# Fueling Expectations: The Causal Impact of Gas Prices on Inflation Expectations*

Yoon Joo Jo
Texas A&M University[†]

Ben Klopack
Texas A&M University[‡]

March 3, 2025

**Abstract**

We investigate the effects of temporary state-level gas tax suspensions on inflation expectations. Using a difference-in-differences strategy, we show that households in states that lower the gas tax reduce their inflation expectations, but the impact of the policy depends on how much of the tax cut was passed through to prices. We provide new causal evidence of the link between gas prices and household inflation expectations and demonstrate that gas prices play a more significant role in shaping inflation expectations than previously suggested in the literature. We also show experimental evidence that informing households about the tax reduction leads them to adjust their inflation expectations downward. However, we do not find evidence that temporary gas tax suspensions had a stimulative effect on consumption. These findings underscore the potential for alternative policy levers to influence household beliefs and behavior.

JEL Classification: C83, D84, E21, E31, E71, H20
Keywords: Inflation expectations, survey, gas prices, gas tax holiday.

*First Draft: February 20, 2024. We are grateful to Olivier Coibion, Stefano Eusepi, Oliver Pfäuti, Steve Puller, Tatevik Sekhposyan, Nils Wehrhöfer, and Sarah Zubairy, and the seminar and conference participants at 2023 KWEN Summer Macro Workshop, University of Houston, Paris School of Economics, Bundesbank, Bilkent University, Texas A&M University, UT-Austin, 2024 NBER SI Monetary Economics, Federal Reserve Bank of Kansas City, and 2025 ASSA meeting for useful comments and suggestions. We thank Taewon Hwang for providing excellent research assistance. All errors are our own.

†4228 TAMU, College Station, TX 77843. Email: yoonjo@tamu.edu
‡4228 TAMU, College Station, TX 77843. Email: bklopack@tamu.edu

# 1 Introduction

Recent interest among central bankers and researchers has surged in how households form inflation expectations, a critical factor for monetary policy effectiveness. While monetary authorities can control nominal interest rates, it is the real interest rate—calculated by the Fisher Equation as the nominal rate minus inflation expectations—that impacts economic decisions such as consumption, savings, and investment. Understanding the formation of inflation expectations is thus vital for policy efficacy.

A series of influential papers have highlighted energy prices as an important driver of inflation expectations. Prior literature has primarily used variation in oil or gasoline prices in the time series induced by shocks to global oil markets, either using satic ordinary least squares (OLS) regressions (Coibion and Gorodnichenko, 2015) or structural vector autoregression (VAR) models (Binder, 2018; Kilian and Zhou, 2022). These analyses have the strength that inflation expectations data is available over a long sample period, and thus researchers can leverage rich variation in the price of gasoline over time. However, a natural concern with this approach is that the time-varying shocks that move global oil prices may be correlated with other unobservable macroeconomic factors that also influence household beliefs.

In this paper, we provide novel, quasi-experimental evidence on the causal effect of gas prices on inflation expectations. We exploit variation induced by temporary cuts in the gas tax in five US states during 2022, a period of rapid growth in the prices of both gasoline and other goods. Ex-ante, the effect of a temporary gas tax reduction on inflation expectations is uncertain. A reduction in gas prices could lead consumers to adjust their inflation expectations downwards, consistent with past literature. However, if consumers understand that the change is temporary, they may not change their beliefs at all, or may even increase their expectations of future price growth. Indeed, we find evidence that even temporary decreases in gas prices induce large reductions in inflation expectations.

A key feature of our empirical setting is that the state-level decision to implement gas tax holidays was largely driven by political motives rather than by idiosyncratic macroeconomic conditions in the state. While gas tax holidays were formally proposed in 21 state legislatures, they were only implemented in 5 states. We argue that the final decision to enact these policies was orthogonal to economic conditions by showing that implementing and non-implementing states exhibit similar economic characteristics prior to the policy enactment. We leverage this policy variation in our research design to overcome a key empirical challenge: the potential endogeneity of gas prices to macroeconomic conditions. There are two possible identification concerns in using time series-based variation in gas prices. First, changes in global oil prices may be caused by other events that also impact attitudes about inflation, such as political events or new information about aggregate demand. For example, the Russia-Ukraine conflict impacted both oil markets and the supply chains for other goods, which raised gas prices and inflation expectations simultaneously. Second, if US monetary policy responds to headline inflation (Bullard (2011); Powell (2022)), including oil prices, it possibly attenuates the impact of gas prices. Our research design deals with the potential endogeneity issue by comparing states that introduced a gas tax holiday to those that did not at the same point in time.

We begin by documenting how temporary gas tax suspensions are passed through to retail gas prices. In imperfectly competitive markets, pass-through may be incomplete, which could blunt the impact of the tax holiday on inflation expectations.[1] We estimate the degree of pass-through in each state using a difference-in-differences design that compares gas prices in tax holiday states to nearby controls. We find significant variation in pass-through rates across states. In Maryland, for example, a 36 cent gas tax cut decreased prices by 30 cents, implying an 83% pass-through. In contrast, New York's 16 cent tax reduction resulted in negligible impacts on consumer fuel prices.

[1] Doyle and Samphantharak (2008) study similar gas tax holidays and report pass-through rates of about 0.7, while Genakos and Pagliero (2022) find pass-through rates that range between 0.4 and 1 and depend on the competitiveness of local retail gasoline markets.

We then turn to assessing how changes in gas prices due to the policy affected household beliefs. We combine two data sources to measure state-level inflation expectations. First, we use data from the Survey of Consumer Expectations (SCE) provided by the Federal Reserve Bank of New York, which surveys a panel of approximately 1,300 respondents in each month. We supplement the SCE by administering an additional online survey in treated states and neighboring control states. Our survey closely mirrors the questions and design from the SCE and asks the same set of respondents to report inflation expectations at multiple intervals around the implementation of the tax holiday. The additional survey significantly improves the precision of our estimates in treated states, while the SCE data provides broad coverage for control states.

Our main analysis uses a difference-in-differences specification that compares individuals in tax holiday states to those in neighboring control states. Our identification assumption is that inflation expectations in both groups would have followed parallel trends in the absence of the policy. We show empirical support for this assumption in an event study specification; inflation expectations in gas tax holiday states closely track those in control states prior to the tax cut. Our preferred specification exploits the unique panel nature of our dataset by controlling for individual and time-fixed effects. In contrast to previous studies that relied on time series variation in gas prices, our research design isolates the impact of the tax holiday from other time-varying macroeconomic shocks, such as changes in monetary policy, supply chain disruptions, or the Russia-Ukraine war.

We first perform the analysis separately for each state. We find that the respondents in treated states reduced their inflation expectations relative to control states during the tax holiday. The effects are large and statistically significant in Maryland, Georgia, and Connecticut, ranging from -1.4 to -2.1 percentage points (pp) on a mean of approximately 8%. We find negative but insignificant effects in New York (where we estimate a pass-through rate close to zero) and Florida (where the beginning of the tax holiday coincided with the landfall of Hurricane Ian). These findings suggest that households put substantial emphasis on their previous experiences with gas prices even though the price cut is temporary. Such behavior appears to diverge from the predictions of the Full-Information Rational Expectation (FIRE) model.

We then adopt a stacked difference-in-differences specification that combines the state-level experiments. We find that the average effect of all five gas tax holidays was to lower inflation expectations by 0.31 pp, which is not statistically significant at the 95% confidence level. However, the policy actions in a subset of the states—Maryland, Georgia, and Connecticut—reduced inflation expectations by 1.35 pp, an effect which is economically large and statistically different from zero at the 99% confidence level. We further explore this heterogeneity by interacting the treatment coefficient with the state-level realized percent change in gas prices, which shows that the effects are driven by the states with the largest price declines, consistent with our hypothesized channel. To further establish the role of the policy, we conduct a set of placebo tests using states that proposed but did not implement gas tax holidays. We find no effect of these placebo policies, underscoring the role of the gas price change on household beliefs.

Our estimates imply that a 1% decline in gas prices reduces inflation expectations by 0.13 pp. Our findings are qualitatively consistent with prior evidence that energy prices play an important role in shaping inflation expectations. For example, Coibion and Gorodnichenko (2015) and Kilian and Zhou (2022) find that a 1% decrease in oil or gas prices reduces inflation expectations by 0.016, and 0.03 pp, respectively. However, our estimate is quantitatively much larger than previous estimates identified from time series variation in energy prices. When we replicate the specification from Coibion and Gorodnichenko (2015) using our data, we find a much smaller estimate; a 1% decrease reduces expectations by 0.036 pp, which is about one-quarter of our baseline estimate. The comparison highlights potential advantages of our identification strategy relative to prior literature.[2]

[2] Binder (2018) documents that a one percentage point increase in gas price inflation raises one-year-ahead headline inflation expectations by approximately 0.01 pp. While our main specification is not di-

The magnitudes of our estimates imply that households disproportionately consider gas prices when forming beliefs. Results from our pooled specification imply that the gas tax suspension reduced inflation expectations by 0.78 pp in Maryland, while there was no detectable effect in New York. Estimates from the Consumer Expenditure Survey suggest that gas expenditures account for 4.3% of total consumption, and the observed reduction in gas price due to the tax cut ranges from near zero in New York to about 7.7% in Maryland. This implies that a household that weights gas prices according to its expenditure share should decrease its inflation expectations by between 0 pp (New York) and 0.33 pp (Maryland). Thus, our findings further highlight the outsized role of current gas prices in determining household future inflation expectations.

We also consider the question of how policymaker communication around the tax cut impacts household beliefs. Given that the pass-through rates of gas tax changes are the result of market equilibrium, which is outside the direct control of policymakers, effective communication may be particularly important in this context. To study the role of communication, we incorporate a randomized experiment within our online survey, drawing on methodologies introduced by Coibion et al. (2022, 2023) in the macroeconomics context. Participants from three treated states—Maryland, New York, and Florida—were provided with details about the extent and duration of the gas tax cut at the conclusion of the survey. Subsequently, we asked them to report again their inflation expectations and consumption sentiments after exposure to the information treatment. We find that respondents who received the information treatment reduced their inflation expectations by 0.7 pp and reported that they were less inclined to purchase durable goods, consistent with intertemporal substitution motives.

Finally, to investigate if gas tax holidays impacted consumption, we analyze data from credit and debit card transactions. The tax suspension could influence consumer behav-

rectly comparable, an alternative specification using our data that is closer to her approach suggests that a one percentage point increase in gas price inflation leads to a 0.07 pp rise in one-year-ahead inflation expectations.

ior in several ways. First, given the relatively inelastic nature of gasoline demand, a reduction in gas prices would likely lower overall gasoline expenditures, thereby increasing consumers' disposable income temporarily, which could potentially enhance non-gas consumption. Additionally, changes in inflation expectations during the gas tax holiday could also affect consumption patterns via intertemporal substitution or sentiment effects. Our results reveal mixed effects: decreases in consumption in Maryland and Florida, no significant changes in Georgia and Connecticut, and a positive impact in New York. Given that the gas tax holiday in New York had a negligible impact on fuel prices, we conclude that short-term gas tax suspensions do not provide an additional stimulative impact on consumption.

Our paper contributes to a large literature in macroeconomics that studies the formation of inflation expectations. In particular, several important papers have documented a relationship between gas prices and household beliefs (Trehan, 2011; Coibion and Gorodnichenko, 2015; Binder, 2018; Kilian and Zhou, 2022). While earlier studies predominantly utilize time series data to explore variations in energy prices, there has been a growing effort to establish a causal link between energy prices and inflation expectations using quasi-experimental methods. For instance, Wehrhöfer (2023) uses the staggered nature of energy-contract renewals in Germany in 2021. Aidala et al. (2024) examine households' reactions to hypothetical scenarios of gas price fluctuations in an experimental setting. Our approach is similar to Binder and Makridis (2022), who also use state-level variation in gas prices to measure the impact on consumer sentiment. Our work differs in two ways: first, we measure inflation expectations directly. Second, our price variation comes directly from the tax change, rather than state-level differences in gas prices, as in Binder and Makridis (2022). We use this novel variation to bring new causal estimates to the literature.

Our work also provides new evidence in how households weight past and anticipated future gas price changes in forming inflation expectations. The gas tax holiday presents a unique situation, showcasing a divergence in price patterns: a decrease in past gas prices contrasted with an anticipated increase in future gas prices. Our findings reveal that households adjust their gas inflation as well as headline inflation expectations downward in response to temporary price drops, emphasizing the importance of past price growth as predictive of future price changes. This finding is inconsistent with the implication of FIRE models, aligning instead with previous studies that highlight the strong impacts of past price increases on inflation expectations (D'Acunto et al., 2021).[3]

We also contribute to a growing literature that studies the effect of fiscal policy on inflation expectations. Correia et al. (2013) examine the effects of unconventional fiscal policy, suggesting that an increasing path of consumption tax can boost inflation and, consequently, consumption when interest rates are at the zero lower bound. A study by Cloyne et al. (2023) demonstrates that an increase in personal income tax reduces inflation expectations in the US. In Germany, research by D'Acunto et al. (2021) and Bachmann et al. (2021) investigates the effects of unexpected changes in the value-added tax (VAT) on inflation expectations and consumer spending. Our research diverges from these studies by concentrating on the taxation of a single commodity—gasoline—and evaluates whether changes in the gas tax can influence household beliefs. To our knowledge, this is the first work to consider the impact of policy levers that reduce gas prices as tools to impact inflation expectations.[4]

The remainder of the paper is organized as follows. Section 2 provides an overview of the 2022 gas tax holiday policy changes and outlines our identification strategy. Section 3 describes the data. In Section 4, we estimate how changes in the gas tax affected retail prices. Section 5 investigates the effects of gas price changes on household inflation expectations. Section 6 examines responses in consumption behavior. Section 7 concludes.

[3]In our main specification, we cannot completely rule out that households do not understand the temporary nature of the policy. However, we find that providing survey respondents with information about the tax holiday, including its temporary nature, leads them to further reduce their inflation expectations.

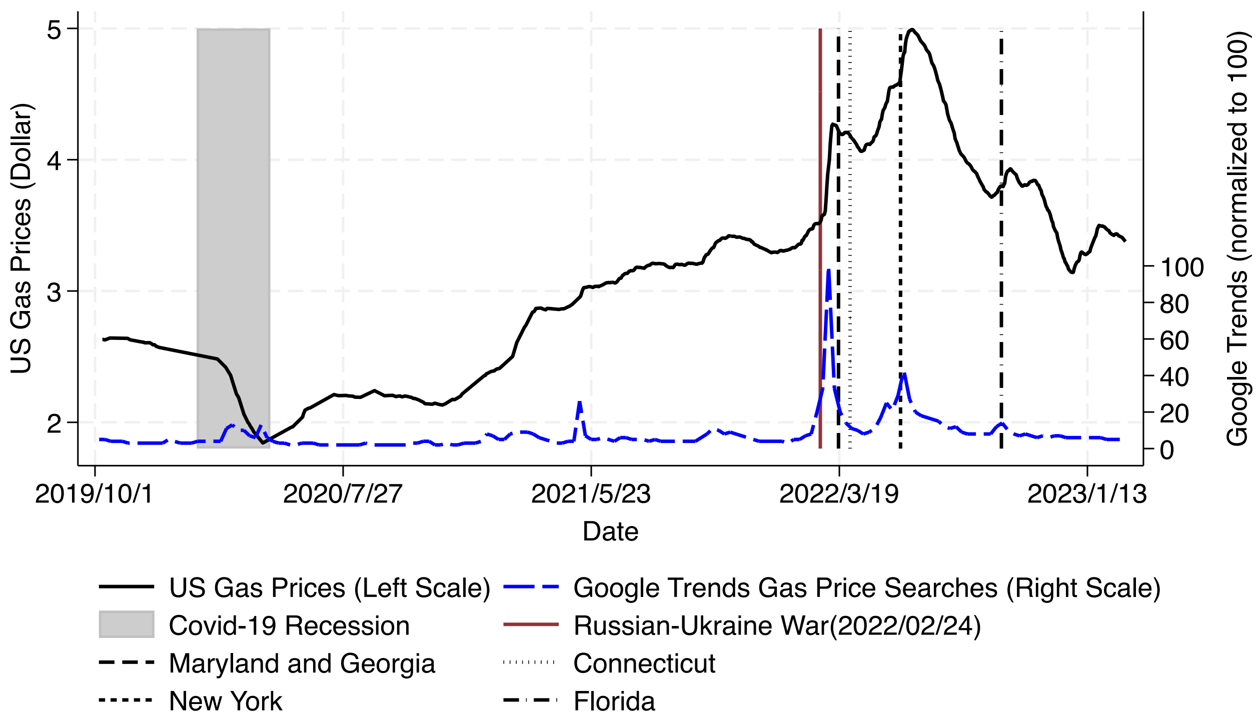
[4]Other examples of similar policy interventions include the 2022 sale of 180M barrels of oil from the Strategic Petroleum Reserve (US Department of the Treasury, 2022).

## 2 Gas Tax Holiday and Identification Strategy

The supply disruptions caused by the COVID-19 pandemic and the Russia-Ukraine war in 2022 led to rapid increases in retail gas prices. Figure 1 shows that the average price of regular gasoline increased by over 50% in the first half of 2022. In response, state governments across nearly every U.S. state as well as the federal government discussed temporary suspensions of the gas tax to mitigate the impact of these high prices. A distinctive feature of gas prices is that the price displayed at the pump is inclusive of federal and state-level gas taxes. Thus, changes in the tax rate are particularly salient, as they are displayed directly in the price. The federal excise tax is 18.4 cents per gallon, while state tax rates vary widely, ranging from 14 cents per gallon in Alaska to 62 cents per gallon in California.

In total, 21 states proposed gas tax suspensions in their state legislature, but only five — Maryland, Georgia, Connecticut, New York, and Florida — implemented such measures, enacting what became known as a gas tax holiday. Figure 1 displays US gas prices as well as the start dates of each tax holiday, while Table A.1 provides the details of the policies in each state. Maryland, Georgia, and Connecticut were the first three states to act. Maryland reduced its tax by 36.1 cents per gallon, Georgia by 29.1 cents, and Connecticut by 25 cents. Maryland and Georgia enacted these changes on March 18th, implementing them immediately, while Connecticut passed the tax cut on March 24th, with implementation beginning April 1st. Maryland's suspension lasted for one month, while Georgia and Connecticut initially proposed a two-month gas tax holiday but eventually extended their policies through the end of 2022. Connecticut gradually phased the gas tax back in over a four month period. New York offered a 16-cent reduction per gallon from June 1st to December 31st. Despite signing the bill on April 7th, New York delayed its implementation for nearly two months. The policy in New York, which had a standard state gas tax of 25 cents, was only a partial suspension. Lastly, Florida enacted a 25.3 cent cut

Figure 1: US average regular-grade gas prices




The solid line plots the average regular-grade gas prices in the US from October 2019 to March 2023 on the left scale, while the long dashed blue line represents US Google searches for the query "gas prices" (from Google Trends data), normalized to 100 at the maximum value, on the right y-axis. The shaded area highlights the Covid-19 recession period. The solid red vertical line marks the start of the Russia-Ukraine war. The dashed vertical lines indicate the beginning of the implementation of the gas tax holiday in Maryland and Georgia. The dotted, short-dashed, and dash-dot vertical lines indicate the start date of the implementation of the gas tax holidays in Connecticut, New York, and Florida, respectively.

in October, following a mid-July signing. We note that given the lag between passage and implementation of the policy in New York and Florida, retailers and buyers were likely able to anticipate the cuts in these states.

Figure 1 also shows the (indexed) number of US Google searches for the query "gas prices" during this period (dashed blue series, plotted on the right y-axis). Search volumes are a proxy for the level of media coverage and consumer attention focused on gasoline markets during this period, and may reflect the salience of gas prices for consumers. Interestingly, search volumes are imperfectly correlated with actual fuel prices. Searches peak in February and March 2022 immediately prior to the implementation of the policies in Maryland, Georgia, and Connecticut, which coincides with a large initial run-up in gas prices. There is another surge in June (when prices hit their highest point), around the start of the tax holiday in New York, but it is only about 40% of the level from February 2022. Search volumes are significantly lower around the date of Florida's implementation.

Prior literature has established a link between energy prices and inflation expectations (Coibion and Gorodnichenko, 2015; Binder, 2018; Kilian and Zhou, 2022), primarily using variation in energy prices over time. A possible identification concern with this approach is that shocks that impact global oil markets and thus gas prices may also change inflation expectations. For instance, in early 2022, the Russia-Ukraine conflict disrupted supply chains concurrent with an increase in global oil demand, simultaneously raising gas prices and inflation expectations. Our research design deals with this challenge by exploiting policy-induced variation in the gas tax across states and over time. Our primary analysis uses a difference-in-differences specification that compares households in states that implemented a gas tax holiday with those in neighboring states that did not. All of our specifications include time fixed effects which partial out the impact of changes in the national or global macroeconomic environment, such as shifts in monetary policy, supply chain disruptions, or shocks to commodity markets.[5]

The key identification assumption in our research design is that inflation expectations would have followed parallel trends in treated and control states absent the passage of the gas tax holiday. This would be violated if the decisions of states to enact tax holidays are correlated with time-varying unobserved macroeconomic shocks that also affect household beliefs.

We provide several pieces of evidence to support this assumption throughout the paper. First, whether states implemented tax holidays appears to be primarily driven by

[5] Binder (2018) shows that inflation expectations are sensitive to gas price inflation, using consumers' self-reported gas price expectations at two different horizons and assuming that inflation expectations follow an AR(1) process. The main result remains robust to the inclusion of time fixed effects. In contrast, our study examines the impact of policy-induced changes in actual gas prices.

political considerations. As an illustrative example, consider neighboring states Maryland and Virginia, which both experienced similar increases in gas prices. Governors of both states pushed for tax suspensions in March 2022. However, Virginia governor Glenn Youngkin's proposal was opposed by transit proponents and rejected by Democrats in the state Senate, while Maryland's policy garnered bipartisan support and was signed into law (Moomaw, 2022; Collins, 2022). Similarly, in Michigan, the state House and Senate passed a gas tax holiday, but Democratic governor Gretchen Whitmer vetoed the bill. In total, gas tax holidays were proposed in 21 state legislatures, but implemented only in five. We provide additional details of the policy discussions in states that proposed but did not implement a gas tax holiday in Table A.2. In general, states with Republican governors and legislatures tended to favor tax suspension policies, while Democratic-controlled state houses tended to oppose them.[6]

One might wonder if specific state-level characteristics influenced the decision to consider and implement gas tax holidays. For instance, legislators in states experiencing more rapidly rising inflation might be more inclined to introduce temporary tax suspensions, or those in states with higher economic growth might have more fiscal leeway to reduce taxes. We investigate this in Table 1, where we compare a number of macroeconomic variables prior to policy implementation across states that implemented gas tax suspensions versus those that did not. The table shows that the overall economic conditions of treatment and control states are quite similar. Notably, our main variables of interest, 1-year ahead inflation expectations and consumption, are not statistically significantly different across the two groups of states.[7] Therefore, it appears unlikely that state governments were reacting to state-specific macroeconomic conditions.

We also conduct several analyses to substantiate the parallel trends assumption. Gas

[6] Of the 21 states that debated these policies, they were proposed by a Republic governor or congressperson in 15 (see Tables A.1 and A.2).

[7] Pre-period macroeconomic conditions in implementing states (Table 1 column (1)) look particularly similar to states that proposed but did not implement the policy (Table 1 column (3)). We show that our results are robust to using this latter group as the control, instead of all other states.

prices in treated and control states appear to be on parallel trends before the tax is suspended, which we show in Section 4. In Section 5.2, we perform an event study analysis that shows that household inflation expectations appear to follow similar paths prior to the enactment of the policy. We also perform a set of placebo analyses using the set of states that debated but did not implement gas tax holidays, which we discuss further in Section 5.3.

