The Expected, Perceived, and Realized Inflation of U.S. Households before and during the COVID19 Pandemic

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Motivation

- Pandemic induced sharp contraction
- Challenge for policymakers at onset of pandemic: supply vs demand?
- Similar challenge for households:
  - Stockout of toilet paper due to stockpiling? $\rightarrow$ wait until restocking
  - Stockout due to workers staying at home? $\rightarrow$ shortage long lived
- Use subjective expectations of households to disentangle drivers

Motivation cont.

- Households' inflation expectation spiked $\rightarrow$ consistent w supply shock
- But also large increase in disagreement
- What drives rise in disagreement?
  - Disagreement whether shock supply- or demand driven?
  - Disagreement about severity of the shock?
  - Differences in price signals due to different shopping bundles?
  - Differences in price signals due to different prices but same bundle?

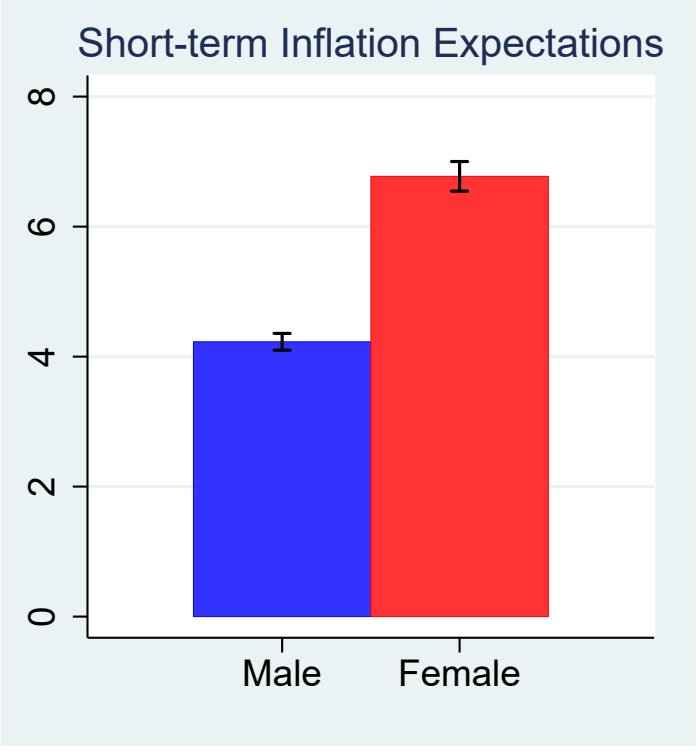
This Paper

- Field large-scale survey on 25,000 households in U.S. during pandemic
- Match survey with spending data at individual level
- Data allows observing realized, perceived, and expected inflation
- Also subjective expectations for other outcomes such as unemployment

Overview of Results

- Inflation of regularly purchased goods (milk, beer,) spiked at onset
- Also sharp increase in dispersion in realized inflation
- Dispersion due to Δ bundles & large het. in inflation across categories
- Higher realized inflation in non-durables $\rightarrow$ higher $\mathbb{E}$ overall inflation
  - Effect most pronounced for low income and low education households
- Households' views consistent w supply-side shock across groups
- $\uparrow$ dispersion of realized π likely driver of $\uparrow$ disagreement about $\mathbb{E}(\pi)$

Within-Household Inflation Expectations: Gender Gap



Source: D'Acunto, Malmendier, Weber, PNAS (2021):
"Gender Roles Produce Divergent Economic Expectations"

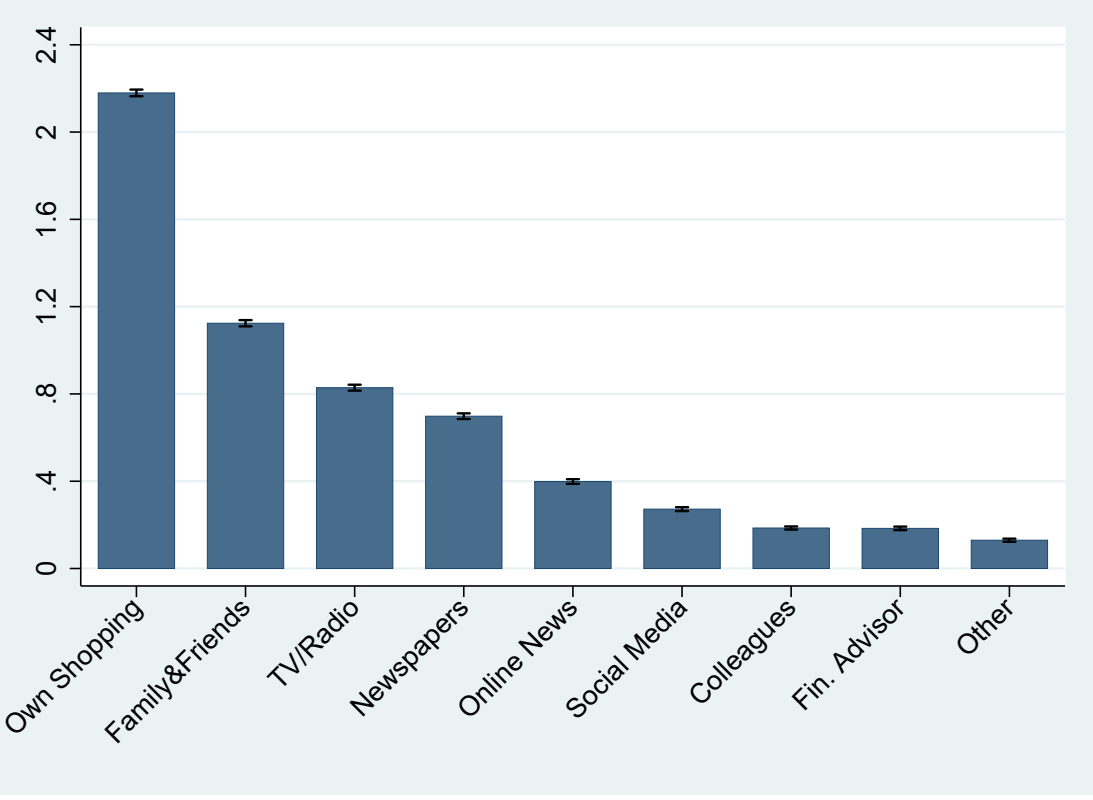
- Women have (more) positively biased inflation expectations

Why Are Women (More) Biased? They Do the Groceries!

