

Subjective Inflation Expectations and Monetary Policy Communication: The Role of Medium, Messenger, and Message

Michael Weber
University of Chicago, CEPR, and NBER

May 26 2023

Subjective Inflation Expectations

Inflation expectations are terribly important. We spend a lot of time watching them.

Jerome Powell (2021)

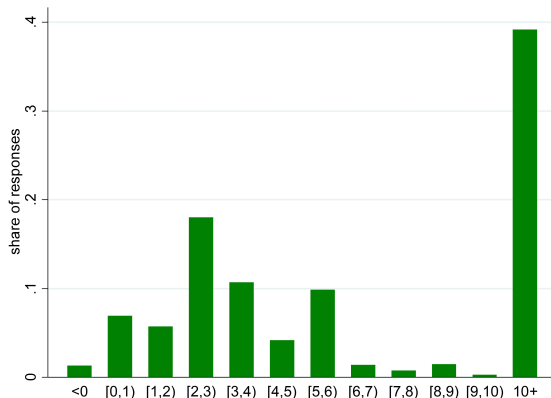
The Role of Expectations for Household Decisions...

- Key variable for economic decisions: perceived real interest rate

$$r_t^i = i_t - \mathbb{E}_t^i \pi_{t+1}$$

- Most **households'** choices depend on inflation expectations
 - Consumption/saving choices (D'Acunto, Hoang, and Weber, 2018)
 - Mortgage Uptaking, Type (Malmendier and Nagel, 2015)
 - Stock Market Participation (Das, Kuhnen, and Nagel, 2019)
 - **Wage bargaining**
- Normal times: $\Delta i_t \rightarrow \Delta r_t$ if expectations anchored
- **Especially important when nominal rates low!**
(Coibion, Gorodnichenko, Kumar, and Pedemonte, 2018)
 - Policy needs to manage households' expectations
 - Examples: Unconventional Fiscal Policy, Forward Guidance

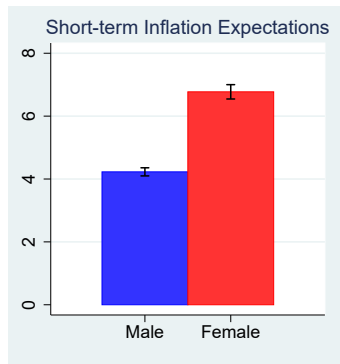
BUT Households have dispersed knowledge...



Source: Coibion, Gorodnichenko, Weber, JPE (2022):
“Monetary Policy Communication and Households’ Inflation Expectations”

- Expectations do react to info and determine actual consumption in scanner data

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

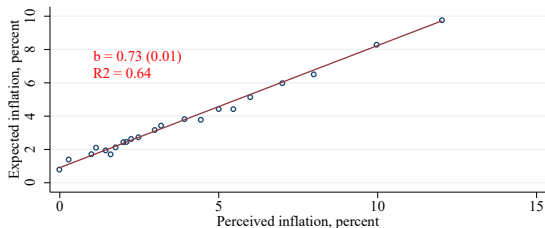
Why Are Women (More) Biased? They Do the Groceries!



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

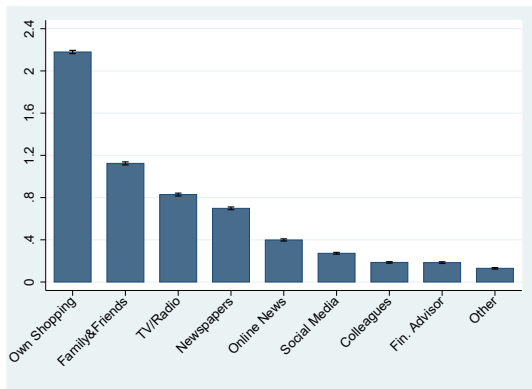
From Perceived Inflation to Inflation Expectations



Source: Weber, D'Acunto, Gorodnichenko, Coibion, JEP (2022):
"The Subjective Inflation Expectations of Households and Firms"

- Strong link between what individuals perceive and expect to happen to inflation
- Need to understand which signals individuals see and notice

