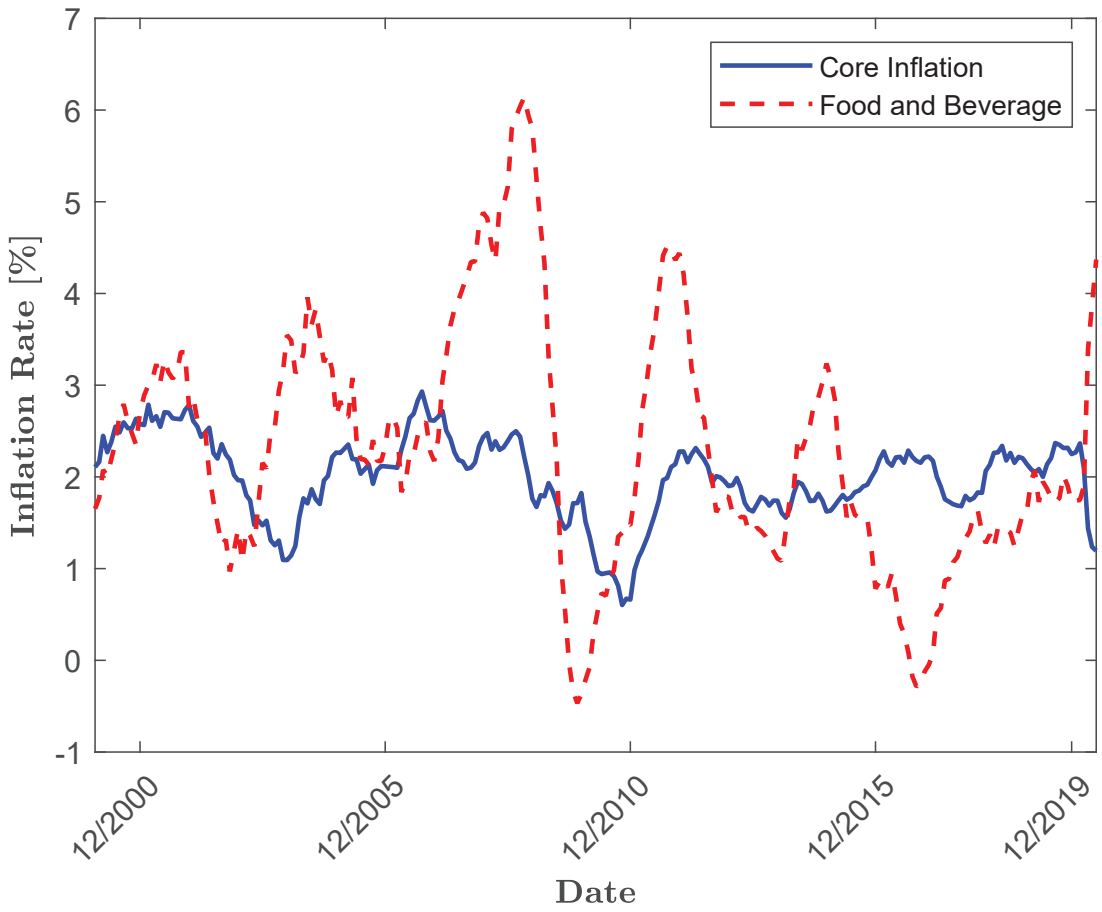
Figure A.1: **Realized inflation**



Notes. This figure plots annual realized core inflation rate in percent in blue and the food and beverage inflation rate in red-dashed. We calculate inflation rates as the annual change in price indeces that are collected by the US Bureau of Labor Statistics and that we retrieved from FRED, the database of the Federal Reserve Bank of St. Louis for January 2000 until June 2020.

