

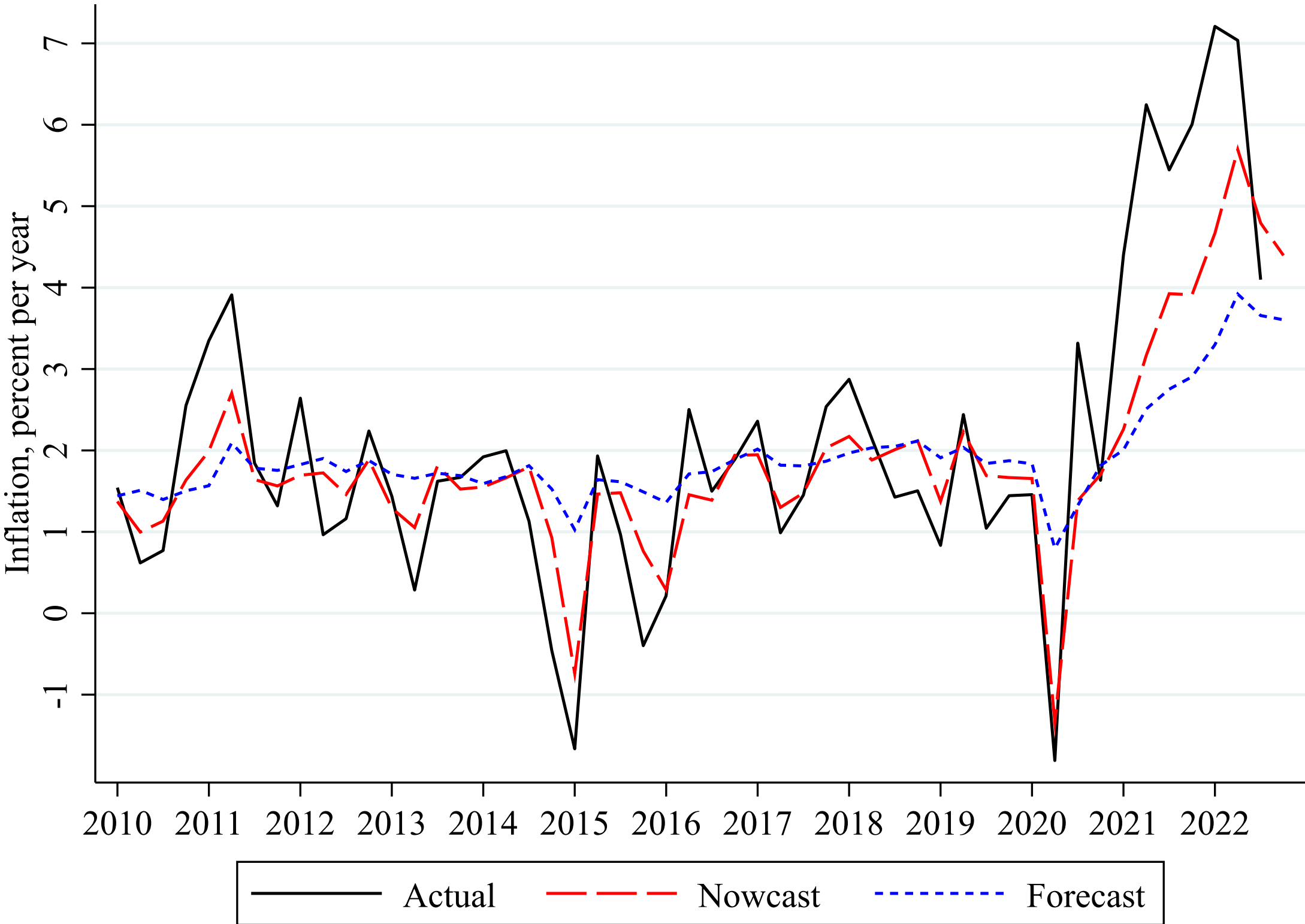
THE ART AND SCIENCE OF MANAGING INFLATION EXPECTATIONS

Yuriy Gorodnichenko
UC Berkeley and 

HOW DO AGENTS FORM THEIR EXPECTATIONS?

- One of the most fundamental questions in macroeconomics, finance, and other fields in economics.
- Inflation expectations play a central role in almost all key economic decisions
 - Prices and wages (Phillips curve): $\pi_t = E_t \pi_{t+1} + \gamma * gap_t$
 - Consumption decisions (Euler eqtn): $c_t = E_t c_{t+1} - \sigma [i_t - E_t \pi_{t+1}]$
 - Investment decisions (Tobin's Q): $Q_t = MP_K / [i_t - E_t \pi_{t+1} + \delta]$
 - Asset prices: $P_t^{stock} = E_t D_{t+1} / (i_t - E_t \pi_{t+1}) + E_t P_{t+1}^{stock}$
 - Central bank decisions (Taylor rule): $i_t = \varphi_\pi E_t \pi_{t+h} + \varphi_x E_t x_{t+h}$

INFLATION & INFLATION EXPECTATIONS IN THE U.S.



INFLATION EXPECTATIONS: STATE OF KNOWLEDGE

- Alan Greenspan (1994): “I am not saying what [inflation expectations] is a function of. We know it’s a very difficult issue, but **that is the key variable**. It’s important, but just because **we can’t make a judgment** as to what these driving forces are in an econometric sense doesn’t mean that it’s not real.”