Finally, we note that the most plausible stories for endogeneity of the policy implementation would bias us towards finding a null effect. Suppose treated states were on a higher inflation trajectory relative to control states, and lawmakers responded by suspending the gas tax. This would lead us to find that inflation expectations in treated states would have *risen*, not fallen, relative to the control group absent the policy. If this were the case, the treatment effects that we estimate in this paper would be a lower bound for the true impact of the policy.

One potential area of concern is the tax suspension in Florida. Florida originally passed a gas tax holiday in July 2022 to take effect in October. However, the first weekend of the tax cut was concurrent with the landfall of Hurricane Ian, which resulted in 161 deaths and caused over $50B in infrastructure damage. As our survey was also active during this time, we are cautious in interpreting these results, as the effects of the tax holiday may be confounded by the impacts of the hurricane on the state's economic conditions.

While we argue that our approach has important advantages relative to past work, we also acknowledge several limitations. First, the identifying variation in our study comes from five state-level gas tax holidays implemented during 2022, a period of accelerating inflation. If the impact of gas prices on inflation expectations is heterogeneous across time, our estimates will be specific to our particular context. On the other hand, the formation of expectations during an inflationary period may be of particular interest to policymakers. This feature of our research design also means that our sample period is

Table 1: Macroeconomic variables in Gas Tax Holiday states vs. others

| | (1) | (2) | (3) |
|---|---|---|---|
| | States | | |
| | Implemented | Did Not Implement | |
| Average from 2021M2 to 2022M2 | | Considered | Did Not Consider |
| Unemployment Rate (%) | 5.26 | 5.15 | 4.21 |
| | (0.18) | (0.09) | (0.07) |
| Changes in Unemployment Rate (%) | -0.21 | -0.19 | -0.16 |
| | (0.02) | (0.01) | (0.01) |
| Growth Rate of Real GDP (%) | 6.26 | 5.74 | 5.00 |
| | (0.37) | (0.25) | (0.18) |
| Growth Rate of Nominal GDP (%) | 10.56 | 11.57 | 12.27 |
| | (0.39) | (0.23) | (0.20) |
| Implicit Regional Price Deflator Inflation Rate(%) | 4.39 | 4.59 | 4.14 |
| | (0.16) | (0.12) | (0.07) |
| One-year ahead Inflation Expectations (%) | 5.15 | 5.03 | 5.25 |
| | (0.14) | (0.10) | (0.08) |
| Three-year ahead Inflation Expectation (%) | 4.14 | 4.30 | 4.48 |
| | (0.10) | (0.08) | (0.09) |
| Growth Rate of Consumption (%) | 16.80 | 17.08 | 16.98 |
| | (1.32) | (0.68) | (0.47) |
| Growth Rates of PCE consumption (%) | 11.82 | 11.61 | 12.07 |
| | (0.32) | (0.12) | (0.12) |
| Average Gas Price ($) | 3.38 | 3.45 | 3.33 |
| | (0.03) | (0.03) | (0.02) |
| Average Monthly Growth Rate of Gas Prices (%) | 2.51 | 2.55 | 2.59 |
| | (0.41) | (0.23) | (0.21) |
| One-year ahead Gas Price Inflation Expectation (%) | 10.32 | 10.51 | 12.83 |
| | (0.35) | (0.44) | (0.34) |
| The Number of States | 5 | 16 | 29 |

This table presents the mean values of state-specific macroeconomic variables for the three groups of states before the implementation of the gas tax holiday, covering the period from February 2021 to February 2022. Standard errors are reported in parentheses. The data sources are as follows: the unemployment rate and monthly changes in unemployment rates are obtained from the Local Area Unemployment Statistics Database (BLS); growth rates of real and nominal GDP are sourced from BEA regional data (series SQGDP2 and SQGDP9); implicit regional price deflator inflation rates are from BEA (series SAIRPD); one-year and three-year-ahead inflation expectations are derived from the NY Fed Survey of Consumer Expectations (SCE); the growth rate of credit card consumption is obtained from the Opportunity Insights Database; and the growth rate of PCE consumption is sourced from BEA (series SAPCE1). The average gas price and its monthly growth rate are calculated using state-level gas price data from AAA, while one-year-ahead gas price inflation expectations are drawn from the NY Fed SCE.

shorter than that used in some past work.[8] Second, the policies that we study result in reductions in gas prices that are both smaller and less persistent than the time-varying shocks in global oil markets used in prior literature. The five tax holidays we consider reduce the tax between \$0.16 and \$0.36 per gallon (between 4% and 9% of the average price during this period) and last between one and twelve months. In contrast, during the sample period in Coibion and Gorodnichenko (2015), gas prices increased by more than double over a much longer time horizon, from approximately \$1.88 per gallon at the beginning of 2005 to \$4.10 in the middle of 2008. If the response of inflation expectations to gas prices is asymmetric (D'Acunto et al., 2021), nonlinear, or dependent on recent reference points, this could partially explain the differences between our measured effects and those reported in other work. Given these caveats, we view the estimates provided in this work as complementary evidence to the existing literature.

The unobservable factors that influence inflation expectations may be serially correlated due to individual or state-level shocks. At the individual level, this could arise if the effect of rising gas prices varies across survey respondents. At the state level, macroeconomic shocks may lead to changes in inflation perceptions that persist over time and are correlated among respondents within a state. In the presence of correlated unobservables, typical Huber-White robust standard errors may not be asymptotically valid. To account for this, we report two-way clustered standard errors by state and time throughout the paper.[9]

[8]For example, Coibion and Gorodnichenko (2015) study the period between 1981 and 2013, while the sample used in Kilian and Zhou (2022) goes from 2009 to 2013.

[9]Abadie et al. (2023) show that in some cases standard cluster-robust standard errors can be too large. For the main analyses in the paper, we also report one-way clustered standard errors at the individual or state level in the appendix and discuss differences in results further in Section 5.

# 3 Data

Our analysis in this paper combines data from several sources. We use state-level data on gas prices from the American Automobile Association (AAA).[10] They report daily price data for regular, mid-grade, and premium fuel. We scrape the historical data from all available dates between January 1, 2021 to August 17, 2023 using the Internet Archive. The data are available for approximately 2/3 of the days in this interval. We take the daily price in each state as the average of the three fuel grades.

To measure consumption responses to the policy, we use state-level debit and credit card consumption data sourced from Opportunity Insights.[11] This data is constructed by Affinity Solutions and captures 10% of all debit and credit card spending in the US (Chetty et al., 2023). The data has been seasonally adjusted since January 2020. According to the Diary of Consumer Payment Choice, 60% of U.S. payments were made using credit and debit cards in 2022, accounting for 35% of total payment value (Foster et al., 2023). Klopack and Luco (2024) also show that the card spending data are highly correlated with the Personal Consumption Expenditure series from the Bureau of Economic Analysis, with a correlation coefficient of 0.99 at the state level.

## 3.1 Household inflation expectations

For our analysis of state-level inflation expectations, we utilize data from two sources: the Survey of Consumer Expectations (SCE) conducted by the Federal Reserve Bank of New York and an online survey that we implemented independently. The SCE is a nationally representative, internet-based survey of a rotating panel of approximately 1,300 respondents monthly. Survey respondents are asked a series of questions about their perception of inflation, unemployment, and other macroeconomic variables. Importantly, the SCE

[10] The AAA Gas Prices website provides average gasoline, diesel, and E-85 prices at the national, state, and local levels, updated daily by the Oil Price Information Service (OPIS). Up to 120,000 stations are surveyed each day in partnership with WEX, Inc., ensuring unparalleled statistical accuracy. State-level gas prices data is publicly avilable at https://gasprices.aaa.com/state-gas-price-averages/

[11] Data is publicly available at https://www.opportunityinsights.org/data

surveys the same respondent in multiple months, which allows comparisons within an individual over time. A drawback of the SCE for this study is that the sample size in each state is relatively small. On average, the survey includes about 25 respondents per state in each month, with a higher number of participants from more populous states. We use SCE data from January 2021 to January 2023.

To increase statistical power, we conducted an additional online survey using the platform Prolific. This survey included respondents from both treated states and neighboring control states, and was administered in multiple waves to measure inflation expectations before, during, and after the tax holidays took effect. Our survey questions were designed to align closely with those used in the SCE. The sample survey questionnaires used in our study can be found in Appendix A.4.

Our survey gathered samples from four states that implemented a gas tax holiday: Maryland, Georgia, New York, and Florida. In each survey wave, we also collected data from a neighboring control state which did not reduce the gas tax. Detailed information on the scope of the online survey can be found in Table A.4. Our dataset primarily consists of panel data, except for the data from Georgia and Alabama, where we administered only one survey wave. The data collection periods were varied, covering time frames before, during, and after the gas tax holiday.

When gathering our data, we did not impose any demographic restrictions on our sample. To ensure a fair representation of each state's demographics, we apply survey weights for analysis. These weights are constructed based on state-level demographic characteristics as obtained from the American Community Survey (ACS).[12] Table A.5 presents aggregated demographic characteristics across the states. Compared to ACS data, our unweighted Prolific sample tends to skew towards a younger and more highly educated population. This skew might reflect the demographic characteristics of individuals who typically participate in online surveys. In contrast, the unweighted SCE data

[12]Weights are constructed using post-stratification to ensure that the sample represents the population based on gender, race, age, and education for each state. We use individual data from the 2021 5-year ACS.

tends to over-represent white, older, and highly educated demographics. We combine the SCE and Prolific data and construct individual survey weights to match state-level demographic characteristics. After applying these weights, the demographic distribution in our dataset closely aligns with the figures from the ACS.

To gather data on inflation expectations, we adopt the exact same questionnaire format used by the SCE. The SCE asks respondents to allocate a percentage chance across predefined intervals of inflation rates, a method known as soliciting density forecasts of inflation expectations. Our primary measure of inflation expectations is the expected value computed from this density forecast.[13] Table A.6 compares the survey-weighted average and standard deviation of 1-year ahead inflation expectations during the gas tax holiday, as derived from our online Prolific survey and the SCE.[14]

In general, the Prolific data reports higher 1-year ahead inflation expectations compared to the SCE. Several factors might contribute to this discrepancy. There could be inherent differences between respondents from the Prolific platform and SCE participants. Additionally, learning effects through repeated survey participation in SCE could influence results. Kim and Binder (2023) discuss these learning-through-survey effects for SCE's repeat participants. The SCE revisits their respondents up to 12 times, and they find that SCE participants consistently reported lower inflation expectations as they became more familiar with the survey. By the end of their participation, their inflation expectations dropped by approximately 2 percentage points compared to their initial responses. These learning effects might be more prevalent for SCE data since our online data revisits the respondents at most 3 times. Given these nuanced disparities in reported expectations, we incorporate survey tenure fixed effects in our models to control for these level differences.

[13]We calculate the expected value of the density forecast by assuming that the masses in each bin are distributed uniformly.

[14]Note that the online survey period does not cover the entire duration of the gas tax holiday. When comparing the weighted average of inflation expectations during the online survey data collection period, the SCE data has only a few observations.

In addition to the inflation and consumption-related questions that mimic the SCE, our survey's final phase also included a randomized experiment component with an information treatment, which was administered after respondents had reported their inflation expectations. Specifically, we randomly selected half of the respondents in the treated states and gave them additional information about the gas tax holiday. This experiment was designed to assess whether increased awareness of the policy influenced households' inflation expectations relative to a control group in the same state that did not receive this information. Following the information treatment, selected respondents were again asked to report their inflation expectations. Control group participants were also asked to report their inflation expectations a second time, but received no information about the policy.

# 4 Pass-through rates to retail gas prices

We begin our analysis by documenting the effect of the gas tax holidays on retail gasoline prices. If markets are imperfectly competitive, gas tax reductions may not be fully passed on to consumers, and the effect of the policy on inflation expectations may be blunted. Indeed, prior studies of gas tax holidays find incomplete pass-through rates that range between 0.4 and 1 (Doyle and Samphantharak, 2008; Genakos and Pagliero, 2022).

Pass-through was an issue of particular concern among state governments in this context. The attorneys general in Georgia, New York, and Connecticut threatened gas stations that did not pass through the tax cut with legal action for violating price gouging statutes, while retail gasoline providers complained that they were stuck with taxed fuel that they had purchased before the tax cut took effect (Reisman, 2022; Herb, 2022; Shirek, 2022).[15] This could create incentives for retail gas stations to raise prices prior to the tax holiday to leave themselves room to cut them again as the policy took effect. Indeed, we see evidence of anticipatory price increases in some states (Coglianese et al., 2017).

We first study the dynamics of gasoline prices in tax holiday states with the following

[15] In many states the fuel excise tax is collected by the supplier or distributor.

regression equation:

$$P_{st} = \alpha_s + \beta_t + \theta_{sw} \times D_s + \varepsilon_{st}, \tag{1}$$

where $P_{st}$ is the retail gasoline price in state $s$ and day $t$, $\alpha_s$ and $\beta_t$ are state and day fixed effects, and $D_s$ is a dummy variable equal to one for states implementing a gas tax holiday. The coefficient $\theta_{sw}$ measures the difference in week $w$ between gas prices in a treated state compared to control states, which are defined as non-treated neighboring states. We estimate equation (1) separately for each tax holiday state using the time period from 20 weeks before the tax holiday through 20 weeks after its conclusion.

Figure 2 plots the time-varying coefficients, $\widehat{\theta}_{sw}$, along with their 95% confidence intervals for the gas tax holidays in Maryland and New York. In Maryland, retail gas prices prior to the holiday closely track those of neighboring states. When the tax holiday goes into effect, prices immediately drop by close to the full amount of the tax reduction and remain lower for the duration of the period. On average, prices during the holiday were 30 cents lower relative to control states, indicating near-complete pass-through of the 36 cent tax reduction.

The right panel of Figure 2 shows the same analysis for the New York tax holiday, where the story is quite different. In contrast to Maryland, which approved a tax suspension in March 2022 to be effective immediately, New York passed its tax holiday in April to take effect in June 2022. In the three months prior to the holiday, prices in New York remained close to those in neighboring states. About three weeks before the policy was set to take effect, the relative price in New York increased by about 10 cents, before dropping again as the tax was reduced by 16 cents beginning on June 1. As a result of the increase prior to the policy, the gas price in New York did not drop by nearly as much as in Maryland, relative to the prices in neighboring states. Interestingly, after the expiration of the tax holiday, New York gas prices appear to resume tracking those of control states. We interpret this apparent low pass-through as evidence that a significant fraction of the

Figure 2: Gas prices in tax holiday states vs. neighboring states


Notes: The figures plot the estimates $\widehat{\theta}_{sw}$ from the regression equation (1), along with a 95% confidence interval. We estimate equation (1) separately for each tax holiday state using the time period from 20 weeks before the tax holiday through 20 weeks after its conclusion. In the left panel, the treated state is Maryland, with Pennsylvania (PA), Delaware (DE), Virginia (VA), and West Virginia (WV) serving as control states. In the right panel, the treated state is New York, with Pennsylvania (PA), Delaware (DE), New Hampshire (NH), and New Jersey (NJ) chosen as control states. The periods between the red vertical line indicate the period of gas tax holiday. Standard errors are clustered by state and week.

tax cut was captured by gasoline suppliers in New York.[16]

We then estimate average pass-through during the tax cut using a static difference-in-differences specification:

$$P_{st} = \alpha_s + \beta_t + \theta_s D_{st} + \varepsilon_{st}, \tag{2}$$

where $D_{st}$ is an indicator variable set to one during the gas tax holiday period in treated states. Table 2 presents the regression results.[17] Our findings indicate significant state-by-state variation in pass-through rates. Consistent with Figure 2, prices in Maryland fell by nearly 30 cents of the 36 cent tax decrease, implying a pass-through rate of 0.83. In Florida, we find a decrease of 20.8 cents per gallon, translating to a pass-through rate of 0.82 with a 25-cent tax cut. Georgia and Connecticut saw reductions of 18.1 and 13.9 cents per gallon, corresponding to pass-through rates of 0.62 and 0.56, respectively.

[16]We repeat this event study analysis for Connecticut, Georgia, and Florida, which we show in Figure A.1. Results look similar to Figure 2, with no obvious pre-trends.

[17]Figure 2 and Table 2 both use neighboring states as the control group in each regression. We also show estimates using all non-treated states as controls (Figure A.2 and Table A.3), but find that prices in neighboring states tracked tax holiday states much more closely.

Table 2: Pass-through rates of gas tax holiday to state-level gas prices

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Daily Gas Prices (dollars) | | | | |
| | MD | GA | CT | NY | FL |
| Gas Tax Holiday ($D_{st}$) | -0.299*** | -0.181*** | -0.139*** | 0.00471 | -0.208*** |
| | (0.0321) | (0.0161) | (0.0269) | (0.0352) | (0.00725) |
| State FE | Yes | Yes | Yes | Yes | Yes |
| Day FE | Yes | Yes | Yes | Yes | Yes |
| Observations | 4,315 | 3,452 | 4,315 | 4,315 | 6,041 |
| $R^2$ | 0.99 | 1.00 | 0.99 | 0.99 | 1.00 |
| Gas tax cut (dollar) | 0.36 | 0.29 | 0.25 | 0.16 | 0.25 |
| Passthrough | 0.83 | 0.62 | 0.56 | 0.03 | 0.82 |
| Passthrough 95% CI | [0.65,1.00] | [0.51,0.73] | [0.35,0.77] | [-0.40,0.46] | [0.77,0.88] |
| Percent change (%) | -7.72 | -4.88 | -3.40 | 0.10 | -4.97 |
| 95% CI | [-9.35,-6.10] | [-5.72,-4.03] | [-4.68,-2.11] | [-1.36,1.56] | [-5.31,-4.63] |

Notes: The table presents the regression results based on the regression equation (2). The row labeled "Gas tax cut (dollar)" represents the size of the temporary gas tax cut in dollar terms, while the "Passthrough" row reports the pass-through rates for each state. "Passthrough 95% CI" denotes the 95% confidence interval. "Percent change (%)" reports percent changes in gas prices compared to the average over the previous three months before the implementation of the tax holiday and "Percent change 95% CI" reports 95% confidence interval. The control states for the analysis are as follows: for Maryland, Pennsylvania (PA), Delaware (DE), Virginia (VA), and West Virginia (WV); for Georgia, Tennessee (TN), South Carolina (SC), and Alabama (AL); for Connecticut (CT), Massachusetts (MA), Rhode Island (RI), and Pennsylvania (PA); for New York (NY), Pennsylvania (PA), Delaware (DE), New Hampshire (NH), and New Jersey (NJ); and for Florida, North Carolina (NC), South Carolina (SC), Virginia (VA), Tennessee (TN), Alabama (AL), and Mississippi (MS). Standard errors clustered by state and week are indicated in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

New York, however, showed an almost negligible pass-through effect on its retail gas prices, although we note that the 95% confidence interval includes values as large as 0.46.

Our study explores the average pass-through rates of gas tax suspensions on state-level gas prices. Nonetheless, it is conceivable that the gas tax holiday's impacts vary within a state, particularly between cities near state boundaries compared to those that are further away. This hypothesis aligns with findings from Doyle and Samphantharak (2008), who find smaller pass-through estimates near state borders. While an in-depth analysis of differential pass-through rates within states is feasible, our investigation focuses on state-level averages, as the sample size of our survey is insufficient to measure inflation expectations at a finer geographical level.

The extent to which the gas tax holiday affected retail gas prices varies widely across the five treated states. There could be several possible reasons for this heterogeneity. There may be differences in local market structure and demand elasticity across states, which would generate variation in pass-through rates. It may also be the case that the degree of pass-through depends on the magnitude and duration of the tax cut. A larger tax cut or shorter duration may have made the effects on gas prices more pronounced. Finally, the timing of the announcement of the policy may affect the pass-through. In states like Florida and New York, the tax cut was announced several months prior to its implementation, which may have allowed retailers to raise their prices in advance of the policy. Our data does not allow us to distinguish between the possible factors that affect the pass-through of the tax cut. Rather, we take the incidence of the policy as given and aim to investigate its effects on inflation expectations and consumption.

# 5 Household inflation expectations

## 5.1 State-level specification

In order to assess how the gas tax holiday affects inflation expectations, we first start with a state-level difference-in-differences regression approach with both individual and time-fixed effects, as shown below:

$$E_t^i \pi_{s,t+1} = \alpha_i + \beta_t + \gamma X_{it} + \theta D_{st} + \varepsilon_{st}, \tag{3}$$

where $E_t^i \pi_{s,t+1}$ denotes one-year-ahead inflation expectations for individual $i$ in state $s$ and month $t$, $\alpha_i$ represents individual-fixed effects, $\beta_t$ captures monthly fixed effects, $X_{it}$ includes survey tenure dummies, and $D_{st}$ is a day-level indicator equal to one if the survey was administered during the gas tax holiday in the treated state. We estimate effects for each treated state separately, including a set of nearby non-treated states as controls. Table 3 reports the regression results. We find large negative and statistically significant effects of the gas tax policy on inflation expectations in Maryland, Georgia, and Connecticut. In Maryland and Georgia, 1-year ahead inflation expectations during the gas tax holiday are 1.4 percentage points (pp) lower than in control states, with Connecticut showing reductions of 2.1 pp. The coefficients for New York and Florida are negative but not statistically different from zero.[18]

We attribute the heterogeneity in estimated effects across states to several factors. We first note that our results in Section 4 indicate that New York had essentially zero pass-through of the tax cut into gasoline prices over the holiday period. If gas tax changes impact inflation expectations through retail gas prices, it should be unsurprising that the observed effect in New York is more muted than in other states. Building on this insight, we explore a regression specification that relates the observed decline in gas prices to inflation expectations in the following subsection.

In contrast, in Florida, we find that the policy decreased prices by $0.21 (on a tax cut of $0.25), yet still observe no effect on inflation expectations. We note that the beginning of the gas tax suspension in Florida coincided with the landfall of Hurricane Ian on September 29, 2022, which killed 161 people and caused over $50B in damage. We thus interpret results from Florida with caution, as the destruction caused by the storm could have interrupted the usual gasoline purchases of consumers. This event also could have impacted household attitudes towards the economy, potentially raising inflation expectations during the holiday, consistent with the findings from Kamdar (2019), who suggest that households associate higher inflation expectations with pessimistic beliefs about the economy.

The tax holidays in New York and Florida were also distinct in that they were passed by the state legislatures before implementation (two months prior in New York and three months in Florida - see Table A.1), while the tax holidays in Maryland, Georgia, and Connecticut were implemented immediately. Figure 2 shows that gas prices in New York in

[18] Table A.7 in Online Appendix A.2 reports the regression results based solely on SCE data. Results are similar, but less precisely estimated.

particular increased relative to control states in the three weeks prior to implementation; if this led to an increase in inflation expectations prior to the policy, our difference-in-differences estimate may be smaller than if the policy was fully unanticipated. We test for this by dropping the three weeks prior to policy implementation in New York and Florida and re-estimating equation (3). The results—presented in Table A.8—yield a coefficient in New York of -0.55 (statistically significant at the 5% level), suggesting a larger effect than in our baseline estimation, but no detectable impact in Florida.[19]

Finally, it may be the case that the importance of gas prices for inflation expectations varies during our sample period. We note that the Maryland, Georgia, and Connecticut tax cuts were implemented in Spring 2022 during a time when both inflation and gas prices were rapidly rising, while the New York and Florida policies took effect in June and October 2022, respectively, when gas prices had declined slightly and inflation growth was more stable, as shown in Figure 1. During periods of rapid price increases (particularly in early 2022), there was also heightened public attention to gas prices, corroborated by Google searches for "gas prices" peaking in February and March and declining significantly by October (also shown in Figure 1). This increased attention may have intensified the influence of gas prices on inflation expectations. This hypothesis also aligns with Pfäuti (2024), who show that public attention on inflation intensifies nonlinearly as inflation rates increase.

## 5.2 Pooled specification

We next turn to a pooled specification that combines the five state-level experiments in a single regression. Pooling the data both improves statistical power and yields an average treatment effect across the different policy implementations. A growing body of work in econometrics has raised concerns with using standard panel data models to estimate the

[19] Individuals may also anticipate the tax change directly and reduce their inflation expectations prior to the policy, which would tend to decrease our estimate of $\theta$. While we cannot fully rule this out, our survey suggests that a minority of respondents were aware of the policy a few days before implementation (31% in New York and 19% in Florida - see Table A.18).

