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Running head: Inflation expectations

**The effect of question wording  
on consumers' reported inflation expectations**

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### Abstract

Economists and policy makers increasingly consult national household surveys asking individuals about their economic circumstances, financial decisions, and expectations for the future. For decades, the Reuters/Michigan Survey of Consumers and other national surveys have asked about expectations for “prices in general,” with responses being used by academic economists, policy makers, and central bankers. Although median responses track official inflation estimates, respondents exhibit considerable disagreement, with some reporting seemingly large overestimations. Here, we demonstrate that changes in the wording of survey questions about inflation expectations affect the central tendency of responses as well as their dispersion. We randomly assigned respondents to questions asking about “prices in general,” “inflation,” or “prices you pay.” Respondents’ expectations and perceptions were lower and less dispersed when questions asked about “inflation” instead of “prices in general” or “prices you pay,” with the latter two formulations eliciting similar response patterns. These question-wording effects were mediated by how much respondents thought of (extreme) personal price experiences when receiving questions about “prices in general” or “prices you pay.” Compared to questions about “inflation,” questions about “prices in general” and “prices you pay” elicited expectations that were more strongly correlated to expected increases in gas prices, which were relatively large and likely salient at that time.

Key words:

Inflation expectations, Question design, Consumer surveys

Research highlights:

- We show that question wording affects responses to inflation surveys.
- Inflation surveys often ask people for their expectations for “prices in general.”
- We asked questions about “prices in general,” “inflation,” or “prices you pay.”
- Questions about “inflation” yielded lower expectations and less disagreement.
- Questions about “inflation” also reduced thoughts of large price changes.

## 1. Introduction

Economists increasingly use national household surveys to elicit individuals' beliefs about their economic circumstances, as well as related expectations and decisions. Economic surveys can provide information that is useful in terms of predicting individuals' future behavior, beyond what can be deduced from observable measures (Hurd, 2009; Manski, 2004). The usefulness of economic surveys depends in part on how well questions are understood by respondents. Shorter questions and simpler wording make responding easier and reduce "don't know" responses (Basili & Scott, 1996; Knäuper et al., 1997; Yan & Tourangeau, 2008). However, seemingly irrelevant changes in question wording can influence people's interpretations of a question (Bruine de Bruin, 2011; Schwarz, 1999). For example, people are more willing to endorse a policy to "not allow" a behavior rather than to "forbid" it (Holleman, 1999), and to estimate different speeds for cars "colliding" or "hitting" each other in a previously watched video-taped accident (Loftus & Palmer, 1974). Hence, it is important to better understand the potential effect of wording on responses before implementing questions on national economic surveys.

Here, we examine the effect of wording on consumers' interpretations of and responses to a widely used question about expectations for future inflation. Inflation expectations are widely believed to affect people's economic decisions about saving, investing, purchasing durable goods, and negotiating wages (see Armantier et al., 2011). In order to achieve price stability, central bankers aim to keep inflation expectations consistent with their policy objectives. They rely on surveys of consumers to assess

inflation expectations, in combination with market-based measures, model-based forecasts and surveys of professionals.

For decades, survey measures of inflation expectations, collected by the Reuters/Michigan Survey of Consumers (henceforth: the Michigan survey), as well as other national surveys, have formulated these questions in simple terms, asking respondents for expected changes in “prices in general.” Yet, to date, relatively little is known about how this choice of wording affects how people interpret the question and generate their responses.<sup>1</sup>

Median responses to survey questions about inflation expectations generally track actual inflation, and sometimes outperform professional and model-based forecasts in predicting actual inflation (Ang et al., 2007; Hafer & Hein, 1985; Thomas 1999). Yet, there tends to be considerable disagreement among respondents, with some expecting seemingly high inflation (Bates & Gabor, 1986; Bruine de Bruin et al., 2010; Bryan & Venkatu, 2001). Because price changes are not uniform across product categories, variations in individuals’ consumption patterns could partially explain variations in their inflation expectations (Ranyard et al., 2008; Hafer & Hein, 1985). However, previous work also suggests that the disagreement in responses may reflect variations in how respondents interpret the Michigan Survey question about “prices in general.” That is, some seem to interpret that question as asking about prices they personally pay, while others recognize it as asking about the U.S. inflation rate (Bruine de Bruin et al., 2010), a concept with which members of the general public have some familiarity (Leiser and Drori, 2005; Svenson & Nilson, 1986; Williamson & Wearing, 1996).

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<sup>1</sup> Jungermann et al. (2007) did examine the effect of response modes on reported price changes for specific product categories, concluding that it was best to ask questions of the format: “12 months ago, 500 g of coffee cost €3.49. How much does coffee cost presently?”

