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Abstract

Public expectations and perceptions of inflation may affect economic decisions, and have subsequent effects on actual inflation. The Michigan Survey of Consumers uses questions about “prices in general” to measure expected and perceived inflation. Median responses track official measure of inflation, showing some tendency toward overestimation and considerable disagreement between respondents. Possibly, responses reflect how much respondents thought of salient personal experiences with specific prices when being asked about “prices in general.” Here, we randomly assigned respondents to questions about “prices in general,” as well as “the rate of inflation” and “price you pay.” Reported expectations and perceptions were higher and more dispersed for “prices in general” than for “the rate of inflation,” with “prices you pay” and “prices in general” showing similar responses patterns. Compared to questions about “the rate of inflation,” questions about “prices in general” and “prices you pay” focused respondents relatively more on personal price experiences—and elicited expectations that were more strongly correlate to the expected price increases for food and transportation, which were relatively large and likely salient, but not to the expected price increases for housing, which were relatively small and likely less salient. Our results have implications for survey measures of inflation expectations.

Key words: inflation expectations, question design, consumer surveys

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1. Introduction

In everyday life, individuals face economic decisions about saving and borrowing, purchasing durable goods, as well as investing in human capital, which have effects that extend well into the future. As a result, their ability to assess past and future inflation may affect their long-term economic well-being, and, in turn, economy-wide outcomes (Katona, 1975). Thus, a better understanding of individuals' inflation expectations may help to improve economists' predictions of future macroeconomic trends, the formulation of monetary policy, and the effectiveness of Central Bank communications to the public.

Indirect measures of individuals' inflation expectations may be derived from prices of inflation-indexed securities, economists' forecasts, and past inflation trends. However, complex inferences are often required to derive inflation expectations from these measures. Surveys can be used to directly elicit inflation expectations from members of the general public (Blanchflower & Coile, 2009; Bryan & Venkatu, 2001a; Curtin, 1996; Jonung, 1981; Ranyard, Del Missier, Bonini, Duxbury, & Summers, 2008; Wärneryd & Wahlund, 1985). The Reuters/Michigan Survey of Consumers (henceforth, Michigan Survey) has been measuring Americans' inflation expectations for more than 50 years (Curtin, 1996, 2006). Although there tends to be considerable disagreement between respondents, median responses generally track actual inflation, and sometimes outperform professional and model-based forecasts in predicting actual inflation (Hafer & Hein, 1985; Thomas, 1999; Ang, Bekaert & Wei, 2007).

Yet, even in periods of relatively stable inflation, survey measures may show systematic overestimations of official inflation estimates (Bates & Gabor, 1986; Bryan & Venkatu, 2001; Ranyard et al., 2008). For example, one possible source of this bias

might be found in the period following the introduction of the Euro in 2002, when consumers in Euro countries reported unusually high perceptions (of past inflation) and expectations (of future inflation) despite actual inflation being relatively low (for a review, see Ranyard et al., 2008). Because price changes are not uniform across product categories, variations in individuals' consumption patterns may partially explain variations in their inflation expectations (Bryan & Venkatu, 2001; McGranahan & Paulson, 2006; Ranyard et al., 2008). Based on psychological theories, it has been suggested that overestimations of general inflation will result from people paying more attention to larger (vs. smaller) price changes, and price increases (vs. decreases), especially among respondents who have more personal experience with prices, and for products that are purchased more often (Bates & Gabor, 1986; Brachinger, 2008; Fluch & Stix, 2005; Jungermann et al., 2007; Kahneman & Tversky, 1979; Ranyard et al., 2008). Such psychological processes could occur even for items that receive a relatively low expenditure weight in official estimates of inflation.

However, in their recent review, Ranyard et al. (2008) conclude that scientific understanding of how people form their inflation expectations remains fragmentary and incomplete. To better understand what shapes inflation expectations, we conducted a survey (Bruine de Bruin, van der Klaauw, Downs, Fischhoff, Topa, & Armantier, 2009) in which respondents who had answered the Michigan question about "prices in general" indicated how they had interpreted that question. Some survey respondents interpreted the "prices in general" formulation as asking about prices they personally pay, supporting the speculation that people's personal experiences with prices may affect their general inflation expectations (Ranyard et al., 2008). However, others recognized the question

about “prices in general” as asking about the U.S. inflation rate. Indeed, studies have found that members of the general public are familiar with the term “inflation” and have a basic understanding of what it means (Leiser & Drori, 2005; Svenson & Nilsson, 1986; Williamson & Wearing, 1996).

Moreover, which of these topics participants thought about when generating their responses to the Michigan question about “prices in general” was associated with their reported expectations (Bruine de Bruin et al. 2009). Participants who thought relatively more about their personal expenses and prices they pay than about the U.S. inflation rate reported significantly higher expectations. That finding led to the conjecture, tested in the present paper, that survey questions that directly ask for the expected “rate of inflation” will evoke lower responses than those that ask for expected changes in “prices in general,” by reducing attention to personally experienced prices. Similarly, questions asking about “prices you pay” should evoke higher responses than those asking about “prices in general” by increasing attention to personally experienced prices.