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- Ben Bernanke (2007): “How should we measure inflation expectations, and how should we use that information for forecasting and controlling inflation? **I certainly do not have complete answers** to those questions, but I believe that they are of **great practical importance**. ... Information on the price expectations of businesses--who are, after all, the price setters in the first instance--... is particularly scarce.”

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- Janet Yellen (2016): “Perhaps **most importantly**, **we need to know more** about the manner in which inflation expectations are formed and how monetary policy influences them.”

HOW DO AGENTS FORM THEIR EXPECTATIONS?

- Frameworks:

- Non-rational expectations (adaptive)

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■ Frameworks:

- Full-information rational expectations (FIRE)
 - Sticky-information
 - Noisy information
 - Bounded rationality
 - Learning
 - Non-rational expectations (adaptive)
- Rational Expectations models subject to frictions/costs.
- Rationality but no knowledge of the economy structure.

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- **Phillips curve:**
 - Old style: Phillips (1958), Samuelson and Solow (1960)
 - New style: Fischer (1977), Taylor (1977), Calvo (1983)

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- Phillips curve:
 - Old style: Phillips (1958), Samuelson and Solow (1960)
 - New style: Fischer (1977), Taylor (1977), Calvo (1983)
 - **New Keynesian macroeconomics = dominant framework**
 - Micro-founded
 - FIRE-based
 - Forward-looking

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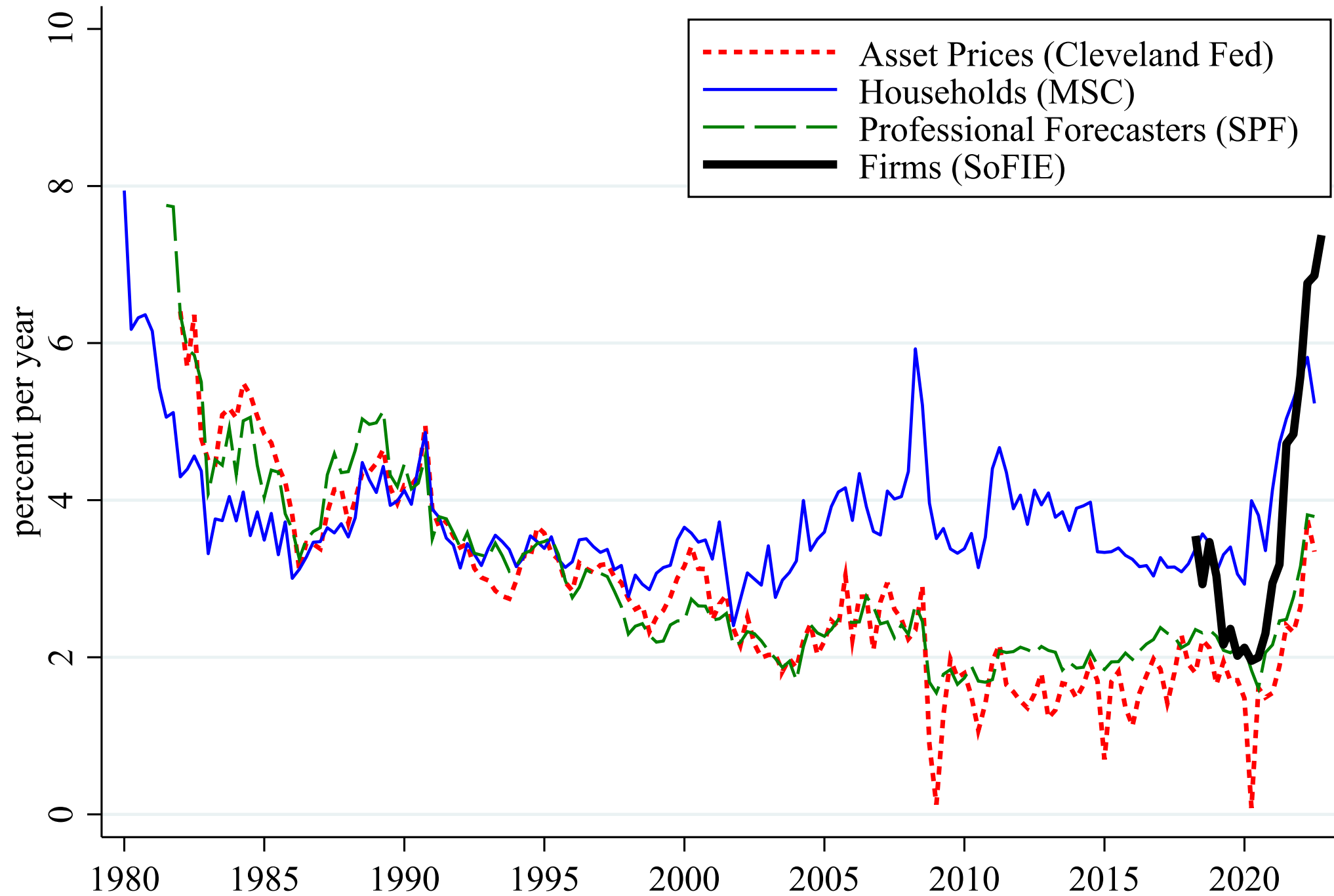
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- Pushback to Prescott (Zarnowitz, Lovell, Manski, etc.): one should not discount data even if it’s inconsistent with a beautiful theory.

WHAT DOES THE PUBLIC PREDICT?