Moreover, responses to the Michigan Survey's "prices in general" question vary depending on what respondents think of when generating their answers. Respondents who think relatively more about their personal price experiences than about the U.S. inflation rate report significantly higher expectations (Bruine de Bruin et al., 2010), because experiences with large price changes (such as for gas and transportation) are most likely to come to mind (Bruine de Bruin, van der Klaauw, & Topa, 2011). These results are in line with research finding that extreme events are more memorable (Morewedge, Gilbert, & Wilson, 2005), and that price increases are often noticed more than price decreases (Jungermann, Brachinger, Belting, Grinberg, & Zacharias, 2007; Kahneman & Tversky, 1979). If questions that directly ask about expected "inflation" focus respondents less on their personal price experiences, they should evoke lower responses than questions that ask about expectations for "prices in general."

In the present research, we test this hypothesis by randomly assigning respondents to answering questions about "prices in general," "inflation," or "prices you pay." We examine how these variations in question wording affect reported expectations, thoughts about personal price experiences, the relationship of reported expectations to salient changes in specific prices, as well as ratings of question clarity and ease of responding.

## **2. Materials and Methods**

### **2.1. Sample**

We conducted an Internet survey with RAND's American Life Panel (ALP). Its members were recruited from 2007 respondents to the Michigan Survey, who were originally contacted through random-digit dialing. Interested individuals without internet

access were offered a Web TV. A total of 815 ALP members completed our survey questions. Of those,<sup>2</sup> 54.2% of respondents reported being female, 87.7% being white, 66.0% being married or living with a partner, 61.7% having completed education beyond high school, and 55.4% receiving at least \$75k in household income. Median age was 48 years old (M=47.7, SD=14.3).

## 2.2. Procedure

Our web-based survey was available between May 29, 2008, and November 5, 2008, with 45.7% of respondents completing it by May 31, 2008, and 89.1% by June 30, 2008. Following the Michigan Survey protocol, respondents first answered questions about their financial situation and perceived business conditions. Next, respondents were asked to report their expectations for “prices in general,” “inflation,” or “prices you pay” for the next 12 months, and for the next 5 to 10 years (Section 2.2.1). After answering the second question, they indicated how difficult it was to generate their answer, how clear the question was, and how they interpreted it (Section 2.2.2). Subsequently, they reported past-year perceptions of “prices in general”, “inflation,” or “prices you pay” (Section 2.2.1) and again indicated the question’s difficulty, clarity, and interpretation (Section 2.2.2). Respondents also answered demographic questions (Section 2.2.3). Respondents received \$20 for answering the entire survey, which included the questions analyzed here,

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<sup>2</sup> During the months in which the survey was online, the different monthly samples of the Michigan Survey of Consumers included between 53.7% and 59.8% females, 58.8%-62.4% being married or living with a partner, 62.8%-71.4% having at least a bachelors degree, 37.1%-46.5% reporting income over \$75k, 83.2%-85.3% being white, and 59.9%-66.1% being 48 years of age or older. By comparison, our sample had higher rates of respondents who were white, married or living with a partner, reporting no college education, having a household income of \$75k or more, and younger -- in terms of having values falling outside of the range observed for the Michigan sample.



and took on average 35 minutes to complete. Those who skipped questions received prompts encouraging them to respond.

2.2.1. Question wording. Respondents were randomly assigned to answer questions about (a) “prices in general” (n=281), (b) “inflation” (n=257), or (c) “prices you pay” (n=277). The assigned wording was used for three consecutive questions, asking about expectations for the year ahead, expectations for the next 5 to 10 years, and perceptions of the past year.

First, respondents who received questions about “prices in general” followed the Michigan Survey’s protocol. Following the protocol outlined in Table 1, respondents were first asked for their expectations of the year ahead. Respondent indicated whether they thought prices would “go up, go down, or stay the same” (q1a), with a follow-up question asking respondents who said “stay the same” asking whether they meant “will go up at the same rate” or “will not go up” (q1b). Those who expected prices to go up or to go down were asked for the percent change, expressed as a point estimate or a range (q2a). Those who responded with a range were prompted for a point estimate (q2b).<sup>3</sup> Those who gave point estimates over 5% were given the opportunity to revise their response (q2c-d). Subsequently, respondents gave their longer-term expectations (e.g., “Do you think prices in general will be higher, about the same, or lower, 5 to 10 years from now?”) and their past-year perceptions (e.g., “During the past 12 months, do you think that prices in general went up, or went down, or stayed about the same?”). The structure of follow-up questions was similar to the one used for the year-ahead expectations (Table 1). However, as in the Michigan Survey, the opportunity to revise responses (Q2c in Table 1) was different for long-term expectations: “Would that be

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<sup>3</sup> Only the point estimates are analyzed here.