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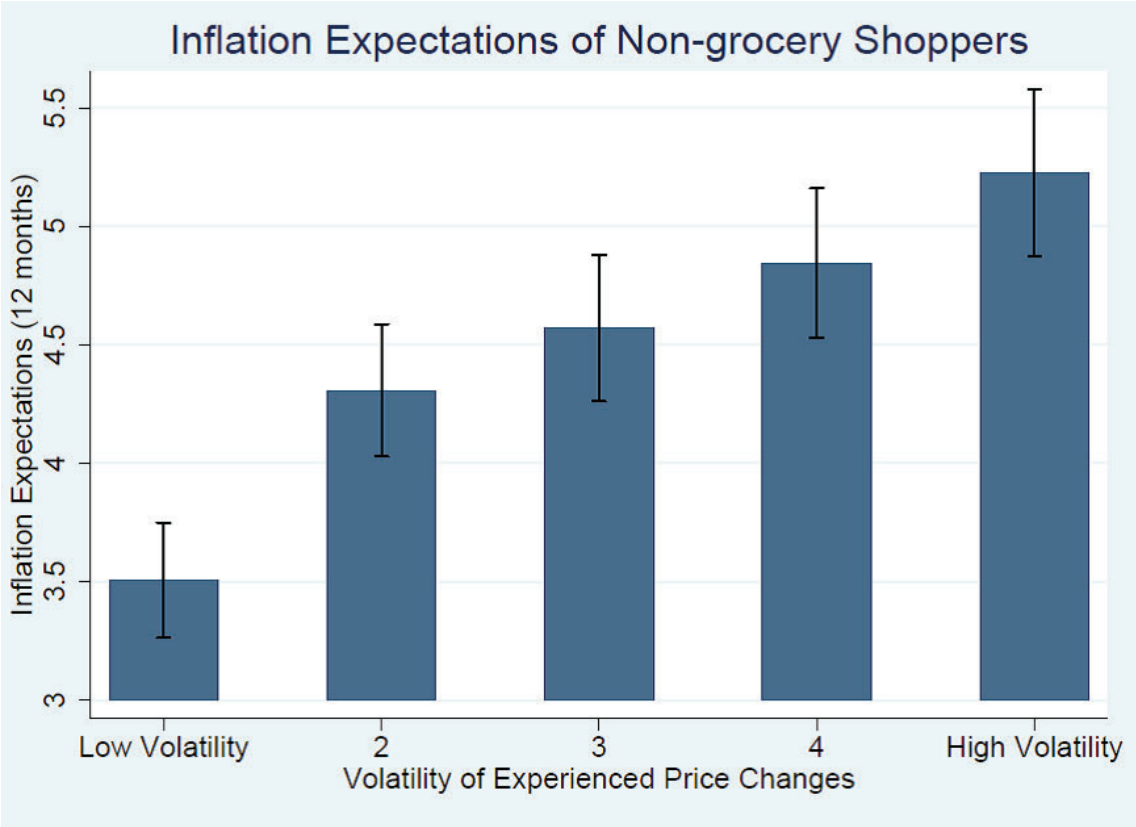
Figure A.2: **Perceived Price Volatility and Inflation Expectations: Non-grocery Shoppers**



Notes. Figure A.2 splits the subsample of non-grocery in the customized *Chicago Booth Expectations and Attitudes Survey*, which we fielded in June of 2015 and 2016, into 5 equally-sized groups based on the volatility of perceived price changes before participating in the survey. On the y-axis, we report the average inflation expectations for each group (blue bars) and the 95% confidence intervals associated with these estimated sample averages (black segments).

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Table A.1: **Variable Names, Sources, and Definitions**