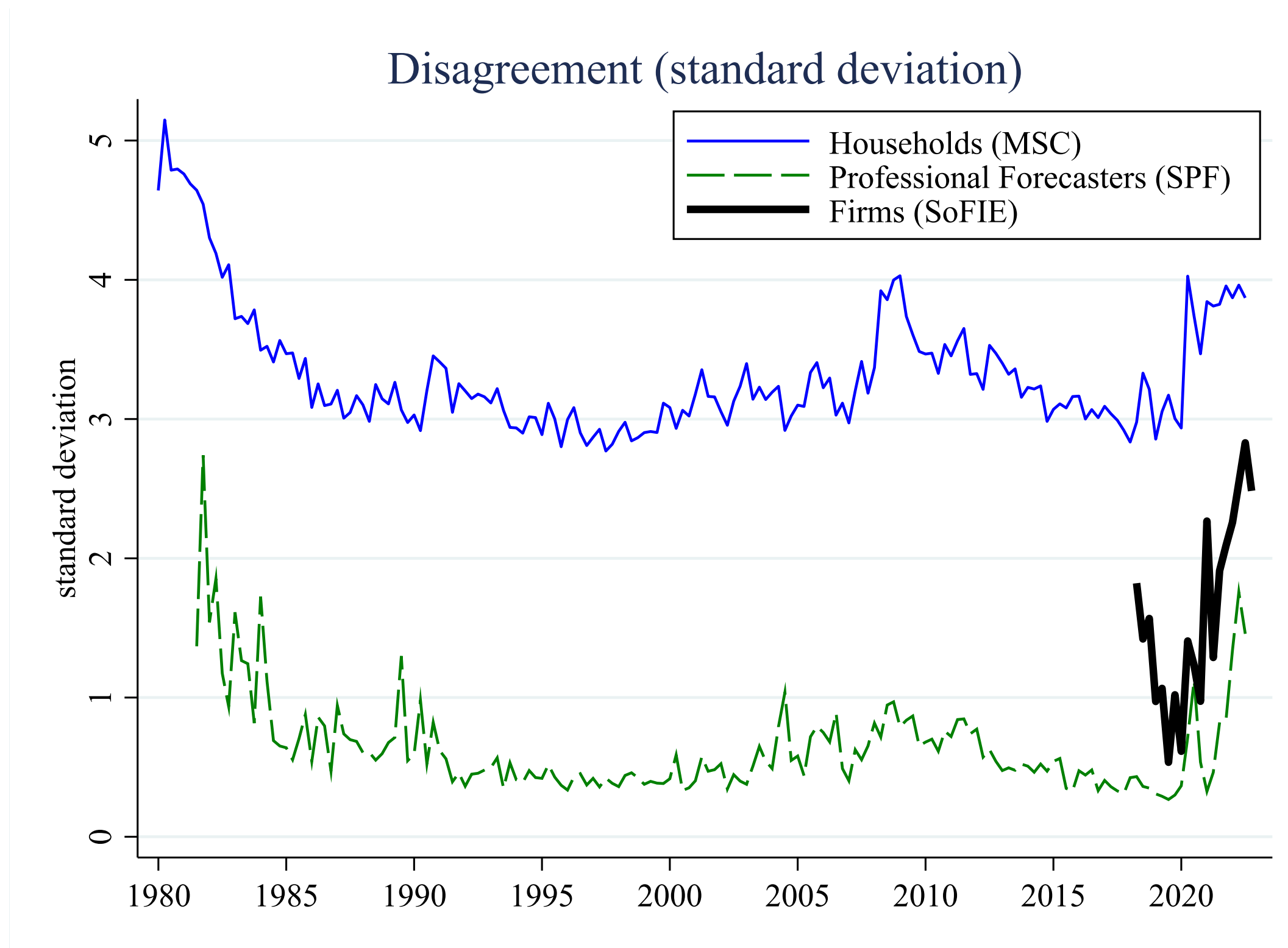
Mean forecast



source: Candia,
Coibion, and
Gorodnichenko
(2021)

Divergence in expectations.