[x%] per year, or the total for prices over the next 5 to 10 years?” All of our respondents received this opportunity, even though the Michigan Survey offers it only to respondents who report point estimates over 5%.

Second, respondents who received questions about “inflation” also considered three time horizons (e.g., the next 12 months, the next 5 to 10 years, and the past 12 months). For each time horizon, the “inflation” question used the very same logical structure as the “prices in general” question (Table 1). The first question about the year ahead started with “Over the next 12 months, do you think that there will be inflation, deflation (the opposite of inflation), or neither?” with a follow-up question asking about the magnitude of expected inflation or deflation.

Third, respondents who received questions about the “prices you pay” considered the same three time horizons, (e.g, the next 12 months, the next 5 to 10 years, and the past 12 months). These questions were based on the Michigan question, replacing “prices in general” with “the prices of things you usually spend money on” (Table 1).

2.2.2. Question clarity and ease of responding. Ratings of question clarity and ease of responding were provided twice, after answering the question about expectations for the next 5 to 10 years, and after answering the question about past-year perceptions. Each time, participants rated the question they received (about “prices in general,” “inflation,” or “prices you pay”), answering “how clear was the question in terms of what it was asking about?” on a scale ranging from 1 (=very unclear) to 7 (=very clear), and “how hard was it to come up with an answer to this question”, on a scale ranging from 1 (=very easy) to 7 (=very hard). The latter ratings were reverse-coded in our analyses so that higher ratings reflected increased ease of responding.

2.2.3. Question interpretation. Respondents reported their question interpretations twice, after answering the question about expectations for the next 5 to 10 years, and after answering the question about past-year perceptions. For example, they were asked “When you received the question about ‘prices in general during the next 5 to 10 years,’ what did you think it was asking for the most? Please check the one option that best describes what you thought the question was asking for.” Respondents could select from ten response options, including three focal ones: (a) “the prices of things you usually spend money on,” (b) “the U.S. inflation rate,” and (c) “how to cover expenses in the next year.” They also rated “how much you thought of each of these things, when trying to come up with an answer,” on a scale from 1 (=not at all) to 7 (=very much). Following our previous work (Bruine de Bruin et al., 2010), our analyses only focus on the latter ratings of the three focal interpretations.

2.2.4. Expectations for specific prices. Respondents first indicated the specific prices they paid for the most. They were asked “From the following list of seven items, please check the top three items in your yearly spending budget” with response options including (a) housing costs, which includes mortgage or rent, maintenance, and utilities, (b) food, which includes groceries, dining out, and beverages, (c) clothing, (d) transportation, which includes gas, public transportation fares, and car maintenance, (e) health care, (f) recreation and entertainment, (g) education and child care. We then asked respondents to report their year-ahead expectations for the prices of food, housing costs, and the largest item in their yearly spending budget other than food or housing. These questions used the same structure as the Michigan question (Table 1), replacing “prices in general” with the name of the specific item (e.g., food, housing).

2.2.5. Respondent characteristics. During their initial enrollment into RAND's American Life Panel, respondents had already reported their gender, highest level of education, and the total combined income for all members of their family (living in their household) over the past 12 months, defined as including "money from jobs, net income from business farm or rent, pensions, dividends, interest, social security payments, and any other money income received by members of their family who are 15 years of age or older," selecting from 14 categories ranging from "less than \$5,000" to "\$75,000 or more." Prior to our survey, they had also already answered questions that measured their financial literacy, including their understanding of concepts related to inflation (Bruine de Bruin et al., 2010).

### **3. Results**

#### **3.1. Effects of question wording on reported expectations and perceptions**

Table 2 shows descriptive statistics for responses to questions about "inflation," "prices in general," and "prices you pay," as reported for the three time horizons (the next 12 months, the next 5 to 10 years, and the past 12 months). Distributions showed positive skewness, indicating that means were higher than medians, and positive kurtosis, suggesting relatively long tails. Given these departures from normality, we used the Mann-Whitney (M-W) test, a nonparametric alternative to the t-test (Siegel and Castellan, 1988) to examine question-wording effects on reported expectations. We also used chi-square tests to examine question-wording effects on whether or not responses were over 5%.<sup>4</sup>

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<sup>4</sup> Following previous work (Bruine de Bruin et al., 2010; 2011), we used 5% as a threshold for seemingly high expectations, because (1) the Michigan Survey of Consumers gives respondents who report