Source: D'Acunto, Malmendier, Weber, PNAS (2021):
"Gender Roles Produce Divergent Economic Expectations"

- Large difference in inflation expectations by gender *within* household
- Unconditional difference driven by differences in grocery shopping

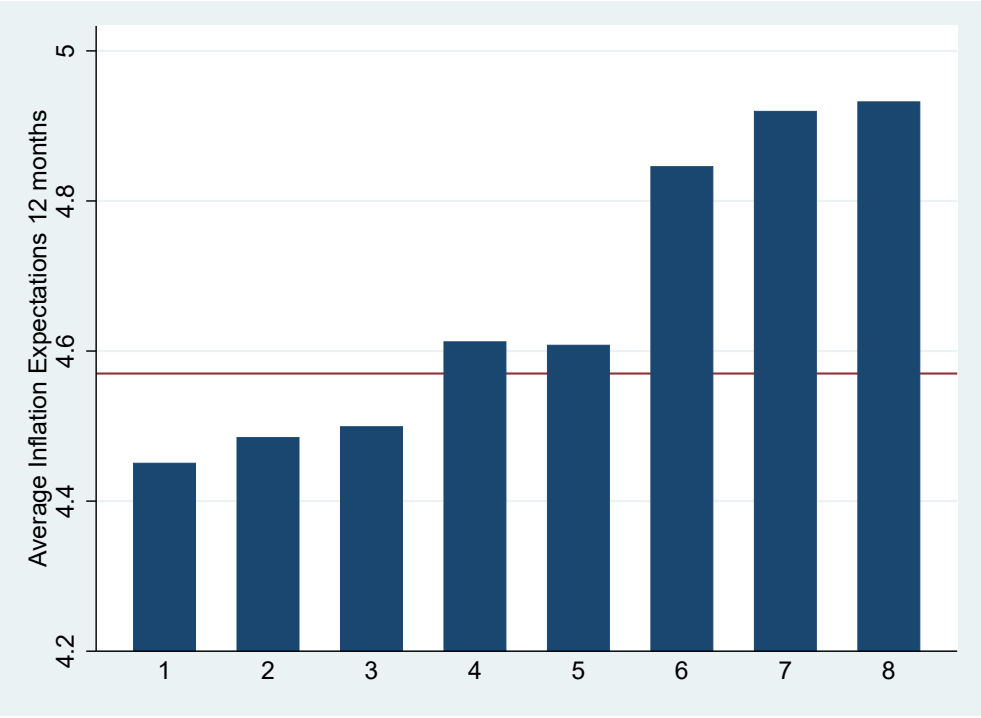
Shopping is the Most Important Source of Information



Source: D'Acunto, Malmendier, Ospina, Weber, JPE (2021):
"Exposure to Grocery Prices and Inflation Expectations"

- Most relevant sources of information when we asked their inflation expectations
- Own (and family) shopping much more common than media, other sources

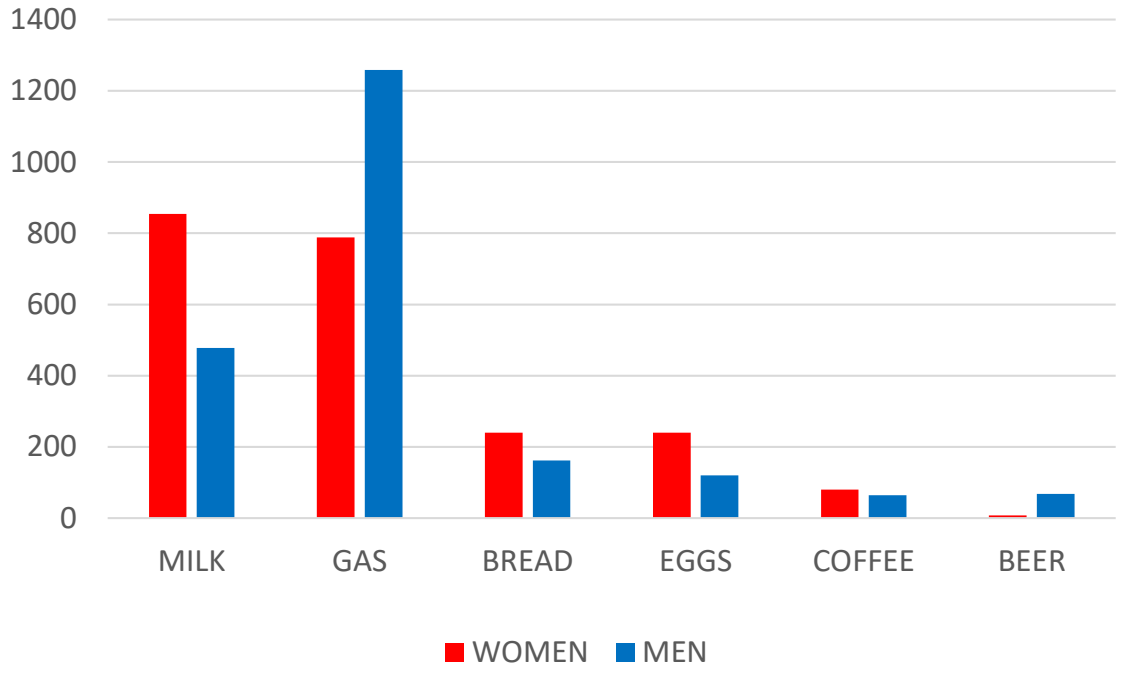
Variation in Households' Bundles → Inflation Expectations



Source: D'Acunto, Malmendier, Ospina, Weber, JPE (2021):
"Exposure to Grocery Prices and Inflation Expectations"

- Sort 50,000 households into bins by grocery price changes
- High-low portfolio: difference in expected inflation of 0.5 percentage points
- Economically sizeable given inflation target of 2%

Men and Women often Think about Individual Goods



Source: D'Acunto, Malmendier, Weber, PNAS (2021):
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- Individuals often focus on price changes of specific items
- Put larger weight on positive than equal-sized negative price changes
- Inflationary impulse in narrow categories can result in spike in inflation expectations

AC Nielsen Panel

- 80,0000 – 90,000 households across the U.S.
- Rich set of demographics: age, income, # kids, martial status, etc
- Balanced panel along demographics
- Actual purchases in "grocery bundle"
- Incentives to report accurately
  - Monthly prize drawings
  - Points to purchase goods
  - Structured to not distort shopping behavior

Expectations and Communications Survey

- Nielsen runs regular small-scale surveys and larger customized surveys
- Mainly retailers and consumer-goods producers
- Quarterly waves from 2018Q1 through 2021Q2
- All members of AC Nielsen panelist households
- Similar to Michigan Survey and NY Fed Survey of Expectations
  - But larger in scale: 25,000 vs 500 and 1,500
- Sample weights from Nielsen
- Response rate of around 25% (multiple respondents per household)