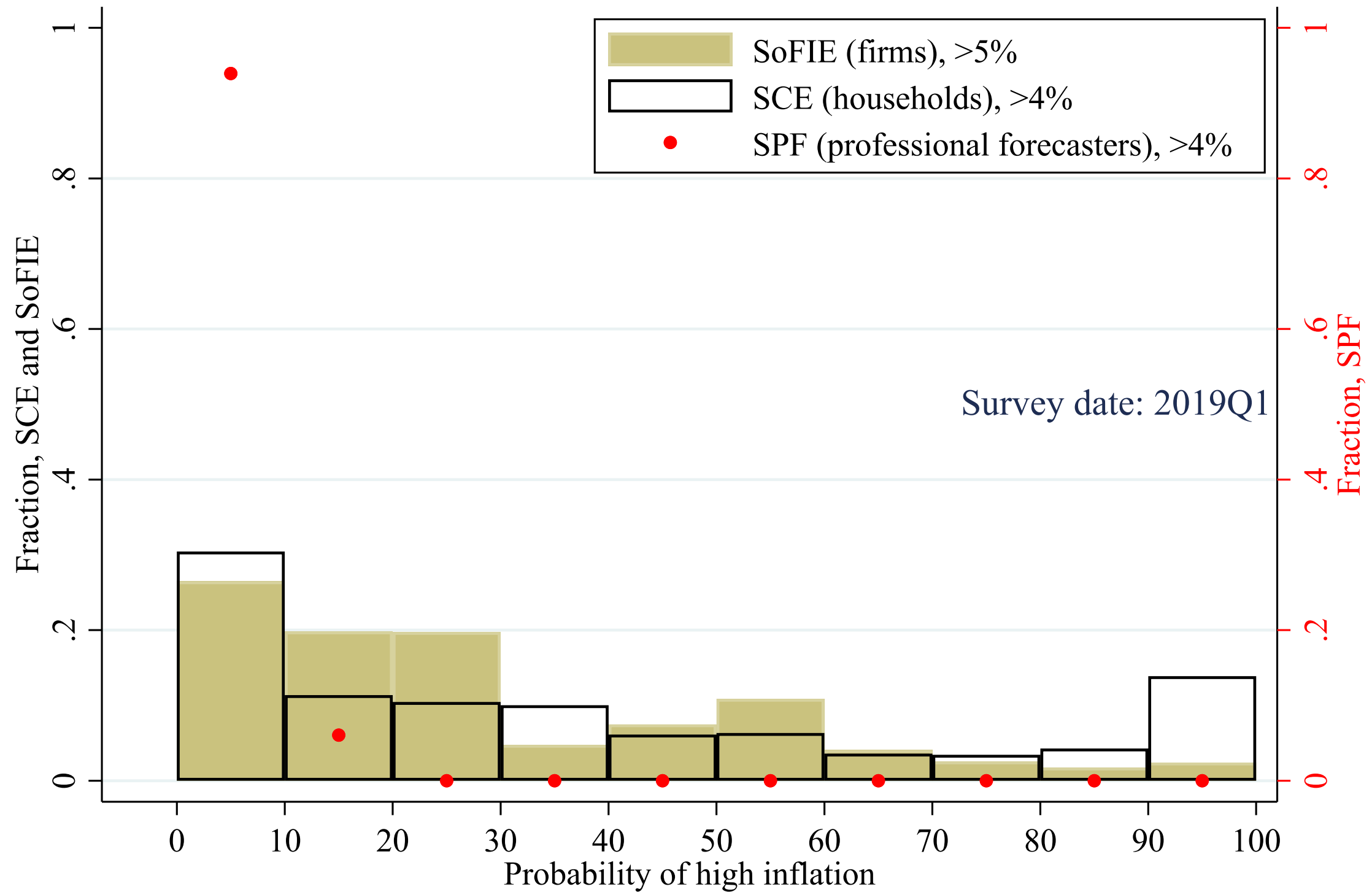
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Households and firms disagree much more than professional forecasters.

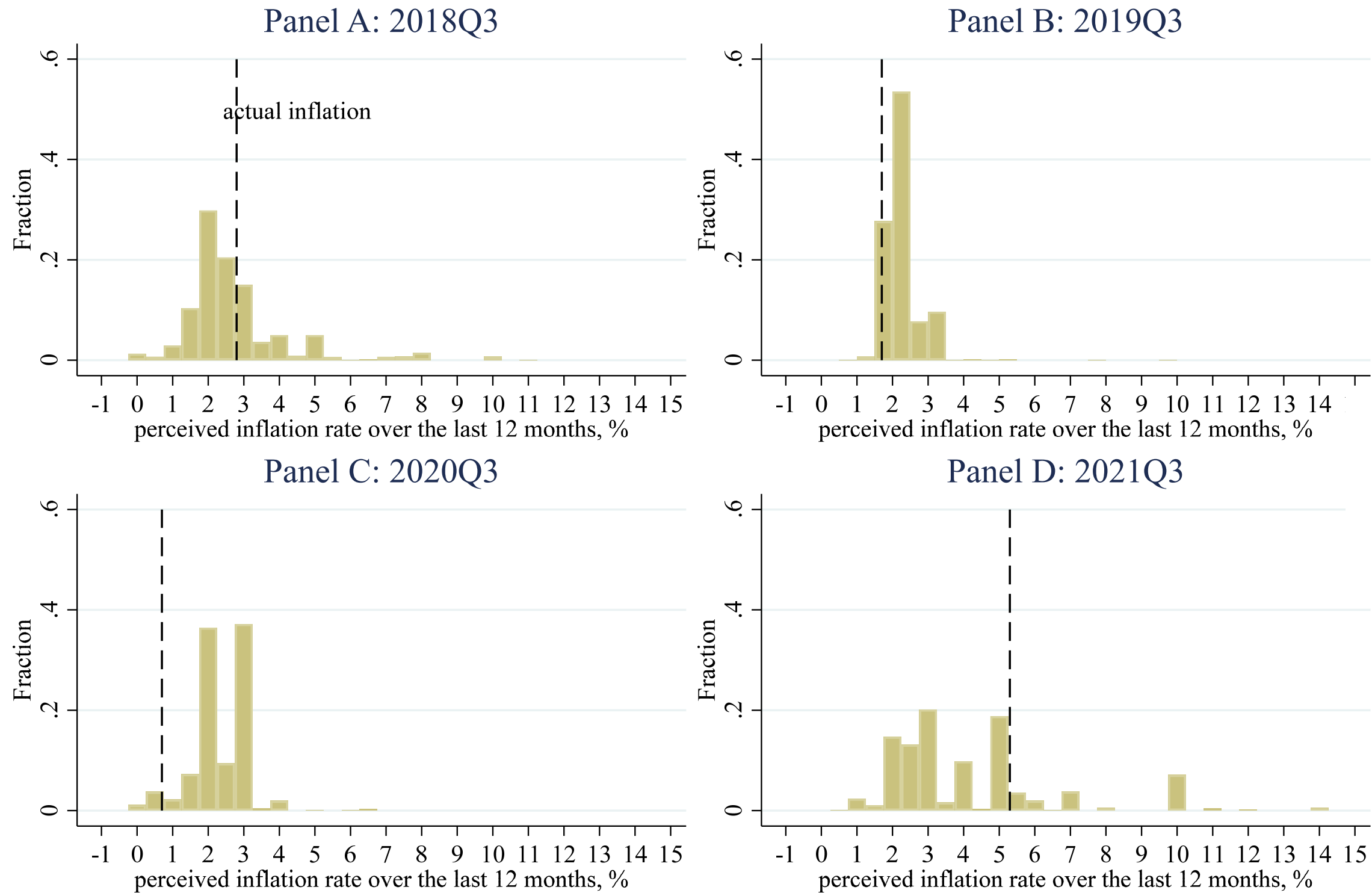
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Households and firms are much more uncertain than professional forecasters.