Table 3: State-level effects on inflation expectations

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Expected inflation rate (density) | | | | |
| Gas Tax Holiday (dummy) | -1.365** (0.448) | -1.449** (0.316) | -2.065** (0.472) | -0.0684 (0.233) | -0.0171 (0.0789) |
| State | MD | GA | CT | NY | FL |
| Sampling Weight | Yes | Yes | Yes | Yes | Yes |
| Individual Fixed Effect | Yes | Yes | Yes | Yes | Yes |
| Time Fixed Effect | Yes | Yes | Yes | Yes | Yes |
| Survey Tenure Fixed Effect | Yes | Yes | Yes | Yes | Yes |
| Data | Combined | Combined | Combined | Combined | Combined |
| Observations | 1,881 | 2,251 | 2,312 | 3,494 | 6,241 |
| $R^2$ | 0.71 | 0.64 | 0.66 | 0.71 | 0.71 |

Notes: The table presents the weighted regression results based on the regression equation (3), utilizing pooled data with individual and monthly-time fixed effects. Control states are defined as neighboring states to the treated states. The control states for Maryland are Pennsylvania, Delaware, Virginia, and West Virginia. For Georgia, the control states are Tennessee, South Carolina, and Alabama. Connecticut's control states are Massachusetts, Rhode Island, Pennsylvania, and New Jersey. The control states for New York include Pennsylvania, Delaware, New Hampshire, New Jersey, Massachusetts, and Vermont. Lastly, the control states for Florida are North Carolina, South Carolina, Virginia, Tennessee, Alabama, and Mississippi. Standard errors clustered by state and week are indicated in parentheses.

effects of staggered treatments. A principal issue is that the two-way fixed effects model uses earlier-treated units as a control for later-treated observations, which can introduce bias when treatment effects are heterogeneous (Goodman-Bacon, 2021).

We deal with this issue by adopting the stacked difference-in-differences approach from Cengiz et al. (2019). The process begins by compiling a dataset that encompasses the treated states and all other states serving as controls, specifically excluding any states that underwent treatment, for a duration of 100 days both preceding and following the gas tax holiday. Subsequently, we "stack" these individual datasets into a single dataset for analysis. We use this combined dataset to run a regression that includes interactions between individual IDs and an indicator for the experiment, as well as interactions between time and the experiment, where the experiment refers to a single treated state and its associated control group. The regression equation is as follows:

$$E_t^i \pi_{e,t+1} = \alpha_{ei} + \beta_{et} + \gamma X_{eit} + \theta D_{eit} + \varepsilon_{eit}, \tag{4}$$

where $E_t^i \pi_{e,t+1}$ denotes one-year-ahead inflation expectations for an individual $i$ at time $t$ in experiment $e$ and $D_{eit}$ is an indicator set to one during the gas tax holiday for individuals in a treated state.

As we discuss in Section 2, the validity of our identification strategy depends on the assumption that inflation expectations would have followed parallel trends in treated and control states in the absence of the policy. We first investigate this assumption by running a dynamic, or event study, version of the stacked difference-in-differences specification in equation (4) in which we allow the treatment coefficient $\theta$ to vary over time. We plot the results of this analysis in Figure 3, where the coefficient in month 0, the calendar month in which the treatment was enacted, is normalized to 0. Panel (a) shows results using all five tax holiday states, while panel (b) shows results using only Maryland, Georgia, and Connecticut. Prior to the implementation of the gas tax holiday, there is no evident pre-trend. Following the tax suspension, we see a noticeable decline in household inflation expectations, beginning in month 1.[20] The drop is particularly pronounced in the three states shown in panel (b), consistent with the results shown in Table 3.

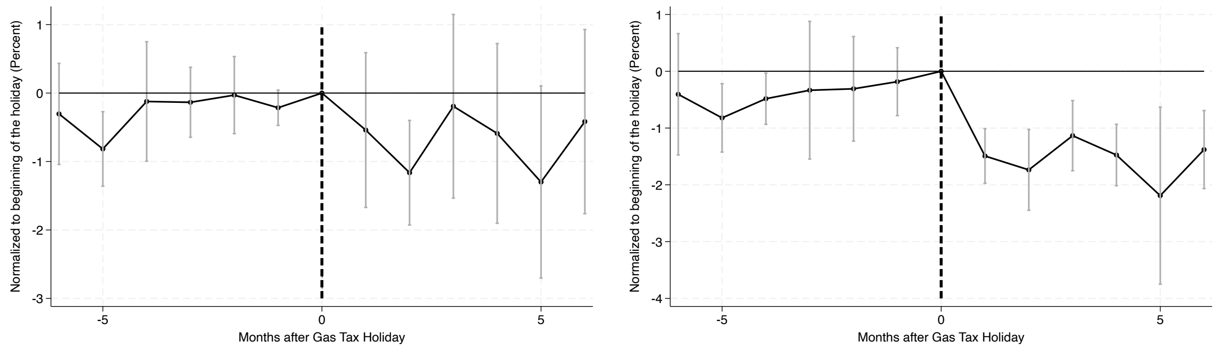
Table 4 presents the results from estimating equation (4). The first three columns show our baseline specification, while the latter three columns add time-varying state-level controls – the unemployment rate (from the Bureau of Labor Statistics) and growth rates of nominal and real GDP (from the Bureau of Economic Analysis) in each state.[21] Using results from all five state experiments, we find that the implementation of the gas tax holiday reduced inflation expectations by 0.31 percentage points on average, but this result is not statistically significant (p-value of 0.20 in column (1) and 0.22 in column (4)).[22]

[20] We note that the tax suspension begins in the middle of the calendar month in Georgia, Maryland, and Connecticut, and so month 1 in the plot is the first fully treated period.

[21] Note that the nominal and real GDP data are available on a quarterly basis. To convert this data into a monthly frequency, we interpolated the data.

[22] We show results using alternative clustering in Tables A.10 (one-way by state) and A.9 (one-way by in-

Figure 3: Event study specification




(a) All tax holiday states

(b) Only MD, GA, and CT

Notes: The figures illustrate the dynamics of 1-year ahead inflation expectations in treated states compared to control states, as per the stacked difference-in-differences (DID) specification. The left panel shows results using all five state experiments, while the right shows results using only Maryland, Georgia, and Connecticut. On the y-axis, the inflation expectations are normalized to zero in month 0, the month that the tax suspension takes effect (also marked by the vertical dashed line). 95% confidence intervals constructed from standard errors clustered at the state and week level are shown in grey.

In columns (2) and (5), we show results using only Maryland, Georgia, and Connecticut, where our state-level regressions show larger impacts. The treatment effects in these three states are significantly larger; we find that the policy reduced inflation expectations by about 1.3 percentage points, which is statistically significant at the 99% confidence level.

In columns (3) and (6), we again use all five state experiments, but interact the treatment dummy with the average percent change in gas prices multiplied by 100. Our estimates imply that a tax reduction that resulted in a 5% decline in gas prices reduced inflation expectations by approximately 0.25 percentage points. This finding underscores the fact that the impact of the tax cut on household beliefs depends crucially on the extent to which it is passed through to retail gas prices, which partially explains the heterogeneity in effect size across states. It also may provide guidance for policymakers seeking to design tax holidays during inflationary periods as to their likely effects on household expectations.

dividual). Clustering at the individual level yields a statistically significant coefficient at the 95% confidence

Table 4: Impact of the Gas Tax Holiday on Inflation Expectations: Pooled Effects

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | One-year-ahead expected inflation rate (density) | | | | | |
| Gas Tax Holiday<br>(dummy) | -0.314<br>(0.245) | -1.333$^{***}$<br>(0.183) | 0.280<br>(0.197) | -0.307<br>(0.252) | -1.351$^{***}$<br>(0.221) | 0.235<br>(0.232) |
| Gas Tax Holiday<br>× Percent Gas Price Change | | | 0.145$^{**}$<br>(0.0591) | | | 0.132$^{*}$<br>(0.0685) |
| Sample | All | Excl. FL, NY | All | All | Excl. FL, NY | All |
| Sampling Weight | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment × Individual FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment × Time FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment × Survey Tenure FE | Yes | Yes | Yes | Yes | Yes | Yes |
| State-level controls | No | No | No | Yes | Yes | Yes |
| Data | Combined | Combined | Combined | Combined | Combined | Combined |
| Observations | 68,463 | 41,122 | 68,463 | 68,463 | 41,122 | 68,463 |
| $R^2$ | 0.67 | 0.66 | 0.67 | 0.67 | 0.66 | 0.67 |

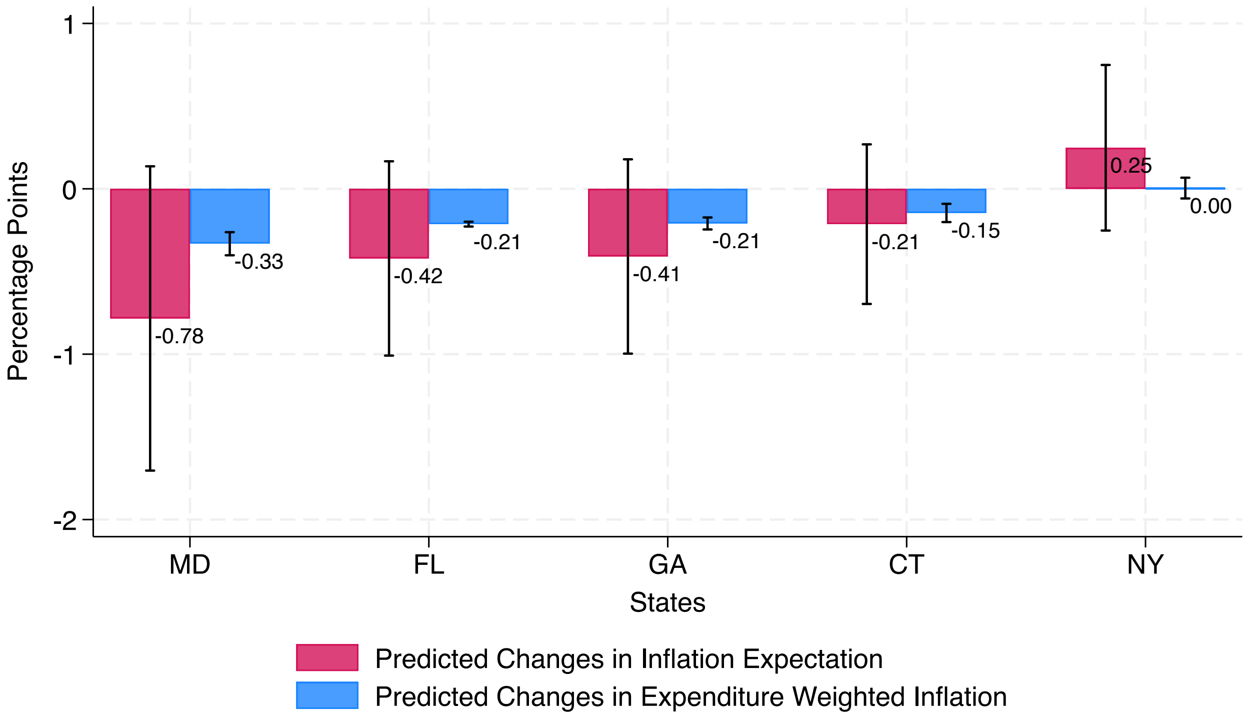
Notes: The table details the impact of the Gas Tax Holiday on inflation expectations, utilizing the stacked DID specification outlined in equation (4). The average percent change in gas prices indicates changes in gas prices during the holiday compared to the previous 3-month average gas prices multiplied by 100. The control group comprises all states except the ones treated. Columns (1)-(3) report the results with the experiment interacted with individuals, time, and survey tenure fixed effects but without including state-level control variables. Columns (4)-(7) add additional state-level control variables – state-level unemployment rate (from the BLS) and growth rates of nominal and real GDP (from the BEA). Columns (2) and (5) exclude the policy experiments in Florida and New York, while the other columns report results using all five policy changes. Standard errors clustered by state and week are provided in parentheses.

Drawing from the pass-through estimates reported in Section 4, we can project the state-level changes in inflation expectations attributable to the gas tax holiday using estimates from Table 4. The red bars in Figure 4 illustrate the predicted changes in inflation expectations due to the gas tax holiday across the treated states. According to our estimation, Maryland is predicted to have lowered inflation expectations by 0.78 percentage points. In comparison, Florida and Georgia are projected to reduce inflation expectations by 0.42 and 0.41 percentage points, respectively. Meanwhile, Connecticut is expected to see a decrease of 0.21 percentage points in inflation expectations, while New York exhibits a 0.25 percentage point increase; however, we note that the confidence intervals around the estimated effect include zero. These predictions qualitatively align with our state-level difference-in-differences regression findings, with Florida being the exception.[23]

level for the specifications in columns (1) and (4).

[23]The quantitative differences between the estimates in Table 3 and Table 4 primarily stem from Florida.

Figure 4: Predicted changes in inflation expectations across states




Notes: In the figure, the red bars represent the predicted changes in inflation expectations, as based on our estimates reported in Column (6) of Table 4. Conversely, the blue bars illustrate the expenditure-weighted changes in inflation expectations attributable to changes in gas prices during the gas tax holiday. The black solid line across the bars indicates the 95% confidence interval.

To benchmark the magnitude of this effect, Figure 4 compares the predicted changes in inflation expectations (red bar) with the predicted changes in expenditure-weighted inflation (blue bar) attributable to the gas tax holiday. Utilizing data on gas price reductions during the tax holiday, we can compute the state-level expected change in the expenditure-weighted inflation rate. Consider Maryland as an example: state-level gas prices declined by approximately 7.7% during the holiday. Given that gas consumption constitutes about 4.3% of total expenditures nationally, this reduction in gas prices would curtail inflation by about 0.3 percentage points. This comparison suggests that house-

Although the tax cut in Florida had a relatively large effect on gas prices, we find almost no effect on inflation expectations, which could reflect the impact of Hurricane Ian or the timing of the holiday's enactment. Our pooled regression analysis, which still includes Florida, may therefore underestimate the effect of the gas tax holiday. Table A.12 in Online Appendix A.2 presents the results of a pooled regression that excludes Florida, showing that the quantitative implications become more aligned with those from Table 3.

holds tend to place greater importance on gas prices in shaping their inflation expectations than the actual expenditure share of gas might suggest, although we note that the expenditure-weighted estimate is within the confidence interval of the predicted effect.[24] One caveat to consider is that gasoline, as an input to other goods, might influence broader price levels. However, studies by Cavallo (2008) and Binder (2018) suggest that fluctuations in gas prices have limited effects on core inflation rates.

Our estimates are notably larger than the effect sizes from prior literature, which has primarily used time-series variation in gas or oil prices. After controlling for state-level macroeconomic conditions (column (6) in Table 4), we observe that a 1 percentage point (pp) decrease in gas prices leads to a reduction in inflation expectations by about 0.13 pp. In comparison, Coibion and Gorodnichenko (2015) find that a 1 pp increase in oil prices results in an increase in inflation expectations of 0.016 pp. Similarly, Kilian and Zhou (2022) report that a 1 pp increase in gas prices corresponds to rises of 0.04 pp in inflation expectations.[25]

The divergence between our results and those in past literature could result from the potential endogeneity of gas prices to other macroeconomic shocks that impact inflation expectations. For instance, as noted by Leduc and Sill (2004), Bullard (2011) and Powell (2022), if monetary policy systematically responds to the headline inflation rate, which includes food and energy prices, this may attenuate the impact of an oil price shock. Alternatively, shocks that move oil prices and inflationary pressures in opposite directions would also mute the measured sensitivity of inflation expectations to gas prices. For example, the expansion in domestic oil production that resulted from the fracking boom

[24]This comparison is conservative, particularly because our pooled specification incorporates data from Florida. Upon excluding Florida from our analysis, we observe a marked difference: households in the treated states, on average, place 5.6 times more emphasis on gas prices in shaping their inflation expectations (relative to about 2 in more baseline estimates) than what would be suggested by their share in total expenditures.

[25]A notable exception is Aidala et al. (2024), who study inflation in a similar period to our study using an experimental design in which survey individuals report how their inflation expectations would change under a hypothetical change in gas prices. They report that a 1 pp increase in gas prices leads to a 0.075 pp increase in inflation expectations, while a 1 pp decrease results in a 0.009 pp decline in inflation expectations.

reduced global oil prices and increased domestic GDP, thus creating inflationary pressure due to an increase in demand. In a similar vein, political instability in a foreign oil producing nation could contract global oil production and simultaneously create economic uncertainty, leading to economic contraction. However, the discrepancy may also simply reflect heterogeneity in the impact of gas prices across different sample periods. To further investigate this, we replicate the analysis from Coibion and Gorodnichenko (2015) during our sample period (December 2021 to January 2023).[26] We report the results from both aggregate and individual-level first difference specifications in Table A.15. In contrast to our baseline estimates that are identified purely from gas price variation across states induced by the tax holidays, the coefficients in Table A.15 are primarily identified from fluctuations in global oil markets over time. The individual-level specification in column (3) shows that a 1% decrease in gas prices leads to a reduction in inflation expectations of 0.036 pp, which is about a quarter of the size of the effect from Table 4 and much closer to estimates from prior literature. The large differences in treatment effects between the two approaches further highlight the potential identification advantages of our policy setting.[27]

Of course, we cannot completely rule out the role of other factors that explain the difference between our results and those from prior work. We study an inflationary period that coincides with an extremely rapid increase in gas prices (an average increase of over 50% during the first 6 months of 2022). Gasoline prices may be particularly salient in this

[26]Specifically, following equation (8) in Coibion and Gorodnichenko (2015), we regress the first difference of one-year ahead inflation expectations on the first difference in logged gas prices. While Coibion and Gorodnichenko (2015) uses first differences in logged oil prices, Binder (2018) documents the similar results using gas prices (Table 2 column (1) and (3)). A caveat is that we compute first differences over one-month intervals, while they use six-month intervals.

[27]Binder (2018) finds that a 1 percentage point increase in gas price inflation leads to a 0.01 percentage point increase in one-year-ahead headline inflation expectations. To provide a closer comparison, we run an alternative specification to examine the effect of gas price inflation on inflation expectations. Table A.16 reports the results. In our sample, we find that a 1 percentage point increase in gas price inflation leads to a 0.07 percentage point increase in one-year-ahead inflation expectations when we instrument gas price inflation using the percentage change in gas prices during the holiday interacted with a holiday dummy. This estimate is substantially larger than the OLS estimate of gas price inflation on one-year-ahead inflation expectations, echoing the comparison to Coibion and Gorodnichenko (2015).

context, given the large amount of focus in the popular press on retail gas markets and price levels more broadly.[28] However, analysis of behavior during this period may also be particularly valuable, as this is the exact setting in which monetary or fiscal policy may have the largest impact on household expectations, and thus future inflation.

We show that the variation across states in the effects of the policy on beliefs is significantly correlated with the actual impact on gas prices, which depends on the local pass-through rate. One possibility is that the competitiveness of local gasoline markets itself influences how households form inflation expectations. A more competitive gasoline market may lead to higher pass-through of gas tax reductions, potentially causing broader spillover effects on other prices within the consumption basket, leading to more pronounced changes in inflation expectations. We note that this does not affect the validity of our identification strategy as long as market competitiveness in each state is stable around policy implementation.

If households fully understood the temporary nature of the gas tax holiday and formed inflation expectations based on rational expectations, they would anticipate a future rise in gas prices and adjust their inflation expectations accordingly. However, contrary to this prediction, our findings indicate a decline in inflation expectations during gas tax holidays, suggesting a deviation from the FIRE model. This discrepancy implies that households may adopt a backward-looking approach to forming gas price inflation expectations, placing greater weight on past price movements rather than anticipating future changes as suggested by the FIRE model.

To further investigate this mechanism, we analyze the impact of the tax holidays on one-year-ahead gas price inflation expectations; similar to our main analysis, households in treated states have lower expectations of future gas price growth (about 2 pp) relative to control states (see Table A.13). This could be attributed to households' incomplete understanding of the temporary nature of the gas tax holiday, which contradicts the FIRE

[28] This evidence is also consistent with D'Acunto et al. (2021), who show that the impact of price increases on household beliefs is significantly larger than price decreases.

model's assumption that households have full information.[29] Alternatively, even if households recognize the temporary nature of the tax holiday, they may still revise their gas price inflation expectations downward, suggesting a backward-looking approach to expectation formation.

Additionally, we find that when survey respondents in treated states are provided with more information about the gas tax holiday, including its temporary nature, they continue to lower their inflation expectations (detailed in Section 5.4). This suggests that even with an explicit understanding of the temporary nature of price reductions, respondents still tend to revise their inflation expectations downward, reinforcing the idea that their expectation formation follows a backward-looking pattern.

### 5.3 Robustness and Heterogeneity

As we discuss in Section 2, our maintained identification assumption is that inflation expectations would have followed parallel trends in treated and control states absent the policy change. One possible violation of this assumption would be if lawmakers in treated states implemented the policies to respond to idiosyncratic economic shocks in that state. *Ex ante*, we believe this is unlikely; policy implementation appears to be primarily driven by the state political environment, and we find that pre-period macroeconomic conditions look similar in states that implemented the policy relative to those that did not (see Table 1).

We further test this assumption with two exercises. First, we perform our primary analysis using a different set of control states: those where a tax holiday was formally proposed in the legislature, but not implemented.[30] If gas tax holidays were a response to a particular state-level shock, we might expect the treatment effect to narrow when we compare implementing states to those that proposed the policy, but did not implement it. In Table 5, column (4) shows our overall treatment effect using this control group is -0.461,

[29] This interpretation aligns with findings by Bachmann et al. (2021), who report that a significant fraction of German households misinterpreted the temporary VAT tax cut as a permanent decrease.

[30] We provide details of the legislative process in these 16 additional states in Table A.2 .

which is similar in magnitude to the estimate in our baseline analysis (-0.307 from Table 4, column (3)). Treatment effects using only the policy changes in Maryland, Connecticut, and Georgia are also similar across the two specifications (-1.529 in Table 5 column (5) vs. -1.351 in Table 4 column (5)). Column (6) shows the results from a specification in which we interact the effect with the change in gas prices, which yields a coefficient of 0.125 (relative to the baseline estimate of 0.132).

Second, we conduct a set of placebo tests using the non-implementing states. Specifically, we take the set of 7 states from Table A.2 where we were able to obtain proposed implementation dates (Alaska, Arizona, Massachusetts, Michigan, Pennsylvania, Virginia, and Washington). We then estimate a version of equation (4) where we define the treatment to be the proposed policy in the non-implementation states, with states that did not propose a gas tax holiday serving as controls. We get a coefficient close to zero (Table 5, column (7)), which is statistically insignificant and much smaller than our primary treatment effect. This provides additional evidence that the effect that we measure is being driven by the gas tax holiday, rather than other confounding factors.

Finally, as we discuss in Section 3, our primary analysis incorporates two distinct sources of data: the SCE, which is administered by the Federal Reserve Bank of New York, and an online survey that we administered via Prolific. We repeat both the state-level analysis (equation (3), presented in Table A.7) and the pooled analysis (equation (4), results in Table A.11) using the SCE data alone. The results are similar to the combined data, although less precisely estimated.