Variable Name	Source	Variable Definition
Inflation Expectations (ST)	NY Fed SCE and CBEAS	Respondent numerical 12-month-ahead inflation rate forecast
Inflation Expectations (LT)	NY Fed SCE	Respondent numerical 5-year-ahead inflation rate forecast
House Price Expectations	NY Fed SCE	Respondent numerical 12-month-ahead forecast for the price increase of the average home nationwide
Likelihood Stock Prices Increase	NY Fed SCE	Respondent numerical expectations about the percent chance that 12 months ahead on average stock prices in the US stock market will be higher than at the time of the interview
US Gov't Debt Expectations	NY Fed SCE	Respondent numerical expectations about the number of percentage points by which they expect the U.S. government debt to increase/decrease over the following 12 months
Perception Financial Situation	NY Fed SCE	Respondent's answer to the question *"Do you think you (and any family living with you) are financially better or worse off these days than you were 12 months ago?"* Five ordered categorical answers range from *"Much Worse off"* (-2) to *"Much Better off"* (2).
Grocery Expected Inflation	NY Fed SCE	Respondent numerical 12-month-ahead food inflation rate forecast
Gas Expected Inflation	NY Fed SCE	Respondent numerical 12-month-ahead gas inflation rate forecast
Medical Expected Inflation	NY Fed SCE	Respondent numerical 12-month-ahead medical care inflation rate forecast
Schooling Expected Inflation	NY Fed SCE	Respondent numerical 12-month-ahead college-expense inflation rate forecast
Rent Inflation Expectations	NY Fed SCE	Respondent numerical 12-month-ahead average house rent inflation rate forecast
Female	NY Fed SCE and CBEAS	Dummy variable that equals 1 if the respondent is female, zero otherwise
Age	NY Fed SCE and CBEAS	Respondent age

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Table A.1: **Variable Definitions** (*cont.*)

Variable Name	Source	Variable Definition
Hispanic	NY Fed SCE and CBEAS	Dummy variable that equals 1 if the respondent is Hispanic
Black	NY Fed SCE and CBEAS	Dummy variable that equals 1 if the respondent is African American
Asian	NY Fed SCE and CBEAS	Dummy variable that equals 1 if the respondent is Asian
Some College	NY Fed SCE and CBEAS	Dummy variable that equals 1 if the respondent has some college education but did not earn a college degree
College Degree	NY Fed SCE and CBEAS	Dummy variable that equals 1 if the respondent earned a college degree
Post-graduate Degree	NY Fed SCE and CBEAS	Dummy variable that equals 1 if the respondent earned a post-graduate degree
Single	NY Fed SCE and CBEAS	Dummy variable that equals 1 if the respondent is single
Employed	NY Fed SCE and CBEAS	Dummy variable that equals 1 if the respondent is employed in a full-time or part-time job
Income Group 1	NY Fed SCE and CBEAS	Dummy variable that equals 1 if the respondent's household has a pre-tax income below $40,000 over the previous 12 months
Income Group 2	NY Fed SCE and CBEAS	Dummy variable that equals 1 if the respondent's household has a pre-tax income between $40,000 and $99,999 over the previous 12 months
Income Group 3	NY Fed SCE and CBEAS	Dummy variable that equals 1 if the respondent's household has a pre-tax income of $100,000 or above over the previous 12 months

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Table A.1: **Variable Definitions** (*cont.*)

Variable Name	Source	Variable Definition
Confidence	NY Fed SCE and CBEAS	Standard deviation of the probability distribution of numerical expectations for 12-month-ahead inflation. The probability distribution is elicited by asking respondents to allocate 100 percentage points across 10 bandwidths that might include the realized 12-month-ahead inflation rate. For instance: *"The rate of inflation will be between 4% and 8%: ... percent chance"*
Numeracy 1	NY Fed SCE	Dummy variable that equals 1 if the respondent replied correctly to the question *"In a sale, a shop is selling all items at half price. Before the same, a sofa costs $300. How much will it cost in the sale?"*, zero otherwise.
Numeracy 2	NY Fed SCE	Dummy variable that equals 1 if the respondent replied correctly to the question *"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?"*
Probability 1	NY Fed SCE	Dummy variable that equals 1 if the respondent replied correctly to the question *"In the BIG BUCKS LOTTERY, the chances of winning a $10.00 prize are 1%. What is your best guess about how many people would win a $10.00 prize if 1,000 people each buy a single ticket from BIG BUCKS?"*
Probability 2	NY Fed SCE	Dummy variable that equals 1 if the respondent replied correctly to the question *"If the chance of getting a disease is 10 percent, how many people out of 1,000 would be expected to get the disease?"*
Probability 3	NY Fed SCE	Dummy variable that equals 1 if the respondent replied correctly to the question *"The chance of getting a viral infection is 0.0005. Out of 10,000 people, about how many of them are expected to get infected?"*
Fin. Literacy 1	NY Fed SCE	Dummy variable that equals 1 if the respondent replied correctly to the question *"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 left in this account?"*
Fin. Literacy 2	NY Fed SCE	Dummy variable that equals 1 if the respondent replied correctly to the question *"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."*
Grocery Shopper	CBEAS	Dummy variable that equals 1 if the respondent is the primary grocery shopper for the household