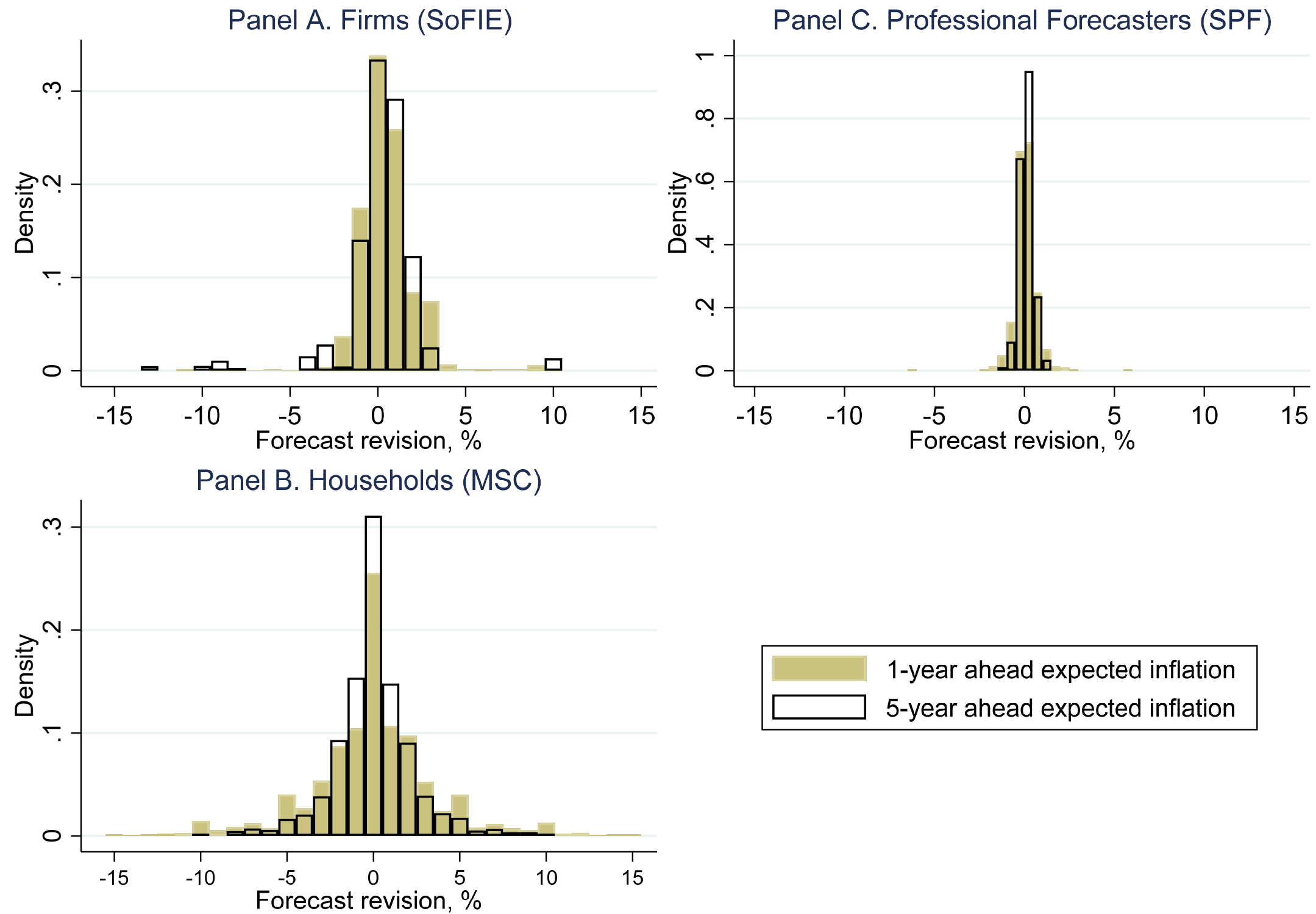
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Households and firms perceive inflation differently.