We also explore potential heterogeneous effects of the gas tax holiday on household beliefs. Heterogeneity in inflation expectations across various demographic groups is well-documented in prior literature (see D'Acunto et al. (2023) for a survey). We explore this in our study by estimating equation (4) separately for different groups of respondents. We report the results in Table A.17. We find that treatment effects are particularly strong among male, non-white, and younger age groups. Consistent with our results, D'Acunto

Table 5: Robustness: alternate control groups and placebo tests using non-implementing states

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | | | Expected inflation rate (density) | | | | |
| Gas Tax Holiday (dummy) | -0.451 (0.281) | -1.532*** (0.187) | 0.111 (0.229) | -0.461* (0.274) | -1.529*** (0.228) | 0.0385 (0.269) | |
| Gas Tax Holiday × Percent Gas Price Change | | | 0.141** (0.0642) | | | 0.125* (0.0703) | |
| Placebo (dummy) | | | | | | | -0.000828 (0.410) |
| Sample | All | Excl. FL, NY | All | All | Excl. FL, NY | All | |
| Sampling Weight | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment × Individual FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment × Time FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment × Tenure FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State-level controls | No | No | No | Yes | Yes | Yes | Yes |
| Data | Combined | Combined | Combined | Combined | Combined | Combined | Combined |
| Observations | 37,482 | 21,542 | 37,482 | 37,482 | 21,542 | 37,482 | 55,383 |
| $R^2$ | 0.65 | 0.64 | 0.65 | 0.65 | 0.64 | 0.65 | 0.68 |

Notes: The table presents the robustness results of our main specification, Equation (4). In columns (1)-(6), we perform estimation using states that proposed gas tax holidays but did not implement them as the control group. Columns (2) and (5) exclude the policy experiments in Florida and New York, while the other columns report results using all five policy changes. Column (7) reports the results of a placebo test using 7 states that proposed gas tax holidays but did not implement them in which we were able to obtain proposed implementation dates (Alaska, Arizona, Massachusetts, Michigan, Pennsylvania, Virginia, and Washington; see Table A.2 for details). We form a control group from states that did not propose or implement gas tax holidays and show the results of the placebo treatment in column (7). The average percent change in gas prices indicates changes in gas prices during the holiday compared to the previous 3-month average gas prices multiplied by 100. Columns (1)-(3) report the results with the experiment interacted with individuals, time, and survey tenure fixed effects but without including state-level control variables. Columns (4)-(7) add additional state-level control variables – state-level unemployment rate and growth rates of nominal and real GDP. Standard errors clustered at the state and time level are provided in parentheses.

and Weber (2020) also emphasize that males are more likely than females to recall gas prices in forming their beliefs.

Columns (10) and (11) of Table A.17 provide a comparison between respondents in the treated states who were aware of the Gas Tax Holiday and those who were not, taking respondents in the control states as a control group. Our findings indicate that respondents who were aware of the gas tax holiday demonstrate a higher responsiveness of inflation expectations to gas prices. This highlights a potential role for public policy communication in enhancing the effectiveness of such a policy. We investigate this issue further in Section 5.4.

### 5.4 Policy communication

The results in the previous sections establish that a temporary cut in the gas tax reduced inflation expectations, provided that the tax cut is actually passed through to prices. As a final exercise, we test whether the effect of the tax cut can be enhanced by informing households about the policy.

To assess the impact of policy awareness, we implemented a randomized experiment in the survey we administered in Maryland, New York, and Florida. At the survey's conclusion (and after households have already reported their inflation expectations), we randomly selected half of the participants in treated states to receive an information treatment about the size and duration of the reduction in the gas tax cut in their state.[31] The other half of respondents were not provided with any additional information. We first asked the treated group whether they were aware of the gas tax holiday and their predictions for how the policy would impact gas prices. We then asked both groups to report their inflation expectations and consumption sentiments a second time to determine if any adjustments occurred.

We show descriptive statistics for the experiment in Table A.18 and the results in Table A.19, which compares respondents that randomly received the information treatment to those in the same state that did not. In general, we find that informing households about the policy led them to further revise down their inflation expectations. Our preferred specification in column (2), which uses Huber robust regression to reduce the influence of outliers, suggests that the information treatment reduced inflation expectations by approximately 0.7 percentage points. We further divide the sample by whether the survey was conducted before the tax cut period (in New York and Florida, columns (5) and (6)) or during the tax holiday (in Maryland and Florida, columns (3) and (4)). We find that the information treatment had a larger effect for respondents surveyed before the tax holiday

[31]The specific details of the additional information provided are documented in Figures A.4-A.6, all of which can be found in the Online Appendix A.3.

commenced. This distinction underscores the importance of timely and effective public policy communication, suggesting that preemptive dissemination of policy details may amplify its impact on public inflation expectations.

The results of the information treatment help to shed light on how households form inflation expectations. The analysis in Sections 5.1-5.2 establishes that the tax cut reduced inflation expectations, which is inconsistent with standard FIRE models. However, our main analysis does not allow us to rule out that households simply don't understand the temporary nature of the price cut. The experimental treatment helps to resolve this uncertainty by providing explicit information about the duration of the gas tax holiday, after which households still revise their inflation expectations downward. This finding reaffirms that households adopt adaptive expectations, focusing more on recent declines in gas prices than on anticipated future price increases according to FIRE model.

# 6 Consumption during the Gas Tax Holiday

We next investigate the effect of the temporary gas tax suspension on consumption by analyzing data from credit and debit card transactions. Since the demand for gasoline is inelastic, a tax cut will reduce gasoline expenditures, which we refer to as the direct effect (Li et al., 2014).[32] The impact of the tax cut on non-gas consumption may operate through several channels. A reduction in spending on gasoline increases consumers' disposable income, which may boost spending in other categories, called the discretionary income effect (see Edelstein and Kilian (2009); Baumeister and Kilian (2016); Gelman et al. (2023) among others). However, since the tax suspension is temporary, we do not expect to observe a substantial income effect, in line with the permanent income hypothesis. The gas tax holiday may also impact consumption by changing inflation expectations. On one hand, if the tax cut lowers inflation expectations, it may raise the perceived real interest rate, encouraging intertemporal substitution and thereby reducing non-gas consumption

[32] Kilian and Zhou (2024) report that the price elasticity of gasoline demand is -0.31, while Levin, Lewis, and Wolak (2017) find state-level elasticities of demand between -0.245 and -0.325.

(see D'Acunto et al. (2021); Duca-Radu et al. (2021); Coibion et al. (2022) among others). On the other hand, lower inflation expectations could improve consumer sentiment, leading to increased consumption (Kamdar, 2019; Kamdar and Ray, 2024).

Therefore, the net effect on total spending depends on the Marginal Propensity to Consume (MPC) from the savings on gas. If the MPC is less than one, the increase in non-gas spending will not fully offset the reduced expenditure on gasoline, leading to a net decrease in overall spending. However, if the MPC is greater than one, the increase in non-gas spending would more than compensate for the reduced gas spending, resulting in an overall increase in total spending during the gas tax holiday.

To investigate the effect of the gas tax holiday on consumption, we perform a state-level analysis where we compare spending in tax holiday states to that in neighboring states:

$$\ln(C_{st}) = \alpha_s + \beta_t + \theta D_{st} + \varepsilon_{st}, \tag{5}$$

where $\ln(C_{st})$ represents log weekly consumption in state $s$ at time $t$, $\alpha_s$ captures state fixed effects, and $\beta_t$ controls for monthly time fixed effects. To allow for potential treatment effect heterogeneity, we estimate a separate regression for each policy. $D_{st}$ is a weekly indicator set to one during the gas tax holiday in the treated state, while the control group in each regression includes neighboring states (similar to the specification in Table 3). The coefficient $\theta$ measures the change in consumption in the treated state relative to control units and captures the net effect of the policy on the sum of gas and non-gas spending.

The estimated $\theta$ coefficients for each state are presented in Table 6. While the estimates vary in both sign and magnitude across states, we do not find evidence that the gas tax holiday had a stimulative impact on consumption, implying the MPC from gas savings is not greater than one. Specifically, we observe a negative and statistically significant effect in Maryland, a positive and significant effect in New York, and insignificant effects in

Table 6: Consumption During the Gas Tax Holiday

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Log Spending × 100 | | | | |
| Gas Tax Holiday | -1.306** | 0.130 | -1.155 | 1.964*** | -0.508 |
| (Dummy) | (0.379) | (0.238) | (0.945) | (0.268) | (0.407) |
| State | MD | GA | CT | NY | FL |
| State FE | Yes | Yes | Yes | Yes | Yes |
| Time FE | Yes | Yes | Yes | Yes | Yes |
| Observations | 160 | 288 | 355 | 290 | 231 |
| $R^2$ | 0.80 | 0.75 | 0.50 | 0.65 | 0.85 |

Notes: The table shows regression results based on the estimation of equation (5). The dependent variable is log spending across all consumption categories. Each column corresponds to a separate policy experiment, in which the treated state is labeled across the top row and the control group is formed from states that border the treated state. The control states for Maryland are Pennsylvania, Delaware, Virginia, and West Virginia. For Georgia, the control states are Tennessee, South Carolina, and Alabama. Connecticut's control states are Massachusetts, Rhode Island, Pennsylvania, and New Jersey. The control states for New York include Pennsylvania, Delaware, New Hampshire, and New Jersey. Lastly, the control states for Florida are North Carolina, South Carolina, Virginia, Tennessee, Alabama, and Mississippi. Each regression includes state and month fixed effects. Standard errors clustered by state and month are provided in parentheses.

Georgia, Connecticut, and Florida. We hypothesize that the short duration of the gas tax holiday may partially explain the negative result in Maryland, consistent with findings from Gelman et al. (2023), who report that the MPC increases from 0.5 to 1 within one to four months after an oil price shock. In contrast, Georgia and Connecticut had longer gas tax holidays, and in these places we are unable to reject the null hypothesis that the MPC is equal to 1, consistent with consumers spending their gas savings on other categories of consumption. However, given that the analysis includes only five policy experiments, we are cautious not to overinterpret this pattern, given other differences across states in implementation. While we see a positive effect in New York, the results from Section 4 show that the tax holiday had a negligible impact on fuel prices. Additionally, in Florida, the tax holiday period coincided with the landfall of Hurricane Ian, which temporarily depressed consumption and could partially drive the negative coefficient.

We further investigate the impacts of the gas tax holiday on consumption by looking at the effects across spending categories, including non-durable goods (which include gasoline), durable goods, and services. Given the limited impact on fuel prices in New York and the confounding effect of the hurricane in Florida, we estimate a stacked difference-in-differences specification that focuses on Maryland, Georgia, and Connecticut, which we present in Table A.21. Aggregate consumption in these three states declined by 0.645 percentage points during the tax holiday. An event study analysis using this sample (Figure A.3) shows that the spending decline begins in the month of the tax holiday and persists for several months. When we break out the effect by category, we find a negative impact on non-durable expenditure of -1.244 percentage points, which we attribute to the direct effect of reduced gas spending. We find a positive effect on durable expenditures and a decrease in services spending of 1.799 percentage points (with a p-value of 0.054), which could be driven by the intertemporal substitution effect.

# 7 Conclusion

This paper explores the impact of state-level temporary suspensions of the gas tax on inflation expectations. We leverage novel policy variation that induces sizable exogenous, but temporary, differences in retail gas prices across states during an inflationary period. We find that these temporary decreases in the gas tax result in drops in household inflation expectations, as well as decreases in overall consumption. The effects are most pronounced in states where the tax reduction was more fully passed through to prices. Our results establish new evidence of a causal link between gas prices and household inflation expectations.

Our work raises the possibility that the gas tax, or other policy measures that might impact gas prices, could be another potential lever for policymakers to impact household beliefs. We highlight several factors that influence the effectiveness of such a policy, including the degree of supply-side competition in gasoline markets and how the policy is communicated to consumers. However, we raise several important caveats in generalizing our results on a broader scale. First, the effects that we observe occur in an environment in which the gas tax changes relatively infrequently. If policymakers began to regularly use the tax rate as a policy instrument, households may place lower weight on gas prices when forming beliefs over future prices. Second, this policy was implemented during a period when gas prices were rapidly rising, and thus were perhaps particularly salient for households. Third, states may have other motivations when deciding how much to tax gasoline, including correcting for environmental externalities and generating revenue to fund the construction and maintenance of roads. Changes to the gas tax for other purposes, such as to affect inflation expectations, may conflict with the appropriate level of taxation for other policy goals. We believe further study of these issues is a potential avenue for future research.

# References


Abadie, A., S. Athey, G. W. Imbens, and J. M. Wooldridge (2023). When should you adjust standard errors for clustering? *The Quarterly Journal of Economics 138*(1), 1–35.

Aidala, F., O. Armantier, G. Koşar, J. Somerville, G. Topa, and W. van der Klaauw (2024). Gasoline price changes and consumer inflation expectations: Experimental evidence. *Journal of Economic Behavior & Organization 220*, 66–80.

Bachmann, R., B. Born, O. Goldfayn-Frank, G. Kocharkov, R. Luetticke, and M. Weber (2021). A Temporary VAT Cut as Unconventional Fiscal Policy. NBER Working Paper 29442.

Baumeister, C. and L. Kilian (2016). Lower oil prices and the u.s. economy: Is this time different? *Brookings Papers on Economic Activity 47*(2 (Fall)), 287–357.

Binder, C. and C. Makridis (2022). Stuck in the seventies: gas prices and consumer sentiment. *Review of Economics and Statistics 104*(2), 293–305.

Binder, C. C. (2018). Inflation expectations and the price at the pump. *Journal of Macroeconomics 58*, 1–18.

Bullard, J. (2011). Measuring inflation: the core is rotten. *Federal Reserve Bank of St. Louis Review 93*(4), 223–233.

Cavallo, M. (2008). Oil prices and inflation. Technical report, FRBSF Economic Letter.

Cengiz, D., A. Dube, A. Lindner, and B. Zipperer (2019, 05). The Effect of Minimum Wages on Low-Wage Jobs*. *The Quarterly Journal of Economics 134*(3), 1405–1454.

Chetty, R., J. N. Friedman, M. Stepner, and O. I. Team (2023, 10). The Economic Impacts of COVID-19: Evidence from a New Public Database Built Using Private Sector Data*. *The Quarterly Journal of Economics 139*(2), 829–889.

Cloyne, J., J. Martinez, H. Mumtaz, and P. Surico (2023, May). Do tax increases tame inflation? *AEA Papers and Proceedings 113*, 377–81.

Coglianese, J., L. Davis, L. Kilian, and J. H. Stock (2017). Anticipation, tax avoidance, and the price elasticity of gasoline demand. *Journal of Applied Econometrics 32*(1), 1–15.

Coibion, O., D. Georgarakos, Y. Gorodnichenko, and M. van Rooij (2023). How does consumption respond to news about inflation? field evidence from a randomized control trial. *American Economic Journal: Macroeconomics 15*(3), 109–52.

Coibion, O. and Y. Gorodnichenko (2015). Is the Phillips Curve Alive and Well after All? Inflation Expectations and the Missing Disinflation. *American Economic Journal: Macroeconomics 7*(1), 197–232.

Coibion, O., Y. Gorodnichenko, and M. Weber (2022). Monetary policy communications and their effects on household inflation expectations. *Journal of Political Economy 130*(6), 1537 – 1584.

Collins, D. (2022). Hogan, legislative leaders agree to one-month gas tax break amid budget surplus. https://www.wbaltv.com/article/gas-tax-maryland-emergency-suspension/39399009.

Correia, I., E. Farhi, J. P. Nicolini, and P. Teles (2013, June). Unconventional fiscal policy at the zero bound. *American Economic Review 103*(4), 1172–1211.

D'Acunto, F., D. Hoang, and M. Weber (2021). Managing Households' Expectations with Unconventional Policies. *The Review of Financial Studies 35*(4), 1597–1642.

D'Acunto, F., U. Malmendier, J. Ospina, and M. Weber (2021). Exposure to grocery prices and inflation expectations. *Journal of Political Economy 129*(5), 1615–1639.

D'Acunto, F., U. Malmendier, and M. Weber (2023). What do the data tell us about inflation expectations? In *Handbook of Economic Expectations*, pp. 133–161. Academic Press.

D'Acunto, F. and M. Weber (2020). Memory and beliefs: Evidence from the field. Technical report.

Doyle, J. J. and K. Samphantharak (2008). $2.00 gas! studying the effects of a gas tax moratorium. *Journal of Public Economics 92*(3), 869–884.

Duca-Radu, I., G. Kenny, and A. Reuter (2021). Inflation expectations, consumption and the lower bound: Micro evidence from a large multi-country survey. *Journal of Monetary Economics 118*(C), 120–134.

Edelstein, P. and L. Kilian (2009). How sensitive are consumer expenditures to retail energy prices? *Journal of Monetary Economics 56*(6), 766–779.

Foster, K., C. Greene, and J. Stavins (2023). 2022 survey and diary of consumer payment choice: Summary results. *Federal Reserve Bank of Atlanta, Research Data Report* (23-3).

Gelman, M., Y. Gorodnichenko, S. Kariv, D. Koustas, M. Shapiro, D. Silverman, and S. Tadelis (2023). The response of consumer spending to changes in gasoline prices. *American Economic Journal: Macroeconomics 15*(2), 129–60.

Genakos, C. and M. Pagliero (2022). Competition and pass-through: evidence from isolated markets. *American Economic Journal: Applied Economics 14*(4), 35–57.

Goodman-Bacon, A. (2021). Difference-in-differences with variation in treatment timing. *Journal of Econometrics 225*(2), 254–277.

Herb, C. (2022). Ct gas tax holiday is causing confusion for locally owned stations. https://ctmirror.org/2022/03/30/ct-gas-tax-holiday-is-causing-confusion-for-locally-owned-stations/.

Kamdar, R. (2019). The inattentive consumer: Sentiment and expectations. Technical report, Working Paper.

Kamdar, R. and W. Ray (2024). Attention-driven sentiment and the business cycle. Technical report, Working Paper.

Kilian, L. and X. Zhou (2022). Oil prices, gasoline prices, and inflation expectations. *Journal of Applied Econometrics 37*, 867–881.

Kilian, L. and X. Zhou (2024). Heterogeneity in the pass-through from oil to gasoline prices: A new instrument for estimating the price elasticity of gasoline demand. *Journal of Public Economics 232*(C).

Kim, G. and C. Binder (2023, April). Learning-through-survey in inflation expectations. *American Economic Journal: Macroeconomics 15*(2), 254–78.

Klopack, B. and F. Luco (2024). Measuring local consumption with payment cards and cell phone pings. *Working Paper*.

Leduc, S. and K. Sill (2004). A quantitative analysis of oil-price shocks, systematic monetary policy, and economic downturns. *Journal of Monetary Economics 51*(4), 781–808.

Levin, L., M. S. Lewis, and F. A. Wolak (2017, August). High frequency evidence on the demand for gasoline. *American Economic Journal: Economic Policy 9*(3), 314–47.

Li, S., J. Linn, and E. Muehlegger (2014). Gasoline taxes and consumer behavior. *American Economic Journal: Economic Policy 6*(4), 302–42.

Moomaw, G. (2022). Va. senate committee votes down youngkin's gas-tax holiday plan. https://virginiamercury.com/blog-va/va-senate-committee-votes-down-youngkins-gas-tax-plan/.

Pfäuti, O. (2024). The inflation attention threshold and inflation surges. *Working Paper*.

Powell (2022). Fomc meeting(june 14-15, 2022), press conference transcript. https://www.federalreserve.gov/mediacenter/files/FOMCpresconf20220615.pdf.

Reisman, N. (2022). New york attorney general: Gas stations must honor tax holiday. https://virginiamercury.com/blog-va/va-senate-committee-votes-down-youngkins-gas-tax-plan/.

Shirek, J. (2022). Georgia gas tax-cut | will gas stations pass along the savings to customers? https://www.11alive.com/article/traffic/gas-prices/georgia-gas-tax-cut-customer-savings/85-8c1b6947-2ed6-4621-b867-48049403b2cf.

Trehan, B. (2011). Household inflation expectations and the price of oil: It's deja vu all over again. Technical report, FRBSF Economic Letter.

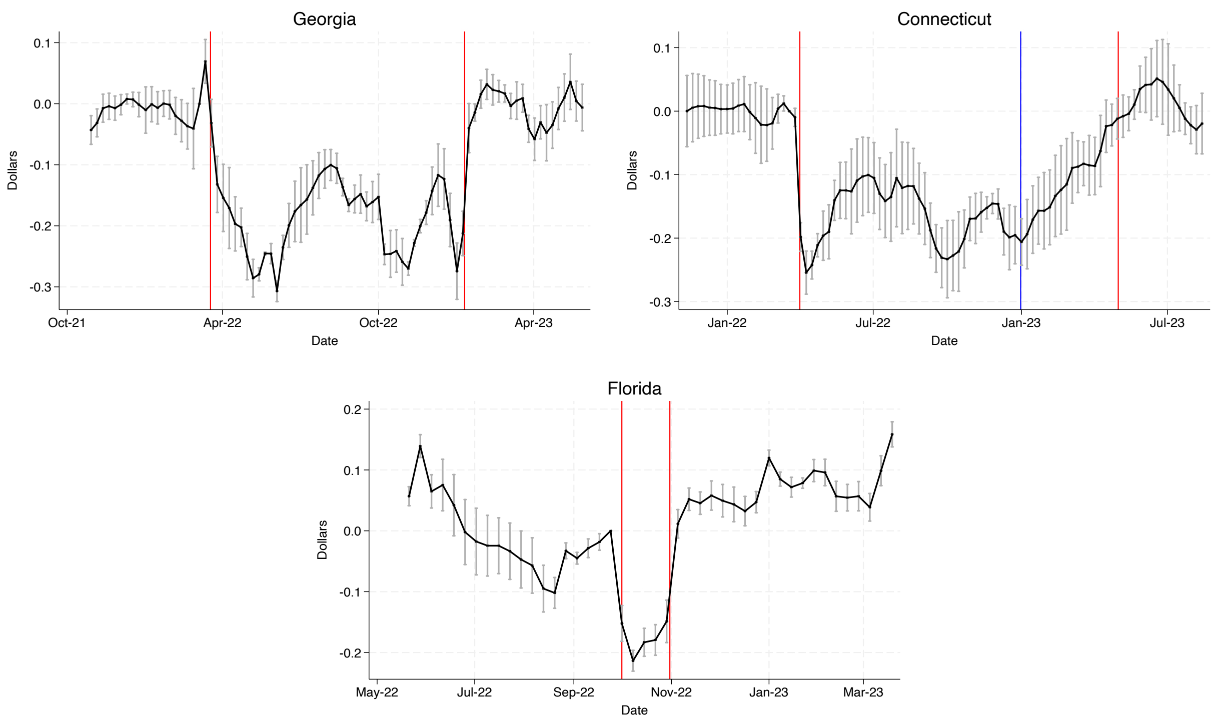
US Department of the Treasury (2022). The price impact of the strategic petroleum reserve release. https://home.treasury.gov/news/press-releases/jy0887.

Wehrhöfer, N. (2023). Energy prices and inflation expectations: Evidence from households and firms. Discussion paper 28, Deutsche Bundesbank.

