

Can Higher Gasoline Prices Set Off an Inflationary Spiral?

By Nida Çakır Melek, Francis M. Dillon, and A. Lee Smith

Imbalances between supply and demand following the COVID-19 pandemic pushed consumer price inflation, as measured by the consumer price index (CPI), to highs last witnessed in the early 1980s. Then in early 2022, Russia's invasion of Ukraine triggered further increases in energy prices, bringing retail gasoline prices to all-time highs and further lifting inflation. The timing of this recent spike in the price of gasoline—a salient good that is historically important in shaping consumers' inflation expectations—has increased public concerns that the U.S. economy could be in for a repeat of the inflationary spiral that gripped the nation in the 1970s and 1980s. During this period, a sequence of energy price increases helped to set off an inflationary spiral, as rising inflation and rising inflation expectations reinforced one another until a deep economic contraction broke the feedback loop.

In this article, we assess the risk of a similar spiral in the current environment by exploring whether high inflation makes consumers' inflation expectations more responsive to salient price increases—namely, higher gasoline prices. We explore this risk using differences across individual responses in survey-based microdata in the pre-COVID-19 era. We find that in response to an increase in the national price of gasoline, individuals with higher initial inflation expectations revise up their one-year-ahead inflation forecasts by almost twice as much as those

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with lower initial inflation expectations. We interpret our findings as evidence that high rates of prevailing inflation can make consumers' inflation expectations more sensitive to salient price increases. In further evidence of this interpretation, we find a similar pattern when looking across time, as the sensitivity of one-year-ahead inflation expectations to gasoline prices also increases following periods when CPI inflation has been high. With current inflation high and consumers' inflation expectations elevated, our results suggest that changes in salient prices could indeed have an amplified effect on inflation expectations in the current environment.

Section I reviews research on the economic importance and determinants of inflation expectations. Section II presents our empirical analysis of how gasoline price increases affect inflation expectations across individuals and time. Section III discusses the implications of our findings for inflation expectations in the current environment.

I. The Link between Households' Inflation Expectations and Salient Prices

Inflation expectations are a key determinant of actual inflation. For instance, if firms anticipate higher future inflation and hence rising input costs, then they are likely to set higher prices today to protect their profit margins. Similarly, if households anticipate higher future inflation, then they are likely to negotiate for higher wages to preserve their spending power. In addition, inflation expectations can influence a range of forward-looking decisions households and firms make, including savings and consumption decisions as well as investment choices, thereby indirectly influencing inflation.¹ For example, if households expect higher inflation in the future, they may choose to make big-ticket purchases such as household appliances today; this pulling forward of future demand, in turn, drives up actual inflation. It is therefore not surprising that central banks—who are tasked with stabilizing inflation—pay close attention to inflation expectations.

One way to gauge inflation expectations is through survey-based measures such as the inflation expectations gathered from the Michigan Survey of Consumers (MSC). The MSC is one of the longest-running household surveys, conducted by the Survey Research Center at the University of Michigan, with data available monthly since 1978. The

MSC has around 500 participants each month and is weighted to be representative of the U.S. population. The survey also has a rotating panel component, so that each month, about 60 percent of interviewees are first-time respondents, and the remaining 40 percent were interviewed six months prior.²

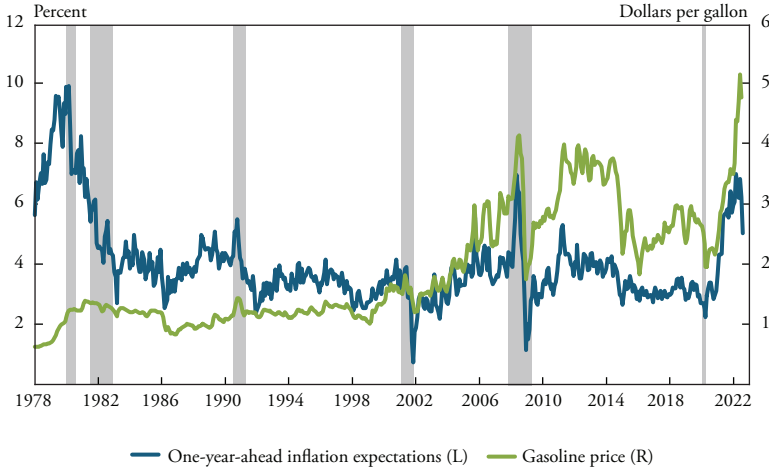
The long history and rotating panel structure make the MSC especially useful for studying consumer inflation expectations. And Coibion and Gorodnichenko (2015) provide convincing evidence that the MSC measure of inflation expectations, compared with other survey measures of inflation expectations, is more closely linked with realized inflation outcomes.