Although two of these formulations (“prices in general” and “rate of inflation”) have the same economic interpretation, members of the general public may interpret them differently. Indeed, research in survey design has shown that, across a variety of domains, even seemingly irrelevant variations in question wording have been shown to influence people’s interpretation of the question, and cause significant changes in survey responses in a variety of domains (e.g., Bruine de Bruin, in press; Schwarz, 1999). For example, people are more willing to endorse a proposition to “not allow” a behavior rather than to “forbid” it (Hippler & Schwarz, 1986; Holleman, 1999), rate the same type of condom as more favorable when it is described as having a “95% success rate” rather

than a “5% failure rate” (Linville, Fischer, & Fischhoff, 1993), and estimate different speeds for cars smashing, colliding, or hitting each other in the same video-taped accident (Loftus & Palmer, 1974).

To date, no studies have examined the effect of question wording on reported inflation expectations. Most existing surveys, such as the widely used Michigan Survey, ask participants to assess their expectations for “prices in general” (Bryan & Venkatu, 2001; Jonung, 1981). Here, we present respondents with questions about “prices in general,” “the rate of inflation,” and “prices you pay.” We find that question wording affects reported expectations and perceptions of inflation. That is, compared to questions about “the rate of inflation,” questions about “prices in general” and “prices you pay” elicit responses that are significantly higher and more dispersed, with the latter two showing no significant differences. Compared to questions about “the rate of inflation”, those asking about “prices in general” and “prices you pay” focused respondents relatively more on personal price experiences (vs. the U.S. inflation rate) – and, more importantly, elicited expectations that were more strongly related to expected price increases for food and transportation, which were relatively large and likely salient, but not to expected price increases for housing, which were relatively small and likely not salient. Our results have implications for the design of survey questions about inflation expectations.

2. Method

2.1. Overview

We conducted two separate surveys, which used similar measures and procedures.¹ For presentation purposes, we first discuss the methodology for both surveys, and then present their combined results in the next section.

2.2. Survey 1

2.2.1. Sample

We conducted an internet survey with RAND's American Life Panel (ALP). Its members were recruited from among individuals who participated in the Michigan Survey in 2007, who were originally contacted through random-digit dialing. If they were willing to participate in internet surveys and gave consent to have their information shared with RAND, they were invited to join the panel. Those without internet access were offered a Web TV.

A total of 609 participants completed Survey 1 between December 22, 2007 and May 22, 2008, with 47.9% filling it out by December 31, 2007, and 86.0% by January 31, 2008. Of those, 54.8% reported being female, 87.7% being white, 65.7% being married or living with a partner, 60.6% completing education beyond high school, and 44.9% having at least \$75k in household income. Median age was 48 years old ($M=47.5$, $SD=14.35$).

¹ The survey modules were designed by a team composed of research economists at the Federal Reserve Bank of New York and behavioral psychologists from Carnegie Mellon University (CMU) led by Wandu Bruine de Bruin and Baruch Fischhoff. Mike Bryan (Atlanta Fed), academic consultants (Charles Manski, Kenneth Wolpin, Eric Johnson), a team from RAND's Roybal Center for Financial Decision Making led by Jeff Dominitz and Arie Kapteyn, all provided valuable input. All modules were pilot tested on small samples by the CMU team. The modules were funded by the Federal Reserve Bank of New York and by the Federal Reserve Bank of Cleveland.

During the months in which Survey 1 was online, the percent of females in the different monthly samples of the Michigan Survey of Consumers ranged from 53.4% to 59.4%. In addition, 79.6%-83.7% were white, 58.0%-64.7% married or living with a partner, 64.4%-69.9% having at least a bachelors degree, and 36.1%-43.6% reporting income over \$75k, and 61.3%-64.4% being of 48 years of age or older. By comparison, our sample included somewhat higher rates of participants who were white, married or living with a partner, less educated, receiving more income, and younger -- in terms of having values falling outside of the range observed for the Michigan sample.

Participants were randomly assigned to receiving questions about their year-ahead expectations for (a) changes in “prices in general” (n=299), or one of its two alternatives (b) “the rate of inflation” (n=179) and (c) changes in “prices you pay” (n=131).² Thus, they had a 50% chance to receive the Michigan question about “prices in general,” and a 25% chance of receiving one of the two alternatives. Each of these questions is described in detail below.

2.2.2. *Measures*

Question wording: “prices in general” Participants who received the question about “prices in general” followed the protocol of the Michigan Survey (Curtin,1996). They were asked “During the next 12 months, do you think that prices in general will go up, or go down, or stay where they are now?” followed by the response options “Go up,” “Stay the same,” and “Go down.” As in the Michigan Survey, participants who responded “stay the same” were asked whether they meant that prices would go up at the

² Here, we analyzed the responses to the first question participants received. They subsequently answered questions that used the alternative wordings. Doing so introduced complex order effects that are beyond the scope of this paper, without affecting the main conclusions of the paper.

same rate as now, or not go up but stay the same. Those who indicated that they meant that prices would go up at the same rate then received the same follow-up questions given to those who had said that they believed prices would go up (see below).

Participants who answered that they expected prices to go up or go down were asked “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” followed by “My best guess is that prices will go [up/down] by ____ percent” as well as “My best guess for a range is that prices will go up between ____ percent and ____ percent.” Thus, participants could give a point estimate, a range, or both.