# Online Appendix

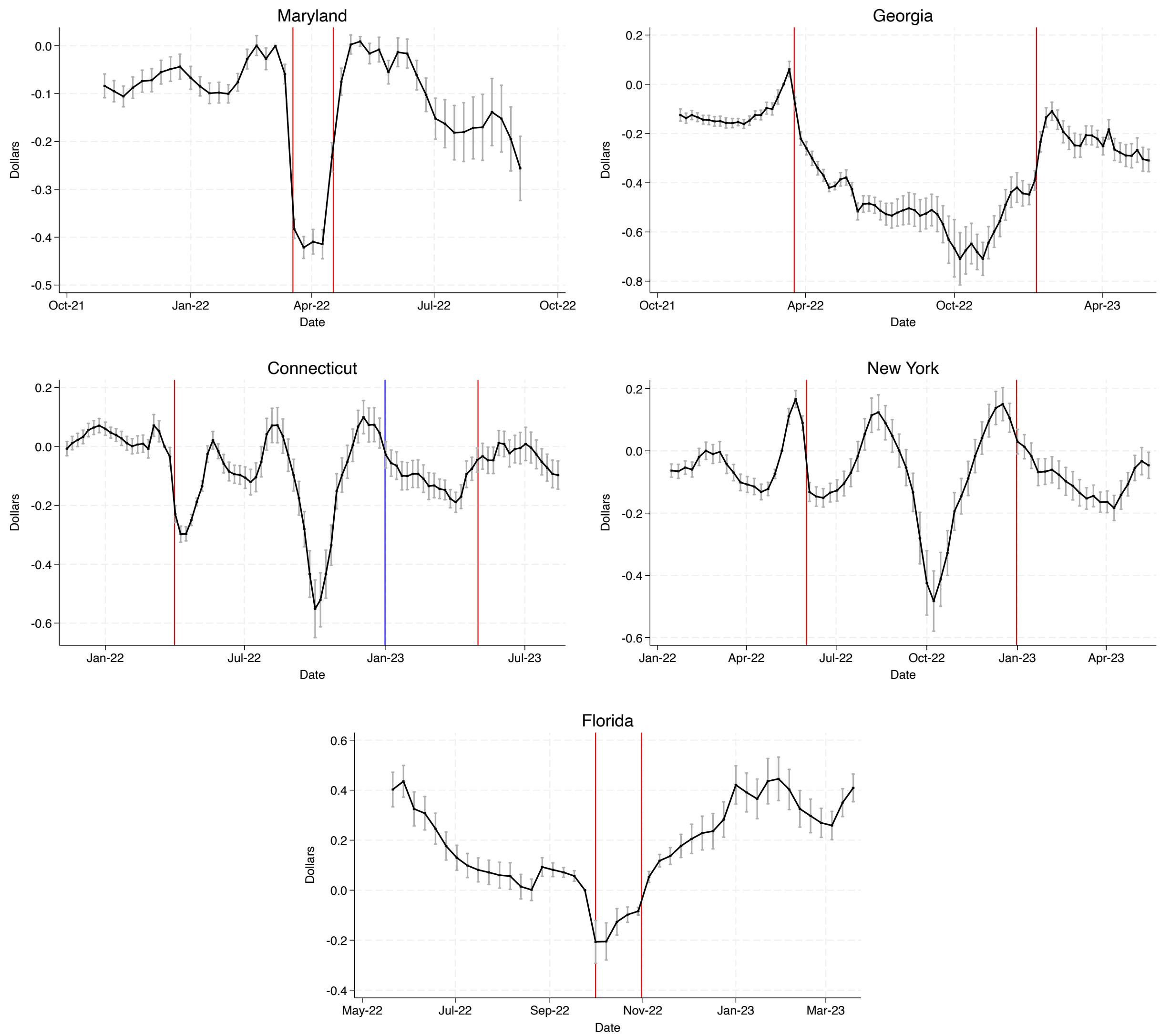
## A.1 Additional Figures

Figure A.1: Gas prices in tax holiday states vs. neighboring states (FL, GA, and CT)



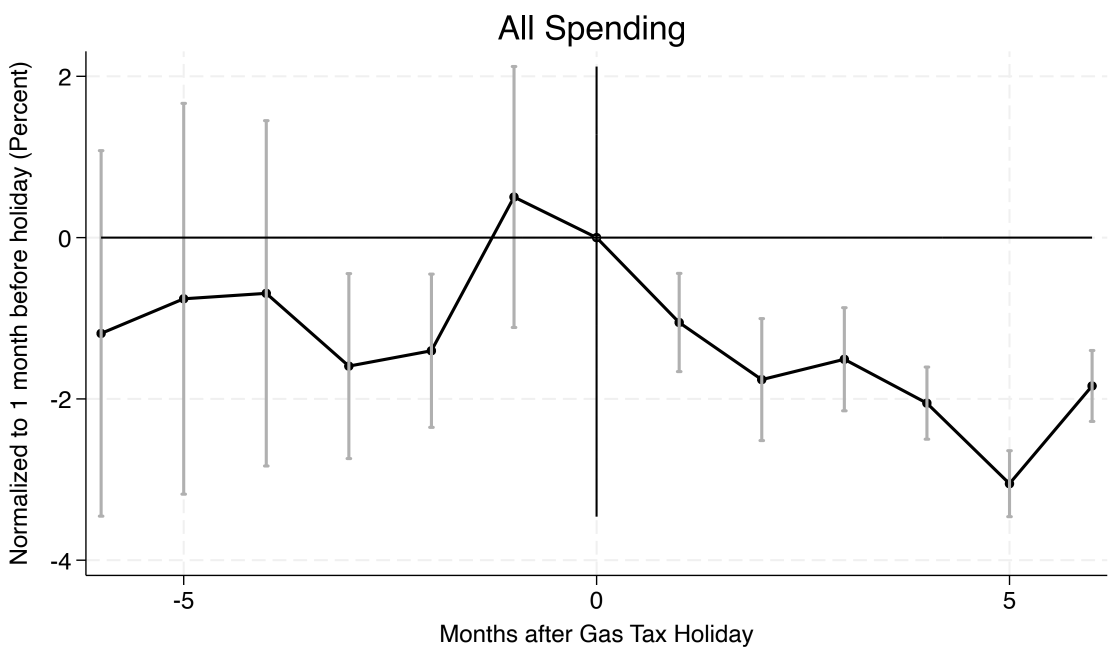

Notes: The figures plot the estimates $\widehat{\theta}_{st}$ from the regression equation (1), along with a 95% confidence interval for Florida ($0.16 cut), Georgia ($0.291 cut), and Connecticut ($0.25 cut). In the upper left panel, the treated state is Georgia, with Tennessee, Alabama, and South Carolina chosen as control states. In the upper right panel, the treated state is Connecticut, with Massachusetts, Rhode Island, Pennsylvania, and New Jersey serving as control states. In the bottom panel, the treated state is Florida, with North Carolina, South Carolina, Virginia, Tennessee, Alabama, and Mississippi serving as control states. The periods between the red vertical line indicate the period of gas tax holiday. In Connecticut, the tax holiday was phased out gradually by 5 cents a month beginning in January 2023 (marked by the blue line) and ending in May 2023 (red line). Standard errors are two-way clustered at the state and week level.

Figure A.2: Gas prices in tax holiday states vs. all non-treated states




Notes: The figures plot the estimates $\widehat{\theta}_{st}$ from the regression equation (1), along with a 95% confidence interval. The control group for each treated state includes all non-treated states. The periods between the red vertical line indicate the period of gas tax holiday. In Connecticut, the tax holiday was phased out gradually by 5 cents a month beginning in January 2023 (marked by the blue line) and ending in May 2023 (red line). Standard errors are two-way clustered at the state and week level.

Figure A.3: Event study specification for Consumption excluding New York and Florida




Notes: The figure illustrates the dynamics of all spending in treated states compared to control states using the stacked difference-in-differences (DID) specification (a modified version of equation (5) where we allow the treatment effect to vary over time). On the y-axis, the log spending is normalized to zero in month 0, the month that the tax suspension takes effect (also marked by the vertical dashed line). Standard errors are two-way clustered at the state and week level

## A.2 Additional Tables

Table A.1: Gas tax holiday policy details

| States | Governor | Gas Tax Cut | Period | Signed |
|---|---|---|---|---|
| Maryland | Larry Hogan (R) | 36.1¢/gal | Mar 18 - Apr 17, 2022 | Mar 18 |
| Georgia | Brian Kemp (R) | 29.1¢/gal | Mar 18, 2022 - Jan 10, 2023 | Mar 18 |
| Connecticut | Ned Lamont (D) | 25¢/gal | Apr 1 - Dec 31, 2022* | Mar 24 |
| New York | Kathy Hochul (D) | 16¢/gal | Jun 1 - Dec 31, 2022 | Apr 7 |
| Florida | Ron DeSantis (R) | 25.3¢/gal | Oct 1 - 31, 2022 | Jul 14 |

The table shows the details of policy implementation for the five states that implemented gas tax holidays in 2022. Unlike other states, Connecticut gradually phased out the gas tax holiday. Following the 25 cent cut in 2022, the tax increased by 5 cents per month beginning in January of 2023, until it reached the previous level of 25 cents in May 2023.

Table A.2: States that Proposed Gas Tax Holidays but Did Not Implement

| State | Legislative Action | Duration | Tax Reduction (per gallon) | Outcome/Status |
|---|---|---|---|---|
| Alaska | HB 104 (Partisan Bill (R)) | June 1, 2022[a]- June 30, 2023 | 8 cents | Passed House but did not advance in Senate |
| Arizona | S.3609 (Partisan Bill (D)) | February 9 - January 1, 2023 | 18.4 cents | Died in Senate Committee |
| California | AB1638 (Partisan Bill (R)) | 6 months | 18 cents | Stricken from file |
| Maine | Rep. Libby (R) proposed | A year | 30 cents | Did not advance in House |
| Massachusetts | Gov. Baker (R) proposed | March 22 - September 5, 2022 | 24 cents | Senate rejected |
| Michigan | HB 5570 / SB972 (Partisan Bill (R)) | June 15 - September 15, 2022 | 27.2 cents | Passed both House and Senate but vetoed by Gov. Whitmer (D) |
| Mississippi | Lt. Gov. Hosemann proposed | 6 months | 18.4 cents | State legislature remained focused on income tax reform efforts |
| New Hampshire | Gov. Sununu (R) proposed | A couple of month | 22 cents | Alternative proposal is proposed |
| New Jersey | Sen. Turner (D) proposed | 60 days | 42.4 cents | Gov. Murphy (D) opposed |
| Ohio | SB 277 (Partisan Bill (R)) | | | Died in House Committee |
| Pennsylvania | SB10 (Partisan Bill (R)) | March 21[b] - December 31, 2022 | 20 cents | Died in Senate Committee |
| Rhode Island | Senate Republicans proposed | | 35 cents | Opposed by Gov. Dan McKee (D) |
| Tennessee | Democratic lawmakers proposed | 90 days | | Refused by Gov. Lee (R) |
| Virginia | Gov. Youngkin (R) proposed | May 1 - July 31, 2022 | 26.2 cents | Senate rejected |
| Washington | SB5897 (Partisan Bill (R)) | January 18 [c] - December 31, 2022 | 49.4 cents | Died in Senate Committee |
| West Virginia | Democrats proposed | | | Gov. Justice (R) did not proceed |

Notes: The table presents a list of states that formally proposed legislative actions to reduce the gas tax but did not implement the policy (many additional states discussed these policies more informally without a legislative proposal). To the best of our knowledge, the following states did not formally propose a Gas Tax Holiday in the state legislature: Alabama, Arkansas, Colorado, Delaware, Hawaii, Illinois, Indiana, Idaho, Iowa, Kansas, Kentucky, Louisiana, Minnesota, Missouri, Montana, Nebraska, Nevada, New Mexico, North Carolina, North Dakota, Oklahoma, Oregon, South Carolina, South Dakota, Texas, Utah, Vermont, Wisconsin, and Wyoming. A suspension of the federal gas tax was also proposed by the Biden administration in 2022.

[a] HB104, proposed on May 16, 2022, suggested a Gas Tax Holiday beginning on the first day of the month following the effective date of this section and ending on June 30, 2023.

[b] SB10, proposed on MARCH 21, 2022, suggested a gas tax holiday from effective date of SB10 through the end of the 2022

[c] SB5897 on 2022-01-18 notes that no taxes may be imposed beginning on the effective date of this section through December 31, 2022.

Table A.3: State-level gas tax holiday pass-through using all non-treated states

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Daily Gas Prices (dollars) | | | | |
| | MD | GA | CT | NY | FL |
| Gas Tax Holiday ($D_{st}$) | -0.277*** | -0.310*** | -0.0708*** | 0.0145 | -0.451*** |
| | (0.0179) | (0.0211) | (0.0186) | (0.0246) | (0.0459) |
| State FE | Yes | Yes | Yes | Yes | Yes |
| Day FE | Yes | Yes | Yes | Yes | Yes |
| Observations | 40,561 | 40,561 | 40,561 | 40,561 | 40,561 |
| $R^2$ | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Gas tax cut (dollar) | 0.36 | 0.29 | 0.25 | 0.16 | 0.25 |
| Passthrough | 0.77 | 1.07 | 0.28 | 0.09 | 1.78 |
| Passthrough 95% CI | [0.67,0.86] | [0.92,1.21] | [0.14,0.43] | [-0.21,0.39] | [1.43,2.14] |
| Percent change (%) | -7.15 | -8.35 | -1.72 | 0.31 | -10.76 |
| 95% CI | [-8.06,-6.25] | [-9.47,-7.24] | [-2.61,-0.84] | [-0.71,1.33] | [-12.90,-8.61] |

Notes: The table presents the regression results based on the regression equation (2). The row labeled "Gas tax cut (dollar)" represents the size of the temporary gas tax cut in dollar terms, while the "Passthrough" row reports the pass-through rates for each state. "Passthrough 95% CI" denotes the 95% confidence interval. "Percent change (%)" reports percent changes in gas prices compared to the average over the previous three months before the implementation of the tax holiday and "Percent change 95% CI" reports 95% confidence interval. The control group in each regression includes all non-treated states. Standard errors clustered by state and week are indicated in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table A.4: Scope of Online Survey

| State | Wave | Observation | Survey Period | Gas Tax Holiday Implementation |
|---|---|---|---|---|
| Maryland | 1 | 119 | 2022/4/14-2022/4/17 | Yes |
| | 2 | 108 | 2022/6/1-2022/8/21 | |
| Virginia | 1 | 170 | 2022/4/14-2022/4/17 | |
| | 2 | 149 | 2022/6/1-2022/8/21 | |
| Georgia | 1 | 177 | 2022/5/26-2022/5/27 | Yes |
| Alabama | 1 | 70 | 2022/5/26-2022/5/27 | |
| New York | 1 | 520 | 2022/5/26-2022/5/31 | |
| | 2 | 414 | 2022/7/5-2022/8/19 | Yes |
| Pennsylvania | 1 | 421 | 2022/5/26-2022/5/31 | |
| | 2 | 325 | 2022/7/5-2022/8/19 | |
| Florida | 1 | 898 | 2022/9/18-2022/9/30 | |
| | 2 | 867 | 2022/10/13-2022/10/31 | Yes |
| | 3 | 819 | 2022/11/14-2022/12/31 | |
| Florida-control | 1 | 948 | 2022/9/18-2022/9/30 | |
| | 2 | 939 | 2022/10/13-2022/10/31 | |
| | 3 | 881 | 2022/11/14-2022/12/31 | |

Notes: The table outlines the extent and timing of the online survey we conducted on the Prolific platform. Data were collected from the treated states—Maryland, Georgia, New York, and Florida—and their neighboring states. The data exhibits a panel structure for those states with multiple survey waves. For the Maryland-Virginia pair, samples were collected during and after the gas tax holiday in Maryland. In the case of Georgia and Alabama, the sample was collected in only one wave during the gas tax holiday in Georgia. For New York and Pennsylvania, responses were solicited before and during the gas tax holiday in New York. Lastly, for Florida and its control states, data were collected before, during, and after the gas tax holiday. The control states for Florida include South Carolina, North Carolina, Tennessee and Virginia. The last column indicates whether the survey timeline overlapped with the gas tax holiday, providing a snapshot of the coverage of online survey relative to the policy's implementation.

Table A.5: Demographic composition from ACS, SCE, and Prolific

| | (1) ACS | (2) Prolific | (3) SCE | (4) Combined Prolific and SCE |
|---|---|---|---|---|
| | Weighted | Unweighted | Unweighted | Weighted |
| Female | 0.51 | 0.56 | 0.50 | 0.52 |
| White | 0.70 | 0.70 | 0.81 | 0.75 |
| 18-34 | 0.30 | 0.52 | 0.21 | 0.28 |
| 35-54 | 0.33 | 0.34 | 0.41 | 0.33 |
| 55+ | 0.37 | 0.14 | 0.39 | 0.40 |
| Bachelor's degree (e.g. BA, BS) | 0.31 | 0.55 | 0.57 | 0.31 |
| Observations | 12,453,498 | 3,654 | 4,749 | 8,297 |

Notes: column (1) reports the weighted aggregate state-level demographic characteristics using data from the American Community Survey (ACS). Columns (2) and (3) present the unweighted demographic characteristics from the Prolific and SCE samples, respectively. Finally, column (4) displays the weighted demographic characteristics for the combined data, including both the Prolific and SCE datasets. This combined data is weighted using individual-level weights constructed for this paper.

Table A.6: Comparison of Inflation Expectation between Prolific and SCE data

| | One-year-ahead Inflation Expectations during Gas Tax Holiday | | | | | |
|---|---|---|---|---|---|---|
| | Prolific | | | SCE | | |
| State | Mean | Standard Deviation | Observation | Mean | Standard Deviation | Observation |
| Maryland | 7.1 | 3.4 | 99 | 6.1 | 3.6 | 16 |
| Virginia | 7.5 | 3.4 | 140 | 5.8 | 3.6 | 34 |
| Georgia | 8.0 | 3.4 | 164 | 6.2 | 4.7 | 314 |
| Alabama | 9.4 | 4.3 | 62 | 7.4 | 3.8 | 109 |
| New York | 7.9 | 3.8 | 392 | 5.8 | 5.3 | 455 |
| Pennsylvania | 8.4 | 3.3 | 310 | 6.0 | 4.4 | 404 |
| Florida | 7.5 | 4.0 | 815 | 5.4 | 5.7 | 65 |
| Florida-Control | 7.4 | 4.0 | 887 | 5.7 | 4.9 | 122 |

Notes: The table presents the average and standard deviations of 1-year ahead inflation expectations (computed as the expected value from the density forecast) during the gas tax holiday. The data from the Prolific survey are displayed in the left panel, while the SCE data are shown in the right panel.

Table A.7: State-level effects on inflation expectations using SCE data

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Expected inflation rate (density) | | | | |
| Gas Tax Holiday | -0.514 | -1.364* | -1.768* | -0.422 | -0.945 |
| (dummy) | (0.585) | (0.443) | (0.642) | (0.339) | (1.187) |
| State | MD | GA | CT | NY | FL |
| Sampling Weight | Yes | Yes | Yes | Yes | Yes |
| Individual Fixed Effect | Yes | Yes | Yes | Yes | Yes |
| Time Fixed Effect | Yes | Yes | Yes | Yes | Yes |
| Survey Tenure Fixed Effect | Yes | Yes | Yes | Yes | Yes |
| Data | SCE | SCE | SCE | SCE | SCE |
| Observations | 816 | 1,313 | 1,698 | 1,992 | 1,462 |
| $R^2$ | 0.71 | 0.59 | 0.63 | 0.67 | 0.66 |

Notes: The table presents the weighted regression results based on the regression equation (3), utilizing SCE data with individual and monthly-time fixed effects. Control states are defined as neighboring states to the treated states. The control states for Maryland are Pennsylvania, Delaware, Virginia, and West Virginia. For Georgia, the control states are Tennessee, South Carolina, and Alabama. Connecticut's control states are Massachusetts, Rhode Island, Pennsylvania, and New Jersey. The control states for New York include Pennsylvania, Delaware, New Hampshire, and New Jersey. Lastly, the control states for Florida are North Carolina, South Carolina, Virginia, Tennessee, Alabama, and Mississippi. Standard errors clustered by state and week are indicated in parentheses.

Table A.8: State-level effects on inflation expectations in New York and Florida, dropping three weeks prior to implementation

| | (1) | (2) |
|---|---|---|
| | Expected inflation rate (density) | |
| Gas Tax Holiday (dummy) | -0.551** | 0.00278 |
| | (0.194) | (0.0873) |
| State | NY | FL |
| Sampling Weight | Yes | Yes |
| Individual Fixed Effect | Yes | Yes |
| Time Fixed Effect | Yes | Yes |
| Survey Tenure Fixed Effect | Yes | Yes |
| Data | | |
| Observations | 2,157 | 4,192 |
| $R^2$ | 0.68 | 0.76 |

Notes: The table presents the regression results based on the regression equation (3) for Florida and New York where we drop survey responses collected during the three weeks prior to the implementation of the policy. Control states are defined as neighboring states to the treated states. The control states for Maryland are Pennsylvania, Delaware, Virginia, and West Virginia. For Georgia, the control states are Tennessee, South Carolina, and Alabama. Connecticut's control states are Massachusetts, Rhode Island, Pennsylvania, and New Jersey. The control states for New York include Pennsylvania, Delaware, New Hampshire, and New Jersey. Lastly, the control states for Florida are North Carolina, South Carolina, Virginia, Tennessee, Alabama, and Mississippi. Standard errors clustered by state and week are indicated in parentheses.

Table A.9: Impact of the Gas Tax Holiday on Inflation Expectations: Pooled Effects, individual clustering

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | One-year-ahead expected inflation rate (density) | | | | | |
| Gas Tax Holiday<br>(dummy) | -0.314**<br>(0.156) | -1.333***<br>(0.379) | 0.280<br>(0.223) | -0.307**<br>(0.157) | -1.351***<br>(0.378) | 0.235<br>(0.235) |
| Gas Tax Holiday<br>× Percent Gas Price Change | | | 0.145**<br>(0.0565) | | | 0.132**<br>(0.0587) |
| Sample | All | Excl. FL, NY | All | All | Excl. FL, NY | All |
| Sampling Weight | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment × Individual FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment × Time FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment × Survey Tenure FE | Yes | Yes | Yes | Yes | Yes | Yes |
| State-level controls | No | No | No | Yes | Yes | Yes |
| Data | Combined | Combined | Combined | Combined | Combined | Combined |
| Observations | 68,463 | 41,122 | 68,463 | 68,463 | 41,122 | 68,463 |
| $R^2$ | 0.67 | 0.66 | 0.67 | 0.67 | 0.66 | 0.67 |

Notes: The table details the impact of the Gas Tax Holiday on inflation expectations, utilizing the stacked DID specification outlined in equation (4). The average percent change in gas prices indicates changes in gas prices during the holiday compared to the previous 3-month average gas prices multiplied by 100. The control group comprises all states except the ones treated. Columns (1)-(3) report the results with the experiment interacted with respondents time fixed effects but without including state-level control variables. In contrast, Columns (4)-(6) incorporate both of these fixed effects, while also controlling for state-level variables– state-level unemployment (from the BLS), growth rates of nominal and real GDP (from the BEA) in each state. Columns (2) and (5) exclude the policy experiments in Florida and New York, while the other columns report results using all five policy changes. Standard errors clustered by individual are provided in parentheses.

Table A.10: Impact of the Gas Tax Holiday on Inflation Expectations: Pooled Effects, state clustering

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | One-year-ahead expected inflation rate (density) | | | | | |
| Gas Tax Holiday | -0.314 | -1.333*** | 0.280 | -0.307 | -1.351*** | 0.235 |
| (dummy) | (0.233) | (0.125) | (0.207) | (0.238) | (0.172) | (0.241) |
| Gas Tax Holiday | | | 0.145** | | | 0.132* |
| × Percent Gas Price Change | | | (0.0590) | | | (0.0678) |
| Sample | All | Excl. FL, NY | All | All | Excl. FL, NY | All |
| Sampling Weight | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment × Individual FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment × Time FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment × Survey Tenure FE | Yes | Yes | Yes | Yes | Yes | Yes |
| State-level controls | No | No | No | Yes | Yes | Yes |
| Data | Combined | Combined | Combined | Combined | Combined | Combined |
| Observations | 68,463 | 41,122 | 68,463 | 68,463 | 41,122 | 68,463 |
| $R^2$ | 0.67 | 0.66 | 0.67 | 0.67 | 0.66 | 0.67 |

Notes: The table details the impact of the Gas Tax Holiday on inflation expectations, utilizing the stacked DID specification outlined in equation (4). The average percent change in gas prices indicates changes in gas prices during the holiday compared to the previous 3-month average gas prices multiplied by 100. The control group comprises all states except the ones treated. Columns (1)-(3) report the results with the experiment interacted with individuals, time, and survey tenure fixed effects but without including state-level control variables. Columns (4)-(7) add additional state-level control variables – state-level unemployment rate (from the BLS) and growth rates of nominal and real GDP (from the BEA). Columns (2) and (5) exclude the policy experiments in Florida and New York, while the other columns report results using all five policy changes. Standard errors clustered by state are provided in parentheses.