The blue line in Chart 1 shows that average one-year-ahead inflation expectations from the MSC have shot up since the pandemic-induced recession in 2020, underscoring concerns about a feedback loop between inflation and inflation expectations. The role that these inflation expectations appear to play in shaping realized inflation prompts an important question: what determines households' inflation expectations?

Individuals' inflation expectations appear to be highly susceptible to changes in prices of the goods that they purchase most often. For example, Nobel laureate economist Robert E. Lucas has postulated that individuals form their expectations about aggregate inflation based on their source of information on the current state of the economy (Lucas 1972, 1973, 1975). D'Acunto and others (2021) bring Lucas's assertion to the data and find that the price changes of goods consumers purchase frequently in grocery stores influence their inflation expectations, while price changes of goods that they do not purchase in the same stores do not. Their evidence suggests that consumers interpret price changes in their individual consumption bundles as signals about aggregate price changes. Similarly, Brachinger (2008) shows that the aggregate perceived inflation of German consumers can be explained by overweighting the inflation rates of goods consumers purchase frequently. Overall, existing research suggests that frequent price changes in the goods consumers purchase most often—henceforth referred to as salient goods—play an important role in shaping inflation expectations.³

Gasoline is one such salient good, the price of which consumers frequently observe at retail gasoline stations. Indeed, several studies have documented a strong relationship between the price of gasoline and

Chart 1

Households' Short-Term Inflation Expectations
and the Price of Gasoline

Note: Gray bars denote National Bureau of Economic Research (NBER)-defined recessions.

Sources: U.S. Energy Information Administration (EIA), University of Michigan Survey Research Center, and NBER (Haver Analytics).

households' inflation expectations (Hastings and Shapiro 2013; Georganas, Healy, and Li 2014; Coibion and Gorodnichenko 2015; Binder 2018). The volatile nature of gasoline prices contributes to this correlation, as consumers are more likely to remember extreme movements in prices and use them to form expectations about the future (Bruine de Bruin, van der Klaauw, and Topa 2011). Chart 1 presents visible evidence of the positive association between gasoline prices and one-year ahead inflation expectations from the MSC. For example, inflation expectations (blue line) rose in the mid-2000s, fell in 2008, and then rose again from 2009 to 2011, in line with swings in gasoline prices (green line).

Critically, this connection between gasoline prices and inflation expectations also appears to affect inflation dynamics. For example, Coibion and Gorodnichenko (2015) show that the link between oil prices and inflation expectations helps explain why inflation did not fall in the Great Recession, a puzzle dubbed "the missing disinflation." Indeed, they attribute the lack of disinflation from 2009 to 2011, a period of severe economic contraction, to the simultaneous increase in households' short-run inflation expectations. They then assign the

increase in inflation expectations during this period to the remarkable sensitivity of inflation expectations to oil prices. The findings from Coibion and Gorodnichenko (2015) demonstrate that energy prices—operating through consumers’ inflation expectations—can influence economy-wide inflation dynamics.

II. The Changing Sensitivity of Household Inflation Expectations When Inflation Is High

The linkages between gasoline prices, inflation expectations, and inflation demonstrated by Coibion and Gorodnichenko (2015) highlight the risk that surging gasoline prices can pose to the inflation outlook. We build on this result and investigate whether a surge in gasoline prices *in an already high-inflation environment* puts inflation expectations at a heightened risk of destabilizing and driving inflation even higher.