Participants who only filled out the lower bound or the higher bound of the range were prompted to complete both. Those who only gave a range were also asked for a point estimate representing their best guess. Following the Michigan Survey protocol, participants whose point estimate was over 5% were asked: “Let me make sure I have that correct. You said that you expect prices to go up during the next 12 months by [x] percent. Is that correct?” A “no” response was followed by a request for a new best guess. Finally, those who had not given a point estimate or a range were asked: “How many cents on the dollar do you expect prices to go up on the average, during the next 12 months?”

Alternative question wording: “the rate of inflation” and “prices you pay”

Participants who received the first alternative to the Michigan question about “prices in general” were asked “What do you think the rate of inflation will be over the next 12 months? Below, please give your best guess OR your best guess for a range,” following the procedure used for the question about prices in general. Participants who only filled

out the lower bound or the higher bound of the range were prompted to fill out both. Those who gave a range were also asked to give a best guess. Point estimates over 5% were followed with “Let me make sure I have that correct. You said that you expect the rate of inflation to be [x]% over the next 12 months. Is that correct?” A “no” response was followed by a request for another point estimate.

Participants who received the second alternative question, were asked about their expectations for personally experienced prices. It used the same presentation format as the Michigan question about prices in general, while replacing “prices in general” with “the prices of things you usually spend money on” (from hereon referred to as “prices you pay”).

Question clarity and ease of responding. After giving their year-ahead expectations for “prices in general”, “the rate of inflation”, or “prices you pay”, participants rated how clear that question was, on a scale anchored at 1 (=very unclear) and 7 (=very clear), and how hard it was to produce an answer to the question, on a scale anchored at 1 (=very easy) and 7 (=very hard). The latter ratings were reverse-coded so that higher ratings reflected increased ease of responding.

Question interpretation. Participants completed two measures of how they interpreted the year-ahead expectations questions. First, they were asked “what did you think it was asking for the most?” Response options were based on question interpretations that had emerged in cognitive pilot interviews using standard think-aloud procedures (Blair, Conrad, Ackerman, & Claxton, 2006; Bruine de Bruin, in press; Dillman, Smyth, & Christian, 2009; & Ericsson & Simon, 1980), in which interviewees verbalized their thoughts while answering the Michigan question about “prices in

general”: (a) “the prices of things you usually spend money on,” (b) “the prices of things that Americans usually spend money on,” (c) “annual raise in salary,” (d) “the price of one or more specific things,” (e) “the U.S. inflation rate,” (f) “seasonal changes in prices,” (g) “changes in cost of living for next year,” (h) “how your life will be different next year,” (i) “how to pay for loans or other debts next year,” (j) “how to cover expenses next year,” and (k) “other, please specify.” Second, participants rated how much they had thought about each topic, which they “may or may not have thought of,” when generating their inflation expectations, on a scale from 1 (not at all) to 7 (very much).

Demographic measures. Participants were asked to report their gender, highest level of education, and the total combined income of all members of their family (living in their household) during 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” and selected from 14 categories ranging from “less than \$5,000” to “\$75,000 or more.”

2.2.3. Procedure

Following the Michigan Survey protocol, participants first answered warm-up questions asking about their financial situation and business conditions, as perceived in the past and expected for the future. They were then asked to report their expectations for the next 12 months, either for “prices in general,” “the rate of inflation,” or “prices you pay.” Subsequently, they rated the clarity and ease of responding of the question they had answered, and to report how they had interpreted it. Participants also answered

demographic questions. Participants received \$20 for answering the entire internet survey, which included the measures described above, and took about 35 minutes to complete. Although participants were allowed to skip questions, those who tried to do so received a prompt encouraging them to provide an answer.

2.3. Survey 2

2.3.1. Sample

Survey 2 was also conducted with RAND's American Life Panel. A total of 815 participants completed Survey 2 between May 29, 2008 and November 5th, 2008, with 45.7% doing so by May 31, 2008 and 89.1% by June 30, 2008. In this sample, 54.2% of participants 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).

During the months in which Survey 2 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, and 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 participants 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.

Participants were randomly assigned to receive questions about (a) changes in “prices in general” (n=281), (b) “the rate of inflation” (n=257), (or (c) changes in “prices you pay” (n=277). Each of these questions is described in detail below.

2.3.2. *Measures*

Expectations and perceptions of “prices in general.” Participants who received the questions about “prices in general” followed the Michigan protocol for three time horizons. First, they answered the same year-ahead questions as presented in Survey 1. Subsequently, they 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 perceptions of the past (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 the follow-up questions was similar to the one used for the question about year-ahead expectations, described above. However, as in the Michigan Survey, the opportunity to revise responses was phrased differently for expectations over the next 5 to 10 years: “Would that be [x%] per year, or the total for prices over the next 5 to 10 years?” All participants received this opportunity, even though the Michigan Survey presents it only to participants who report point estimates over 5%.

Expectations and perceptions of “the rate of inflation.” Participants who received questions about the “rate of inflation” also considered three time horizons (e.g., the next 12 months, the next 5 to 10 years, and the past 12 months). Unlike Study 1, it used the same structure as the equivalent “prices in general” question, which explicitly asked about prices increasing, decreasing, or staying the same. That is, the question about

expectations for the next 12 months started with “Over the next 12 months, do you think that there will be inflation, deflation (the opposite of inflation), or neither?”