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Table A.2: **Hunting for Discounts: Goods Purchased at a Discount and Concentration of Purchases by Stores**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Share Discounted Goods				Concentration Purchases by Stores			
	Low		*High*		*Low*		*High*	
Female	0.138	0.245	0.148	0.080	0.185	0.255	0.085	0.080
	(0.126)	(0.168)	(0.129)	(0.173)	(0.138)	(0.184)	(0.117)	(0.157)
Main Grocery Shopper	0.570***	0.497**	0.251	0.375*	0.251	0.349	0.548***	0.472**
	(0.176)	(0.229)	(0.159)	(0.201)	(0.180)	(0.234)	(0.153)	(0.198)
Demographics	X	X	X	X	X	X	X	X
Expectations	X	X	X	X	X	X	X	X
Household FE		X		X		X		X
R^2	0.099	0.630	0.126	0.626	0.107	0.649	0.114	0.649
Obs.	10,433	10,433	10,433	10,433	10,066	10,066	10,794	10,794

Notes. Table A.2 reports ordinary-least-squares coefficients and standard errors clustered at the household level (in parentheses). Observations are the responses of male and female heads of household in the customized *Chicago Booth Expectations and Attitudes Survey*, which we fielded in June of 2015 and 2016. We split the sample in three groups based on the concentration of the grocery quantities purchased by the respondents' households across different stores over the 12 months before they took part in the survey. We define *ShareGoodsDiscounted* as the ratio of goods that the respondent's household purchased using a coupon or at a discount over the total number of goods purchased over the 12 months before the survey, based on the *Nielsen Homescan Database* good-level file. *Low* includes respondents below the median by this share and *High* respondents above the median. We define *Concentration Purchases by Store* as the Herfindahl-Hirschman Index (HHI) of the quantities purchased across different stores: The higher is the HHI, the more concentrated are the household's groceries in fewer stores and hence the least households hunt for discounts across stores. *Low* includes households whose HHI is below the median and *High* above the median. The sample sizes differ because of tie values at the median. In all columns, the outcome variable is respondents' 12-month ahead numerical inflation expectations. *Female* is an indicator for female heads; *Main Grocery Shopper* is an indicator that equals 1 if the respondent declares that he/she is the main grocery shopper for the household, and zero otherwise; *Demographics* include age, square of age, employment status, 16 income dummies, home ownership, marital status, college dummy, four race dummies, reported risk tolerance, and confidence in inflation expectations accuracy. *Expectations* include dummies for respondents' 12-month-ahead qualitative income expectations, 12-month-ahead individual financial soundness, and 12-month-ahead aggregate US growth.