To formally assess whether consumer inflation expectations, and hence inflation, are more sensitive to salient price increases in a high-inflation environment, we analyze MSC microdata. We use individual consumer responses that have not been aggregated to measure changes in one-year-ahead inflation expectations during the pre-COVID-19 era, from 1981 to 2019.⁴ We match each MSC survey with the price of gasoline in the corresponding month. This allows us to observe how changes in the national price of gasoline over a six-month period relate to concurrent changes in inflation expectations for the same individual.⁵

In our ideal dataset, we would be able to link the inflation rates experienced by individuals with their inflation expectations. This linkage would enable us to directly test whether the inflation expectations of individuals experiencing higher inflation are more sensitive to increases in gasoline prices than the expectations of individuals experiencing lower inflation. Unfortunately, experienced (or perceived) inflation is not regularly reported in the MSC. However, in a special installment, economists at the Board of Governors of the Federal Reserve System surveyed MSC respondents on how much prices changed over the past year to study the relationship between inflation perceptions and inflation expectations (Detmeister, Lebow, and Peneva 2016). They found a strong positive relationship between the inflation rates individuals perceive and the inflation rates that individuals expect in the future, suggesting that individuals reporting higher expected inflation are also likely to be currently experiencing high rates of inflation.

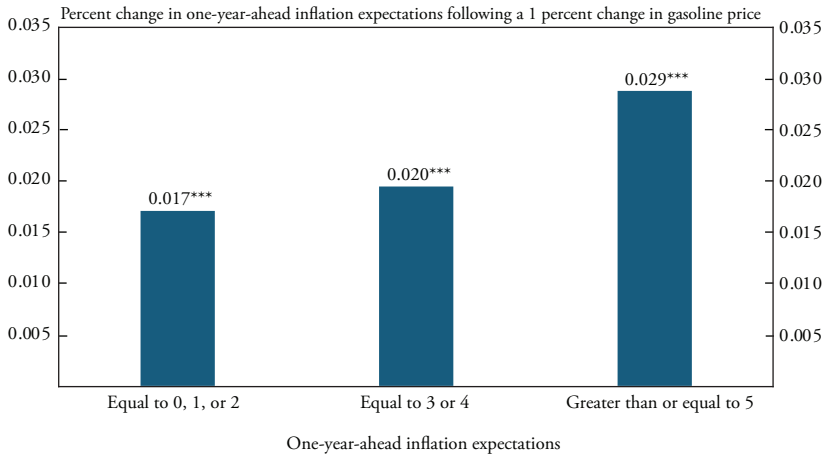
Leveraging these results, as a first step, we treat individuals' initial inflation expectations as a proxy for the inflation rates they experience and examine how these individuals revise their inflation expectations in response to an increase in gasoline prices over a six-month period. We split our sample into three subgroups: individuals with initial inflation expectations equal to 0, 1, or 2 percent; individuals with initial inflation expectations equal to 3 or 4 percent; and individuals with inflation expectations greater than or equal to 5 percent.⁶ The blue bars in Chart 2 illustrate the estimated results for each of the three subgroups.⁷ More specifically, the bars show the upward revision in inflation expectations of each group in response to a 1 percent increase in the price of gasoline.

Two key results are visible in the chart. First, an increase in the price of gasoline is associated with a statistically significant upward revision in inflation expectations for all groups, in line with the results reported in Coibion and Gorodnichenko (2015).⁸ Second, and novel, the sensitivity of inflation expectations to changes in gasoline prices is monotonic—that is, the higher an individual's initial inflation expectations, the more sensitive their one-year-ahead inflation expectations are to an increase in gas prices. In fact, individuals with higher inflation expectations are almost twice as sensitive to an increase in the price of gasoline as those with lower inflation expectations. Specifically, respondents with initial short-term inflation expectations of 5 percent or higher revise their inflation forecasts up by 0.029 percent in response to a 1 percent increase in the price of gasoline, while respondents with initial inflation expectations of 0, 1 or 2 percent revise up their forecasts by only 0.017 percent in response to the same price increase.⁹

Although these forecast revisions may seem small in isolation, they can have a substantial influence on inflation expectations. Our estimates are based on a 1 percent increase in the price of gasoline; however, gasoline prices are highly volatile and can post large fluctuations (up to 60 percent) over a six-month period. As a result, even a 0.017 percent increase in expected inflation in response to a 1 percent increase in the price of gasoline—as estimated for the least sensitive group—can have an economically meaningful effect. For example, our results suggest a downward revision ranging between 1.02 and 1.74 percent in inflation expectations in response to a 60 percent decline in gasoline prices, a decline similar in size to that experienced during the global financial

Chart 2

Inflation Expectation Revisions



*** Significant at the 1 percent level

Notes: Individuals surveyed after December 2019 or who revised their inflation expectations by more than 15 percentage points are excluded from the sample. Observations are weighted using MSC microdata weights.