Expectations and perceptions of “prices you pay.” Participants who received questions about the “prices you pay” also considered three time horizons, (e.g, the next 12 months, the next 5 to 10 years, and the past 12 months). These questions used the same structure as the “prices in general” question, replacing “prices in general” with “the prices of things you usually spend money on.”

Question clarity and ease of responding. After considering two of the three time horizons (i.e., the next 5 to 10 years and the past year), participants rated the clarity and ease of responding of the questions they received about “prices in general”, “the rate of inflation” or “prices you pay” with wording following Survey 1.

Question interpretation. After considering two of the three time horizons (the next 5 to 10 years and the past year), participants also indicated which out of ten topics they thought questions about “prices in general,” “the rate of inflation,” or “prices you pay” asked about the most, then rated how much they thought about each of these topics, when forming their expectations. Both measures of question interpretation used the response options presented in Survey 1.

Expectations for specific prices. Participants selected the top three items in their yearly spending budget, from a list including (a) housing, 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. For each selected item, they indicated the percent of their yearly spending

budget they used to pay for it. Subsequently, they gave their year-ahead expectations for the prices of food, housing, and the largest item in their yearly spending budget other than food or housing.

Demographic measures. Participants answered the same questions as in Survey 1.

2.3.3. Procedure

As with Survey 1, all participants first answered the warm-up questions taken from the Michigan Survey. They were then asked to report their expectations for “prices in general” “the rate of inflation” or “prices you pay” for the next 12 months, and for the next 5 to 10 years, as in the Michigan survey protocol. For the latter time horizon, they then rated how difficult it was to answer, how clear it was, and how they interpreted it. Subsequently, they reported past-year perceptions of “prices in general”, “the rate of inflation” or “prices you pay.” For that question, participants also rated question difficulty, clarity, and interpretation. Finally, participants answered demographic questions. Participants received \$20 for answering the entire internet survey, which included the measures described above, and took about 35 minutes to complete. They were allowed to skip questions, but received a prompt encouraging them to provide an answer.

3. Results

3.1. Effects of question wording on reported expectations and perceptions

The top rows of Table 1 show the descriptive statistics for participants’ year-ahead expectations for the rate of inflation, prices in general, and prices you pay, as

reported in Survey 1. The subsequent rows show the descriptive statistics for these three questions (the rate of inflation, prices in general, and prices you pay) for the three time horizons presented in Survey 2 (the next 12 months, the next 5 to 10 years, and the past year). Almost all had strong positive skewness, indicating that means were higher than medians, and strong positive kurtosis, suggesting relatively flat distributions with longer tails. Given these departures from normality, we used the Mann-Witney (M-W) test, a nonparametric alternative to the parametric *t*-test (Siegel & Castellan, 1988), to compare responses by question wording.

As predicted, responses to questions about “prices in general,” were significantly higher than responses for “the rate of inflation” when asking for expectations of the next 12 months (M-W $z=-3.42$, $p<.001$), expectations for the next 5 to 10 years (M-W $z=-2.12$, $p<.05$), and perceptions of the past 12 months (M-W $z=-4.46$, $p<.001$). Although the year-ahead expectations reported in Survey 1 were in the same direction, they were not significant (M-W $z=-.56$, $p=.57$).

As predicted, questions asking about “prices you pay” elicited significantly higher responses than those asking about “the rate of inflation.” This pattern was observed for year-ahead expectations (For Survey 1 Mann-Whitney $z=-2.07$, $p<.05$; for Survey 2 Mann-Whitney $z=-3.87$, $p<.001$), expectations for the next 5 to 10 years (Mann-Whitney $z=-3.19$, $p<.001$) and past-year perceptions (Mann-Whitney $z=-5.52$, $p<.001$).

We did not find differences between the questions asking about “prices.” Although the year-ahead expectations for “prices you pay” reported in Survey 1 were marginally higher than those for “prices in general” (Mann-Whitney $z=-1.76$, $p<.10$), that difference – while maintaining the same sign – was no longer statistically significant for

any of the time horizons presented in Survey 2 (Mann-Whitney $z=-.64$, $p=.52$ for the next 12 months; Mann-Whitney $z=-.95$, $p=.34$ for the next 5 to 10 years; Mann-Whitney $z=-1.23$, $p=.22$ for the past 12 months).

Further inspection of the data showed that question wording also affected the disagreement in reported expectations and perceptions. The interquartile ranges (IQRs) suggest that there is less agreement (i.e., higher dispersion) for questions about prices compared to questions about inflation. IQRs are commonly used to evaluate disagreement between respondents' inflation expectations (Curtin, 2006), because they are less likely than standard deviations to be affected by skew. To test for group differences in dispersion, we used the Fligner-Killeen F test (Fligner & Killeen, 1976), which compares ranked absolute deviations from their respective medians (Conover, Johnson, & Johnson, 1981). First, responses showed less dispersion with the "rate of inflation" questions than with the "prices in general" questions for all time horizons in Survey 2, including the next 12 months ($F(1,533)=7.39$, $p<.01$), the next 5 to 10 years ($F(1,534)=4.60$, $p<.05$), and the past 12 months, ($F(1,528)=16.13$, $p<.001$), but not for year-ahead expectations in Survey 1 ($p>.10$). Second, in each time horizon, responses showed less dispersion for the "rate of inflation" than for "prices you pay" as reported for the next 12 months (as reported in Survey 1, $F(1, 306)=4.14$, $p<.05$ and Survey 2, $F(1, 530)=7.63$, $p<.01$), for the next 5 to 10 years ($F(1, 531)=7.85$, $p<.01$), and the past year ($F(1, 527)=22.37$, $p<.001$). Finally, there were no significant differences in the dispersion of responses to questions about "prices in general" versus "prices you pay" in any of the time periods ($p>.10$).