Measuring Realized Inflation at Household Level

- Nielsen homescan panel (subset of consumption: groceries, etc)
- Construct effective price paid by hh h in quarter t for module j: $pe^h_{j,t}$
  - Modules are "breakfast bars", "baking soda", "dessert cakes frozen"
  - Effective price: total expenditure divided by total volume
- Realized inflation at module level: $\pi^h_{j,t} : log \frac{pe^h_{j,t}}{pe^h_{j,t-1}} \times 100$
- Allows for substitution across goods within modules and stores
- Household realized inflation: $\pi^h_t = \sum_{j \in B^h_t} \omega^h_{j,t} \pi^h_{j,t}$
  - $\omega^h_{j,t}$ average expenditure share from current and previous periods
  - B^h_t household consumption bundle

Inflation Expectations

- Directly ask about *inflation* (New York Fed Survey)
- First perception of current inflation
- Expectations of inflation via probability distribution and point estimate
- Also ask for perception of current unemployment and expectations

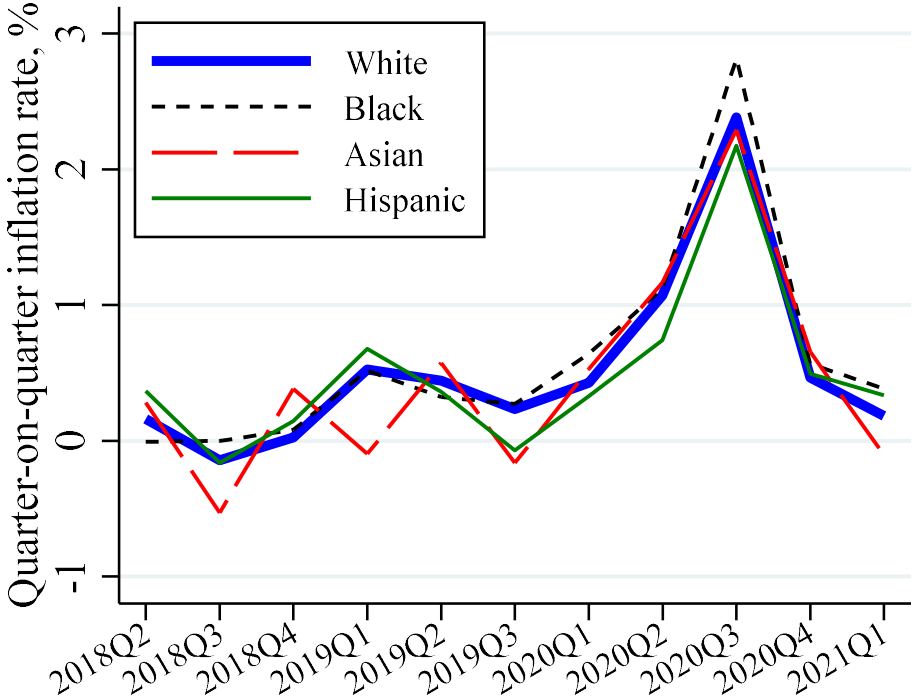
Realized Inflation by Characteristics

- Differences in realized inflation mildly related to observables

  Kaplan and Schulhofer-Wohl (2017)

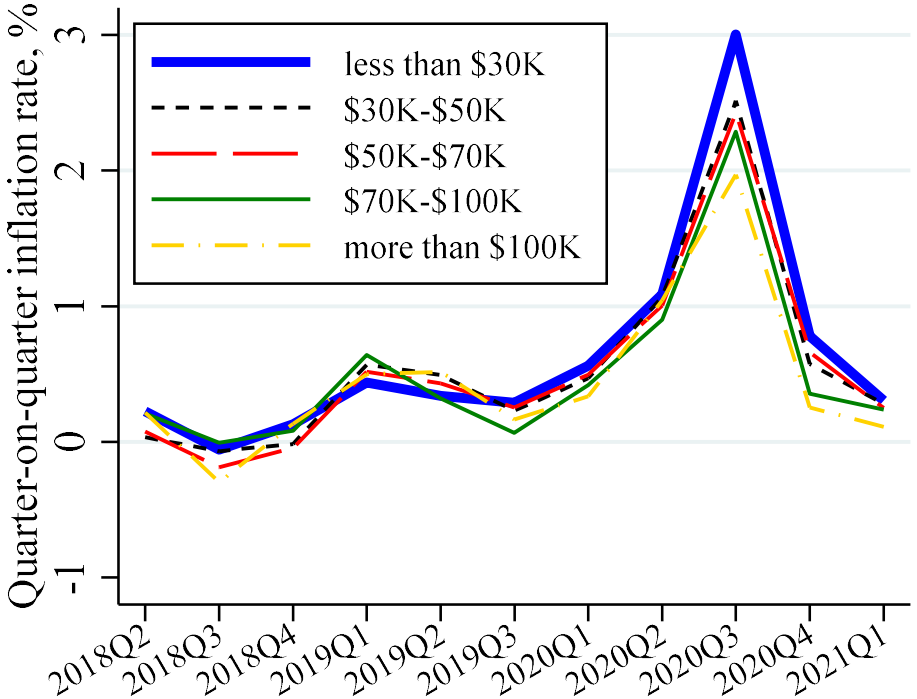
- Study differences in realized inflation by race, income, education

Realized Inflation by Race



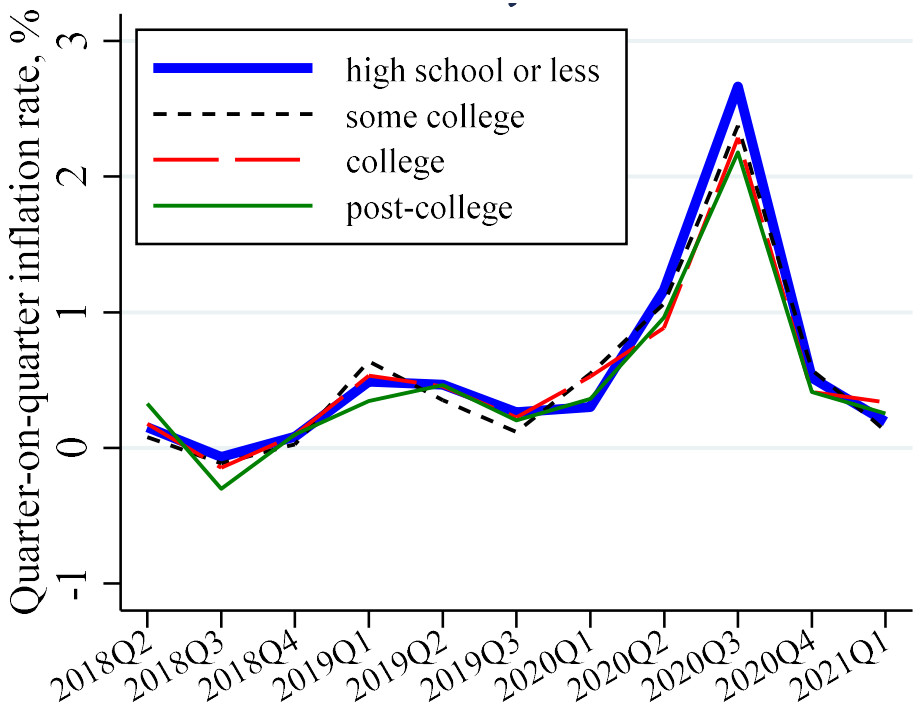
- Small differences in realized inflation by race before pandemic
- Substantially larger increase in realized inflation for blacks than for others