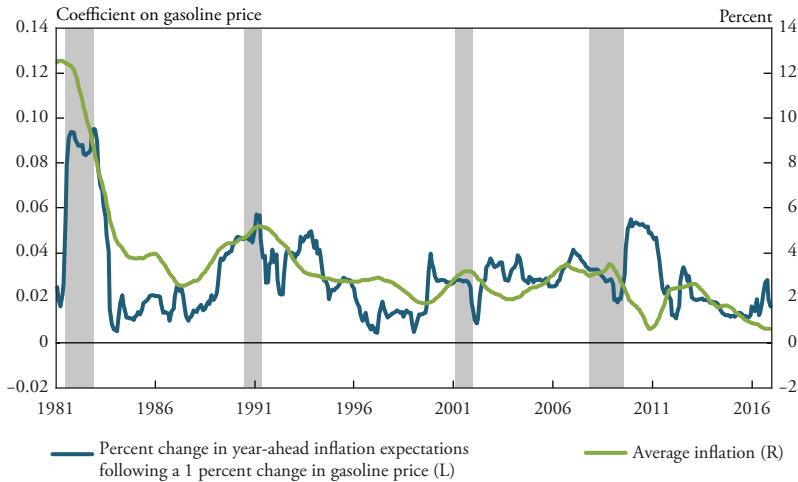
Sources: EIA, University of Michigan Survey Research Center, and authors' calculations.

crisis. Therefore, our evidence suggests that high inflation can make individuals' inflation expectations more sensitive to salient price increases.

Our analysis has thus far assumed that inflation expectations proxy for experienced (or perceived) inflation. We now relax this assumption at the cost of reduced data granularity. Instead of dividing our sample into subgroups based on inflation expectations and estimating each subgroup's sensitivity to gasoline price changes, we now estimate the sensitivity of inflation expectations—aggregated across all survey respondents—to changes in gasoline prices on two-year rolling samples. In other words, we estimate the sensitivity of inflation expectations to gasoline price changes over two-year intervals that move forward one month at a time. For example, the first estimate is for January 1981, which represents the effect of a 1 percent change in the price of gasoline on one-year-ahead inflation expectations estimated over the January 1981–December 1982 period. The second estimate is for February 1981, representing the sensitivity of inflation expectations to a 1 percent change in gasoline prices estimated over the February 1981–January 1983 period. We do this rolling estimation using data through the end of 2019, and hence lay out how the relationship

Chart 3

Changes in Sensitivity and Inflation



Notes: Individuals surveyed who revised their inflation expectations by more than 15 percentage points or who had negative inflation expectations are excluded from the sample. Average inflation is average headline CPI over the previous two years.

Sources: U.S. Bureau of Labor Statistics (Haver Analytics), EIA, University of Michigan Survey Research Center, NBER (Haver Analytics), and authors' calculations.

between revisions to inflation expectations and gasoline prices might have varied over different time periods.

The blue line in Chart 3 presents these time-varying estimates and shows that the sensitivity of inflation expectations to gasoline prices has in fact varied meaningfully across time. Moreover, the time variation in the relationship between revisions to inflation expectations and gasoline prices correlates positively with official inflation measures in previous years. The green line in Chart 3 shows realized average inflation over the two years preceding the survey as measured by the CPI. The chart shows a clear, positive relationship between the estimated sensitivity of inflation expectations to changes in gasoline prices and recent inflation. Indeed, the correlation between the two lines is 0.58, a strong positive correlation that suggests that following periods of high inflation, consumers make larger revisions to their inflation forecasts in response to changes in the price of gasoline compared with the same change in gasoline prices following a period of low inflation. Overall, the results from both the subgroup and aggregate analyses provide evidence that a high-inflation environment can make individuals' inflation expectations more sensitive to changes in salient prices.