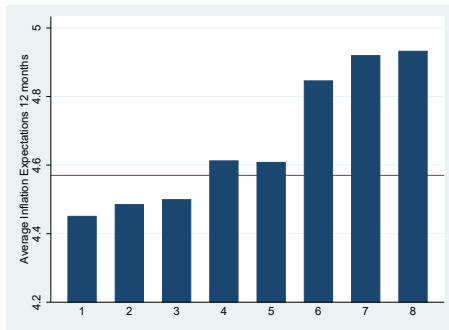
Shopping is the Most Important Source of Information



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

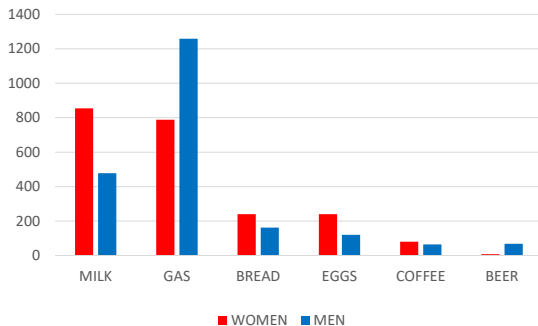
Variation in Households' Bundles → Inflation Expectations



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

- Sort 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%
- **Higher weight on positive prices changes of frequently purchased goods**

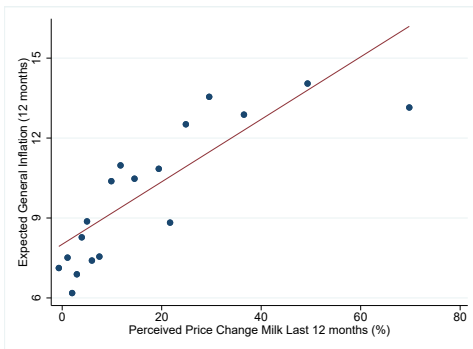
Men and Women often Think about Individual Goods



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

- Individuals often focus on price changes of specific items
- NB: gas price changes largely uniform across US, can't drive dispersion in $\mathbb{E}\pi$
- Inflationary impulse in narrow categories can result in spike in inflation expectations

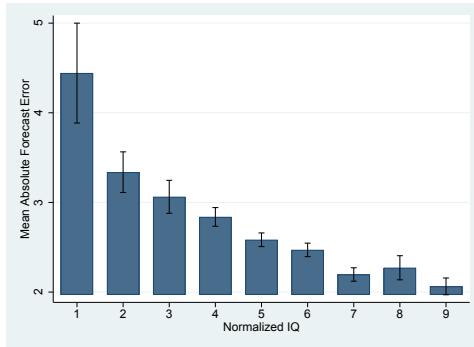
From Recalled Good-Specific Signals to Aggregate Beliefs



Source: D'Acunto and Weber (2022):
"Memory and Beliefs: Evidence from the Field"

- **Survey January 2022:** Elicit recalled milk prices, milk inflation
- Perceived milk inflation correlates with general inflation expectations

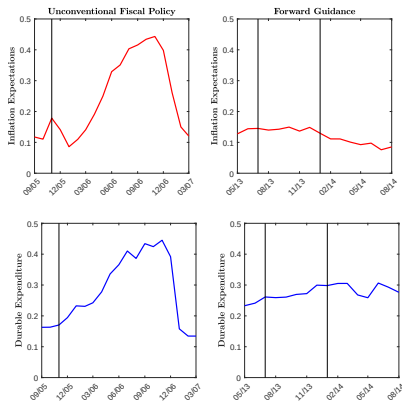
Forecast Accuracy and Expectations



Source: D'Acunto, Hoang, Paloviita, Weber, Restud (2022):
"IQ, Expectations, and Choice"

- IQ data for all men in Finland from military
- Men with low IQ: absolute forecast error for inflation of 4.5%
- Decreases monotonically with IQ
- Effect unrelated to income and education

Simple Policies vs Complex Policies



Source: D'Acunto, Hoang, Weber, RFS (2022):
"Managing Household Expectations with Unconventional Policies"