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Table A.3: **Inflation Expectations: Men's Exposure to Gasoline Prices**

	(1)	(2)	(3)	(4)	(5)	(6)
Men's expos. to gas prices:	*Low*	*Medium*	*High*	*Low*	*Medium*	*High*
	Across Households			Within Households		
Female	0.264	0.267***	0.429***	0.244	0.301**	0.442**
	(0.228)	(0.099)	(0.164)	(0.301)	(0.139)	(0.229)
Demographics	X	X	X	X	X	X
Expectations	X	X	X	X	X	X
Household FE				X	X	X
R^2	0.130	0.110	0.108	0.419	0.388	0.407
Obs.	2,674	11,656	5,519	2,674	11,656	5,519

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

Notes. Table A.3 reports ordinary-least-squares coefficients and standard errors clustered at the household level (in parentheses). Observations are the responses of male and female heads of household in the customized *Chicago Booth Expectations and Attitudes Survey*, which we fielded in June of 2015 and 2016. We split the sample in three groups based on the male head's frequency of purchasing gasoline: *Low* includes households whose male head never purchases gasoline; *Medium* includes households whose male head purchases gasoline between one and four times per month; and *High* households whose male head purchases gasoline five times per month or more frequently. In all columns, the outcome variable is respondents' 12-month ahead numerical inflation expectations. *Female* is an indicator for female heads; *Demographics* include age, square of age, employment status, 16 income dummies, home ownership, marital status, college dummy, four race dummies, reported risk tolerance, and confidence in inflation expectations accuracy. *Expectations* include dummies for respondents' 12-month-ahead qualitative income expectations, 12-month-ahead individual financial soundness, and 12-month-ahead aggregate US growth.

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Table A.4: **Gender Gap in Inflation Expectations: NY Fed SCE**

	(1)	(2)	(3)	(4)
Sample:	Full		Math & Finance Literate	
	ST Inflation	LT Inflation	ST Inflation	LT Inflation
Median; St. dev. (in pp)	*3; 13.2*	*3; 13.3*	*3; 6.9*	*3; 6.2*
Female	0.08***	0.04***	0.10***	0.06**
	(0.01)	(0.02)	(0.03)	(0.03)
Age	0.00**	0.00	0.00***	0.00***
	(0.00)	(0.00)	(0.00)	(0.00)
Hispanic	0.01	0.02	0.14***	0.20***
	(0.03)	(0.03)	(0.04)	(0.04)
Black	0.21***	0.25***	0.18**	0.22**
	(0.04)	(0.04)	(0.08)	(0.11)
Asian	0.04	0.05	0.23***	0.27***
	(0.04)	(0.04)	(0.07)	(0.09)
Some College	0.03	0.04	0.04	0.05
	(0.04)	(0.04)	(0.09)	(0.08)
College	−0.03	−0.04	−0.00	−0.02
	(0.04)	(0.03)	(0.09)	(0.08)
Postgraduate	−0.03	−0.02	0.01	−0.00
	(0.03)	(0.04)	(0.09)	(0.08)
Single	0.01	0.03	0.00	−0.01
	(0.02)	(0.02)	(0.03)	(0.03)
Employed	−0.01	−0.02	−0.00	−0.02
	(0.02)	(0.02)	(0.03)	(0.03)
Income Group 1	0.01	0.01	−0.07*	−0.09**
	(0.02)	(0.02)	(0.04)	(0.04)
Income Group 3	0.074***	0.053***	0.10***	−0.10***
	(0.02)	(0.02)	(0.02)	(0.03)
Confidence	0.01***	0.01***	0.01***	0.01***
	(0.00)	(0.00)	(0.00)	(0.00)
Numeracy 1	−0.01	−0.06		
	(0.07)	(0.07)		
Numeracy 2	−0.07***	−0.07***		
	(0.02)	(0.02)		
Probability 1	−0.08***	−0.08***		
	(0.03)	(0.03)		
Probability 2	−0.01	−0.06		
	(0.04)	(0.04)		
Probability 3	0.01	−0.00		
	(0.03)	(0.03)		
Financial Literacy 1	0.03	0.03		
	(0.03)	(0.04)		
Financial Literacy 2	−0.11**	−0.11**		
	(0.05)	(0.05)		
Constant	−0.08	0.08	−0.26***	−0.24**
	(0.11)	(0.11)	(0.10)	(0.10)
R^2	0.07	0.06	0.05	0.07
Obs.	39,645	39,645	15,639	15,639

Notes. Table A.4 reports ordinary-least-squares coefficients and standard errors (in parentheses) clustered at the individual level, estimated on the *New York Fed Survey of Consumer Expectations*. All dependent and independent variables are defined in Table A.1. Outcome variables are standardized. We report the value of one standard deviation of each outcome variable and its median below the variables names. Columns (3) and (4) limit the sample to respondents who provide correct answers to the survey questions labeled Numeracy 1, Numeracy 2, Probability 1, Probability 2, Probability 3, Financial Literacy 1, Financial Literacy 2. The sample period is from June 2013 to April 2018.