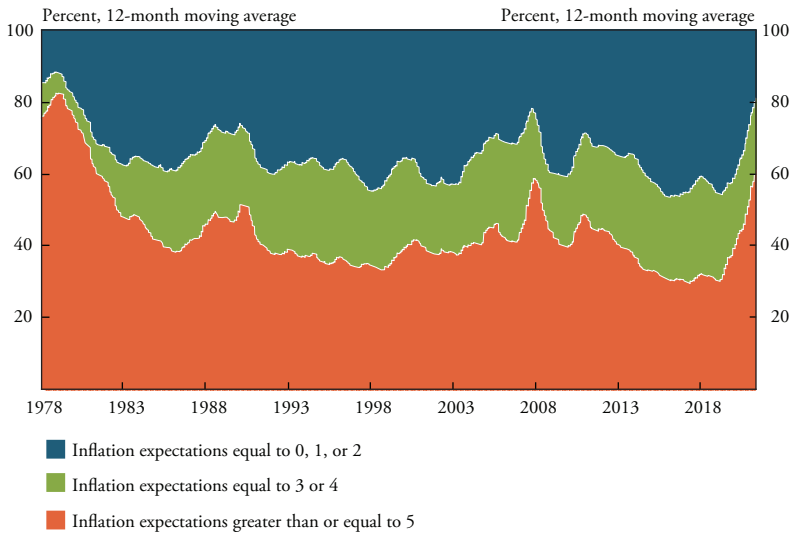
III. Implications for the Current High-Inflation Environment

Given that the United States is experiencing its highest bout of inflation in decades, our findings from the previous section underscore that inflation expectations are at risk of moving even higher when consumers absorb a large increase in gasoline prices in a high-inflation environment. Inflation has become an everyday topic for many consumers, possibly strengthening the linkages between salient prices, inflation, and inflation expectations.

As households are already navigating large increases in the cost of living after a long period of price stability, the public has become much more attuned to inflation. For example, in August 2022, Google searches for “inflation” hit their highest level since the company began tracking searches in 2004. The run-up in inflation and the attention it has garnered has led individuals to increase their expectations for near-term inflation. The orange shaded area in Chart 4 shows the share of MSC respondents since 1978 who expect prices to go up by 5 percent or more in the next year. This share has increased from around 30 percent in 2019 to around 60 percent in early 2022, the highest since the early 1980s. Gasoline prices have also increased recently. Monthly gasoline prices increased by almost 50 percent in the first half of this year, partly due to shortages driven by the Russia-Ukraine war. Our pre-COVID-19 estimate presented in Section II suggests that, all else equal, this 50 percent jump in gasoline prices could lead individuals who already expect short-term inflation to be higher—individuals who now make up the majority of the survey respondents—to revise their expectations up by 1.45 percent (0.029×50).¹⁰ Somewhat mechanically, our results suggest that the increase in the share of MSC respondents with high inflation expectations will likely lead to a stronger link between aggregate consumer inflation expectations and gasoline prices.

Our results can be interpreted in the context of recent research on rational inattention, a concept that policymakers have recently highlighted to emphasize the risk that high inflation can pose to inflation expectations. For example, in his speech at the 2022 Jackson Hole Economic Symposium Chair Jerome Powell said: “one useful insight into how actual inflation may affect expectations about its future path is based in the concept of ‘rational inattention.’ When inflation is persistently high, households and businesses must pay close attention and incorporate

Chart 4
One-Year-Ahead Inflation Expectations Since 1978



Note: Inflation expectations less than zero are excluded from calculations.

Sources: University of Michigan Survey Research Center and authors' calculations.

inflation into their economic decisions. When inflation is low and stable, they are freer to focus their attention elsewhere.”

As highlighted by Chair Powell, the theory of rational inattention assumes that economic agents cannot process all available information but instead choose which fraction of available information to process based on their economic environment. For example, in a low-inflation environment, such as much of the past 30 years in the United States, inflation is likely to be less prominent in the minds of consumers, as errors in understanding inflation are likely to come at a low cost. In contrast, in a high and volatile inflation environment, inaccurate information on inflation can be costly, so rational inattention theory predicts that people will allocate more attention to inflation signals (Mankiw, Reis, and Wolfers 2003).