- Pre-announced VAT increase (left): inflation expectations AND spending react
- Fwd guidance announcements (right): nothing moves
- Both policies theoretically operate through identical channel: Euler equation

Policy Medium Matters: AC Nielsen Panel

- Three waves in June, September, & December 2018
- All members of AC Nielsen panelist households
- Similar to Michigan Survey and NY Fed Survey of Expectations
 - But larger in scale: 20,000 vs 500 and 1,500
- Rich set of demographics: age, income, # kids, marital status, etc
- Actual purchases in “grocery bundle”

Source: Coibion, Gorodnichenko, Weber, JPE (2022):
“Monetary Policy Communication and Households’ Inflation Expectations”

Information Treatments: Setup

- Directly ask about *inflation* (New York Fed Survey)
- After initial questions information provision experiment
- Study how different information affects updating
- Assign to 9 groups: 8 information treatments and 1 control group
- 1 placebo treatment to disentangle learning from anchoring effects
- Treatments randomly assigned

Information Treatments

- 1 Actual CPI inflation rate over the last twelve month (2.3%)
- 2 Inflation target of the Federal Reserve of 2% per year
- 3 FOMC forecast for inflation in 2018 of 1.9%
- 4 Most recent FOMC statement
- 5 Coverage of most recent FOMC decision in USA Today
- 6 Most recent unemployment numbers (Philipps curve in mind?)
- 7 Average gas price inflation over the previous three months of 6.4%
- 8 U.S. population growth of 2% over the last two years (placebo)

Information Treatments: Follow-up Questions & Survey

- Ask again for inflation expectations (point estimate)
 - Ensure individuals not asked same question twice
- Measure instantaneous updating of expectations
- Only information treatments in first wave of survey
- Follow-up surveys only elicit inflation expectations and perceptions
- Same questions across all participants

Empirical Specification

- Regress forecast revision on treatment dummy & controls $\forall$ treatment

$$\mathbb{E}_i^{post} \pi - \mathbb{E}_i^{pre} \pi = a + b \times Treatment_i + \beta X_i + error_i$$

- $\mathbb{E}_i^{post}$: posterior forecast of individual i
- $\mathbb{E}_i^{pre}$: prior belief (mean of distribution)
- $Treatment_i$: dummy variable for treatment
- X_i : vector of controls
 - Quadratic polynomial in age
 - Dummies for gender, employment status, income, household size, race, census region, lifestyle

Policy Medium Matters

$$E_i^{post} \pi - E_i^{pre} \pi = a + b \times Treatment_i + \beta X_i + error_i$$

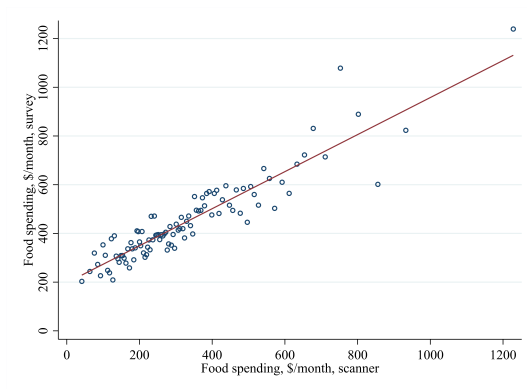
Population growth	-0.224*	-0.271**
	(0.116)	(0.120)
Past inflation	-1.170***	-1.241***
	(0.114)	(0.120)
Inflation Target	-1.087***	-1.130***
	(0.113)	(0.120)
Fed inflation forecast	-1.166***	-1.240***
	(0.113)	(0.120)
FOMC statement	-1.284***	-1.298***
	(0.113)	(0.119)
USA today coverage	-0.469***	-0.555***
	(0.116)	(0.121)
Unemployment	-0.348***	-0.352***
	(0.115)	(0.121)
Gas Price	1.490***	1.420***
	(0.125)	(0.130)
Controls for demographics	No	Yes
Nobs	19,654	17,979

- Print media less effective because less trustworthy in US

Consumption

- Euler equation: lower perceived real rates $\rightarrow$ higher consumption
- Use treatments to instrument posterior inflation expectations
 - Cross-sectional variation in real rates keeping constant nominal rates
- Study spending 3 & 6 month post treatments: survey and scanner