Table A.11: Impact of the Gas Tax Holiday on Inflation Expectations: Pooled Effects using SCE data

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | One-year-ahead expected inflation rate (density) | | | | | |
| Gas Tax Holiday | -0.720*** | -1.059*** | -0.274 | -0.748*** | -1.067*** | -0.350 |
| (dummy) | (0.261) | (0.217) | (0.226) | (0.243) | (0.238) | (0.229) |
| Gas Tax Holiday | | | 0.131** | | | 0.117** |
| × Percent Gas Price Change | | | (0.0591) | | | (0.0542) |
| Sample | All | Excl. FL, NY | All | All | Excl. FL, NY | All |
| Sampling Weight | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment × Individual FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment × Time FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment × Survey Tenure FE | Yes | Yes | Yes | Yes | Yes | Yes |
| State-level controls | No | No | No | Yes | Yes | Yes |
| Data | SCE | SCE | SCE | SCE | SCE | SCE |
| Observations | 51,048 | 32,881 | 51,048 | 51,048 | 32,881 | 51,048 |
| $R^2$ | 0.66 | 0.65 | 0.66 | 0.66 | 0.65 | 0.66 |

Notes: The table details the impact of the Gas Tax Holiday on inflation expectations, utilizing the stacked DID specification outlined in Equation (4) using SCE data. The percent change in gas prices indicates changes in gas prices during the holiday compared to previous 3 month average gas prices. The control group comprises all states except the ones treated. Columns (1)-(3) report the results with the experiment interacted with both respondents and time fixed effects but without including state-level control variables. In contrast, Columns (4)-(6) incorporate both of these fixed effects, while also controlling for state-level variables– state-level unemployment (from the BLS), nominal and real GDP, and the GDP deflator inflation rate (from the BEA). Columns (2) and (5) exclude the policy experiments in Florida and New York, while the other columns report results using all five policy changes. Standard errors clustered by state and week are provided in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table A.12: Impact of the Gas Tax Holiday on Inflation Expectations: Pooled Effects except Florida

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | One-year-ahead expected inflation rate (density) | | | |
| Gas Tax Holiday (dummy) | -0.631<br>(0.476) | 0.139<br>(0.183) | -0.680<br>(0.456) | 0.0774<br>(0.194) |
| Gas Tax Holiday × Percent Gas Price Change | | 0.253***<br>(0.0460) | | 0.248***<br>(0.0431) |
| Sample | All | All | All | All |
| Sampling Weight | Yes | Yes | Yes | Yes |
| Experiment × Individual FE | Yes | Yes | Yes | Yes |
| Experiment × Time FE | Yes | Yes | Yes | Yes |
| Experiment × Survey Tenure FE | Yes | Yes | Yes | Yes |
| State-level controls | No | No | Yes | Yes |
| Data | Combined | Combined | Combined | Combined |
| Observations | 56,579 | 56,579 | 56,579 | 56,579 |
| $R^2$ | 0.66 | 0.66 | 0.66 | 0.66 |

Notes: The table details the impact of the Gas Tax Holiday on inflation expectations, utilizing the stacked DD specification outlined in Equation (4). This regression table features data from four treated states—Maryland, Georgia, Connecticut, and New York—along with their corresponding control states. The control group comprises all states except the ones treated. Columns (1)-(2) report the results with the experiment interacted with individuals, time, and survey tenure fixed effects but without including state-level control variables. Columns (3)-(4) add additional state-level control variables – state-level unemployment rate (from the BLS) and growth rates of nominal and real GDP (from the BEA). Standard errors clustered by state and week are provided in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table A.13: Impact of the Gas Tax Holiday on Gas Price Inflation Expectations: Pooled Effects using SCE data

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | One-year-ahead expected gas price inflation rate | | | | | |
| Gas Tax Holiday | -2.057*** | -2.495** | -1.624** | -1.963** | -2.691** | -1.054 |
| (dummy) | (0.648) | (1.044) | (0.639) | (0.808) | (1.224) | (0.777) |
| Gas Tax Holiday | | | 0.127 | | | 0.267 |
| × Percent Gas Price Change | | | (0.181) | | | (0.218) |
| Sample | All | Excl. FL, NY | All | All | Excl. FL, NY | All |
| Sampling Weight | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment × Individual FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment × Time FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment × Survey Tenure FE | Yes | Yes | Yes | Yes | Yes | Yes |
| State-level controls | No | No | No | Yes | Yes | Yes |
| Data | SCE | SCE | SCE | SCE | SCE | SCE |
| Observations | 45,914 | 29,569 | 45,914 | 45,914 | 29,569 | 45,914 |
| $R^2$ | 0.63 | 0.62 | 0.63 | 0.63 | 0.62 | 0.63 |

Notes: The table details the impact of the Gas Tax Holiday on gas price inflation expectations, utilizing the stacked DID specification outlined in equation (4), replacing inflation expectations with gas price inflation expectations. The average percent change in gas prices indicates changes in gas prices during the holiday compared to the previous 3-month average gas prices multiplied by 100. The control group comprises all states except the ones treated. Columns (1)-(3) report the results with the experiment interacted with individuals, time, and survey tenure fixed effects but without including state-level control variables. Columns (4)-(7) add additional state-level control variables – state-level unemployment rate (from the BLS) and growth rates of nominal and real GDP (from the BEA). Columns (2) and (5) exclude the policy experiments in Florida and New York, while the other columns report results using all five policy changes. Standard errors clustered by state and week are provided in parentheses.

Table A.14: State-level effects on inflation expectations using all non-treated states

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Expected inflation rate (density) | | | | |
| Gas Tax Holiday | -1.505*** | -1.194*** | -1.464*** | 0.231 | -0.0523 |
| (dummy) | (0.250) | (0.252) | (0.290) | (0.141) | (0.0896) |
| State | MD | GA | CT | NY | FL |
| Sampling Weight | Yes | Yes | Yes | Yes | Yes |
| Individual Fixed Effect | Yes | Yes | Yes | Yes | Yes |
| Time Fixed Effect | Yes | Yes | Yes | Yes | Yes |
| Survey Tenure Fixed Effect | Yes | Yes | Yes | Yes | Yes |
| Data | Combined | Combined | Combined | Combined | Combined |
| Observations | 8,231 | 16,871 | 16,020 | 15,457 | 11,884 |
| $R^2$ | 0.70 | 0.65 | 0.65 | 0.67 | 0.71 |

Notes: The table presents the weighted regression results based on the regression equation (3), utilizing pooled data with individual and monthly-time fixed effects. The control group in each regression includes all non-treated states. Standard errors clustered by state and week are indicated in parentheses.

Table A.15: Time Series Analysis of Gas Price Fluctuations and Inflation Expectations

| | (1) | (2) | (3) |
|---|---|---|---|
| | Changes in 1-year ahead Inflation Expectation | | |
| Monthly Growth Rates of Gas Prices (%) | 0.0462* | 0.0419*** | 0.360*** |
| | (0.0247) | (0.00936) | (0.0830) |
| Constant | -0.0940 | -0.0739 | -0.145** |
| | (0.174) | (0.0489) | (0.0612) |
| Unit of Observation | Aggregate | State | Individual |
| Gas Prices | National | State | State |
| Observations | 13 | 661 | 14,465 |
| $R^2$ | 0.28 | 0.06 | 0.00 |

Notes: Sample period: December 2021 to January 2023. Column (1) examines how aggregate national 1-year ahead inflation expectations respond to monthly percent changes in national gas prices. Column (2) investigates how state-level 1-year ahead inflation expectations are influenced by monthly percent changes in state-level average gas prices. Column (3) analyzes individual inflation expectations in response to state-level monthly percent changes in gas prices. Heteroskedasticity-robust (column (1)) and state-level clustered standard errors (columns (2)-(3)) are provided in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table A.16: Gas Price Inflation and Inflation Expectations

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | One-year-ahead expected inflation rate (density) | | | | | |
| $\pi^{gas}$ | 0.0192*** | 0.00156 | 0.0693* | 0.0188*** | 0.00331 | 0.0653 |
| | (0.00209) | (0.00396) | (0.0402) | (0.00217) | (0.00380) | (0.0439) |
| Sample | All | All | All | All | All | All |
| Sampling Weight | Yes | Yes | Yes | No | Yes | Yes |
| Experiment × Individual FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment × Time FE | No | Yes | Yes | No | Yes | Yes |
| Experiment × Survey Tenure FE | Yes | Yes | Yes | Yes | Yes | Yes |
| State-level controls | No | No | No | No | Yes | No |
| Data | Combined | Combined | Combined | Combined | Combined | Combined |
| Estimation | OLS | OLS | 2SLS | OLS | OLS | 2SLS |
| First-stage F | | | 128.4 | | | 124.5 |
| Observations | 68,463 | 68,463 | 68,463 | 68,463 | 68,463 | 68,463 |
| $R^2$ | 0.67 | 0.67 | 0.01 | 0.67 | 0.67 | 0.02 |

Notes: This table presents the estimated impact of gas price inflation on inflation expectations, using a stacked difference-in-differences (DID) specification: $E_t^i \pi_{e,t+1} = \alpha_{ei} + \beta_{et} + \gamma X_{eit} + \theta \pi_{s,t}^{gas} + \varepsilon_{eit}$, where the gas price inflation rate is calculated as the price growth in the preceding 6 months using state-level daily gas price data from AAA: $\pi_{s,t}^{gas} = \log(P_{s,t}^{gas}/P_{s,t-6}^{gas}) \times 100$ . The control group includes all states except those that implemented the gas tax holiday. Columns (1), (2), (4), and (5) report ordinary least squares (OLS) estimates, while columns (3) and (6) use two-stage least squares (2SLS), instrumenting gas price inflation with the percentage change in gas prices during the gas tax holiday in treated states. Columns (1) and (4) present results from a specification that includes experiment x respondent and experiment x survey tenure fixed effects. Columns (2)-(3) and (5)-(6) extend this specification by adding experiment x time fixed effects. Columns (1)-(3) do not include additional control variables, while columns (4)-(6) incorporate state-level controls: state-level unemployment (from the BLS) and the growth rates of nominal and real GDP (from the BEA). Standard errors clustered by state and week are provided in parentheses. * p<0.10, ** p<0.05, *** p<0.01.

Table A.17: Heterogeneous effects of gas tax holiday

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1-year ahead expected inflation rate(density) | | | | | | | | | | |
| | Gender | | Race | | Age | | | Education | | Awareness | |
| | Male | Female | Non-white | White | 18-34 | 35-54 | 55+ | $\leq$ College | $\geq$ College | Not Aware | Aware |
| Gas Tax Holiday | 0.279 | 0.233 | 0.969*** | -0.157 | 0.431 | 0.252 | -0.0252 | 0.147 | 0.386** | 1.013*** | 1.648** |
| (dummy) | (0.250) | (0.217) | (0.197) | (0.172) | (0.354) | (0.226) | (0.565) | (0.320) | (0.167) | (0.126) | (0.676) |
| Gas Tax Holiday | 0.121* | 0.102 | 0.426*** | -0.0544 | 0.137 | 0.184*** | 0.00937 | 0.113 | 0.0959*** | 0.137*** | 0.370*** |
| $\times$ Percent Gas Price Change | (0.0680) | (0.0760) | (0.0514) | (0.0416) | (0.0835) | (0.0522) | (0.152) | (0.0915) | (0.0366) | (0.0300) | (0.119) |
| Sampling Weight | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment $\times$ Individual | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment $\times$ Time | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State-level controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Data | Pool | Pool | Pool | Pool | Pool | Pool | Pool | Pool | Pool | Pool | Pool |
| Observations | 35,417 | 36,726 | 13,975 | 58,168 | 19,052 | 30,000 | 23,091 | 31,600 | 40,543 | 68,122 | 67,264 |
| $R^2$ | 0.69 | 0.66 | 0.67 | 0.67 | 0.66 | 0.66 | 0.70 | 0.68 | 0.67 | 0.67 | 0.67 |

Notes: The table presents the heterogeneous impacts of the gas tax holiday on inflation expectations among different demographic groups, employing the stacked DID specification as outlined in Equation (4). Columns (1) and (2) compare the results for male and female respondents, respectively. Columns (3) and (4) focus on non-white and white respondents. Columns (5), (6), and (7) categorize the results based on age groups. Columns (8) and (9) differentiate between respondents with less than a college education and those with a college education or higher. Finally, Column (10) compares respondents in the treated states who were aware of the policy with all respondents in the control group, while Column (11) compares those in the treated states who were unaware of the policy with all respondents in the control group. Standard errors clustered by state and week are indicated in parentheses.

Table A.18: Awareness and Expected Pass-through of Gas Tax Holiday in treated states

| | (1) MD | (2) NY | (3) FL (Sep) | (4) FL (Oct) |
|---|---|---|---|---|
| Survey Implementation | During | Before | Before | During |
| | Gas Tax Holiday | | | |
| Awareness of treatment (%) | 70.53 | 31.36 | 19.21 | 21.59 |
| Expect gas prices to increase (%) | 8.27 | 4.55 | 8.94 | 5.63 |
| Expect no changes in gas prices (%) | 23.40 | 38.42 | 28.29 | 39.06 |
| Expect gas prices to decrease (%) | 68.32 | 57.03 | 62.77 | 55.31 |
| Expected passthrough (cents) | -16.70 | -6.30 | -15.02 | -22.17 |
| Expected passthrough (rates) | 0.46 | 0.39 | 0.59 | 0.88 |
| Observations | 88 | 223 | 443 | 436 |

Notes: This table summarizes the awareness and expected pass-through of the gas tax holiday among information-treated respondents in treated states.

Table A.19: Immediate Revisions in Inflation expectations

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Forecast revisions in 1-year ahead Inflation Expectations | | | | | |
| Information treatment | -0.0362 | -0.186 | -1.023 | -1.004 | 0.163 | 0.0457 |
| | (0.320) | (0.351) | (0.742) | (0.844) | (0.445) | (0.524) |
| | | | Survey Implementation | | | |
| | | | During | | Before | |
| Sample fixed effect | Yes | Yes | MD1,FL2 | MD1,FL2 | NY1,FL1 | NY1,FL1 |
| Control for demographics | Yes | Yes | Yes | Yes | Yes | Yes |
| Robust | OLS | Huber | OLS | Huber | OLS | Huber |
| Observations | 955 | 955 | 170 | 170 | 785 | 785 |
| $R^2$ | 0.04 | 0.05 | 0.25 | 0.35 | 0.03 | 0.03 |

Notes: The table reports the results from the information treatment described in Section 5.4. Specifically, we regress the change in inflation expectations on a treatment indicator and a vector of demographic controls, including age, gender, race, income, employment status, level of education, political orientation, housing status, and gas consumption. The analysis divide the sample into two distinct groups: one comprising participants who received information treatment prior to the gas tax holiday (New York wave 1 and Florida wave 1) and another group that was informed during the gas tax holiday (Maryland wave 1 and Florida wave 2). Columns (1) and (2) feature results using OLS regression and robust regression, respectively, and include sample fixed effects to account for the division into pre- and during gas tax holiday groups. Columns (3) and (4) focus on results from the group informed during the Gas Tax Holiday, while Columns (5) and (6) present findings from the group informed prior to the holiday. Each set of results—those using OLS regression in Columns (1), (3), and (5), and those applying robust regression in Columns (2), (4), and (6). State-level clustered standard errors are provided in parentheses.

Table A.20: Immediate Revisions in Consumption Sentiment

| | (1) | (2) | (3) |
|---|---|---|---|
| | Revisions in Good Time to Purchase | | |
| | House | Car | Durables |
| Information treatment | -0.152 | -0.306 | -0.104 |
| | (0.275) | (0.332) | (0.0857) |
| Sample Fixed Effect | Yes | Yes | Yes |
| Control for demographics | Yes | Yes | Yes |
| Observations | 471 | 473 | 438 |
| $R^2$ | 0.05 | 0.08 | 0.05 |

Notes: The table examines the effect of information treatment on consumer sentiment towards purchasing durable goods. It captures the immediate adjustments in consumption sentiment, represented by the differential between sentiments before and after receiving information treatment. Specifically, respondents were surveyed on their current outlook towards acquiring durable goods like houses, apartments, vehicles, and large appliances or electronics, both prior to and following the information treatment. To articulate their sentiment, participants selected from a five-point scale: "Very Good" (coded as 5), "Good" (coded as 4), "Neither Good Nor Bad" (coded as 3), "Bad" (coded as 2), and "Very Bad" (coded as 1). Control variables include age, gender, race, income, employment status, level of education, political orientation, housing status, and gas consumption. State-level clustered standard errors are provided in parentheses.

Table A.21: Consumption During the Gas Tax Holiday Exc Florida and New York

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Log Spending × 100 | | | |
| | | Goods | | Services |
| | All | Durables | Non-durables | Service |
| Gas Tax Holiday (Dummy) | -0.645*** (0.110) | 0.735** (0.348) | -1.244*** (0.444) | -1.799*** (0.389) |
| Experiment × State FE | Yes | Yes | Yes | Yes |
| Experiment × Time FE | Yes | Yes | Yes | Yes |
| State-level Controls | Yes | Yes | Yes | Yes |
| Observations | 8,050 | 8,050 | 8,050 | 8,050 |
| $R^2$ | 0.89 | 0.76 | 0.76 | 0.86 |

Notes: The table shows the impact of the gas tax holiday on different consumption categories, utilizing the stacked DID specification (shown in equation (5)). The dependent variables analyzed are: log spending across all consumption categories (column (1)), log spending on durable goods (column (2)), log spending on non-durable goods (column (3)), log spending on services (column (4)). All specifications include experiment-level state and monthly fixed effects. State-level controls include monthly state-level real and nominal GDP. The main regressor is a gas tax holiday dummy variable. Standard errors clustered by state and week are indicated in parentheses.

## A.3 Information Treatment

Figure A.4: Information treatment in Maryland

You are almost done with the survey. Before the final questions, we would like you to know the following:

Maryland Republican Gov. Larry Hogan signed legislation on March 18 that suspends the state's gas tax of **36.1 cents per gallon for 30 days.**

"I think it makes a huge difference to the average consumer and I can tell you that the average price across the country is something like $4.25 — we're down around $3.75 so we're **50 cents a gallon cheaper** than most," Hogan said during an interview in March on CNBC's "Squawk Box."

Figure A.5: Information treatment in New York

U.S. gasoline prices have reached records above $4 a gallon. The reopening economy already had lifted prices from pandemic lows, but the rise turned into a surge after the Russia-Ukraine War.

To ease the financial burden, New Yorkers will be getting significant relief from soaring prices at the pump, with a suspension in the state's gas tax from June 1st through December 31st, Gov. Kathy Hochul announced.

The tax break would temporarily remove 16 cents per gallon in state taxes. Consumers would save about $2 on a 12-gallon fill-up at the pumps.

Figure A.6: Information treatment in Florida

You are almost done with the survey. Before the final questions, we would like you to know the following:

Gov. Ron DeSantis signed a bill in May that established 10 tax holidays, including a one-month Fuel Tax Holiday from Oct. 1-31. State leaders said this would save Floridians about $200 million as the price of gas per gallon would decrease by 25.3 cents.

## A.4 A Sample of Survey Questions

1 # Gas tax holiday - Florida

---

Start of Block: Information consent

information_consent You are invited to participate in this study because we are trying to learn more about your opinions about the economy. The survey is designed to measure consumer expectations and economic sentiments.

It will take about *15 minutes expected to complete survey or test*.

Your participation in this study is voluntary. You can decide not to participate in this research and it will not be held against you. You can leave the study at any time.

There are no sensitive questions in this survey that should cause discomfort. However, you can skip any question you do not wish to answer, or exit the survey at any point.

You may view the Prolific's confidentiality policy at https://researcher-help.prolific.co/hc/en-gb/articles/360009094594-Data-protection-and-privacy.

Qualtrics's privacy statement is available at https://www.qualtrics.com/privacy-statement/.

Your information will be kept confidential to the extent allowed by law. The results of the research study may be published but your identity will remain confidential.

Once you submit your responses, I will review and approve your submissions. Upon successful responses, you will be paid $3 by Prolific. Your reward will automatically be credited to your Prolific account. The payment will be made in 3 days. More details about the compensation are available here (link).

Please feel free to ask questions regarding this study. You may contact me later if you have additional questions or concerns at yoonjo@tamu.edu *or 1-979-845-7340.*

You may also contact the Human Research Protection Program at Texas A&M University (which is a group of people who review the research to protect your rights) by phone at 1-979-458-4067, toll free at 1-855-795-8636, or by email at irb@tamu.edu for: additional help with any questions about the research voicing concerns or complaints about the research obtaining answers to questions about your rights as a research participant concerns in the event the research staff could not be reached the desire to talk to someone other than the research staff

1 If you want a copy of this consent for your records, you can print it from the screen. If you wish to participate, please click the **“I Agree”** button and you will be taken to the survey. If you do not wish to participate in this study, please select **“I Disagree”** or select **X** in the corner of your browser

◯ I agree. (4)

◯ I disagree. (5)

**End of Block: Information consent**

---

**Start of Block: Demographics**

prolific_id What is your Prolific ID?

________________________________________________________________

Page Break

gender What is your gender?

◯ Male (1)

◯ Female (2)

◯ Other (3)

Page Break

b_year What is your birth year? Enter your 4 digit birth year.

________________________________________________________________

Page Break

1

ethnicity How would you describe yourself? Please select all that apply.

- White (1)
- Black or African American (2)
- American Indian or Alaska Native (3)
- Asian (4)
- Native Hawaiian or Pacific Islander (5)
- Hispanic or Latino Origin (6)
- Other (7)

---

Page Break

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

- Less than a high school diploma (1)
- High school degree or equivalent (e.g. GED) (2)
- Some college, no degree (3)
- Associate degree (e.g. AA, AS) (4)
- Bachelor's degree (e.g. BA, BS) (5)
- Master's degree (e.g. MA, MS, MEd) (6)
- Doctorate or professional degree (e.g. MD, DDS, PhD) (7)

---

Page Break

1
marital_status What is your marital status?

- ○ Single (never married) (1)
- ○ Married, or in a domestic partnership (2)
- ○ Widowed (3)
- ○ Divorced (4)
- ○ Separated (5)

Page Break

zip_home Where is your primary residence? Please enter the 5 digit zip code.

________________________________________________________________

Page Break

zip_work Where is your work place? Please enter the 5 digit zip code.

________________________________________________________________

Page Break

1 party Which political party do you lean towards?

- ◯ Democratic party (1)
- ◯ Republican party (2)
- ◯ Green party (3)
- ◯ Libertarian party (4)
- ◯ Other (5)
- ◯ Prefer not to answer (6)

Page Break

grocery Who typically does the grocery shopping in your household?

- ◯ I do all of the grocery shopping in the household. (1)
- ◯ I share the grocery shopping with others in the household. (2)
- ◯ Someone else does the grocery shopping in the household. (3)

Page Break

1

*Display This Question:*

*If grocery = I do all of the grocery shopping in the household.*

*Or grocery = I share the grocery shopping with others in the household.*

f_grocery How often do you go grocery shopping?

- ◯ Once per month (1)
- ◯ Twice per month (2)
- ◯ Once per week (12)
- ◯ Twice per week (3)
- ◯ 3 times per week (4)
- ◯ 4 times per week (5)
- ◯ More than 5 times per week (6)

---

Page Break

consumption In the last month, how much did your household spend (**per month**) on goods and services in total and for each of the individual components listed below?

Please enter a number between 1 and 10,000 for each category. The sum of the expenditures for the individual categories should add up to the total amount.

Food (including groceries, dining out, take-out food, and beverages) : ________ (1)

Debt and rent payments (mortgages, rent, auto loans, student loans, etc.) : ________ (2)

Everything else : ________ (3)

Total : ________

---

Page Break

1

means_of_payment In the last month, what is your means of payment for purchasing goods and services?

Please enter a number between 1 and 100 for each payment method. The sum of the expenditures for the individual categories should add up to 100%.
Credit/Debit Card : ________ (1)
Check : ________ (2)
Cash : ________ (3)
Total : ________

Page Break

credit Suppose that you had to make an unexpected payment equal to one month of your after-tax income, would you have sufficient financial resources (access to credit, savings, loans from relatives or friends, etc.) to pay for the entire amount?