Cavallo, Cruces, and Perez-Truglia (2017) provide evidence consistent with this hypothesis based on survey experiments. They document that households in Argentina, an environment of high and volatile inflation at the time, were well-informed about recent inflation and monetary policy. In a parallel analysis for the United States, an environment

of low and stable inflation at the time, they find that households were inattentive to inflation and monetary policy developments.

According to this previous research, households appear to adapt how they allocate their attention to the economic environment. With inflation high and the majority of individuals expecting higher inflation now than in the past, increased attentiveness to inflationary developments—such as higher salient prices—supports concern over further increases in inflation expectations. As more households raise their inflation expectations and hence become focused on inflationary developments, the effects of increasing gasoline prices on inflation and inflation expectations could be amplified. In a similar vein, a decrease in gasoline prices can have an amplified effect on lowering inflation expectations when inflation is high.

Conclusion

For much of the past decade, the risk of rising inflation and inflation expectations appeared a distant memory. For instance, in 2019, Federal Reserve Chair Jerome Powell characterized persistently low inflation and inflation expectations as the more pressing economic challenge of our time (Powell 2019). However, the re-emergence of high inflation during the recovery from the COVID-19 pandemic has reignited concerns about the possible feedback loop between rising inflation and inflation expectations that damaged the economy more than 40 years ago. The spike in gasoline prices in the summer of 2022 accentuated the similarities of inflation today to the 1970s and 1980s. Although much has changed since then, including the importance that monetary policymakers place on managing inflation expectations, our results underscore that inflation expectations remain susceptible to salient price shocks when inflation is already high.

Appendix

Methodology and Additional Results

We use microdata from the Michigan Survey of Consumers (MSC), which has been conducted monthly since January 1978. The survey asks individuals “by about what percent do you expect prices to go up/down on the average, during the next 12 months?” Respondents are probed if their answer is greater than 5 percent to make sure they understand the question, and responses in the microdata are capped at an absolute value of 25 percent.

Beginning in January 1981, the MSC began resurveying individuals who responded to their survey six months prior, allowing us to observe revisions in individual inflation expectations across six-month periods while also controlling for individual fixed effects.

We regress changes in individuals’ one-year-ahead inflation expectations against changes in the price of gasoline over the same six-month periods, building on Coibion and Gorodnichenko (2015). We cluster standard errors by year and month. The model is as follows:

$$E_t^i \pi_{t,t+12} - E_{t-6}^i \pi_{t-6,t+6} = \alpha + \beta \times \log \left(\frac{GasP_t}{GasP_{t-6}} \right) \times 100 + error_{i,t}$$

where i and t represent individual i at time t , and $E_t^i \pi_{t,t+12}$ is the one-year-ahead inflation expectation during the second time the individual was surveyed. $GasP_t$ is the price of gasoline (as measured by the U.S. city average retail price of all grades of gasoline, in dollars per gallon, including taxes) during the second time an individual was surveyed.

Similar to Coibion and Gorodnichenko (2015), we remove outliers that could bias the data, so we exclude individuals whose absolute value of change in one-year-ahead inflation expectations ($|E_t^i \pi_{t,t+12} - E_{t-6}^i \pi_{t-6,t+6}|$) was greater than or equal to 15. We also choose to exclude individuals who had inflation expectations of less than zero when they were initially surveyed. This group made up only 3.3 percent of the sample but often-times had large upward revisions to their inflation expectations (bringing them much closer to actual inflation) when they were reinterviewed. Of this group, over 80 percent had non-negative inflation expectations six months later. We view this group as an outlier, and thus exclude them from our analysis.