Ex-post Consumption in Surveys and Scanner Data



- Eliciting consumption ex-post in surveys difficult
- Ex-post measured consumption in surveys and scanner data line up closely
- Key to elicit at category level
- Tight link also across whole distribution but heaping

Treatment Effect on Consumption

$$\log(spend)_{i,t+h} = \beta \mathbb{E}_i^{post} \pi + \gamma \mathbb{E}_i^{prior} \pi + \kappa \log(spend)_{it} + BX_{it} + error_{i,t+h}$$

Panel A: Total Spending Survey		
$\widehat{\mathbb{E}_i^{post} \pi}$	0.248*** (0.090)	0.163 (0.107)
Observations	7,155	5,389
R ²	0.425	0.430
1 st -stage F stat	53.38	39.60
Panel B: Total Spending Nielsen homescan		
$\widehat{\mathbb{E}_i^{post} \pi}$	0.151*** (0.046)	0.139*** (0.054)
Observations	13,170	13,131
R ²	0.747	0.694
1 st -stage F stat	135.6	128.7

- Treatments strong instruments for posterior
- Exogenously higher $\mathbb{E} \pi \rightarrow$ higher spending
- Results in line with policy communication can manage aggregate demand

Policy Message Matters: Customized Survey in Finland

- Survey design in cooperation with Statistics Finland in Spring of 2020
- Sample: all men in Finland with IQ data
- Stratified by age and education to ensure large overlap with IQ data
- Fielded in June 2020

Source: D'Acunto, Hoang, Poloviita, Weber, (2021):
“Effective Policy Communication: Targets versus Instruments”

Information Provision Experiment

- Angeletos & Saastry (2019): target vs. instrument communication?
- Randomize type of communication
- Imitate ideal setup in laboratory
- Keep constant sender: Olli Rehn
- Keep constant medium: twitter
- Control group receives also tweet of crisis time unrelated to policy
- Intro text before information to reduce concerns of demand effects

Target Communication



Olli Rehn
@ollirehn

...

Euroopan keskuspankki tekee kaiken tarvittavan ilman rajoitteita koronaviruksen aiheuttamien taloudellisten vaurioiden minimoimiseksi kansalaisille. Tässä suomeksi pääjohtaja Christine [@lagarde](#)'n tuore blogi. [@ecb](#) [@SuomenPankki](#) [#koronafi](#)



EKP vastaa koronaviruksen aiheuttamaan hätätilaan
ecb.europa.eu

1:35 AM · Mar 20, 2020 · Twitter for iPad

22 Retweets 1 Quote Tweet 61 Likes

- “The European Central Bank will do whatever is necessary to minimize the financial damage to citizens caused by the corona crisis”
- No jargon, no number, no instrument just target
- “Simple, crisp, and constructively imprecise” (Angeletos, 2020)
- Survey did not include last sentence and link

Instrument Communication



- “New EUR750 billion Pandemic Emergency Programme (PEPP) launched by the European Central Bank”
- Only reference to policy instrument
- Large amount likely to both expert and non-expert
- Survey did not include last sentence and link

Control Treatment

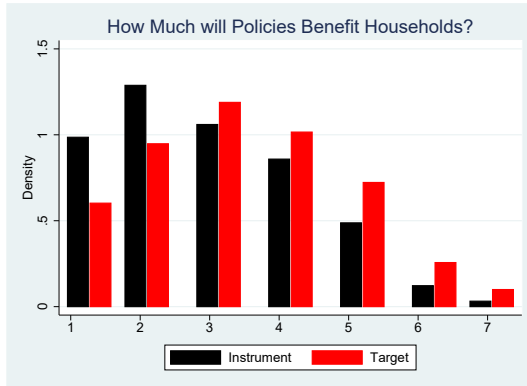


- “The January engagement created the spirit of Winter War 80 years ago. Memories do not live, but they do”
- Control group also discusses period of crisis but no relation to monetary policy
- Within-subject design allows purging potential “crisis” priming effect
- Survey did not include last sentence, link, and picture