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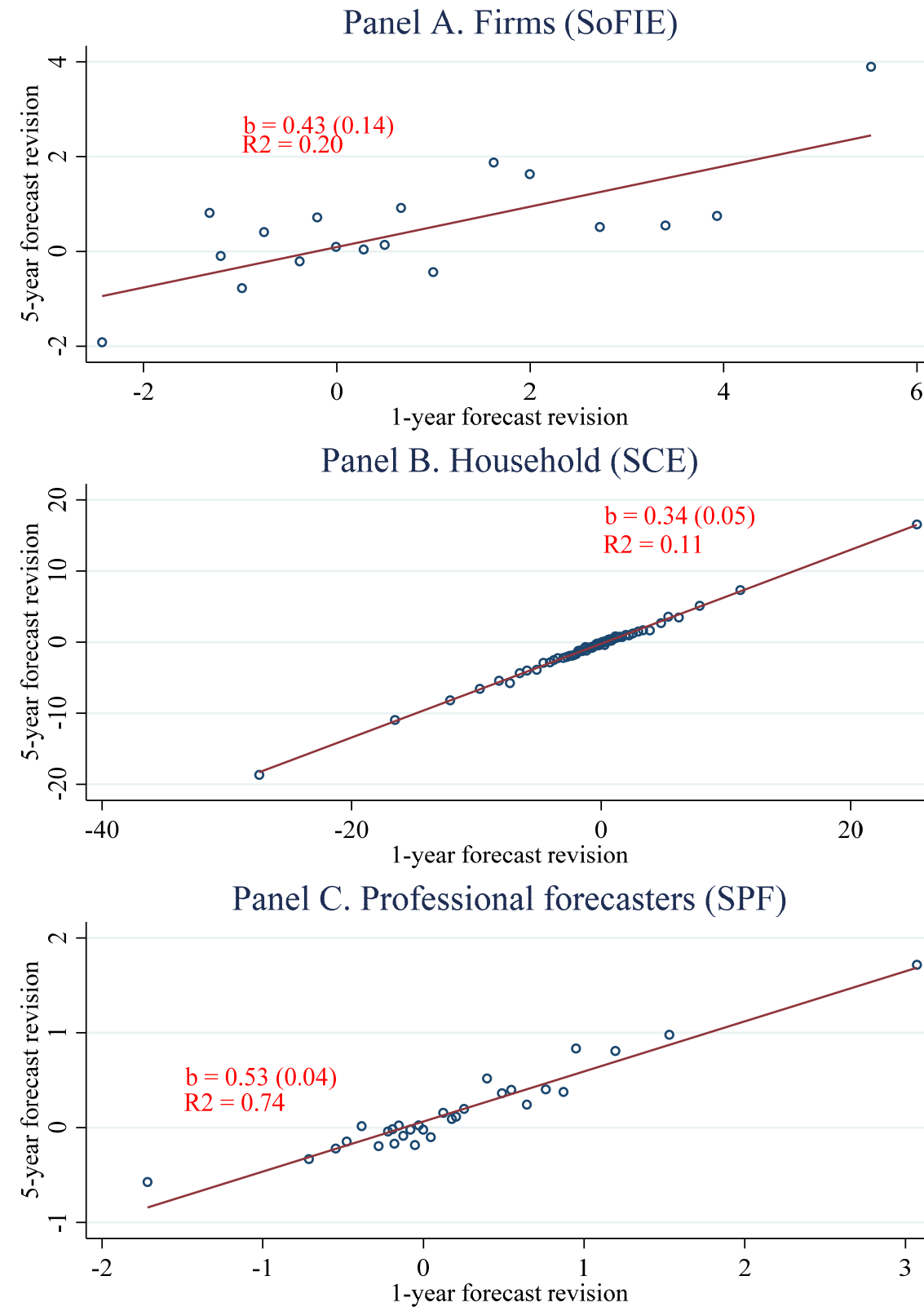


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Households and firms have large revisions of their forecasts.

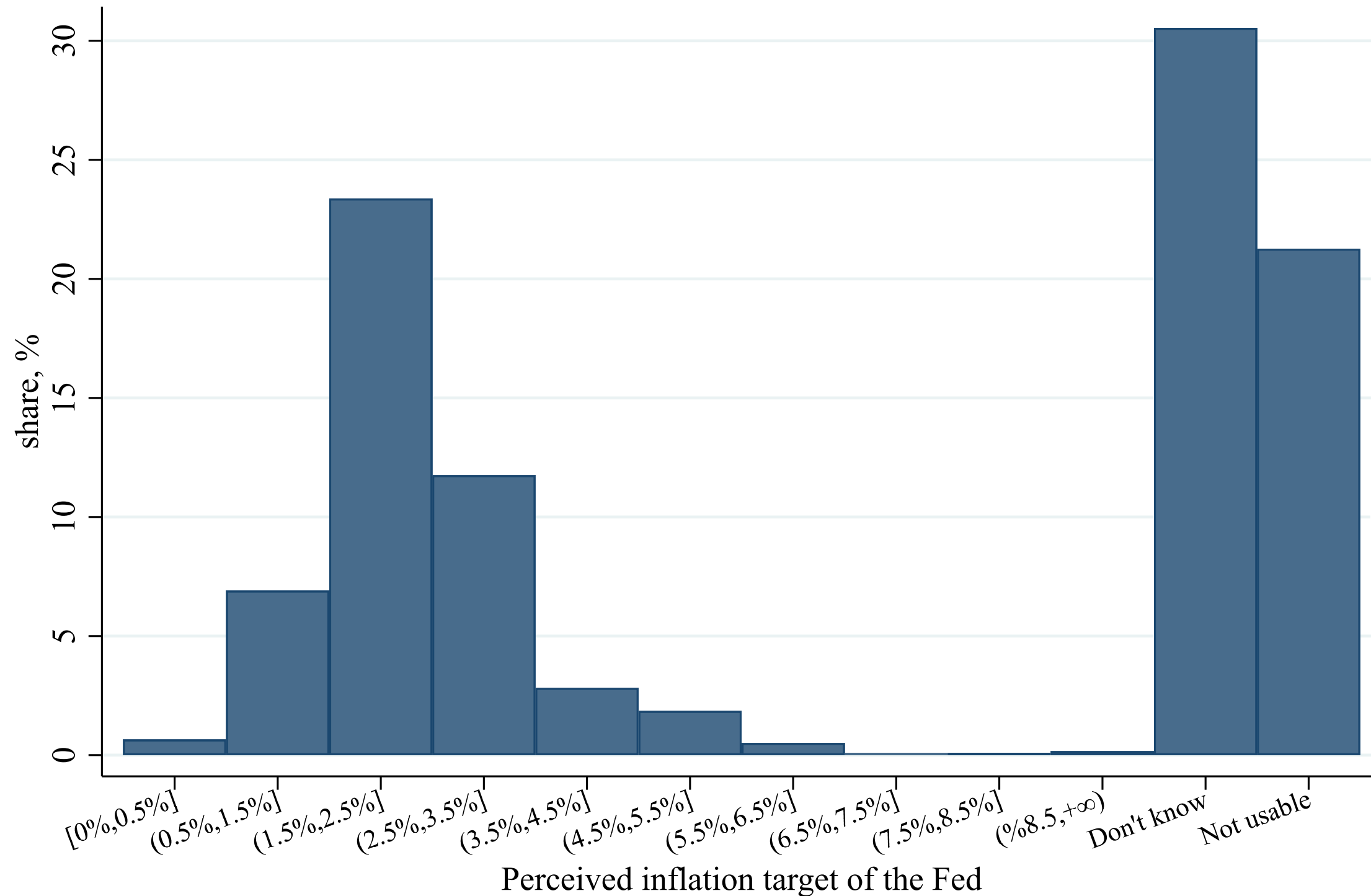
WHAT DOES THE PUBLIC PREDICT?