First, reported expectations were significantly higher for questions about “prices in general” than for questions about “inflation” for the next 12 months, whether analyzing the continuous variable (M-W  $z=-3.42$ ,  $p<.001$ ) or the dichotomous variable indicating whether responses were over 5% ( $\chi^2=9.64$ ,  $p<.01$ ). The same pattern held for the next 5 to 10 years (M-W  $z=-2.12$ ,  $p<.05$ ;  $\chi^2=3.94$ ,  $p<.05$ ), and for past-year perceptions (M-W  $z=-4.46$ ,  $p<.001$ ;  $\chi^2=9.86$ ,  $p<.05$ ). Second, questions about “prices you pay” elicited significantly higher responses than those about “inflation,” for the next 12 months (M-W  $z=-3.87$ ,  $p<.001$ ;  $\chi^2=11.00$ ,  $p<.001$ ) for the next 5 to 10 years (M-W  $z=-3.19$ ,  $p<.001$ ;  $\chi^2=2.80$ ,  $p<.10$ ), and in past-year perceptions (M-W  $z=-5.52$ ,  $p<.001$ ;  $\chi^2=20.15$ ,  $p<.001$ ). Third, we did not find differences between responses to questions about “prices in general” and “prices you pay” (all  $p>.10$ ).<sup>5</sup>

Further inspection found that question wording also affected how much respondents disagreed, as seen in interquartile ranges (IQRs)<sup>6</sup> of their responses, with larger IQRs for questions about “prices in general” and “prices you pay” than for questions about “inflation.” To test for differences in dispersion, we used the Fligner-Killeen F test, which compares ranked absolute deviations from sample medians observed for each question wording (Fligner & Killeen, 1976). First, we found more dispersion with the “prices in general” questions than with the “inflation” questions across all time horizons: the next 12 months ( $F(1,533)=7.39$ ,  $p<.01$ ), the next 5 to 10

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expectations over 5% an opportunity to revise their answer, suggesting that such responses are seen as suspect (Curtin 1996), (2) the CPI has not been above 5% since 1990 (Bryan and Venkatu, 2001) and (3) median inflation expectations have not been above 5% since the mid-1980s (Bryan and Venkatu, 2001).

<sup>5</sup> A repeated-measures multivariate analysis of variance (MANOVA) on reported expectations across the three time horizons found no systematic interaction of question wording and whether respondents had low (vs. high) financial literacy ( $p>.10$ ), as measured through the questions presented in Bruine de Bruin et al. (2010), suggesting that question-wording effects were similar for respondents varying in financial literacy levels.

<sup>6</sup> IQRs are commonly used to evaluate disagreement in respondents’ inflation expectations, because they are less likely than standard deviations to be affected by skewness.

years ( $F(1,534)=4.60, p<.05$ ), and the past 12 months, ( $F(1,528)=16.13, p<.001$ ). Second, we found more dispersion for “prices you pay” than for “inflation” across all time horizons: the next 12 months ( $F(1, 530)=7.63, p<.01$ ), the next 5 to 10 years ( $F(1, 531)=7.85, p<.01$ ), and the past 12 months ( $F(1, 527)=22.37, p<.001$ ). Third, there were no significant differences in the dispersion between responses to questions about “prices in general” versus “prices you pay” ( $p>.10$ ).

### 3.2. Effects of question wording on question interpretation

Table 3 shows how much respondents indicated thinking of “prices of things you usually spend money on,” “how to cover expenses” and “the U.S. inflation rate,” when answering questions about “inflation,” “prices in general” or “prices you pay.”

Bonferroni tests examined the effect of question wording on how much respondents thought of these topics (Table 3). For both time horizons, questions about “inflation” elicited more thinking of “the U.S. inflation rate” and less thinking of “prices of things you usually spend money on,” compared to questions about “prices in general” and “prices you pay.” Additionally, questions about “prices you pay” focused respondents even more on “prices of things you usually spend money on” than did questions about “prices in general.” How much respondents thought about “how to cover expenses” did not differ significantly between the three questions.

Hence, question wording affected how much respondents thought of “the U.S. inflation rate” versus “prices of things you usually spend money on.” Sobel tests examined whether each of these two question interpretations mediated question-wording effects on reported expectations, and a bootstrapping test examined a multiple mediation

model that included both question interpretations (Baron & Kenny, 1986; Preacher & Hayes, 2008).<sup>7</sup> How much respondents thought about “the prices of things you usually spend money on” significantly mediated question-wording effects on reported past-year perceptions (Sobel  $z=2.58$ ,  $p<.05$ ; Bootstrapping 95% CI .21-.80), and marginally for expectations for the next 5 to 10 years (Sobel  $z=1.80$ ,  $p=.07$ ; Bootstrapping 95% CI=.01-.40). For the dichotomous responses (split at 5%), bootstrapping tests found significant mediation by thoughts of “the prices of things you usually spend money on” for the effect of question wording on expectations over the next 5 to 10 years (95% CI=.02-.19) and for the past year (95% CI=.05-.20). How much respondents thought about the “U.S. inflation rate” did not mediate the reported question-wording effects ( $p<.10$ ).