Cognitive Ability Data

- Mandatory military service in Finland: Finnish Armed Forces (FAF)
- Around age 19, 120 questions to measure cognitive abilities
- FAF aggregates scores into a composite: IQ
- FAF standardizes IQ to follow a stanine distribution
 - 9 points to approximate normal
 - Lowest 4% of scores at least 1.75 std from mean: standardized IQ of 1
 - 4% with highest test scores: standardized IQ of 9

Qualitative Results



- Target Communication: specifies aims of policy
- Instrument communication: details implemented measures
- Households higher level of trust in CB for target than instrument communication

Forecast Revisions: Split by IQ

$$(\mathbb{E}_{posterior}^i - \mathbb{E}_{prior}^i) \Delta income = \alpha + \beta_j \times Treatment_j + B \times X + \varepsilon_i,$$

	Target Communication <u>Below-Median IQ</u>		Target Communication <u>Above-Median IQ</u>	
	(1)	(2)	(3)	(4)
Treated with Communication	95.0* (50.8)	163.6 *** (63.6)	63.4 (47.1)	53.4 (51.0)
Controls	X	X	X	X
R ²	0.002	0.030	0.001	0.026
Nobs	1,156	792	1,330	974

- Target comm increase income expectations by EUR 95 -165 for low IQ men
- Muted reaction among high IQ men

Policy Sender Matters: Lagarde tweet

"I was pleased to invite my new Governing Council colleagues to join me at an off-site retreat yesterday. We discussed in an open and informal setting the running of the Governing Council."



Twitter reaction: *"Is that really just white men?! Doesn't look like an open discussion. #DiversityandInclusion" / "Très blanc, très vieux, très male."*

Source: D'Acunto, Fuster, Weber, (2021):

"Diverse Policy Committees Can Reach Underrepresented Groups"

This paper

Study whether **female and minority representation** on FOMC affects extent to which different demographic groups (men vs. women; white vs. minority) incorporate information from Fed into subjective beliefs

- Large-scale survey ($N \approx 9000$)
- Show different Fed officials (White male, White female, Black male)

Shed light on channels through which effects operate:

- trust in the Fed
- “paying attention” / information acquisition

Document Δ in ex-ante knowledge about the Fed and pillars of policy

Screenshot – control group

“We would now like to provide you with some information about monetary policy in the United States, and then ask you some more questions.”

The Federal Reserve, or Fed, conducts the nation's monetary policy by influencing money and credit conditions in the economy in pursuit of full employment and stable prices.

The Federal Reserve System includes three key entities: the Board of Governors, 12 Federal Reserve Banks, and the Federal Open Market Committee (FOMC). The FOMC is the monetary policymaking body of the Federal Reserve System, and sets short-term interest rates. The FOMC is composed of 12 members--the seven members of the Board of Governors and five of the 12 Reserve Bank presidents.



Respondent forced to stay on page for 20 seconds: “Please review the information on this screen – you will be able to move to the next screen shortly.”

Screenshot – inflation forecast; Barkin

The Federal Reserve, or Fed, conducts the nation's monetary policy by influencing money and credit conditions in the economy in pursuit of full employment and stable prices.

At their meeting in June 2020, the Federal Reserve Bank Presidents and Federal Reserve Board Governors forecasted (on average)

- *a 0.8% inflation rate in 2020*
- *a 1.6% inflation rate in 2021*



Thomas Barkin, President of the Federal Reserve Bank of Richmond, **who participated in the June 2020 Fed meeting.**

Screenshot – inflation forecast; Bostic

The Federal Reserve, or Fed, conducts the nation's monetary policy by influencing money and credit conditions in the economy in pursuit of full employment and stable prices.

At their meeting in June 2020, the Federal Reserve Bank Presidents and Federal Reserve Board Governors forecasted (on average)

- *a 0.8% inflation rate in 2020*
- *a 1.6% inflation rate in 2021*



Raphael Bostic, President of the Federal Reserve Bank of Atlanta, **who participated in the June 2020 Fed meeting.**

Screenshot – unemployment forecast; Daly

The Federal Reserve, or Fed, conducts the nation's monetary policy by influencing money and credit conditions in the economy in pursuit of full employment and stable prices.