Realized Inflation by Income



- Small differences in realized inflation by income before pandemic
- Substantially larger increase in realized inflation for low income individuals than for others

Realized Inflation by Education

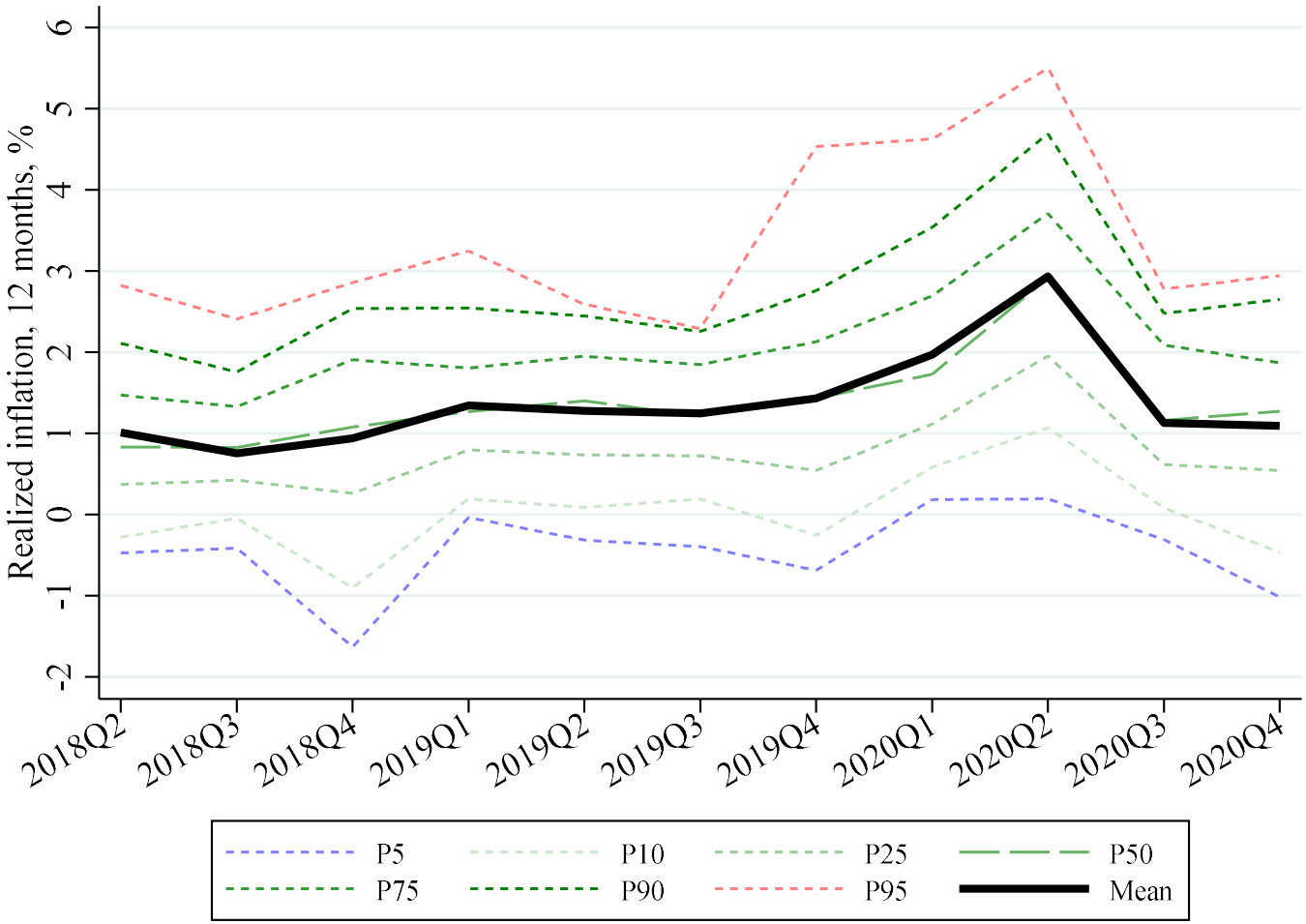


- Small differences in realized inflation by education before pandemic
- Substantially larger increase in realized inflation for low education individuals than others