3.2. Effect of question wording on question interpretation

Table 2 shows the percent of participants who selected each of the ten topics as the main focus of each question. Across wordings and time horizons, the four most commonly chosen topics were “the U.S. inflation rate,” “the prices of things Americans usually spend money on,” “the prices of things you usually spend money on,” and “the cost of living.” We used chi-square tests to compare the percent of participants selecting each of these focal topics for each question pair (Table 2). Looking just at significant differences that occurred for each of the three time horizons, it seems that, for each question wording, the most commonly selected interpretation was the one closest to its wording. That is, compared to the two other questions, (a) questions about “the rate of inflation” were more likely to be interpreted as focusing on “the U.S. inflation rate”; (b) questions about “prices in general” were more likely to be interpreted as focusing on “the prices of things Americans usually spend money on”; (c) questions about “prices you pay” were more likely to be interpreted as asking about “the prices of things you usually spend money on”. Two additional significant differences emerged between question pairs, in each of the three time horizons (Table 2). First, compared to questions about “the rate of inflation,” questions about “prices in general” were much more likely to be interpreted as focusing on “the prices of things you usually spend money on.” Second, compared to questions about “the rate of inflation,” questions about “prices you pay” were less likely to be interpreted as asking about “the prices of things Americans usually spend money on” and “the cost of living.” Ratings of how much participants thought of the four most commonly selected topics showed the same pattern (Table 3).

3.3. Relationship between focal topics and reported expectations and perceptions.

In order to determine whether focusing on particular topics was associated with higher expectations, we computed partial Spearman rank correlations between ratings of how much participants thought of each of the four most commonly selected focal topics and their reported expectations and perceptions, controlling for ratings of how much they thought of the other three focal topics (Table 4). For each time horizon, responses across question wordings were significantly higher for participants who thought relatively more of “the prices of things you usually spend money on” and the “cost of living,” and unrelated to ratings of how much participants thought of the “the rate of inflation” or “the prices of things Americans usually spend money on” ($p > .05$).

3.4. Effects of question wording on the relationship between general expectations and expectations for specific prices.

For the large majority of participants the top three items in their spending budget were “housing, which includes mortgage or rent, maintenance and utilities” (87.2%), “food, which includes groceries, dining out, and beverages” (86.9%), or “transportation, which includes gas, public transportation fares, and car maintenance” (82.3%). For food prices and housing costs, all participants reported year-ahead expected changes. For transportation, expected price changes were only asked of participants who reported transportation to be in the top three of their spending budget. The left panel of Table 5 shows descriptive statistics for these year-ahead expectations, which did not significantly differ between question-wording conditions ($p > .05$). Expectations were much higher for transportation (Wilcoxon $z = -18.92$, $p < .001$) and food (Wilcoxon $z = -17.74$, $p < .001$), than

for housing. During the 12 months leading up to the release of Survey 1 (end of December, 2007), prices for transportation and food had indeed exhibited especially high increases (8.3% and 4.8%, respectively) whereas housing had shown relatively low increases (3.0%) – compared to the overall CPI inflation of 4.1% (Bureau of Labor Statistics, 2007). A similar pattern was found for the 12 months leading up to the release of Survey 2 (end of May, 2008), with price increases being 8.1% for transportation, 5.0% for food (5.0%), 3.3% for housing (3.3%), and overall CPI being 4.2% (Bureau of Labor Statistics, 2008).

Next, we examined whether question wording affected how much participants seemed to pay attention to the increasing prices of transportation and food, when forming their general expectations. The right panel of Table 5 shows that, as predicted, year-ahead expectations for “the rate of inflation,” had a significantly weaker relationship with expectations for food prices ($z=4.36, p<.001$) than those for “prices in general,” with a similar marginal difference being observed in correlations with expectations for transportation prices ($z=1.91, p=.06$), reflecting the lower number of observations. In contrast, there was no significant difference between expectations for “the rate of inflation” and “prices in general” in terms of their correlations with expectations for housing prices ($z=-.24, p=.59$).

Compared to year-ahead expectations for “the rate of inflation,” those for “prices you pay” were more strongly correlated to year-ahead expectations for food prices ($z=-2.22, p<.05$), and marginally more strongly correlated to year-ahead expectations for transportation prices ($z=-1.63, p=.10$) due to the lower number of observations. As

predicted, we found no effect of these question wordings on the correlations with housing prices ($z=-.48$, $p=.62$).

Finally, contrary to what was expected, year-ahead expectations for “prices in general” were more strongly related to year-ahead expectations for food prices than were year-ahead expectations for “prices you pay” ($z=2.25$, $p<.05$), with no difference being observed in correlations with expectations for transportation prices ($z=.29$, $p=.78$), or expectations for housing prices ($z=-.74$, $p=.46$).