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Table A.5: **Gender and Uncertainty of Economic Expectations**

	(1)	(2)	(3)	(4)	(5)	(6)
	Rounding ST Inflation	Rounding LT Inflation	Rounding House Prices	Volatility ST Inflation	Volatility LT Inflation	Volatility House Prices
Female	0.11***	0.09***	0.08***	2.01***	2.07***	1.18***
	(0.01)	(0.01)	(0.01)	(0.28)	(0.27)	(0.17)
Demographics	X	X	X	X	X	X
Quantitative Skills	X	X	X	X	X	X
Income Group FE	X	X	X	X	X	X
Year-month FE	X	X	X	X	X	X
Panel	X	X	X			
Cross-section only				X	X	X
R^2	0.13	0.12	0.04	0.21	0.24	0.19
Obs.	39,645	39,645	39,645	4,578	4,578	4,578

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

Notes. Table A.5 reports ordinary-least-squares coefficients and standard errors (in parentheses) clustered at the individual level, estimated on the *New York Fed Survey of Consumer Expectations*. In columns (1)-(3), the outcome variable is a dummy variable that equals 1 if the respondent reported short-term, long-term, or house-price numerical inflation expectations rounded to a multiple of 5. In columns (4)-(6), the outcome variables are the within-individual variances of the short-term, long-term, and house-price numerical inflation expectations reported by each respondent who was interviewed more than once in the *New York Fed Survey of Consumer Expectations*. All other variables are defined in Table A.1. The sample period is from June 2013 to April 2018.

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Online-Appendix B: Chicago Booth Expectations and Attitudes Survey (CBEAS) Questions

In this Section, we report the questions of our customized survey on the Nielsen Consumer Panel, the *Chicago Booth Expectations and Attitudes Survey* (CBEAS).

Please have all household members, 18 years or older, answer this survey.

Please tell us about yourself...

Question 1 *What is your date of birth?*

3 separate dropdown boxes with years from 1916 until 1997

Question 2 *What is your gender*

- Male
- Female

Question 3 *What is the highest educational level that you, yourself, completed?*

- Some grade school or less $\longrightarrow$ Skip to Q5.
- Grade school $\longrightarrow$ Skip to Q5.
- Some high school $\longrightarrow$ Skip to Q5.
- Graduated high school $\longrightarrow$ Skip to Q5.
- Some college
- Graduated college
- Some post college
- Post college graduate

Question 4 *What is/ was your primary college major as an undergraduate, if any?*

- Undeclared/no major
- Accounting

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- African-American studies
- Agricultural science
- Agriculture
- American civilization
- Anthropology/archaeology
- Architecture
- Area studies
- Art history/fine art
- Bio Sci: zoology/botany/biophys/other
- Business/Management
- City planning
- Clinical pastoral care
- Commercial art
- Communications
- Computer programming
- Computer/information sciences
- Consumer/personal
- Data processing
- Design
- Economics
- Education
- Engineering
- Ethnic studies
- Film arts
- Finance
- Fine and performing arts
- Foreign languages
- Forestry
- Geography
- Health
- History
- International relations
- Journalism
- Law

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- Law: paralegal
- Leisure studies
- Letters: English/American
- Liberal studies
- Library/archival sciences
- Mathematics: including statistics
- Military sciences
- Music
- Natural resources
- Philosophy
- Physical Sci.: chemistry/physics/other
- Political science
- Psychology
- Public administration
- Religious studies
- Social work
- Sociology
- Spanish
- Speech/drama
- Textiles
- Women/Gender studies
- Other

Question 5 *Which of the categories below* ***best*** *describe your* ***current*** *employment status?*

- Full-time employment
- Part-time employment
- On maternity leave / paternity leave / long-term sick leave
- Unemployed
- Student, pupil, intern
- Retired
- Homemaker

If Q5 is "Full-time" or "Part-time" ask Q6.