- ○ Yes (1)
- ○ No (2)
- ○ Don't know/prefer not to answer (3)

Page Break

ha Which of the following best characterizes your household:

- ○ Own our house/apartment without a mortgage (1)
- ○ Own our house/apartment and have a fixed-rate mortgage (2)
- ○ Own our house/apartment and have a variable-rate mortgage (3)
- ○ Rent our house/apartment (4)
- ○ Other (5)

Page Break

1 *Display This Question:*

*If ha = Own our house/apartment and have a fixed-rate mortgage*

*Or ha = Own our house/apartment and have a variable-rate mortgage*

mortgage How much does your household pay for the monthly mortgage?

________________________________________________________________

Page Break

*Display This Question:*

*If ha = Rent our house/apartment*

rent How much is your monthly rent?

________________________________________________________________

Page Break

durable_c In the last month, did you buy a new home, car, or other major big-ticket items (TV, fridge, furniture, and similar items)?

- Yes (1)
- No (2)

Page Break

*Display This Question:*

*If durable_c = Yes*

durable_c2 How much did you spend on the following?
A house/apartment : _______ (1)
A car or other vehicle : _______ (2)
A large home appliance, electronics, or furniture : _______ (3)
Total : ________

Page Break

1

durable_ec Do you plan/expect to purchase a new home, car or other major big-ticket items (TV, fridge, furniture, and similar items) over the next month?

◯ Yes (1)

◯ No (2)

Page Break

*Display This Question:*

*If durable_ec = Yes*

durable_ec2 How much do you plan/expect to spend on the following?
A house/apartment : _______ (1)
A car or other vehicle : _______ (2)
A large home appliance, electronics, or furniture : _______ (3)
Total : ________

Page Break

saving Saving is income that is neither spent nor used to make payments on debt. Methods of saving include putting money aside in, for example, a deposit account, a pension account, an investment fund, or as cash.

What percentage of your monthly income, on average, did you save during the last 12 months?

(Please enter a percentage of your income. Your answer should be greater than 0% if you saved money during the last year. If you did not save any money, please enter “0%”. If you went into debt, enter a negative value.)

________________________________________________________________

**End of Block: Demographics**

1

Start of Block: Labor block

emp Do you have a paid job?

- Yes (1)
- No (2)

Page Break

*Display This Question:*

*If emp = Yes*

job_duty In your current job, do you…
(Please select all that apply)

- Supervise 1 to 10 other people (1)
- Supervise 11 to 50 other people (2)
- Supervise more than 50 other people (3)
- Make decisions about hiring/firing workers (4)
- Make decisions about what prices to set (5)
- Make decisions about capital expenditures (6)
- Make decisions about wages/salaries (7)
- Make decisions about marketing or sales (8)
- None of the above (9)

Page Break

1 *Display This Question:*

*If emp = Yes*

Q24 How much do you make before taxes and other deductions at your main/current job, on an annual basis? Please include any bonuses, overtime pay, tips or commissions

________________________________________________________________

Page Break

*Display This Question:*

*If emp = Yes*

Q27 How many total hours per week do you work in a typical week these days?

________________________________________________________________

Page Break

*Display This Question:*

*If emp = No*

Q28 Are you actively looking for a job?

- ○ Yes (1)
- ○ No (2)

Page Break

1 *Display This Question:*

*If Q28 = No*

Q29 Here are a number of possible reasons why people who are not working choose not to look for work. Please select all that apply to you.

- ☐ Homemaker (1)
- ☐ Raising children (2)
- ☐ Student (3)
- ☐ Retiree (4)
- ☐ Disabled, health issues (5)
- ☐ Couldn’t find a job (6)
- ☐ On break (7)
- ☐ No financial need (8)
- ☐ Temporarily laid-off (expect to be recalled with the next 6 months) (9)
- ☐ Temporarily laid-off (do not expect to be recalled with the next 6 months) (10)
- ☐ Other (11)

**End of Block: Labor block**

---

**Start of Block: Inflation/wage/price expectations**

Q18 We would like to ask you about the rate of inflation/deflation.

Note: inflation is the percentage rise in overall prices in the economy, most commonly measured by the Consumer Price Index and deflation corresponds to when prices are falling.

---

Page Break

1 perceived_inf **Over the last 12 months,** what do you think the overall rate of inflation/deflation has been in the economy?

If you think there has been inflation, please enter a positive number. If you think there has been deflation, please enter a negative number. If you think there has been neither inflation nor deflation, please enter zero.

________________________________________________________________

Page Break

inf_exp_den In THIS question, you will be asked about the probability (**PERCENT CHANCE**) of something happening. The percent chance must be a number between 0 and 100 and the sum of your answers must add up to 100, where 0 means there is absolutely no chance, and 100 means that it is absolutely certain.

What do you think is the **percent chance** that, **over the next 12 months**…
the rate of inflation will be 12% or more : ________ (1)
the rate of inflation will be between 8% and 12% : ________ (2)
the rate of inflation will be between 4% and 8% : ________ (3)
the rate of inflation will be between 2% and 4% : ________ (4)
the rate of inflation will be between 0% and 2% : ________ (5)
the rate of deflation (opposite of inflation) will be between 0% and 2% : ________ (6)
the rate of deflation (opposite of inflation) will be between 2% and 4% : ________ (7)
the rate of deflation (opposite of inflation) will be between 4% and 8% : ________ (8)
the rate of deflation (opposite of inflation) will be between 8% and 12% : ________ (9)
the rate of deflation (opposite of inflation) will be 12% or more : ________ (10)
Total : ________

Page Break

exp_12_inf **Over the next 12-month,** what do you think the overall rate of inflation/deflation will be?

________________________________________________________________

Page Break

1 es How would you rate business/economic conditions in this country as a whole **today**?

- Excellent (4)
- Good (3)
- Only fair (2)
- Poor (1)

---

Page Break

es2 **In a year from now,** do you think that business/economic conditions in this country, as a whole, will be better than they are at present, will be worse, or will be about the same?

- Better a year from now (3)
- About the same (2)
- Worse a year from now (1)

---

Page Break

**End of Block: Inflation/wage/price expectations**

1 Start of Block: good_time_to_buy

c_house Generally speaking, do you think that now is a good time or a bad time to buy **a house or apartment**?

- Very good (5)
- Good (4)
- Neither good nor bad (3)
- Bad (2)
- Very bad (1)

---

Page Break

c_car Generally speaking, do you think that now is a good time or a bad time to buy **a car or other vehicle**?

- Very good (5)
- Good (4)
- Neither good nor bad (3)
- Bad (2)
- Very bad (1)

---

Page Break

1 c_durable Generally speaking, do you think that now is a good time or a bad time to buy **a large appliance (e.g. refrigerator, stove), furniture, or electronics**?

- Very good (5)
- Good (4)
- Neither good nor bad (3)
- Bad (2)
- Very bad (1)

End of Block: good_time_to_buy

Start of Block: Unemployment

current_unemp What is your best guess about what the **current** unemployment rate in the U.S. is?

________________________________________________________________

ex1_unemp What is your best guess about what the unemployment in the U.S. will be **in 12 months**?

________________________________________________________________

exp35_unemp What is your best guess about what the unemployment in the U.S. will be over the **next 3-5 years**?

________________________________________________________________

End of Block: Unemployment

Start of Block: Gas consumption

Q35 Now we would like to ask you about your personal car's gasoline consumption.

Page Break

1 f_gas How often do you fill your car's tank?

- ◯ None (1)
- ◯ Once per month (2)
- ◯ Twice per month (3)
- ◯ Once per week (4)
- ◯ Twice per week (5)
- ◯ 3 times per week (6)
- ◯ 4 times per week (7)
- ◯ more than 5 times per week (8)

---

Page Break

*Display This Question:*

*If f_gas = None*

f_gas_0 Here are a number of possible reasons why you are not filling your car's gas tank. Please select all that apply to you.

- ◯ I drive a electricity car. (1)
- ◯ I do not own a car. (2)
- ◯ Others. (3)

---

Page Break

1 *Display This Question:*

*If f_gas != None*

job_driving Do your job duties include driving?

○ Yes (1)

○ No (2)

---

Page Break

p_gas What is your best guess on the current price of regular unleaded gas (dollars per gallon) in your primary residence?

| | Dollars per gallon | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Gas price () | | | | | | | | | |

---

Page Break

exp_gas What do you expect the price of regular unleaded gas in 12 months (dollars per gallon) in your primary residence?

| | Dollars per gallon | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Gas price () | | | | | | | | | |

---

Page Break

1 willingness_to_drive Suppose you learn that a gas station further away is 10 cents per gallon cheaper gasoline than the closest station. How many extra minutes are you willing to drive?

________________________________________________________________

Page Break

capacity_gas_tank What is the capacity of your car's gas tank?

________________________________________________________________

Page Break

gas_consumption How much do you spend on buying gasoline per month?

________________________________________________________________

**End of Block: Gas consumption**

**Start of Block: Information treatment**

Page Break

Control You are almost done with the survey.

Page Break

Treatment You are almost done with the survey. Before the final questions, we would like you to know the following:

Gov. Ron DeSantis signed a bill in May that established 10 tax holidays, including a one-month Fuel Tax Holiday from Oct. 1-31. State leaders said this would save Floridians about $200 million as the price of gas per gallon would decrease by 25.3 cents.

**End of Block: Information treatment**

1 Start of Block: Post treatment

*Display This Question:*

*If Treatment Displayed*

ps_aware Were you aware of this policy - gas tax suspension?

- Yes (1)
- No (2)

Page Break

*Display This Question:*

*If Treatment Displayed*

ps_p1 How do you think this policy - gas tax suspension- will affect the gas prices in your primary residence?

- Increase (3)
- No change (4)
- Decrease (5)

Page Break

*Display This Question:*

*If ps_p1 = Decrease*

ps_p_cut How much do you expect gas prices to fall as a result of the gas tax suspension in your primary residence?

________________________________________________________________

Page Break

1 *Display This Question:*

*If ps_p1 = Increase*

ps_p_rise How much do you expect gas prices to rise as a result of the gas tax suspension in your primary residence?

________________________________________________________________

Page Break

*Display This Question:*

*If Treatment Displayed*

ps_c How do you think this policy - gas tax suspension- will affect your spending on gas?

- Increase (3)
- No change (4)
- Decrease (5)

Page Break

*Display This Question:*

*If ps_c = Decrease*

ps_c_cut How much do you expect your gas spending to fall as a result of the gas tax suspension?

________________________________________________________________

Page Break

*Display This Question:*

*If ps_p1 = Increase*

ps_c_rise How much do you expect your gas spending to rise as a result of the of gas tax suspension?

________________________________________________________________

Page Break

1 ps_inf What do you think the inflation/deflation rate (as measured by the Consumer Price Index) is going to be **over the next 12 months**? Please provide an answer as a percentage change from current prices.

If you think there will be inflation, please enter a positive number. If you think there will be deflation, please enter a negative number. If you think there will be neither inflation nor deflation, please enter zero.

________________________________________________________________

Page Break

ps_unemp_1 What do you think the unemployment rate will be at the end of 2022?

________________________________________________________________

Page Break

*Display This Question:*

*If c_house = Very good*

*Or c_house = Good*

*Or c_house = Neither good nor bad*

*Or c_house = Bad*

*Or c_house = Very bad*

ps_good_a house Generally speaking, do you think that now is a good time or a bad time to buy **a house or apartment**?

○ Very good (1)

○ Good (2)

○ Neither good nor bad (3)

○ Bad (4)

○ Very bad (5)

Page Break

1 *Display This Question:*

*If c_car = Very good*

*Or c_car = Good*

*Or c_car = Neither good nor bad*

*Or c_car = Bad*

*Or c_car = Very bad*

ps_good_a car Generally speaking, do you think that now is a good time or a bad time to buy **a car or other vehicle**?

- ◯ Very good (1)
- ◯ Good (2)
- ◯ Neither good nor bad (3)
- ◯ Bad (4)
- ◯ Very bad (5)

Page Break

1 *Display This Question:*

*If c_durable = Very good*

*Or c_durable = Good*

*Or c_durable = Neither good nor bad*

*Or c_durable = Bad*

*Or c_durable = Very bad*

ps_good_durable Generally speaking, do you think that now is a good time or a bad time to buy **a large appliance (e.g. refrigerator, stove), furniture, or electronics**?

- Very good (1)
- Good (2)
- Neither good nor bad (3)
- Bad (4)
- Very bad (5)

Page Break

post_es How would you rate business/economic conditions in this country as a whole **today**?

- Excellent (1)
- Good (2)
- Only fair (3)
- Poor (4)

Page Break

1

pose_es2 **In a year from now,** do you think that business/economic conditions in this country, as a whole, will be better than they are at present, will be worse, or will be about the same?

- Better a year from now (1)
- About the same (2)
- Worse a year from now (3)

Page Break

attention_check Now you have completed the first part of the study. We thank you so much for your time spent taking this survey. We will reach out to you again in a month. The next part will be shorter. The expected completion time is 10 minutes, the reward will be $2. We wish you to participate in the survey again.

Based on the text you read above, how much reward will you be paid for participating in the second part of the survey? This is an attention check.

- $1 (4)
- $2 (5)
- $3 (6)
- $4 (7)

the end Please click next to record your responses.

**End of Block: Post treatment**

Dear Eric,

Thank you and the referee very much for your careful review and detailed comments on our manuscript MS 24-466, entitled “Fueling Expectations: The Causal Impact of Gas Prices on Inflation Expectations”. We are attaching a revised version of the paper that attempts to address your comments and those of the referee. We are grateful for the guidance and feel it has significantly improved the paper. The detailed response is included in our submission after the appendix, and we have also attached it separately.

We would like to highlight several key changes in the updated draft:

- We cluster standard errors by state and week in our baseline set of results.
- We have added additional variables to describe the state-specific macroeconomic conditions before the tax holidays in Table 1.
- We have revised our discussion of Binder (2018).
- We have reduced the number of figures and tables in the main text to 10.

Best regards,
Yoon and Ben

Response to Editor

Our response follows the same structure as the editor's decision notes, with each comment followed by our response in *italics*.

Dear Yoon Joo,

I have now heard back from an expert referee and have read your paper carefully myself. The referee is very sympathetic to the topic and methods of the paper, finds the results to be novel and interesting, and thinks that it potentially could be a good fit for the JME. After reading your paper carefully myself, I agree. I'm thus placing the paper in the "reject/revise" category, which is essentially equivalent to a "revise and resubmit" at other journals. Papers in this category appear to contain results of a quality necessary for publication in the JME, but there remains substantial uncertainty about whether the paper will indeed develop to the point that it can be published in JME. The referee report on your manuscript is attached or is available at https://www.editorialmanager.com/monec.

*Thanks!*

The referee lists a number of comments and suggestions that I view as being mostly minor. Here are my own comments and suggestions as I read the paper, which are relatively minor as well:

1. My first comment is that the paper is very well written. It's very readable, all of the discussion and explanations are very clear, and the structure of the paper is great. I wish more JME submissions were this well written.

*Thank you!*

2. My only significant request is that you pay a little more attention in your panel analysis to the degree of clustering of your standard errors. In particular, why cluster by individual rather than by state? The treatment is at the state level, which normally would suggest clustering at that level. And why not do two-way clustering by state and time? It's possible that this doesn't matter much, but the issue should be discussed and your clustering choice should be justified.

*Thank you for this suggestion.*

*The recent econometrics literature makes various recommendations in regard to which level to cluster standard errors. Several recent papers, including Abadie et al (2023) and Roth and Rambachan (2022), take a design-based approach to inference, and suggest clustering at the level that treatment is assigned, which in our research design is at the state level. However, they also note that this can produce standard errors that are overly conservative; Abadie et al (2023) show that standard cluster-robust standard errors can be more than 20 times too large when* *the number of clusters in the sample is a large fraction of the total clusters in the population (which holds in our case when clusters are defined as states). De Chaisemartin and D'Haultfœuille (2023) instead take a model-based approach to inference, and suggest clustering at the smallest level of aggregation possible while still accounting for serial correlation, including at the individual level:*

> *We recommend using standard errors clustered at the most disaggregated level at which one can still construct a panel dataset. The level at which one should assume independence is often unclear. Since the work of Bertrand et al. (2004), it has become common practice to make the independence assumption at the level at which the treatment is assigned, and use standard errors clustered at that level. For instance, with county-level data but a treatment assigned at the state level, one clusters at the state level. While this approach makes perfect sense in a design-based approach to inference (Abadie et al., 2023), it is unwarranted in the model-based approach we adopt. In this example, we instead recommend using standard errors clustered at the county level. The main motivation for our recommendation is that clustering at the state level can lead to non-trivial power losses, and a recent literature has highlighted that power is often a first-order concern in the analysis of natural experiments (Roth, 2022)… We recommend clustering at the most disaggregated level at which one can still construct a panel dataset. For instance, with repeated cross sections of individuals whose county of residence or birth is available, one may conduct the analysis at the county level and cluster at that level. With an individual-level panel dataset, one would cluster at the individual level. [de Chaisemartin and D'Haultfœuille (2023), p. 23]*

*Under the model-based approach, the correct level at which to cluster depends on the correlation structure of the unobservable factors that affect inflation expectations (conditional on individual and time fixed effects and state-level macroeconomic variables). If the error term in equation (4) is serially correlated within individuals over time, but not across individuals, clustering at the individual level is appropriate. If instead the error term is correlated across individuals within a state (which could result from, for example, time-varying shocks across states), standard errors should be clustered at the state level. If the shocks are further correlated across individuals in a given time period, two-way clustering by both state and time is appropriate. An additional consideration is that inference using cluster-robust standard errors relies on a central limit theorem, which states that the difference-in-differences estimator is asymptotically normal as the number of clusters tends to infinity. With few clusters, these standard errors may provide a poor approximation to the true variance of the estimator. A commonly used "rule of thumb" in applied work, based on the recommendations in Cameron and Miller (2015), is that cluster-robust standard errors perform reasonably well when the number of clusters reaches 20 to 50.*

*Given the lack of consensus in the literature, we tried all three approaches (clustering by individual, by state, and by state and time). In the revised manuscript, we follow your guidance and report estimates clustered at the state and week level in the body of the paper, with the alternatives in the Appendix. We have added a discussion of this choice at the end of Section 2* *(p.13). Two-way clustering by state and time generally results in larger standard errors relative to the tables included in our first submission. In particular, the treatment coefficient in our stacked difference-in-difference specification, shown in columns (1) and (4) of Tables 4 and 5, is now statistically insignificant (p-value of 0.20 in column (1) and 0.22 in column (4) of Table 4). The coefficients from the specifications that interact the gas tax holiday with the percentage change in gasoline prices, shown in columns (3) and (6) of Table 4, remain statistically significant (p-value of 0.015 in column (3) and 0.055 in column (6)). The treatment coefficients from the individual state regressions (shown in Table 3) are also statistically different from zero at the 95% confidence level with the two-way clustering in Maryland, Georgia, and Connecticut.*

*In our view, this change in statistical significance for the baseline pooled specification doesn't change the interpretation of our results, and comes from averaging together very heterogeneous treatment effects across the five state experiments (large and negative effects of the policy on inflation expectations in Maryland, Connecticut, and Georgia with no detectable effect in New York and Florida, which we show in Table 3). To emphasize this, we have added two additional columns in Tables 4 and 5, which show results using only the policy changes in Maryland, Connecticut, and Georgia, which yield a much larger coefficient that is significantly different from zero at the 99% confidence level.*

*Regarding the "few clusters" issue, the pooled specifications in Tables 4 and 5 include all non-treated states in the control group, so that each regression includes approximately 50 states. Based on our reading of the literature, this is a sufficient number of clusters to expect the cluster-robust standard errors to provide a good approximation to the variance of the estimator, based on the recommendations given in Cameron and Miller (2015). The state-level regressions in Table 3, as well as the pass-through analysis in Figure 2 and Table 1, use only the neighboring states of each tax holiday state as controls, and thus contain fewer than 10 states in each regression.*

*To test the sensitivity of our results to this issue, we re-estimate the state-level inflation expectations regressions shown in Table 3 and the passthrough analysis from Figure 2 and Table 2 using a larger control group that includes all non-treated states as controls, which gives us data from nearly 50 states in each regression. Using this expanded control group yields quantitatively similar results for both analyses (see Figure A2 and Tables A3 and A14).*

*However, the event study plots for the passthrough analysis show that the pre-period gas prices in treated states are tracked more closely by those in neighboring states than prices across all non-treated states (comparing the plots in Figures 2 and A1 vs. Figure A2). We suspect that this is the result of different gas price seasonality across US regions. Given this, we elected to keep the versions that use neighboring states as controls in the main text and include the alternate versions in the Appendix.*

3. On p. 22, in your discussion of Table 5, you say that you are adding time-varying state-level controls of the unemployment rate and the growth rates of nominal and real GDP. I assume that you mean that state-level unemployment rate and gross state product? I'm a little

confused here. Your time fixed effects would rule out using the national unemployment rate and U.S. GDP.

*Thanks for this comment – the controls in Tables 4 and 5 are indeed the state-level unemployment rate (from the Bureau of Labor Statistics) and state-level nominal and real GDP growth rates (computed from the nominal and real GDP by state from the Bureau of Economic Analysis). We have added citations for these data to the end of this response document. As you point out, national unemployment and GDP growth are absorbed in the time fixed effects. We have modified the language slightly on p. 27 as well as in the notes for Tables 4 and 5 to make this more clear.*

4. In equations (3)-(4), it's confusing to recycle the coefficient beta for fixed effects and also for the coefficient of interest. You still have lots of Greek letters to chose from, I suggest using theta or phi in place of one of the betas. Also, after equation (4) there's a typo in the text where you say alpha_{ei} but mean D_{eit}.

*Thanks for pointing this out. We agree and have cleaned up the notation in several places. We now use $\theta$ to denote the treatment coefficient on the gas tax holiday dummy throughout the paper, including in equations (3) and (4).*

5. In equations (5)-(6), there should be a coefficient on the T_{ist} variables that is missing.

*Thank you – fixed. See also the response to your point 4 above.*

6. I liked very much some of your discussion, especially the discussion of the MPC in Section 7 and your discussion on p. 27 of some of the confounding factors that could lead to endogeneity and distort the usual time series estimates. I also really, really liked your placebo regressions in Table 7 that use states that proposed a gas tax holiday but did not ultimately pass one.

*Thank you!*

7. The referee mentions possibly cutting the Google Trends discussion if you're short on space, but I liked that discussion. I don't think it would be worth cutting it for the small amount of space saved (and I don't think your paper is bumping up against the JME's space constraint, anyway).

*Thanks – we have opted to leave this in.*

8. However, the JME does have a rule that the number of figures and tables must be less than or equal to 10 (i.e., F+T <= 10, where F is the number of figures and T the number of tables). Currently, you have 9 tables and 4 figures, so you must cut 3 of them or relegate them to the online appendix. I suggest cutting Table 1, since that information is generally already provided in the main text. Maybe also Table 6, which could be summarized in the text, and Table 8, which could be summarized in the text.

*Thank you for these suggestions – we have followed your advice and moved Tables 1, 6, and 8 to the online appendix. We have added additional summary of these exhibits in the text where appropriate.*

That is basically the extent of my comments. I encourage you to follow up on them and those of the referee. There is an understanding among the editors that the reject with invitation to resubmit decision on the first round requires at least a 50% chance of ultimate publication. Manuscripts in this category face an "up or out" decision on the next round: your paper will either be rejected or accepted subject to (major or minor) revisions. Thus, it is important to maximize the quality of the revision that you will submit.

We ask that all submissions at this stage fully conform to JME style requirements. These include being prepared in 12 point type with double spacing and line numbering: this makes it easy for the reviewer and editor to give you detailed feedback on your work. If you are working in the Scientific Word version of TeX, then an easy way to do this is to use the DRAFT mode in the style file available at http://jme.rochester.edu/templates.html. Please report any difficulties with implementing this style to aruoba@umd.edu. Note that the style guidelines of the JME also require figures and tables to be placed within the text instead of placed at the back of the paper.