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

Table 6 shows very low rates of missing responses, perhaps due to encouraging participants to answer each question they try to skip. Chi-square tests found only one significant difference in non-response rates between question pairs. For past-year perceptions, the non-response rate was higher for “the rate of inflation” than for “prices you pay.” That pattern was similar for the other time horizons, but did not reach statistical significance.

Table 6 also shows ratings of clarity and ease of responding. For each time horizon, post-hoc Bonferroni tests compared each of these mean ratings for each question pair. The question about “the rate of inflation” was rated as somewhat less clear than each of its alternatives, with differences being statistically significant when questions asked about the next 5 to 10 years. The pattern was similar, but not statistically significant at the 5% level, in the other time horizons. In each time horizon, the question about “the rate of inflation” was somewhat more difficult to answer than the question

about “prices you pay,” with the difference being statistically significant. It was also rated as somewhat more difficult to answer than questions about “prices in general” for two of the three time horizons.

4. Discussion

Normatively irrelevant changes in question wording can affect responses, as reported here with survey measures of inflation expectations. Questions asking for the expected “rate of inflation” elicited significantly lower expectations and less disagreement than those asking about expected changes in “prices in general” or “prices you pay.” These patterns were consistent for expectations about the year ahead, expectations for the next 5 to 10 years, and perceptions over the past year. Questions about “prices in general” and “prices you pay,” evoked similar responses, probably because these questions were more similar in their wording.

To understand what shapes inflation expectations, we asked participants to report how they had interpreted these questions and what they thought about when generating their responses. As might be expected, the question about “the rate of inflation” was less likely to be interpreted as asking about personal experiences with prices, compared to the other two questions which explicitly mentioned prices. Yet, across questions, thinking relatively more about personal experiences with prices was associated with higher expectations and perceptions – as was thinking relatively more about “the cost of living.”

Thus, survey questions that use the word “prices” may bias expectations upwards, if participants pay more attention to larger (vs. smaller) price changes, and price increases (vs. decreases) – a prediction that follows from psychological theories (Bates & Gabor,

1986; Brachinger, 2008; Fluch & Stix, 2005; Jungermann et al., 2007; Kahneman & Tversky, 1979; Ranyard et al., 2008). Indeed, we found that compared to year-ahead expectations for “the rate of inflation,” those for “prices in general” and “prices you pay” were more strongly correlated to expected price changes for food and transportation, but not to those for housing. As indicated above, during the 12 months leading up to each of our surveys, food and transportation had exhibited especially high price increases compared to overall CPI inflation, while housing had not (Bureau of Labor Statistics, 2007, 2008).

Effects of question wording may 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 evoke higher responses than questions about “the rate of inflation.” Moreover, if, over time, different specific prices exhibit large increases (e.g., in one year transportation prices increase more, in another year housing prices increase more), then responses to questions about “prices in general” and “prices you pay” will weigh prices differently over time, and be less comparable over time, compared to questions about “the rate of inflation.”

The salience of larger price increases may be exacerbated by media attention, which tends to focus more on bad (vs. good) economic news (Doms & Morin, 2004), and affect public perceptions even after controlling for actual economic conditions (Goidel & Langley, 1995). Participants may additionally have paid more attention to food and transportation prices (vs. housing) because they pay for them more frequently (Brachinger, 2008; Fluch & Stix, 2005; Jungermann et al., 2007) -- an explanation not

explicitly explored in this study. It is also important to note that the two surveys were fielded at times of relatively high overall inflation. Future research should examine whether the salience of increasing prices is less evident in periods of relatively low inflation.

Even though questions about “the rate of inflation” were less affected by expectations for increasing prices, some participants did rate them as somewhat more difficult to answer, in one of the three time horizons. That perceived difficulty did not result in a higher non-response rate, perhaps because our procedures discouraged participants from skipping questions. In procedures with higher non-response rates, such as face-to-face or telephone interviews (Fricker et al., 2005; Link & Mokdad, 2005), perceived difficulty may lead to a higher rate of missing responses.

Overall, these results support asking directly about “the rate of inflation”, rather than “prices in general” -- the wording that is used by the Michigan Survey of Consumers -- or about “prices you pay.” However, the debate over how to best elicit inflation expectations continues. Good survey measures evoke more reliable responses, as seen in test-retest correlations, and more valid responses, as seen in correlations with individuals’ economic decisions. It is possible, that, while expectations for the general rate of inflation are important to economic theory, individuals’ economic behavior is more strongly affected by their expectations for prices they pay, particularly salient increasing prices. It is also possible that different kinds of expectations affect different economic decisions. For example, expectations for “prices you pay” may affect individuals’ purchasing decisions for specific goods and services, while expectations for “the rate of inflation” may affect individuals’ investment decisions. Questions about “prices in

general” evoked both question interpretations, but less so, which may make it less reliable for predicting either kind of decision. Thus, future research should examine these different kinds of expectations over time, as well as their role in consumer and investment decision making, with more process-oriented variables supplementing summary survey estimates.

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Table 1. Descriptive statistics by question wording and time horizon.