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Question 6 *Which of the following* ***best*** *describes your* ***current*** *primary occupation?*

- Architecture and Engineering
- Armed Forces
- Arts, Design, Entertainment, Sports, and Media
- Building and Grounds Cleaning and Maintenance
- Business and Financial Operations
- Community and Social Services
- Computer and Mathematical
- Construction Trades
- Education, Training, and Library
- Extraction Workers
- Farming, Fishing, and Forestry
- Food Preparation and Serving Related
- Healthcare Practitioners and Technical
- Healthcare Support
- Installation, Maintenance, and Repair Workers
- Legal
- Life, Physical, and Social Science
- Office and Administrative Support
- Personal Care and Service
- Police, Fire Fighter
- Production
- Sales and Related
- Transportation and Material Moving
- Management
- Prefer not to answer

If Q5 is "Full-time" or "Part-time" ask Q7.

Question 7 *Do you have any additional jobs besides your primary job?*

- Yes
- No

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If Q5 is "Unemployed" or "Student, pupil, intern" or "Homemaker" or "Retired" or "On maternity leave / paternity leave / long-term sick leave" ask Q8.

Question 8 *Are you actively looking for a job?*

- Yes
- No

Question 9 *Do you own the place where you live or own any properties that you rent to someone else or use as a vacation home?*

- Yes $\longrightarrow$ Skip to Q13
- No

Question 10 *In the next 12 months do you expect your household income to increase or decrease?*

- Increase
- Decrease
- Not sure

If Q9 is "Increase" or "Decrease" ask Q10.

Question 11 *Suppose that, 12 months from now, you and all other household members are working in the exact same job, working the exact same number of hours. If this were true,* ***over the next 12 months****, would you expect your household income to:*

(Please enter a number in the box below)
Show if Q9=increase:

- Go up by ... percent [RANGE: 1-100]

Show if Q9=decrease:

- Go down by ... percent [RANGE: 1-100]

Question 12 *Approximately how many times per month do you go to a gas station to buy gasoline or for other reasons? (Please enter a number)*

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- ... times [RANGE: 0-999]

Question 13 *Approximately how many times per month do you go to restaurants?*

- ... times [RANGE: 0-99]

Question 14 *Who typically does the grocery shopping* ***in your household****? (Select one)*

- I do all of the grocery shopping in the household
- I share the grocery shopping with others in the household
- Someone else does the grocery shopping in the household

Question 15 *How often do you, or others in your household, shop for groceries? (Select one)*

- Every day
- More than once a week
- Once a week
- Less than once a week

Inflation and Prices [HIDE]

In the next few questions, we will ask for your opinion on a few topics. It is important to us that you reply without any external influence. In particular, please do not search the internet or other sources while going over the following questions.

Question 16 *We would like to ask you some questions about the overall economy and in particular about the rate of inflation/deflation (Note: inflation is the percentage rise in overall prices in the economy, most commonly measured by the Consumer Price Index and deflation corresponds to when prices are falling).*

Over the last 12 months *... (Please enter a number in one of the boxes below. The number you enter should be greater than 0 or equal to 0. If you do not think there was any inflation/deflation in the last 12 months, please enter a "0" in one of the boxes.)*

Allow only one answer

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- The rate of inflation was ... percent [RANGE: 0-100 ALLOW FOR UP TO 2 DECIMAL POINTS]

OR

- The rate of deflation (the opposite of inflation) was ... percent [RANGE: 0-100 ALLOW FOR UP TO 2 DECIMAL POINTS]