Households and firms have a strong correlation between long-term and short-term inflation forecasts



source: Candia,
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Households and firms have little knowledge about the inflation target of the Fed.

ARE EXPECTATIONS ANCHORED?

Five predictions:

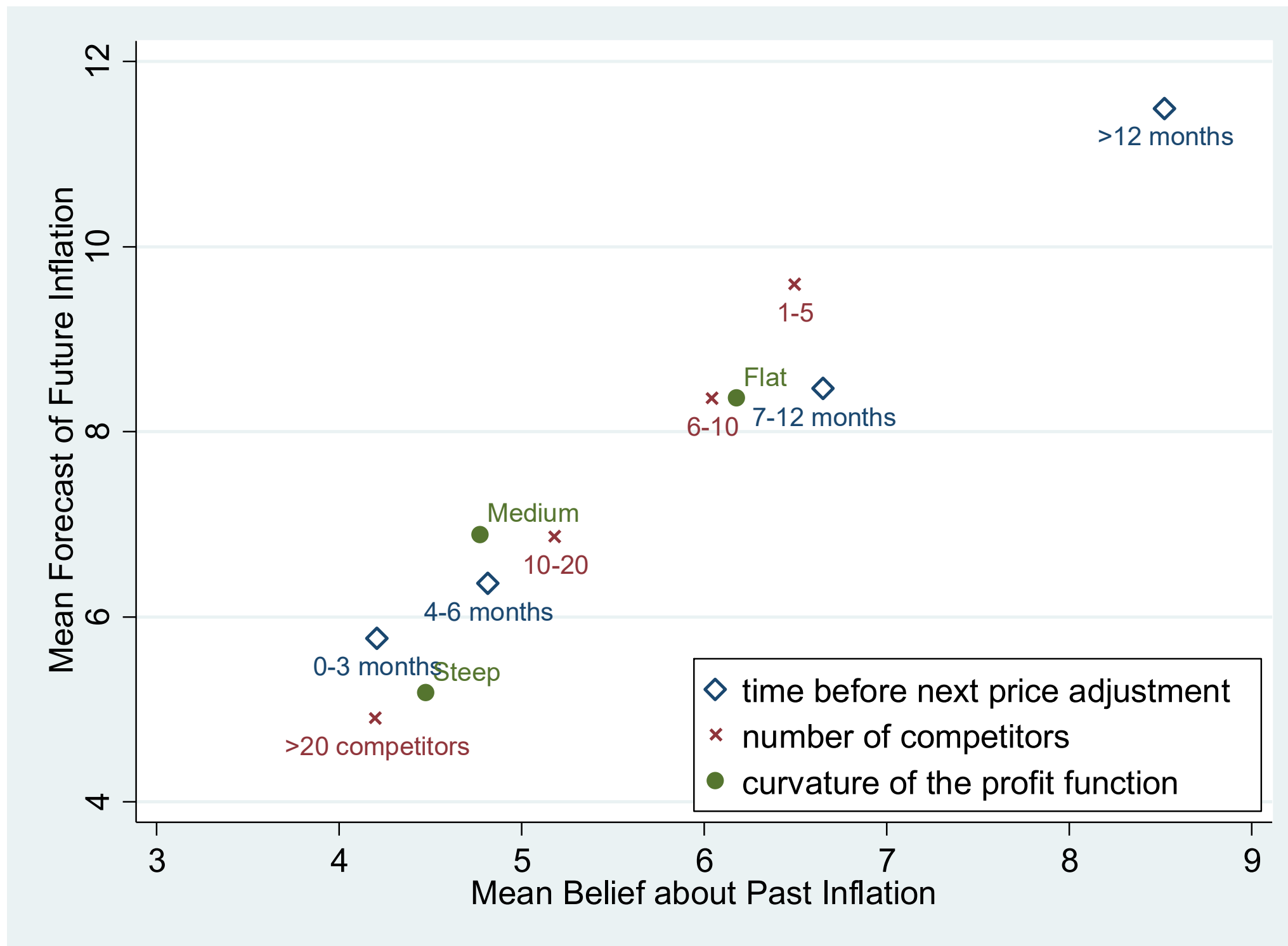
- Inflation expectations are close to the target.
- There is little disagreement in expectations.
- Revisions in inflation expectations are small.
- Firms show confidence in their forecasts.
- Short- and long-term inflation expectations are uncorrelated.