Question N	Median	Mean	SD	IQR ^a	Min.	Max.	Skewness	Kurtosis	
<i>Expectations for next 12 months</i>									
<i>(Survey 1)</i>									
Rate of inflation	177	4.00	6.65	9.70	3.00	.50	80.00	5.20	32.92
Prices in general	299	5.00	6.73	9.02	5.00	-2.00	100.00	5.33	43.04
Prices you pay	131	5.00	7.34	6.81	7.00	-2.00	40.00	2.09	5.58
<i>Expectations for next 12 months</i>									
<i>(Survey 2)</i>									
Rate of inflation	255	5.00	8.22	11.71	7.00	-30.00	75.00	2.54	11.07
Prices in general	280	6.00	9.84	10.01	6.00	-20.00	75.00	2.39	9.08
Prices you pay	277	8.00	9.24	7.98	11.00	-30.00	40.00	.09	4.34
<i>Expectations for next 5 to 10</i>									
<i>years (Survey 2)</i>									
Rate of inflation	256	3.00	4.21	5.59	3.00	-15.00	35.00	2.08	7.79
Prices in general	280	3.50	5.38	7.36	4.00	-12.00	75.00	4.65	34.65
Prices you pay	277	4.00	5.25	5.87	4.00	-10.00	44.00	2.95	14.10
<i>Perceptions of past 12 months</i>									
<i>(Survey 2)</i>									
Rate of inflation	252	4.00	7.13	9.99	5.00	-10.00	100.00	4.89	34.88
Prices in general	278	5.00	9.29	9.15	6.00	.00	50.00	2.33	6.22
Prices you pay	277	7.00	9.62	13.45	6.00	.00	200.00	10.57	146.12

^a IQR=Interquartile range, reflecting the difference between the 25th and 75th percentile.

Table 2: Percent of participants who selected different focal topics for each question wording, by time horizon.

Focal topic	<i>Expectations for next 12 months (Survey 1)</i>			<i>Expectations for next 5 to 10 years (Survey 2)</i>			<i>Perceptions of past 12 months (Survey 2)</i>		
	Rate of inflation	Prices in general	Prices you pay	Rate of inflation	Prices in general	Prices you pay	Rate of inflation	Prices in general	Prices you pay
U.S. inflation rate	36.9 ^{gy}	15.1	10.7	28.5 ^{gy}	13.3	8.3	26.2 ^{gy}	9.4	4.0
Prices of things Americans usually spend money on	22.9 ^y	39.5 ^{iy}	4.6	19.5 ^y	30.5 ^{iy}	10.1	21.5 ^y	33.1 ^{iy}	9.0
Prices of things you usually spend money on	8.4	21.4 ⁱ	64.1 ^{ig}	14.1	21.9 ⁱ	49.1 ^{ig}	16.4	33.1 ⁱ	63.5 ^{ig}
Cost of living	21.2 ^y	17.1	11.5	29.3 ^y	25.4	21.3	23.4 ^{gy}	11.5	13.4
Paying loans and debts	2.8 ^g	.0	.8	.0	1.1	.4	.8	.7	.0
Specific prices	1.7	1.7	2.3	2.0	2.5	2.2	3.1	4.7	3.2
Annual raises	1.7	.7	.0	.8	.0	.4	2.0	1.1	.7
Covering expenses	1.1	1.0	1.5	2.0	1.8	3.6	3.1	2.9	1.1
Life changes	.6	.3	1.5	1.2	1.4	2.9	1.6	1.4	3.6
Seasonal price changes	.6	.3	1.5	.4	.0	.4	.4	.4	.0

Note: For each question, we indicated whether the Chi-square test indicated that the percent of participants selecting each topic as the main question interpretation was significantly higher ($p < .05$) than the percent selecting it as the main interpretation of equivalent question about “the rate of inflation” (*i*), “prices in general” (*g*), or “prices you pay” (*y*). The remaining percent of participants selecting the “other” category is not shown, but did not significantly differ between question pairs.

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

Focal topic	<i>Expectations for next 12 months (Survey 1)</i>			<i>Expectations for next 5 to 10 years (Survey 2)</i>			<i>Perceptions of past 12 months (Survey 2)</i>		
	Rate of inflation	Prices in general	Prices you pay	Rate of inflation	Prices in general	Prices you pay	Rate of inflation	Prices in general	Prices you pay
U.S. inflation rate	5.22 ^{gy} (1.77)	4.61 ^y (1.97)	3.93 (1.92)	5.07 ^{gy} (1.84)	4.67 (1.75)	4.45 (1.86)	4.95 ^{gy} (2.00)	4.31 (1.90)	3.94 (1.88)
Prices of things Americans usually spend money on	4.89 ^y (1.81)	5.33 ^{iy} (1.80)	3.79 (2.04)	5.17 ^y (1.67)	5.27 ^{iy} (1.65)	4.34 ^y (2.00)	5.39 ^y (1.72)	5.49 ^y (1.60)	4.43 (1.98)
Prices of things you usually spend money on	4.94 (1.79)	5.70 ⁱ (1.62)	6.36 ^{ig} (1.07)	5.51 (1.53)	5.87 ⁱ (1.32)	6.18 ^{ig} (1.20)	5.76 (1.55)	6.05 ⁱ (1.31)	6.43 ^{ig} (.97)
Cost of living	4.83 ^y (1.82)	4.86 ^y (1.86)	4.05 (2.00)	5.39 ^{gy} (1.57)	5.02 (1.74)	4.91 (1.83)	5.11 ^y (1.77)	5.03 (1.86)	4.71 (1.98)
Paying loans and debts	2.91 (2.02)	2.99 (2.13)	2.80 (2.18)	3.20 (2.03)	3.11 (2.11)	3.10 (2.14)	3.35 (2.20)	3.16 (2.15)	3.19 (2.24)
Specific prices	3.30 (1.97)	3.81 ⁱ (2.13)	4.00 ⁱ (2.08)	4.00 (2.14)	3.99 (2.14)	4.22 (2.04)	4.54 (2.23)	4.88 (2.10)	4.93 (2.12)
Annual raises	3.37 ^y (1.99)	3.13 ^y (1.96)	2.57 (1.77)	4.03 ^y (1.99)	3.65 (1.94)	3.26 (2.09)	3.97 ^{gy} (2.09)	3.43 (1.94)	3.21 (2.04)
Covering expenses	3.51 (2.01)	3.66 (2.24)	3.52 (2.22)	4.41 (2.05)	4.22 (2.18)	4.10 (2.17)	4.31 (2.16)	4.23 (2.18)	4.27 (2.29)
Life changes	3.17 (1.83)	3.72 ⁱ (2.05)	3.62 (2.06)	4.27 (2.08)	3.97 (2.05)	4.24 (2.03)	4.23 (2.12)	4.03 (2.19)	4.38 (2.13)
Seasonal price changes	2.66 (1.79)	2.57 (1.71)	2.49 (1.62)	2.63 (1.78)	2.45 (1.60)	2.56 (1.77)	2.75 (1.86)	2.55 (1.62)	2.67 (1.79)