Drivers of Increase in Dispersion

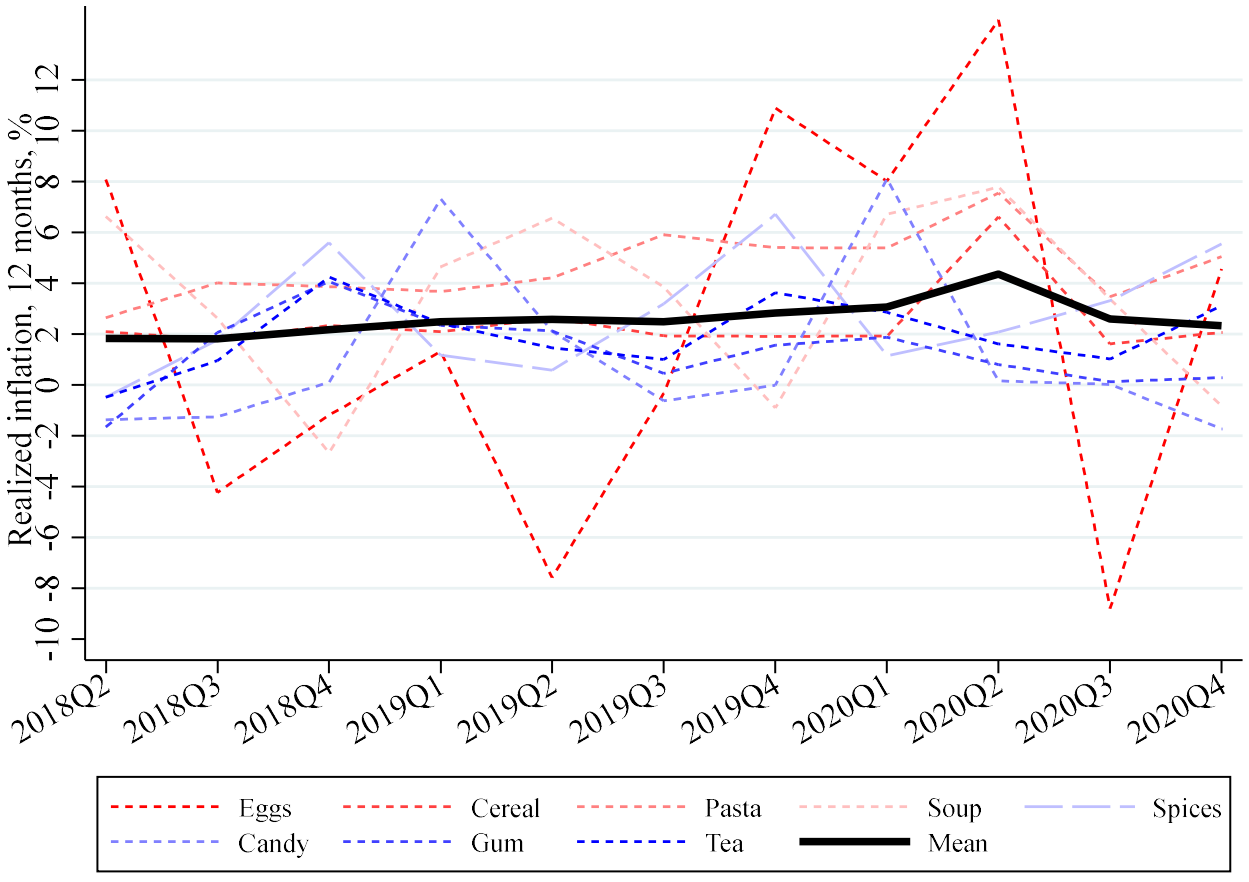
- Different expenditure weights across categories of goods
- Different prices for identical consumption bundles

Dispersion of Inflation Rates across Categories



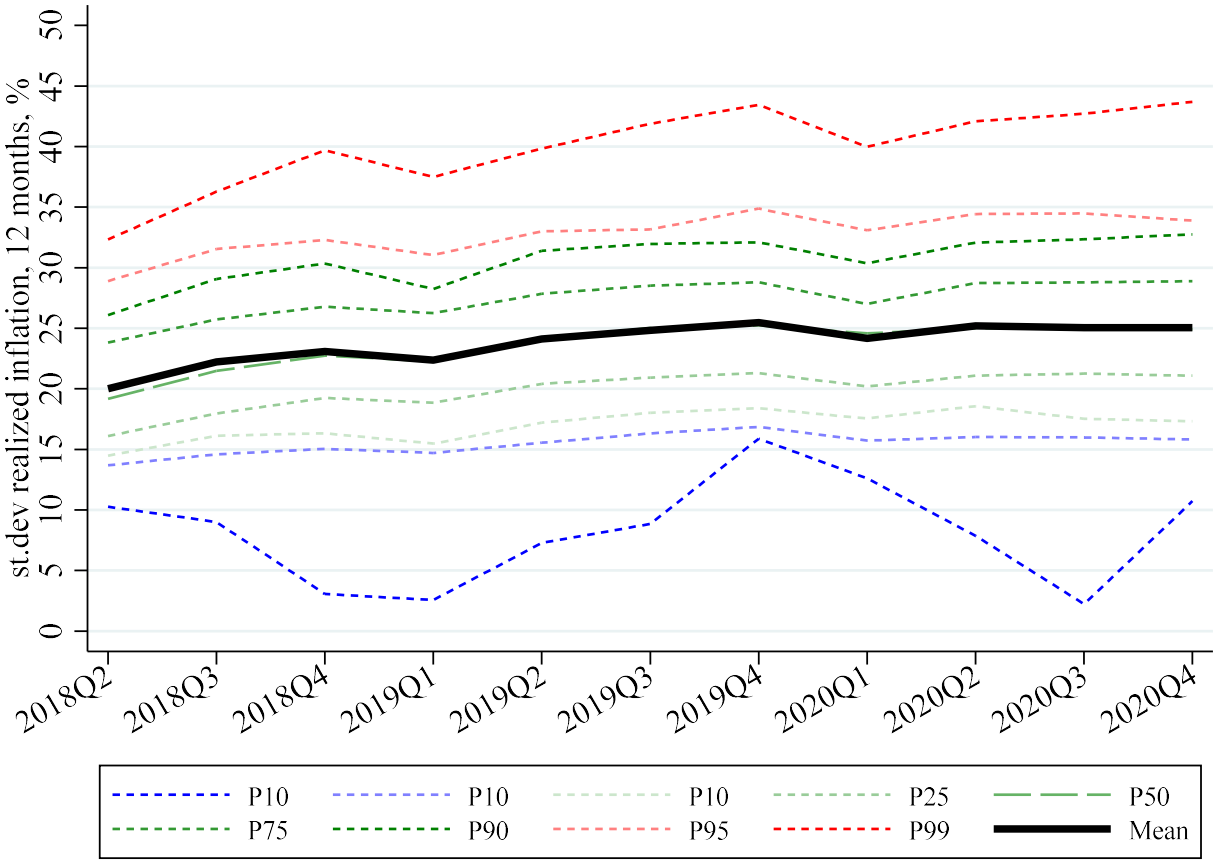
- Large increase in dispersion of price dynamics across categories

Inflation Rates of Select Categories of Goods



- Dispersion because some categories have higher inflation, others deflation
- Some frequently purchased goods (eggs, cereal, pasta) high inflation in 2020Q2
- Other commonly purchased goods (candy) see decline

Across-household within-product-group Dispersion



- Within-category dispersion of realized inflation increasing over time
- No clear spike in dispersion during the COVID19 crisis