### 3.3. Effects of question wording on the relationship between overall price expectations and expectations for specific prices.

Across all respondents, expectations for percent change in prices were much higher for gas (Mdn=10.00, M=14.87, SD=16.01) than for food (Mdn=5.00, M=9.27, SD=35.71; Wilcoxon  $z=-13.88$ ,  $p<.001$ ) or for housing (Mdn=1.00, M=1.84, SD=8.60;

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<sup>7</sup> Mediation was demonstrated in the following three steps, conducted on the continuous variable (Baron & Kenny, 1986; Preacher & Hayes, 2008). First, questions asking about “prices in general” or “prices you pay” (rather than “inflation”) yielded significantly higher responses ( $B=1.10$ ,  $se=.48$ ,  $t(811)=2.29$ ,  $p<.05$  for the next 5 to 10 years;  $B=2.32$ ,  $se=.84$ ,  $t=2.77$ ,  $p<.01$  for the past year). Second, these question wordings also increased how much respondents thought of “prices of things you usually spend money on” ( $B=-.50$ ,  $se=.14$ ,  $t(808)=-3.67$ ,  $p<.001$  for the next 5 to 10 years;  $B=.50$ ,  $se=.10$ ,  $t=5.03$ ,  $p<.001$  for the past year), while at the same time decreasing how much respondents thought of the “U.S. inflation rate” ( $B=.52$ ,  $se=.10$ ,  $t(808)=5.06$ ,  $p<.05$  for the next 5 to 10 years;  $B=-.85$ ,  $se=.15$ ,  $t=-5.81$ ,  $p<.001$ ). Third, adding how much respondents reported thinking of these two topics to a regression model predicting responses from question wording reduced the magnitude of question wording-effects ( $B=.83$ ,  $se=.49$ ,  $t(807)=1.69$ ,  $p<.10$  for the next 5 to 10 years;  $B=2.00$ ,  $se=.86$ ,  $t=2.31$ ,  $p<.05$  for the past year), due to significantly higher responses being given by respondents who thought more of the “prices of things you usually spend money on” ( $B=.32$ ,  $se=.16$ ,  $t(807)=1.92$ ,  $p=.05$  for the next 5 to 10 years;  $B=.89$ ,  $se=.30$ ,  $t=2.99$ ,  $p<.01$  for the past year), with thinking of “the U.S. inflation rate” making little to no additional difference ( $B=-.21$ ,  $se=.12$ ,  $t(807)=-1.71$ ,  $p<.10$  for the next 5 to 10 years;  $B=.14$ ,  $se=.20$ ,  $t=.69$ ,  $p>.10$  for the past year). Mediation analyses using logistic regressions on dichotomized responses showed the same pattern ( $\alpha=.05$ ).

Wilcoxon  $z=-18.92$ ,  $p<.001$ ), as shown by the Wilcoxon test, which is a non-parametric version of the paired-samples t-test.<sup>8</sup> These year-ahead expectations for food, housing, and gas did not significantly differ between question-wording conditions ( $p>.05$ ). During the 12 months leading up to our survey, gas prices had indeed exhibited especially high increases (8.1%), as compared to food prices (5.0%) and housing costs (3.3%), or the overall CPI of 4.2% (Bureau of Labor Statistics, 2008).

The left side of Table 4 shows linear regressions predicting the continuous variable of expectations for overall prices from expectations for specific prices (i.e., gas, food, and housing) and from question wording (i.e., “prices in general” and “prices you pay” vs. “inflation”). The right side of Table 4 shows logistic regressions predicting whether or not overall price expectations were over 5% from the same variables. Model 1 shows that overall price expectations were significantly higher among respondents who had higher expectations for gas and food prices, and who answered questions about “prices in general” or “prices you pay” rather than about “inflation.” Model 3 shows similar results with a logistic regression predicting whether overall price expectations were over 5%, and expectations for housing costs having an additional positive relationship with overall price expectations.