Question 17 ***Over the next 12 months****, I expect the ... (Please enter a number in one of the boxes below. The number you enter should be greater than 0 or equal to 0. If you do not think there was any inflation/deflation in the last 12 months, please enter a "0" in one of the boxes.)*

Allow only one answer

- Rate of inflation to be ... percent [RANGE: 0-100 ALLOW FOR UP TO 2 DECIMAL POINTS]

OR

- Rate of deflation (the opposite of inflation) to be ... percent [RANGE: 0-100 ALLOW FOR UP TO 2 DECIMAL POINTS]

Question 18 *In THIS question, you will be asked about the PERCENT CHANCE of something happening. The percent chance must be a number between 0 and 100. Numbers like 2% or 5% indicate "almost no chance," 19% or so may mean "not much chance," a 47% or 55% chance may be a "pretty even chance," 82% indicates a "very good chance," and 95% or 98% mean "almost certain." What do you think is the percent chance that,* ***over the next 12 months*** *... (Please note: Numbers need to add up to 100%) [RANGE OF EACH OPTION BELOW: 0-100 ALLOW FOR UP TO 2 DECIMAL POINTS]*

- the rate of inflation will be 12% or more
- the rate of inflation will be between 8% and 12%
- the rate of inflation will be between 4% and 8%
- the rate of inflation will be between 2% and 4%

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- the rate of inflation will be between 0% and 2%
- the rate of deflation (opposite of inflation) will be between 0% and 2%
- the rate of deflation (opposite of inflation) will be between 2% and 4%
- the rate of deflation (opposite of inflation) will be between 4% and 8%
- the rate of deflation (opposite of inflation) will be between 8% and 12%
- the rate of deflation (opposite of inflation) will be 12% or more

% Total [PN: TOTAL ANSWERS FROM ABOVE]

Question 19 *Thinking about the rate of inflation/deflation, which were the top three sources of information for your answers? (Select a "1" for the top source, "2" for the second and a "3" for the third source in the drop down by the options listed)*

[RANDOMIZE STATEMENTS]

- Newspaper, Magazine
- Radio, Television
- Colleagues
- Friends & Family
- Financial advisors
- Social networking websites
- Other websites
- Own Shopping experience
- Other (specify)

Question 20 *Thinking about your answer on the rate of inflation/deflation, did you think about any specific goods and/or services when forming your opinion? If yes, which goods and/or services did you think about?*

[OPEN ENDED ANSWER]

- Yes, I thought about *[enter text here]*
- No, I did not think about any goods or services.

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For this next section there is no right or wrong answer. We are looking for your best guess.

Question 21 *How do you expect the general economic situation in this country to develop over the next 12 months? It will . . .*

- Get a lot better
- Get a little better
- Stay the same
- Get a little worse
- Get a lot worse

Question 22 *How do you expect the financial position of your household to change over the next 12 months? It will . . .*

- Get a lot better
- Get a little better
- Stay the same
- Get a little worse
- Get a lot worse

Question 23 *What do you think will happen to the average interest rate on savings accounts during the next 12 months compared to the current rate? It will . . .*

- Go up
- Stay the same
- Go down

Question 24 *What do you think will be the average annual interest rate on savings accounts during the next 12 months?*

- . . . percent per year [RANGE: 0-100 ALLOW FOR UP TO 2 DECIMAL POINTS]

Question 25 *Which of the following statements best describes the current financial situation of your household?*

- We are saving a lot

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- We are saving a little
- We are just managing to make ends meet on our income
- We are drawing on our savings
- We are running into debt

Question 26 *On a scale from 1 to 7, how would you rate your willingness to take risks regarding* ***financial matters****?*

Slider from 1 (Not willing at all) to 7 (Very willing)

Question 27 *On a scale from 1 to 7, how would you rate your willingness to take risks in* ***daily activities****?*

Slider from 1 (Not willing at all) to 7 (Very willing)

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