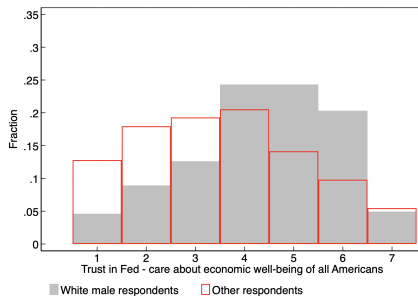
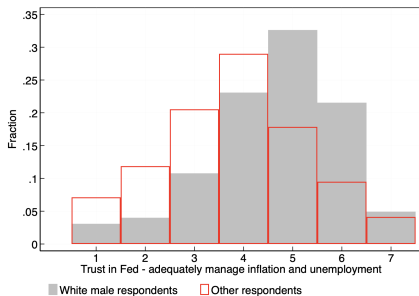
At their meeting in June 2020, the Federal Reserve Bank Presidents and Federal Reserve Board Governors forecasted (on average)

- *a 9.3% unemployment rate in the fourth quarter of 2020*
- *a 6.5% unemployment rate in the fourth quarter of 2021*



Mary Daly, President of the Federal Reserve Bank of San Francisco, **who participated in the June 2020 Fed meeting.**

Trust in Fed – control group (Scale: 1 “no trust at all” to 7 “complete trust”)

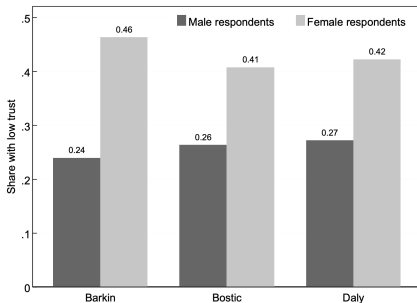


- Large differences in trust across demographic groups — especially female respondents indicate lower trust in Fed $\Rightarrow$ “Scope” for trust channel to play a role
- Next: differential effects of policy maker treatments.
- Focus on share with low trust (≤ 3 out of 7)

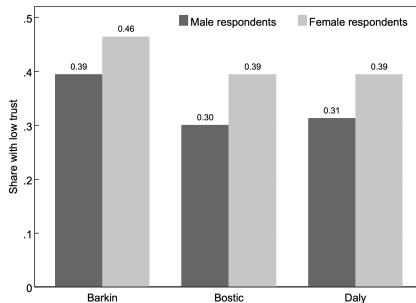
Distrust in Fed – differential effects of policy makers

Distrust that Fed adequately manages inflation and unemployment

White respondents

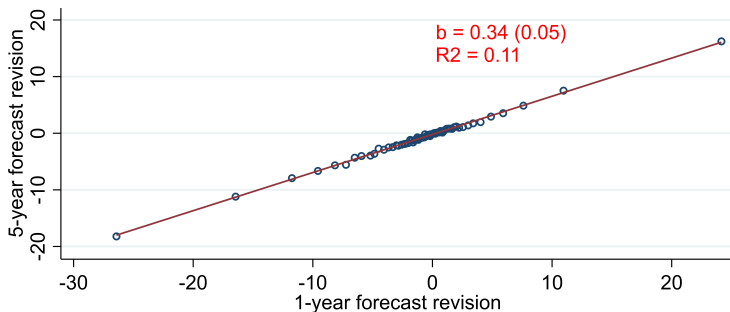


Black respondents



- White female and Black respondents: substantially less distrust in Bostic/Daly treatments
- Little differential effects on White male respondents

Δ in long- and short-term Inflation Expectations Comove

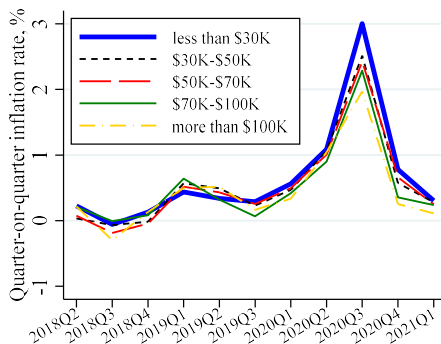


Source: Weber, D'Acunto, Gorodnichenko, Coibion, JEP (2022):