Models 2 and 4 add interaction effects, with one interaction reaching significance in both models, suggesting that responses to questions about “prices in general” and “prices you pay” were more strongly related to expectations for gas prices than were responses to questions about “inflation.” This pattern was supported by separate linear

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<sup>8</sup> The most commonly mentioned items in the top three of respondents’ spending budget were food (86.9%), housing (87.2%), and gas (82.3%). All respondents were asked to report their year-ahead expectations for food prices and housing costs, but year-ahead expectations for gas prices were only requested from respondents who reported it to be in the top three of their spending budget.



regressions for each question wording, showing that gas expectations have a significant positive relationship with overall expectations of “prices in general” ( $\beta=.20$ ,  $p<.01$ ) and of “prices you pay” ( $\beta=.31$ ,  $p<.001$ ), but not of “inflation” ( $\beta=.03$ ,  $p>.10$ ). Separate logistic regressions for each question wording also showed that higher expectations for gas prices increased the likelihood of reporting expectations over 5% for “prices in general” (Odds Ratio=1.06, 95% CI=1.02 – 1.12,  $p<.01$ ) and for “prices you pay” (Odds Ratio=1.08, 95% CI=1.03 - 1.13,  $p<.01$ ) but not for “inflation” (Odds Ratio=1.01, 95% CI=.98 - 1.03,  $p>.10$ ).

#### 3.4. Effects of question wording on percent of missing responses, rated question clarity and rated ease of responding.

As seen in Table 5, there were very few missing responses, perhaps due to our respondents receiving prompts to answer each question they tried to skip. Table 5 also shows ratings of clarity and ease of responding. When comparing these variables across question pairs, only one systematic difference emerged in each time horizon (next 5 to 10 years; past 12 months). A post-hoc Bonferroni test found that respondents rated questions about “prices you pay” as somewhat easier to answer than questions about “inflation.”

## 4. Discussion

We found that normatively irrelevant changes in question wording affect responses to survey questions about inflation expectations. Questions about “prices in general” and “prices you pay” were more likely to generate unreasonably high responses

as well as more disagreement than did questions about “inflation.” These patterns emerged for expectations about the year ahead and the next 5 to 10 years, as well as perceptions for the past year. Questions about “prices in general” and “prices you pay” evoked similarly high responses due to their similar interpretations.

Slight changes in question wording can affect how respondents interpret a question and generate their answer. Questions about “prices in general” and “prices you pay” focused respondents more on personal price experiences than did questions about “inflation.” Such thoughts about personal price experiences tend to be biased towards extremes, such as large changes in gas prices, leading respondents to overestimate overall inflation (Bruine de Bruin et al., 2011; Jungermann et al., 2007). Indeed, questions about “inflation” were less likely to focus respondents on gas prices, which had been exhibiting especially large increases at the time of the survey (Bureau of Labor Statistics, 2007; 2008).

Our survey was fielded at a time of relatively high overall inflation, when specific increasing prices may be especially salient. We have replicated the reported wording effects at other points in time and with questions about different time horizons, suggesting that responses to questions about expectations of “prices in general” tend to be higher than responses to questions about “inflation.”<sup>9</sup> Effects of question wording may nevertheless be stronger at times of relatively high actual inflation, when price changes are most variable, and some specific prices show steeper and perhaps more salient increases. At those times, questions about “prices in general” and “prices you pay,” which draw more attention to increasing prices, may elicit especially high responses.

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<sup>9</sup> To improve readability, these results have been removed from this paper. For more information, please contact the authors.

Moreover, if the specific prices that exhibit large increases vary over time (e.g., in one year gas prices may increase more, in another year housing costs may increase more), then responses to questions about “prices in general” and “prices you pay” will be driven by prices of different goods at different times. As a result, responses to these questions will be less comparable over time than responses to questions about “inflation.”

Respondents’ focus on larger price increases may be exacerbated by the media, which tend to pay more attention to bad economic news, affecting public perceptions even after controlling for actual economic conditions (Goidel & Langley, 1995). Respondents may additionally have paid more attention to changes in gas prices because they pay for them relatively frequently (Brachinger, 2008; Flug & Stix, 2005; Jungerman et al., 2007), an explanation not explicitly explored in this study.

Although questions about “inflation” may evoke more reasonable responses, they may be somewhat more difficult to answer. That difficulty did not result in higher non-response rates, perhaps because our web-based survey provided systematic prompts to discourage respondents from skipping questions. Face-to-face or telephone interviews may lead to a higher rate of missing responses (Fricker et al., 2005; Link & Mokdad, 2005), especially with harder questions about “inflation.”

Overall, these results support asking directly about “inflation”, rather than about “prices in general” (as in the Michigan Survey), or about “prices you pay” (a plausible alternative.) However, different formulations may be useful for different purposes. Questions about “inflation” appear to yield responses that are less sensitive to specific prices, and may be more useful for macroeconomic models. However, if one wants to capture the subjective experience of dealing with changing prices in the marketplace, a

question about “prices” may be better. Moreover, different question formulations may capture expectations that are relevant to different consumer behaviors. It is possible that expectations for “inflation” are more central to people’s investment decisions, whereas expectations for “prices you pay” and associated thoughts about extreme changes in specific prices affect their purchasing decisions. Questions about “prices in general” seemed to evoke some of both perspectives, hence may be less desirable than either alternative, by virtue of producing muddled responses.