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 participants thought of a topic was significantly higher ($p < .05$) from that for the equivalent question about “the rate of inflation” (*i*), “prices in general” (*g*), or “prices you pay” (*y*).

Table 4: Partial Spearman rank correlations of expectations or perceptions as well with ratings of how much respondents thought of different focal topics, by question wording and time horizon.

Focal topic	<i>Expectations for next 12 months (Survey 1)</i>				<i>Expectations for next 5 to 10 years (Survey 2)</i>				<i>Perceptions of past 12 months (Survey 2)</i>			
	Rate of inflation	Prices in general	Prices you pay	Over- all	Rate of inflation	Prices in general	Prices you pay	Over- all	Rate of inflation	Prices in general	Prices you pay	Over- all
U.S. inflation rate	.04	.02	-.05	-.01	-.05	-.03	-.03	-.04	-.07	-.04	-.05	-.08*
Prices of things Americans usually spend money on	.03	-.02	.03	-.02	-.02	.11	.06	.03	-.06	-.08	.02	-.07
Prices of things you usually spend money on	.10	.08	-.04	.10*	.07	.11	.03	.10**	.10	.12	.16**	.15***
Cost of living	.12	.08	.16	.11**	.07	.11	.06	.07*	.16*	.12	*.16	*.15***

Note: For each question within each time horizon, we indicated whether the reported correlation was significantly stronger ($p < .05$) from that for the equivalent question about “the rate of inflation” (*i*), or “prices you pay” (*y*).

Table 5: Descriptive statistics for specific price expectations for the next year, and Spearman rank correlations with general expectations in the same time horizon.

Specific price expectation	Descriptive statistics				Spearman rank correlations		
	N	Median	Mean	SD	with general expectations for the next 12 months (Survey 2)		
					Rate of inflation	Prices in general	Prices you pay
Transportation	600	10.00	14.87	16.01	.40 ^{***} (n=185)	.55 ^{***i} (n=209)	.53 ^{***} (n=205)
Food	808	5.00	9.27	35.71	.40 ^{***} (n=255)	.67 ^{***iy} (n=278)	.55 ^{***i} (n=274)
Housing	801	1.00	1.84	8.60	.22 ^{***} (n=250)	.20 ^{**} (n=277)	.26 ^{***} (n=273)

Note: Z-tests examined the differences between Spearman rank correlations ($p < .10$), with i =larger than inflation, y =larger than prices you pay.

Table 6: Percent of missing responses, rated question clarity, and rated ease of responding by question wording and time horizon.

Rate	<i>Expectations for next 12 months</i>			<i>Expectations for next 5 to 10 years</i>			<i>Perceptions of past 12 months</i>		
	<i>(Survey 1)</i>			<i>(Survey 2)</i>			<i>(Survey 2)</i>		
	of inflation	Prices in general	Prices you pay	Rate of inflation	Prices in general	Prices you pay	Rate of inflation	Prices in general	Prices you pay
Percent of missing responses	1.1% (2/177)	.0% 0/299	.0% 0/131	.4% 1/257	.4% 1/281	.0% 0/277	2.0% 5/252 ^g	1.1% 3/278	.0% 0/277
Mean (SD) rating for question clarity	5.36 (1.78)	5.60 (1.69)	5.67 (1.53)	5.00 (1.75)	5.45 ⁱ (1.58)	5.38 ⁱ (1.64)	5.51 (1.54)	5.67 (1.42)	5.78 (1.38)
Mean (SD) rating for ease of responding	3.54 (1.63)	4.41 ⁱ (1.62)	4.38 ⁱ (1.48)	3.33 (1.63)	3.66 (1.63)	3.81 ⁱ (1.64)	3.63 (1.78)	4.01 ⁱ (1.65)	4.26 ⁱ (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 the rate of 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 “the rate of inflation.”