*Thank you – we have made the appropriate formatting changes.*

We also ask that you prepare a detailed response to the comments of the referee and editor, which you include with your submission after any appendices, figures, etc. Within the Editorial Manager (EM) system, this makes your comments readily available to both the editor and referee. You should also include a brief cover letter to the editor that highlights the major elements of the revised manuscript.

The revised manuscript should not exceed 35 pages of text, references, and footnotes in JME draft format and should not include more than 10 tables and figures (F+T<=10). As a journal, we are working to produce maximum new research output per page: I ask that you help us attain that goal. One aspect of this approach is that in JME all appendices are “supplementary materials”: please see the section on Supplementary materials on http://jme.rochester.edu/jme-style.html for a description of such materials and related JME policies.

In closing, I want to alert you to one aspect of JME policies. If the manuscript is resubmitted after six months, we can no longer hold to our assessment that there is at least a 50% likelihood of ultimate publication, since new research developments may have reduced the impact of your research. Also note that JME does not require a submission fee for resubmissions.

Thank you for submitting your work to JME.

Sincerely,
Eric Swanson
Editor

***References***

*Abadie, Alberto, Susan Athey, Guido W. Imbens, and Jeffrey M. Wooldridge. "When should you adjust standard errors for clustering?." The Quarterly Journal of Economics 138, no. 1 (2023): 1-35.*

*Cameron, A. Colin, and Douglas L. Miller. "A practitioner's guide to cluster-robust inference." Journal of human resources 50, no. 2 (2015): 317-372.*

*de Chaisemartin, Clément and d'Haultfoeuille, Xavier, Credible Answers to Hard Questions: Differences-in-Differences for Natural Experiments (June 21, 2023). Available at SSRN: https://ssrn.com/abstract=4487202 or http://dx.doi.org/10.2139/ssrn.4487202*

*Rambachan, Ashesh, and Jonathan Roth. Design-Based Uncertainty for Quasi-Experiments. arXiv. org, 2022.*

*U.S. Bureau of Economic Analysis, "SQGDP9 Real GDP by state [1]", 2018-2023 (accessed December 28, 2023).*

*U.S. Bureau of Economic Analysis, " SQGDP2 Gross domestic product (GDP) by state [1]", 2018-2023 (accessed December 28, 2023).*

*U.S. Bureau of Labor Statistics, "Local Area Unemployment Statistics", 2018-2023 (accessed December 28, 2023 from http://data.bls.gov)*

Response to Referee

We would like to thank the referee for his/her comments, which have been very useful in revising the paper. We have tried to take all the comments on board in the revised version of the paper as detailed below. Our response follows the same structure as the referee's report, with each comment followed by our response in italics.

Summary: The authors use the five state gas tax holidays that were passed in 2022 to study the effects of gas prices on inflation expectations. This is a clever idea. They document details of all 25 states that proposed gas tax holidays and argue that the ones that passed were virtually random (at least, depended on politics and not on state macroeconomic conditions.) They combine NY Fed survey data with some surveys that they ran on their own in states with gas tax holidays and their neighbors. They estimate the passthrough of the tax cut to gas prices in each state, and find that it varies. Then they estimate the effect on inflation expectations and consumption in each state, using neighboring states as controls.

Comments:

1. Footnote 2 says that "Coibion and Gorodnichenko (2015), Binder (2018), and Kilian and Zhou (2022) find that a 1% decrease in gas prices reduces inflation expectations by 0.016, 0.01 pp, and 0.03 pp, respectively. " Binder actually finds "if gas price inflation increases by one percentage point, then one-year-ahead headline inflation expectations increase by about 0.01 percentage points and five-year-ahead inflation expectations increase by under 0.003 percentage points. " A one percentage point decrease in gas price inflation is different than a one percent decrease in gas prices, so I don't think this is a fair way to compare effect sizes. Also note that most of Binder (2018) is not using oil price shocks, but rather consumers' own survey- reported gas price expectations at two different horizons, and she shows results are robust to including time fixed effects (so the discussion on page 8-9 should be somewhat modified.)

*Thank you for pointing this out. We have corrected footnote 2 to accurately reflect the findings of Binder (2018) and have added additional discussion in footnote 5 in the main text.*

*As you correctly noted, our main specification differs from that of Binder (2018) in several important ways. To provide a closer comparison, we additionally estimate an alternative specification to examine how individual inflation expectations respond to gas price inflation (rather than gas price levels, as in our main specification). Specifically, we consider a stacked difference-in-differences specification that includes gas price inflation as the main right hand side variable:*

$$E_t^i \pi_{e,t+1} = \alpha_{ei} + \beta_{et} + \gamma X_{eit} + \theta \pi_{s,t}^{gas} + \epsilon_{eit} \quad (1)$$

*$\pi^{gas}_{s,t}$ is the gas price inflation in the preceding six-months: $\pi^{gas}_{s,t} = log\left(P^{gas}_{s,t}/P^{gas}_{s,t-6}\right) \times 100$ where $P^{gas}_{s,t}$ and $P^{gas}_{s,t-6}$ are, respectively, the prices of gas at time t and 6 months prior to t in state s. The main analysis in Binder (2018) reports "for one-year-ahead inflation expectations, the derivative of $\pi^{e}_{it,1}$ with respect to $\pi^{g}_{t}$ is $\omega a_{gg} + (1-\omega) a_{cg}$. With my estimates, this derivative is 0.01: a one percentage point increase in gas price inflation results in an 0.01 percentage point increase in one-year-ahead expected headline inflation." The coefficient $\theta$ in equation (1) above provides a reduced-form estimate of this same object.*

*We note that there are several important caveats to making this comparison: as you note, the main analysis in Binder (2018) is derived from a structural model and is estimated using survey-reported gas price expectations at different time horizons, while our specification uses actual gas prices. Nevertheless, we think it's a useful exercise to benchmark the size of our effect relative to the estimates from Binder (2018).*

*Table A16 reports results from estimation of equation (1) above. From the specification in column (4) that excludes time fixed effects (but does include a vector of macroeconomic control variables), we find that a 1pp increase in gas price inflation leads to an increase in one-year ahead inflation expectations of 0.018pp. This estimate is reasonably close to that reported in the main specification in Binder (2018) of 0.01, and very close to the reduced-form estimate of 0.016 from Table 2, column (3) in Binder (2018).*

*To see how our estimate changes using our identification strategy, we add time fixed effects and instrument for gas price inflation with the percentage change in gas prices during each state tax holiday interacted with a holiday indicator: $\frac{P^{gas,holiday}_{s} - P^{gas,pre}_{s}}{P^{gas,pre}_{s}} \times D_{st}$, where $\frac{P^{gas,holiday}_{s} - P^{gas,pre}_{s}}{P^{gas,pre}_{s}}$ is reported for each holiday state in the second-to-last row of Table 2. This specification purges time-series based variation from the estimates and uses only the price variation induced by the policy change. Using this approach, we find a much larger coefficient on gas price inflation of 0.067, although we note that this is somewhat imprecisely estimated (standard error of 0.038). The fact that our identification strategy returns a larger sensitivity parameter echoes our comparison to the estimates from Coibion and Gorodnichenko (2015) reported in Table A15 and discussed in the text on p.30-31. We have now added this comparison to Binder (2018) in this section in footnote 27.*

2. On page 11, they say that "the five tax holidays we consider reduce the tax between 0.16 and 0.36 per gallon…and last between one and twelve months. In contrast, during the sample period in Coibion and Gorodnichenko (2015), oil prices increased from approximately $50 per barrel in 2005 to nearly $150 in 2008. " I am not sure what I am supposed to understand about the "contrast" here. What did the change in oil prices per barrel over 3 years in Coibion and Gorodnichenko imply about the change in gas price per gallon over one to twelve months? And are we supposed to read something between the lines about asymmetry or nonlinearity?

*Thanks for your comment, and sorry for the confusion. To clarify our argument, we think that the responsiveness of inflation expectations to gas prices could plausibly be asymmetric or nonlinear, as you mention (D'Acunto et al (2021) for example shows some evidence of asymmetric effects). The effect may also be dependent on recent reference points, so that a sudden jump in gas prices could be more impactful than a longer run increase of the same magnitude. However, we note that this point is purely speculative as our empirical results do not directly speak to the cause of the heterogeneity.*

*We have edited the discussion on p.14 in the revised draft to be (hopefully) more clear. Specifically, we now make the comparison to the sample period in Coibion and Gorodnichenko (2015) in terms of gas prices rather than oil prices. We also make the discussion of why effects might be heterogeneous over time more explicit.*

3. In Table 2, the growth rate of nominal GDP minus the growth rate of real GDP is not anywhere close to the inflation rate in column 3 (it is a little closer in the other columns). I would first check that there is no typo or mistake. Otherwise, this suggests that the Regional Price Parities measure of state-level inflation is very different from a GDP deflator measure of state-level inflation that could presumable also be included (especially in the "did not consider" states). I would say this is worth looking into/discussing more. My concern is that the "implemented" states actually had lower inflation than the "did not implement" states, and as a result the inflation expectations were lower.

*Thank you for pointing this out. As you mentioned, we could have calculated inflation rates using the state-level GDP deflator, as shown in the table below. As you correctly noted, the state-level GDP deflator inflation rate was lower for states that implemented a Gas Tax Holiday than for those that did not. However, according to the Bureau of Economic Analysis (BEA), state-level real GDP is calculated by applying national chain-weighted price deflators to current-dollar GDP estimates for each state.*[1] *For this reason, the state-level GDP deflator does not accurately capture state-level inflation rates.*

*Instead, Regional Price Parities (RPPs) measure differences in price levels across states for a given year and are expressed as a percentage of the national price level. Based on RPPs, the BEA suggests using implicit regional price growth rates as an implicit measure of regional inflation, which can be calculated as the change in RPPs multiplied by the change in the US PCE price index.* [2] *These implicit regional price deflator inflation rates, reported in the table below, are not*

[1] https://www.bea.gov/sites/default/files/methodologies/0417_GDP_by_State_Methodology.pdf

[2] https://www.bea.gov/system/files/methodologies/Methodology-for-Regional-Price-Parities_0.pdf

*statistically different across states.*

| | (1) | (2) | (3) |
|---|---|---|---|
| | States | | |
| | Implemented | Did Not Implement | |
| Average from 2021M2 to 2022M2 | | Considered | Did Not Consider |
| GDP Deflator Inflation Rate (%) | 4.05 | 5.58 | 6.99 |
| | (0.12) | (0.23) | (0.19) |
| Implicit Regional Price Deflator Inflation Rate (%) | 4.39 | 4.59 | 4.14 |
| | (0.16) | (0.12) | (0.07) |
| The Number of States | 5 | 16 | 29 |

4. I am curious how the authors knew to run the Prolific surveys before the gas tax holidays in certain states (and control states) like Florida and New York. Was this because the holiday was announced a long time prior to the implementation? Does it matter that the holiday was already announced (so people could already expect it)? I am also wondering why there are such different sample sizes for the different waves and states, like 70 in Alabama versus 3 waves of over 800 for Florida. Were these surveys preregistered?

*Thanks for the question and the opportunity to clarify. The gas tax holidays in Florida and New York were passed by the state legislatures in advance of implementation (about two months prior in New York and three months in Florida – see Table A1 for the dates of legislative passage and implementation). This allowed us to roll out the survey prior to the tax change taking effect. We agree that whether the tax cut was anticipated is an important issue – we discuss this more in our response to your point 9.*

*The differences in sample sizes across states are due to both the evolution of our project budget and the regulatory environment, as well as differences in the size of the panel across states on the Prolific platform (which we used to administer the survey).*

*When we began the project in Spring 2022, we had an initial budget for the survey of $12,000, which we planned to allocate between the tax holidays in Maryland, Georgia, and New York. As we started to plan the survey, the tax holidays in Maryland and Georgia had already begun, while the policy in New York had been announced but not yet implemented. We planned to run two survey waves for the tax holidays in Maryland, Georgia, and New York, plus a wave in a neighboring control state for each (Virginia, Alabama, and Pennsylvania, respectively). In Maryland and Georgia, we planned to run the first wave at the end of the tax holiday period (April 14-17 in Maryland and May 26-31 in Georgia) and the second wave after the policy's conclusion. In New York, we planned to administer the first wave prior to implementation and the second wave during the tax holiday period.*

*We ran the survey in Maryland and Virginia as planned. In Georgia, however, the day after we launched the survey on May 26, the governor issued an executive order to extend the tax* *holiday, which was initially scheduled to end on May 31.*[3] *Given that this change would prevent us from administering a post-tax holiday wave in Georgia and Alabama, we decided to suspend the survey in these states after only two days, which is one reason that we have relatively fewer responses in these states. We elected to use the remaining money to take a larger sample in our New York waves, where there are also more Prolific users (see table below). We ran the survey in New York as planned (the first wave from May 26-31 and the second wave from July 5-August 19).*

*Over the summer, Florida announced that it would also temporarily suspend the gas tax in the month of October. We were able to secure additional funding of $15,000, which we used to run more survey waves in Florida. The additional money allowed us to increase the sample size in Florida (and its accompanying control states) and to administer three waves (one wave prior to implementation, one wave during the tax holiday, and the last wave after the policy had concluded).*

*Finally, we note that some variation in sample size across states is the result of differences in the number of users on the Prolific panel. The table below shows the total number of Prolific panel participants who were active in the last 90 days (as of December 2024) by state of residence, as well as the average number of respondents who took our survey (averaged across waves as reported in Table A2 in the paper). Naturally, larger states like New York and Florida have more users than relatively smaller states like Maryland and Alabama, and so we were able to recruit more respondents in these places.*

<table>
<tr><td>State</td><td>Prolific panel size</td><td>Avg. sample size</td></tr>
<tr><td>Maryland</td><td>1,625</td><td>114</td></tr>
<tr><td>Virginia</td><td>2,524</td><td>160</td></tr>
<tr><td>Georgia</td><td>3,317</td><td>177</td></tr>
<tr><td>Alabama</td><td>1,250</td><td>70</td></tr>
<tr><td>New York</td><td>4,876</td><td>467</td></tr>
<tr><td>Pennsylvania</td><td>3,502</td><td>373</td></tr>
<tr><td>Florida</td><td>5,915</td><td>861</td></tr>
<tr><td>South Carolina (FL control)</td><td>1,275</td><td rowspan="4">923</td></tr>
<tr><td>North Carolina (FL control)</td><td>3,060</td></tr>
<tr><td>Tennessee (FL control)</td><td>1,870</td></tr>
<tr><td>Virginia (FL control)</td><td>2,524</td></tr>
</table>

5. If the paper is getting too long, the Google trends part could be omitted.

[3] https://www.wsbtv.com/news/local/gov-kemp-extend-suspension-georgias-gas-tax-until-july-sources-say/NPF4WELLXNCWHD7LAB6NEQL4JI/

*Thanks – we considered your suggestion to cut this discussion for brevity, but ultimately decided to leave it in place given advice from the editor.*

6. I would like to see additional variables in Table 2 to get a better sense of the comparison between gas tax holiday states and other states. For example: gas prices, the change in gas prices, the unemployment rate, the change in the unemployment rate, consumption expenditures growth from BLS instead of just from Opportunity Insights, gas price expectations and longer-run inflation expectations from SCE.

*Thanks for this comment. To provide a clearer comparison of macroeconomic conditions between the treated and control states, Table 1 (previously Table 2 in the earlier draft) now includes 12 variables, incorporating those you suggested: the unemployment rate, changes in the unemployment rate, the growth rate of real GDP, the growth rate of nominal GDP, the implicit regional price deflator inflation rate, 1-year-ahead inflation expectations, 3-year-ahead inflation expectations, the growth rate of consumption from Opportunity Insights, the growth rate of PCE consumption, average gas prices, the average monthly growth rate of gas prices, and 1-year-ahead gas price inflation expectations. The notes below Table 1 detail the data sources for each variable.*

*Notably, consumption expenditure data is sourced from the BEA instead of BLS. Consumer spending growth data from the BLS is unavailable for all states and is instead limited to a few.[4] Overall, macroeconomic conditions do not differ significantly across the three groups of states, suggesting (to us) that the decision to implement the gas tax holiday was orthogonal to state-level economic conditions.*

7. SCE also includes commodity price expectations, so they could show how those changed in response to the holidays. That would be helpful in understanding whether consumers expected the lower prices to last, or expected higher gas price growth in the future.

*Thanks for the suggestion. In response to your comment, we used the SCE data to investigate the effects of the gas tax holidays on gas price inflation expectations. We report the results in Table A13 in the Appendix. Similar to our findings for overall inflation expectations, households in treated states anticipate lower gas price inflation by about 2 percentage points compared to those in the control states. This suggests that households in gas tax holiday states believe the lower gas prices will persist, leading to reduced expected gas price inflation. This could be due to households being unaware of the temporary nature of the gas tax holiday, which contradicts the FIRE model's assumption that households have full information. Alternatively, even if they are aware of its temporary nature, they may still revise their gas price inflation expectations downward, indicating a backward-looking approach to expectation formation. This discussion has been added on p.31-32.*

---

[4] *See: BLS Consumer Spending Data https://www.bls.gov/regions/subjects/consumer-spending.htm#MT*

8. After Equation (1), it would help to have more explanation about whether the equation is estimated separately for each state and what the time sample is.

*Sorry for the confusion here. To clarify, we estimate equation (1) separately for each treated state, using a control group formed from neighboring states. The sample period for each regression begins 20 weeks before the tax holiday starts and extends through 20 weeks after it ends. We have added this information in the text after we introduce equation (1) on p.19 and in the notes for Figure 2.*

9. From Figure 2, clearly there was some announcement effect of New York's policy (prices rose anticipatorily between the announcement and the implementation. Inflation expectations likely also then rose between announcement and implementation. How should we think about this when interpreting the results for New York?

*Thanks for this insightful comment. We agree that whether the tax change is anticipated could affect how households respond. In particular, the tax holidays in both Florida and New York were signed into law some time before implementation (two months prior in New York and three months in Florida – see Table A1 for details), which could have given households and producers time to anticipate the change. This could change the effects of the policy on inflation expectations through two channels.*

*First, as you point out, if suppliers raised gasoline prices prior to the tax suspension, inflation expectations may have also risen in response (and indeed we see an increase in prices in New York in the three weeks prior to implementation in Figure 2). If this is the case, the difference-in-differences estimate of the effect of the policy may be muted relative to the impact if it were fully unanticipated. This is directionally consistent with the larger effects we see in Maryland, Georgia, and Connecticut, where the policy was implemented immediately, relative to New York and Florida, where the change was implemented with a lag. We further test for this by dropping the three weeks immediately prior to the tax holiday in Florida and New York and re-estimating equation (3), which we show in Table A8. This exercise shows that the policy reduced inflation expectations by 0.55 percentage points in New York, with no detectable effect in Florida. We think that supplier anticipation could plausibly explain part of the treatment heterogeneity we see across states. We now discuss potential anticipatory effects on p.23-p.24 to reflect this.*

*Second, if individuals themselves anticipate that future gas prices are likely to fall, they may directly change their inflation expectations prior to the policy, even absent actual gas price changes. If this were the case, it could also reduce the impact of the policy on inflation expectations in these two states, since the change in beliefs would have begun before the start of the treatment. Evidence from our survey suggests that relatively few respondents knew about the policy prior to implementation; 31% of individuals in New York and 19% in Florida reported knowing about the tax suspension in pre-tax holiday survey waves (see Table A19). Nevertheless, we cannot completely rule out this channel given our data, and so we now mention this possibility in footnote 19.*

10. Page 35 says that "the primary objective of gas tax holidays was to alleviate the burden of rising gas prices and stimulate consumer spending." Was stimulating consumer spending really a primary goal, even when the growth rate of consumption (according to Table 2) was 17%? I looked at a few of the state government webpages about the holidays and didn't see stimulating consumption as a stated goal.

*Thanks for pointing this out. We reviewed the policy communication around the gas tax holidays again. Much of the language in the press releases is around reducing the burden of high gas prices for consumers, rather than directly stimulating consumption (though our sense is that policymakers expected some of the gasoline savings to be spent on other goods and services). Given this, we decided to remove the quoted sentence in your comment to avoid confusion or unnecessary speculation, as the objective of the gas tax holiday is not central to motivating our analysis of consumption patterns.*

11. Page 22 says, "This finding underscores that the principle channel through which the tax cut can impact household beliefs is through prices. " I don't understand what other possible channels are being ruled out here. Even if there is another channel (like through reducing government tax revenue), that is going to be correlated with the size of the tax cut and hence with prices.

*Thanks for this suggestion. We have elected to streamline the language on p.22 given that we don't directly discuss other possible mechanisms. Specifically, the text now reads:*

*"This finding underscores the fact that the impact of the tax cut on household beliefs depends crucially on the extent to which it is passed through to retail gas prices."*

12. I am a bit concerned about including both survey tenure effects and individual fixed effects when most of the Prolific surveys had only two waves. Intuitively, it seems like the fixed effects would end up being estimated very imprecisely, and I'm not sure what that would do to the estimates of interest. Another issue is that the tenure effects for tenures of 3 or more end up being estimated solely from the SCE data. This might not be a problem. But I'd be interested in seeing results without the FEs, and if there is a big difference, getting an explanation.

*Thanks for your question, and we appreciate your point that there may be limited variation to estimate survey tenure fixed effects for tenures larger than 3. We replicated the analysis from Tables 3 (state-level regressions) and 4 (stacked difference-in-differences specification) without the survey tenure fixed effects, which we include below. Excluding these fixed effects produces very similar results to those in the baseline version of the analysis in the paper.*

State-level effects on inflation expectations, no respondent fixed effects

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Expected inflation rate (density) | | | | |
| Gas Tax Holiday | -1.591*** | -1.491** | -2.101*** | -0.0318 | -0.0334 |
| (dummy) | (0.284) | (0.296) | (0.440) | (0.249) | (0.0651) |
| State | MD | GA | CT | NY | FL |
| Sampling Weight | Yes | Yes | Yes | Yes | Yes |
| Individual Fixed Effect | Yes | Yes | Yes | Yes | Yes |
| Time Fixed Effect | Yes | Yes | Yes | Yes | Yes |
| Survey Tenure Fixed Effect | No | No | No | No | No |
| Data | Combined | Combined | Combined | Combined | Combined |
| Observations | 1,881 | 2,251 | 2,312 | 3,494 | 6,241 |
| $R^2$ | 0.70 | 0.63 | 0.65 | 0.71 | 0.71 |

Impact of the Gas Tax Holiday on Inflation Expectations: Pooled Effects, no respondent fixed effects

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Control Group: All states<br>1-year ahead Inflation Expectation Rate (Density Forecast) | | | | | |
| Gas Tax Holiday | -0.332 | -1.282*** | 0.287 | -0.322 | -1.284*** | 0.234 |
| (dummy) | (0.235) | (0.148) | (0.200) | (0.237) | (0.188) | (0.227) |
| Gas Tax Holiday | | | 0.151*** | | | 0.135** |
| × Percent Gas Price Change | | | (0.0549) | | | (0.0632) |
| Sample | All | Excl. FL, NY | All | All | Excl. FL, NY | All |
| Sampling Weight | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment × Individual FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment × Time FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Experiment × Survey Tenure FE | No | No | No | No | No | No |
| State-level controls | No | No | No | Yes | Yes | Yes |
| Data | Combined | Combined | Combined | Combined | Combined | Combined |
| Observations | 68,463 | 41,122 | 68,463 | 68,463 | 41,122 | 68,463 |
| $R^2$ | 0.67 | 0.66 | 0.67 | 0.67 | 0.66 | 0.67 |

## *References*

D'Acunto, Francesco, Ulrike Malmendier, Juan Ospina, and Michael Weber. "Exposure to grocery prices and inflation expectations." *Journal of Political Economy* 129, no. 5 (2021): 1615-1639.