Designers of economic surveys may prefer to elicit expectations for both “inflation” and “prices,” examining their changes over time, as well as their role in consumers’ decision making. Asking both versions may be beneficial to survey designers who have already been asking about expectations for “prices” over the years. They will likely prefer to keep that wording to allow them to compare present responses to those given in the past.

In conclusion, our findings demonstrate that seemingly irrelevant changes in wording can elicit variations in how economic survey questions are interpreted. In the study presented here, we followed procedures that are common in survey design research, asking respondents to indicate how they interpreted survey questions, with response options being taken from think-aloud interviews in which interviewees thought out loud while answering the questions. Such procedures may help economists to gain a better understanding of how people interpret different versions of economic survey questions, and design questions that evoke less disagreement and exhibit better validity.

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Table 1: Adapted Michigan Survey protocol for the question about year-ahead expectations for “prices in general.”

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Q1a During the next 12 months, do you think that prices in general will go up, or go down, or stay where they are now?

- Go up  
 Stay the same  
 Go down

[If Q1a response is “Stay the same”]

Q1b Do you mean that prices will go up at the same rate as now, or that prices in general will not go up during the next 12 months?

- Will go up at same rate  
 Will not go up

[If Q1a response is “Go up” or Q2a response is “will go up at same rate,” ask Q2 about prices going up. If Q1a response is “Go down” ask Q2 about prices going down]

Q2a By about what percent do you expect prices to go [up/down] on the average, during the next 12 months? Below, please give your best guess OR your best guess for a range.

My best guess is \_\_\_ percent

OR

My best guess for a range is between \_\_\_ percent and \_\_\_ percent

[If Q2a response is a range]

Q2b Thank you for giving a range. Could you also give a best guess? \_\_\_

[If Q2a or Q2b best guess ‘x’ is >5%]

Q2c Let me make sure I have that correct. You said that you expect prices to go [up/down] during the next 12 months by [x] percent. Is that correct?

- Yes  
 No

[If Q2c response is “Yes”]

Q2d By about what percent do you expect prices to go [up/down] on the average, during the next 12 months? \_\_\_

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Table 2. Descriptive statistics by question wording and time horizon.

Question	N	Median <sup>a</sup>	Mean (SD)	Percent >5% <sup>b</sup>	IQR <sup>c</sup>	Skewness	Kurtosis
Expectations for next 12 months (%)							
Inflation	255	5.00	8.22 (11.71)	41.6%	7.00	2.54	11.07
Prices in general	280	6.00 <sup>i</sup>	9.84 (10.01)	55.0% <sup>i</sup>	6.00 <sup>i</sup>	2.39	9.08
Prices you pay	277	8.00 <sup>i</sup>	9.24 (7.98)	56.0% <sup>i</sup>	11.00 <sup>i</sup>	.09	4.34
Expectations for next 5 to 10 years (%)							
Inflation	256	3.00	4.21 (5.59)	19.5%	3.00	2.08	7.79
Prices in general	280	3.50 <sup>i</sup>	5.38 (7.36)	26.8% <sup>i</sup>	4.00 <sup>i</sup>	4.65	34.65
Prices you pay	277	4.00 <sup>i</sup>	5.25 (5.87)	26.0%	4.00 <sup>i</sup>	2.95	14.10
Perceptions of past 12 months (%)							
Inflation	252	4.00	7.13 (9.99)	36.1%	5.00	4.89	34.88
Prices in general	278	5.00 <sup>i</sup>	9.29 (9.15)	49.6% <sup>i</sup>	6.00 <sup>i</sup>	2.33	6.22
Prices you pay	277	7.00 <sup>i</sup>	9.62 (13.45)	55.6% <sup>i</sup>	6.00 <sup>i</sup>	10.57	146.12

<sup>a</sup> Mann-Whitney tests were used to examine question-wording effects on responses ( $p < .05$ )

<sup>b</sup> Chi-square tests were used to examine question-wording effects on whether or not responses were >5% ( $p < .05$ )

<sup>c</sup> IQR=Interquartile range, reflecting the difference between the 25<sup>th</sup> and 75<sup>th</sup> percentile, with question-effects being examined using Fligner-Killeen tests ( $p < .05$ )

Table 3: Mean (SD) ratings of how much respondents thought of focal topics, by question wording and time horizon.