Table A-1
Effects of Gas and Food Price Changes, with and without Controls

	Gas			Food		
	Coefficient	Observation	R ²	Coefficient	Observation	R ²
Inflation expectations						
Equal to 0, 1, or 2	0.017***	30,525	0.006	0.002**	28,590	0.001
Equal to 3 or 4	0.020***	20,097	0.011	0.001**	19,142	0.001
Greater than or equal to 5	0.029***	28,867	0.010	0.003***	27,636	0.001
Inflation expectations including controls						
Equal to 0, 1, or 2	0.019***	28,622	0.017	0.002***	26,842	0.010
Equal to 3 or 4	0.019***	18,984	0.019	0.002***	18,085	0.009
Greater than or equal to 5	0.029***	27,114	0.012	0.003***	25,962	0.002

* Significant at the 10 percent level

** Significant at the 5 percent level

*** Significant at the 1 percent level

Notes: Regressions exclude individuals who had changes in inflation expectations greater than 15 or who were sampled after December 2019. Observations are weighted using MSC microdata weights. Standard errors are robust and clustered by year and month.

As a robustness check, we also regress changes in individuals' one-year-ahead inflation expectations against changes in food prices (as measured by the change in consumer price index food inflation) over the same six-month periods. In addition, we run both gasoline and food price regressions with a host of demographic variables to control for income, sex, age, education, and geographic region. Table A-1 presents the results.

Endnotes

¹Among others, recent research documenting the role of inflation expectations in shaping economic decisions, such as consumption or financing, are Burke and Ozdagli 2021; Binder and Brunet 2020; Ichiue and Nishiguchi 2015; D’Acunto, Hoang, and Weber 2018, 2022; Dräger and Nghiem 2021; and Botsch and Malmendier 2021.

²The survey elicits inflation expectations in two steps. First, the survey asks respondents whether “prices in general” will increase, decrease, or stay the same over the next 12 months. Second, the survey asks those who answered “increase” or “decrease” by about what percentage they expect prices to go up or down, on average.

³Other factors such as lifetime experiences also affect the formation of consumers’ beliefs and expectations about inflation. Malmendier and Nagel (2016) argue that individuals place extra weight on information about past inflation levels that they personally experienced when forming expectations. Relatedly, Binder and Makridis (2022) find that consumer sentiment becomes more pessimistic as gasoline prices rise, with the strongest effect for consumers who lived through the 1970s. Personal experiences matter not only for the expectations of households, but also for policymakers. Malmendier, Nagel, and Yan (2021) document that members of the FOMC who personally experience higher inflation during their lifetime are more likely to indicate higher inflation expectations in their semiannual Monetary Policy Reports to Congress. Recent research also highlights the role of cognitive abilities in driving inflation expectations, as forming expectations and making economic decisions require the use of cognitive resources. For example, using rich Finnish micro data, D’Acunto and others (forthcoming) find that cognitive abilities (measured by IQ) predict individuals’ inflation expectations beyond the direct effects of income, education levels, wealth, and other proxies for economic sophistication.

⁴As mentioned in the previous section, the MSC has been conducted monthly since January 1978. Since January 1981, the MSC has resurveyed a fraction of participants from the prior six months (thus, in January 1981, the MSC resurveyed certain individuals who participated in the July 1980 survey).

⁵By looking at these changes over time for the same individual, we can implicitly control for individual fixed effects, or attribute beyond initial inflation expectations that lead some individuals to revise their expectations differently from others.

⁶Individuals with inflation expectations of less than zero are rare, and most individuals in this group have large upward revisions to their expectations between surveys; thus, we exclude them from our sample. In addition, following Coibion and Gorodnichenko (2015), we exclude individuals who revised their inflation expectations by more than 15 percentage points. The three subgroups are then chosen to have sample sizes sufficiently large and similar in size to one another.

⁷Our analysis tests whether coefficient estimates are different from zero in a statistically significant sense. In testing if the responses are statistically different from one another, we obtain overall similar results. Given the current period of high inflation and the recent increase in gasoline prices, Chart 2 illustrates revisions to inflation expectations following an *increase* in gasoline prices. However, our regression model is linear, so the plotted responses would have the opposite sign in response to a *decrease* in gasoline prices.

⁸Although still elevated, gasoline prices have dropped in recent months. Following this decline, and in accordance with our results, we have recently observed declines in one-year-ahead inflation expectations from their recent highs.

⁹We obtain similar results when we consider food prices instead of gasoline prices. Moreover, our results are robust to including different controls such as income, age, gender, region, and education.

¹⁰The 1.45 percent upward revision estimate is likely conservative given that it is based on pre-COVID-19 data.

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