Realized and Expected Inflation

- Idiosyncratic signals important driver of aggregate expectations

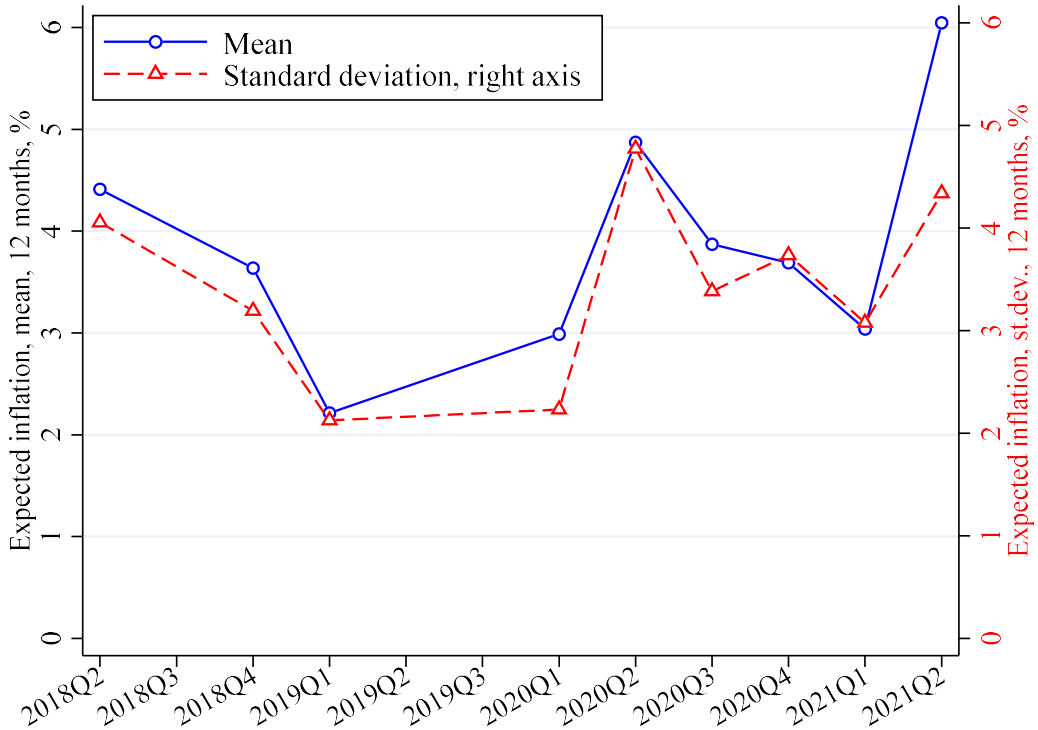
  Lucas (1972)

- Shopping bundle inflation drive inflation expectations in normal times

  D'Acunto et al. (PNAS, JPE 2021)

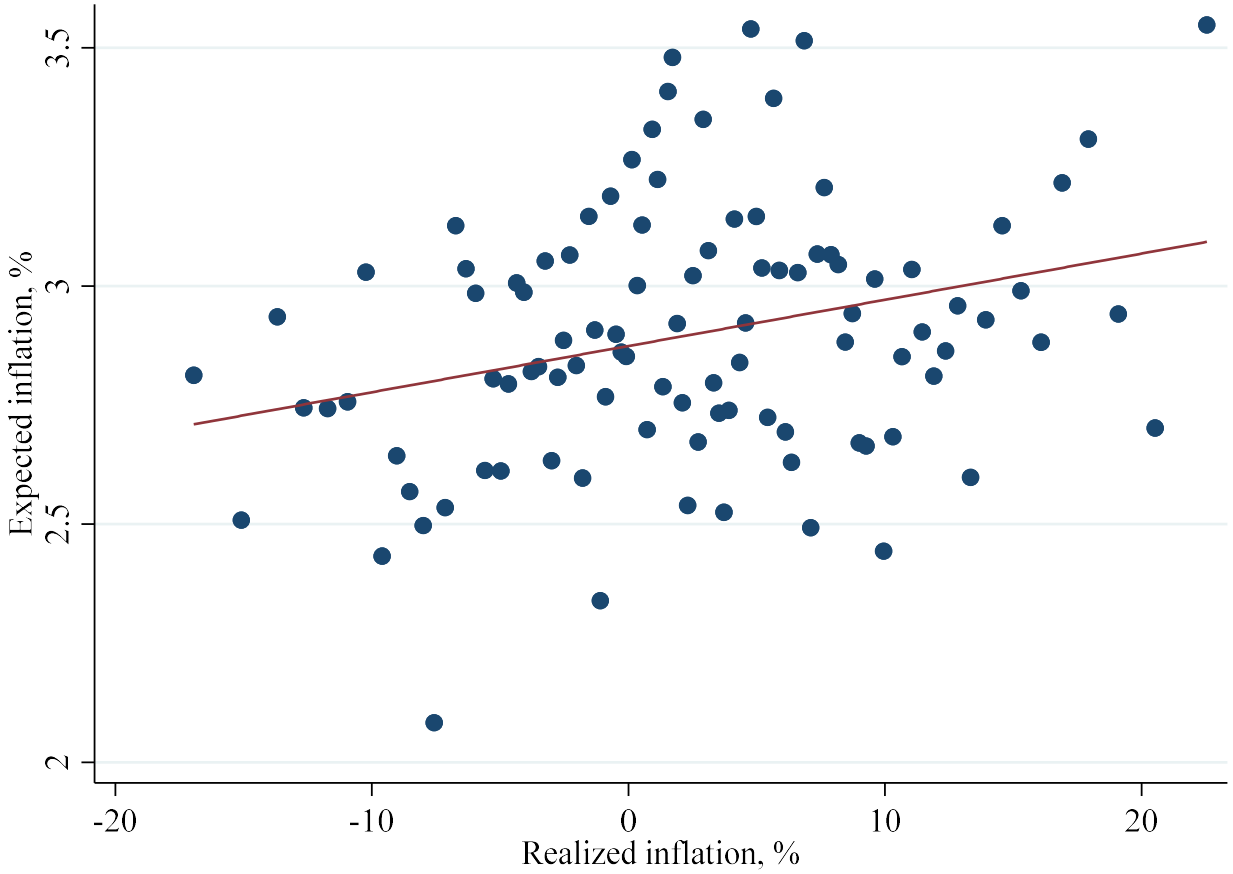
- Does increased dispersion in $\pi_t \rightarrow$ increased dispersion of $\mathbb{E}(\pi_{t+1})$?