"The Subjective Inflation Expectations of Households and Firms"

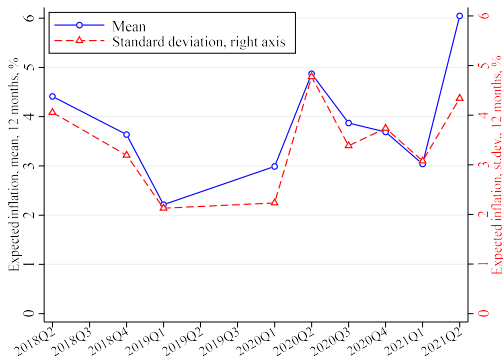
- Central banks aim for stable long-term inflation expectations
- Short-term expectations might temporarily move due to shocks
- Households with high trust should have well anchored long-term expectations
- When households revise short-term expectations, so they do for long-term as well

Realized Inflation by Income



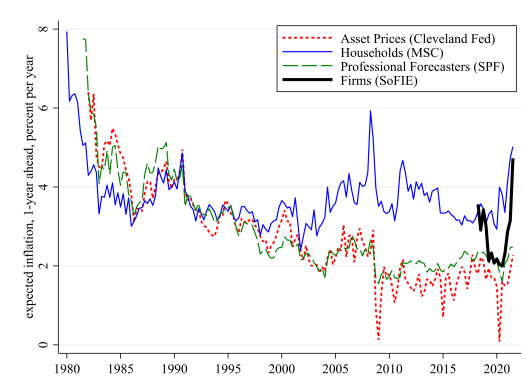
- Small differences in realized inflation by income before pandemic
- Substantially larger increase in realized inflation for low income individuals than for others

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

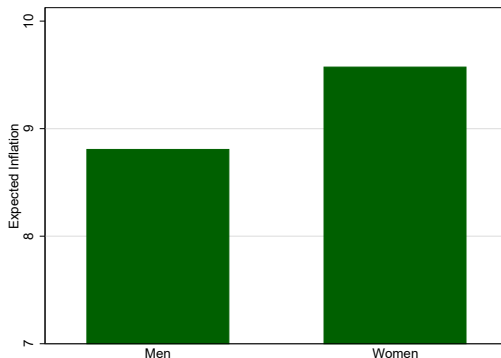
Firms and Households Form Expectations Alike



Source: Weber, D'Acunto, Gorodnichenko, Coibion, JEP (2022):
"The Subjective Inflation Expectations of Households and Firms"

- Limited evidence for firms suggest general biases of HH also prevalent for firms

Inflation Expectations in Singapore: 4/25 - 5/09/2023



Source: D'Acunto and Weber (2023):

"Subjective Inflation Expectations: Global Evidence"

- Global survey on inflation expectations in April and May 2023
- Evidence for 47 countries
- Gender gap in inflation expectations in Singapore: 0.77 percentage points

Recent Reviews of This Literature

- “What Do the Data Tell Us About Inflation Expectations?”
D’Acunto, Malmendier, Weber, Handbook of Subjective Expectations
- “The Subjective Inflation Expectations of Households and Firms: Measurement, Determinants, and Implications”
Weber, D’Acunto, Gorodnichenko, Coibion, Journal of Economic Perspectives (2022)
- “The Expected, Perceived, and Realized Inflation of U.S. Households before and during the COVID19 Pandemic”
Weber, Gorodnichenko, Coibion, IMF Economic Review (2023)
- “Subjective Inflation Expectations: Models meet Reality”
Weber, Annual Review of Economics (forthcoming)

Take Aways

- Households focus on specific goods to form expectations
- Spike in inflation in narrow categories → in spike in expectations
- Larger weight on positive price changes
 - $\mathbb{E}\pi$ will stay elevated even if π comes down
- Messaging by Central Bank important
 - Message, medium, and sender matter