Focal topic	Expectations for next 5 to 10 years			Perceptions of past 12 months		
	Inflation	Prices in general	Prices you pay	Inflation	Prices in general	Prices you pay
U.S. inflation rate	5.07 <sup>gy</sup> (1.84)	4.67 (1.75)	4.45 (1.86)	4.95 <sup>gy</sup> (2.00)	4.31 (1.90)	3.94 (1.88)
Prices of things you usually spend money on	5.51 (1.53)	5.87 <sup>i</sup> (1.32)	6.18 <sup>ig</sup> (1.20)	5.76 (1.55)	6.05 <sup>i</sup> (1.31)	6.43 <sup>ig</sup> (.97)
Covering expenses	4.41 (2.05)	4.22 (2.18)	4.10 (2.17)	4.31 (2.16)	4.23 (2.18)	4.27 (2.29)

Note: Post-hoc Bonferroni tests examined differences between question pairs. For each question within each time horizon, we indicated whether the mean rating of how much respondents thought of a topic was significantly higher ( $p < .05$ ) from that for the equivalent question about “inflation” (i), “prices in general” (g), or “prices you pay” (y).

Table 4: Regressions predicting general year-ahead price expectations from expectations for specific prices.

	Linear regressions ( $\beta$ ) predicting reported expectations <sup>a</sup>		Logistic regressions (Odds Ratio; 95% CI) predicting whether expectations >5% <sup>b</sup>	
	Model 1 ( $R^2=.40$ )	Model 2 ( $R^2=.44$ )	Model 3 (Nagelkerke $R^2=.35$ )	Model 4 (Nagelkerke $R^2=.39$ )
Gas expectation	.15 <sup>**</sup>	.00	1.03 (1.01, 1.06) <sup>**</sup>	1.01 (.98, 1.04)
Food expectation	.48 <sup>***</sup>	.49 <sup>***</sup>	1.16 (1.10, 1.23) <sup>***</sup>	1.11 (1.03, 1.20) <sup>**</sup>
Housing expectation	.05	.03	1.05 (1.01, 1.09) <sup>*</sup>	1.02 (.95, 1.09)
Prices in general	.17 <sup>***</sup>	-.01	2.69 (1.47, 4.93) <sup>**</sup>	.83 (.28, 2.48)
Prices you pay	.15 <sup>**</sup>	.15 <sup>*</sup>	2.84 (1.58, 5.09) <sup>***</sup>	.70 (.23, 2.11)
Gas x prices in general	-	.16 <sup>*</sup>	-	1.05 (1.00, 1.10) <sup>+</sup>
Food x prices in general	-	.11	-	1.09 (.95, 1.24)
Housing x prices in general	-	.07	-	1.00 (.91, 1.10)
Gas x prices you pay	-	.20 <sup>**</sup>	-	1.07 (1.01, 1.13) <sup>*</sup>
Food x prices you pay	-	-.21 <sup>**</sup>	-	1.06 (.93, 1.20)
Housing x prices you pay	-	.07	-	1.10 (1.01, 1.21)

<sup>a</sup> Continuous variable; <sup>b</sup> Dichotomous variable

Note: Models controlled for respondents' age, gender (female), education (high school), income (< 75k), marital status, and financial literacy.

Results were similar without controls. \*\*\*  $p < .001$ , \*\*  $p < .01$ ; \*  $p < .05$ ; +  $p < .10$ .

Table 5: Percent of missing responses, rated question clarity, and rated ease of responding by question wording and time horizon.

	Expectations for next 5 to 10 years			Perceptions of past 12 months		
	Prices in		Prices	Prices in		Prices
	Inflation	general	you pay	Inflation	general	you pay
Percent of missing responses	.4%	.4%	.0%	2.0%	1.1%	.0%
	1/257	1/281	0/277	5/252 <sup>g</sup>	3/278	0/277
Mean (SD) rating for question clarity	5.00 (1.75)	5.45 <sup>i</sup> (1.58)	5.38 <sup>i</sup> (1.64)	5.51 (1.54)	5.67 (1.42)	5.78 (1.38)
Mean (SD) rating for ease of responding	3.33 (1.63)	3.66 (1.63)	3.81 <sup>i</sup> (1.64)	3.63 (1.78)	4.01 <sup>i</sup> (1.65)	4.26 <sup>i</sup> (1.73)

Note: Cross-tabs ( $p < .05$ ) compared the percent of missing responses for each question pair. Missing responses for year-ahead expectations as reported in Survey 2 were .8% (2/257) for inflation, .4% (1/281) for prices in general, and .0% (0/277) for prices you pay, showing no significant differences by question pair. Post-hoc Bonferroni tests compared mean ratings between question pairs ( $p < .05$ ), with i indicating a mean was larger than the corresponding one for the question about “inflation.”