Expected Inflation from Point Forecasts



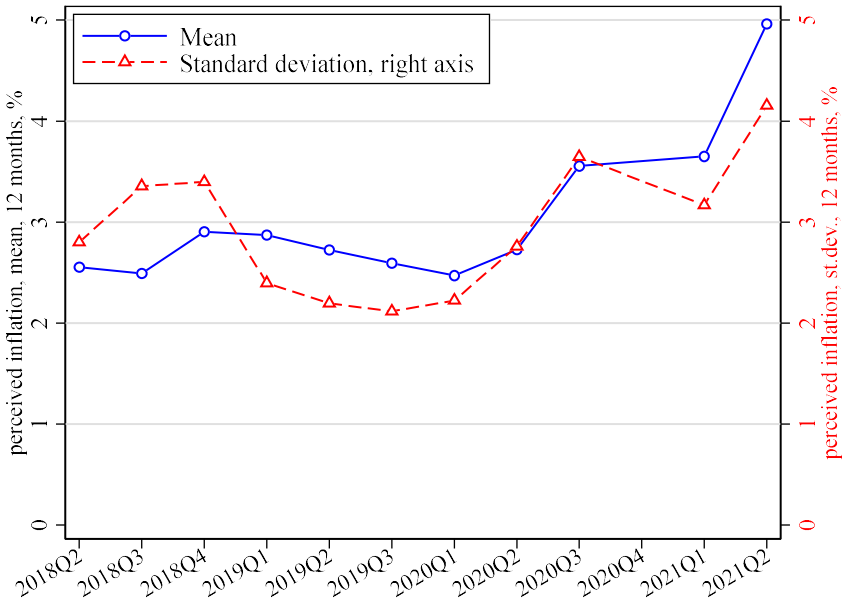
- Inflation expectations trending down from 4% in 2018 to 2-3% in 2019 (Huber robust)
- Large cross-sectional standard deviation of about 3 percentage points
- Large and immediate increase in inflation expectations in 2020Q2
- Elevated expectations during 2020
- Spike to over 6% in 2021Q2

Realized and Expected Inflation of U.S. Households



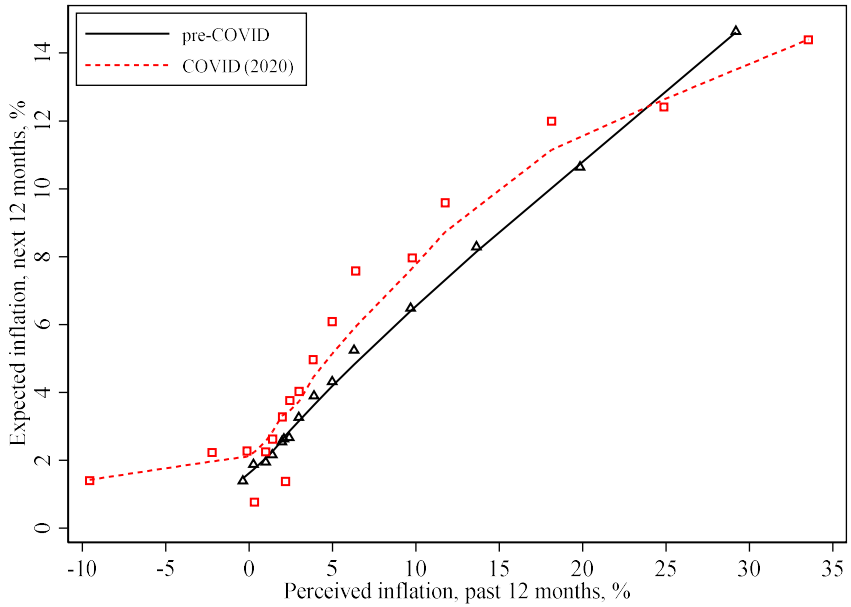
- Positive relationship between inflation expectations and realized inflation
- But other salient price changes such as gas prices can also affect inflation perceptions
- Also study role of perceived inflation

Perceived Inflation over Time



- Perceived inflation slightly above 2% inflation target in 2018 and 2019
- Sharp increase between first and third quarter of 2020
- Similarly large increase in dispersion of perceptions
- Similar dynamics between perceived and expected inflation

Perceived and Expected Inflation

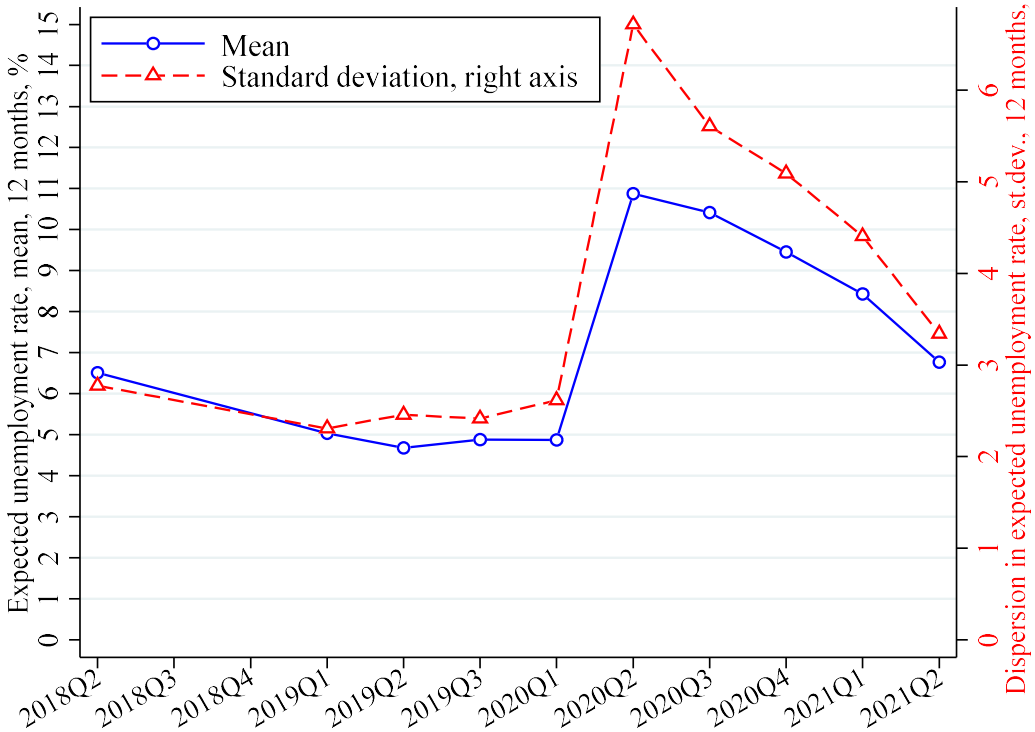


- Strong positive relationship between perceived and expected inflation
- Dispersion of perceived and expected inflation greater during pandemic than before
- Similar relationship holds across different types of households

Households' Perceived Driving Forces behind Inflation

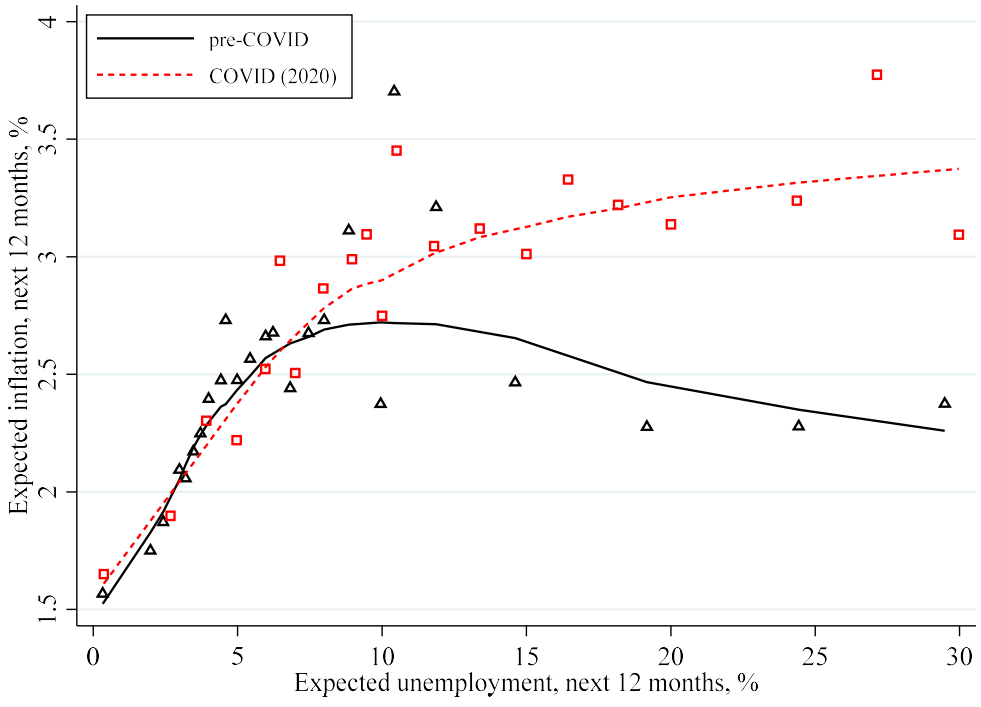
- Belief about aggregate price changes are not formed in isolation
- Often "supply-side" view: $\mathbb{E}(\pi)$ positively correlated with $\mathbb{E}(UR)$
- Similar view during the pandemic and differed perceived shock size?
- Different interpretation of shock nature $\rightarrow$ higher dispersion in $\mathbb{E}(\pi)$?

Expected Unemployment Rate



- Unemployment expectations decreasing before pandemic
- Large increase at onset of pandemic

Unemployment and Inflation Expectations

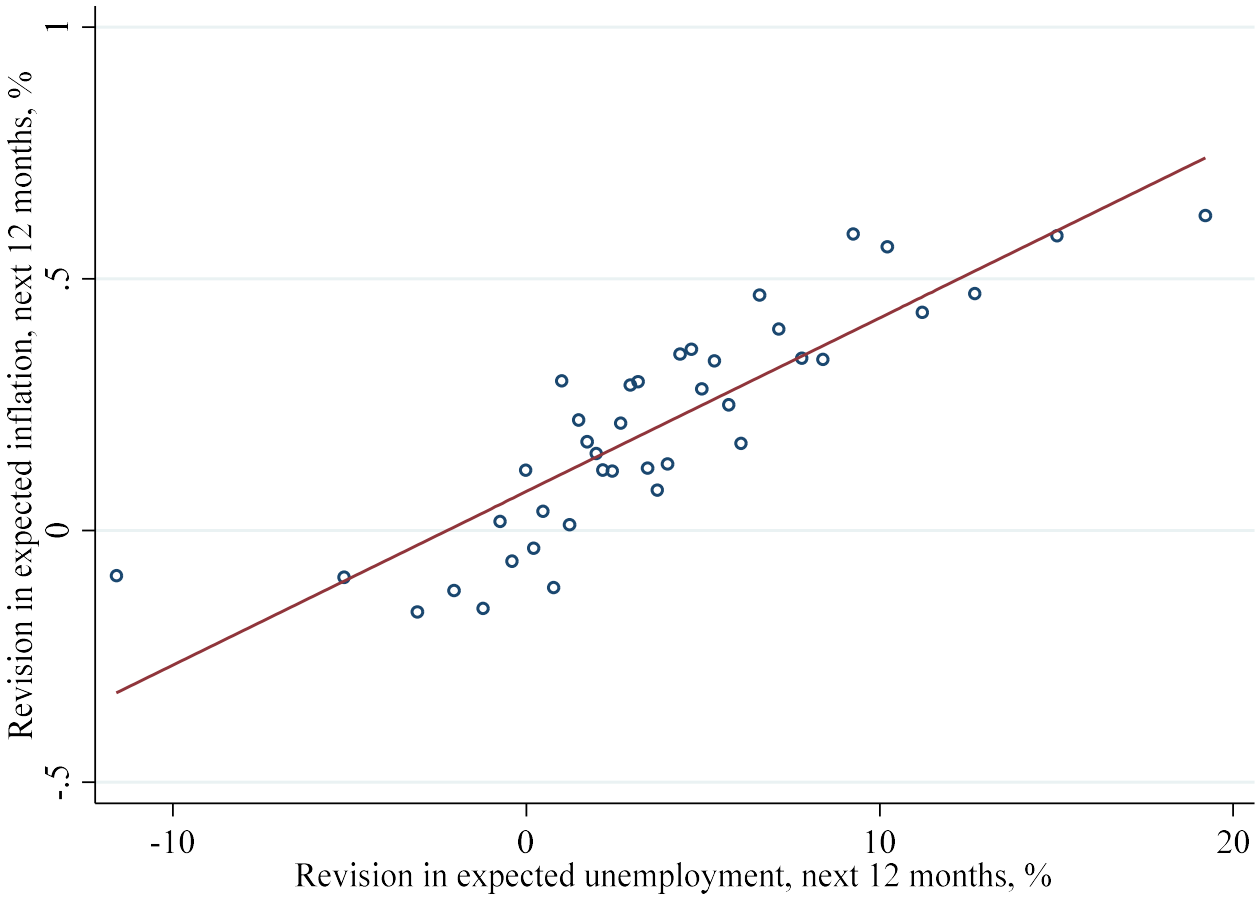


- Before 2020: households expecting higher inflation also expect higher unemployment
- Almost identical relationship during pandemic
- Supply-side view taken by households of inflation remained unchanged during pandemic
- Similar across different subgroups and different from professional forecasters

Unemployment and Inflation Expectations

- Different interpretations about nature of shock unlikely
- Households expecting $\uparrow$ inflation also expect $\uparrow$ unemployment
  - $\Delta\,\mathbb{E}(\pi)$ likely reflection of Δ in beliefs about severity of shock
- Study individuals' forecast revision from before to during pandemic

Revisions in Expected Inflation and Unemployment Rates



- Strong positive relationship between revisions in unemployment and inflation expectations

Conclusion

- March 2020: plummeting real activity but households $\mathbb{E}(\pi)$ spike
- Disagreement about future price dynamics followed suit
- Primary driver of disagreement: different experiences with prices
- Differences in bundles likely driver of increase in dispersion
- Supply side view of inflation pervasive among households