ARE EXPECTATIONS ANCHORED?

Five predictions:

- Inflation expectations are close to the target. **NO**
- There is little disagreement in expectations. **NO**
- Revisions in inflation expectations are small. **NO**
- Firms show confidence in their forecasts. **NO**
- Short- and long-term inflation expectations are uncorrelated. **NO**

IS IT NOISE?



Firms in New Zealand

Source: Coibion, Gorodnichenko and Kumar (2018)

WHAT DOES INFLATION MEAN FOR ECONOMIC PLAYERS?

Mario Draghi (2015): *“When inflation expectations go up with zero nominal rates, real rates go down. When real rates go down, investments and the economic activity improves. That’s the reasoning [of QE].”*

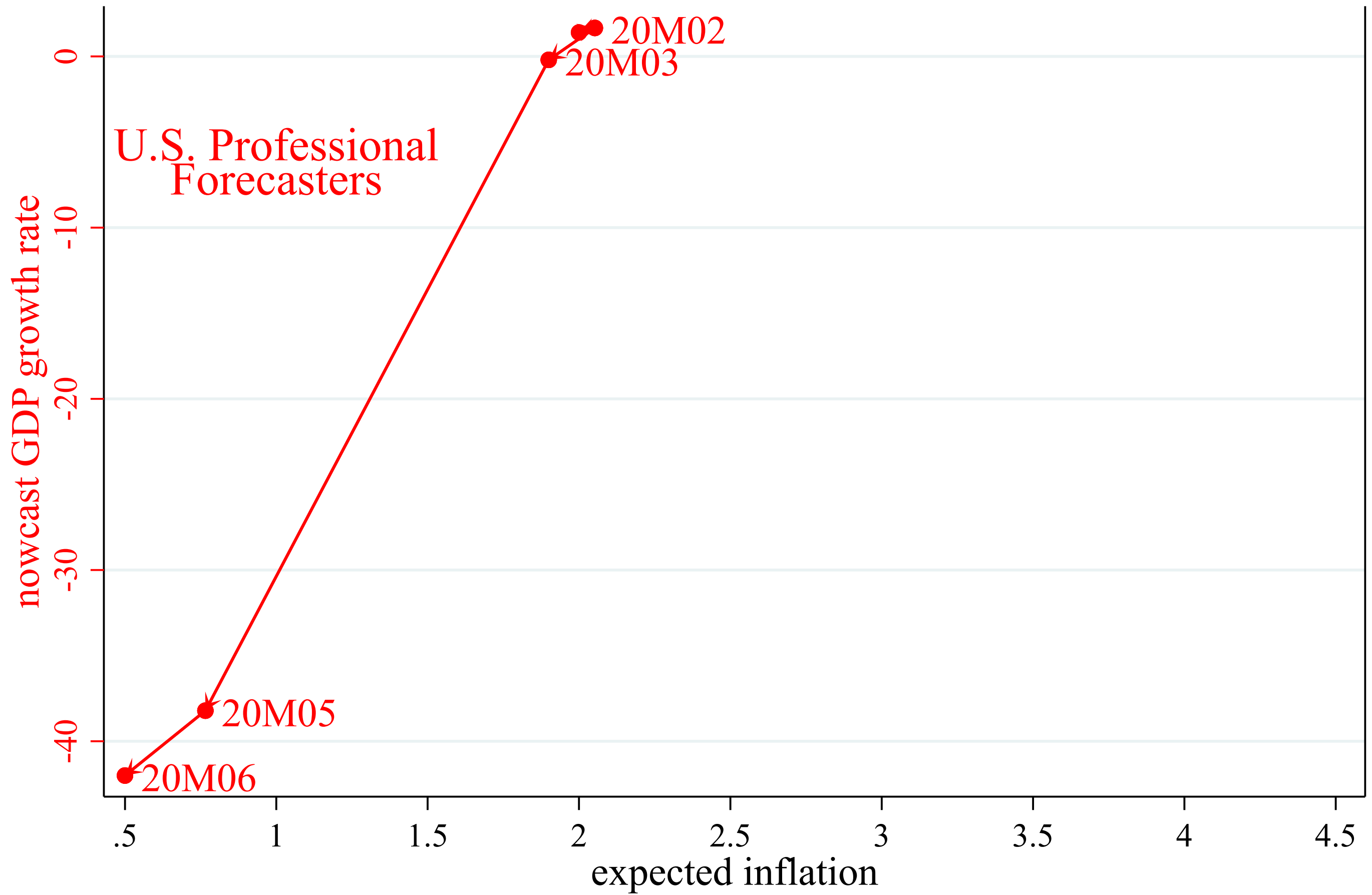
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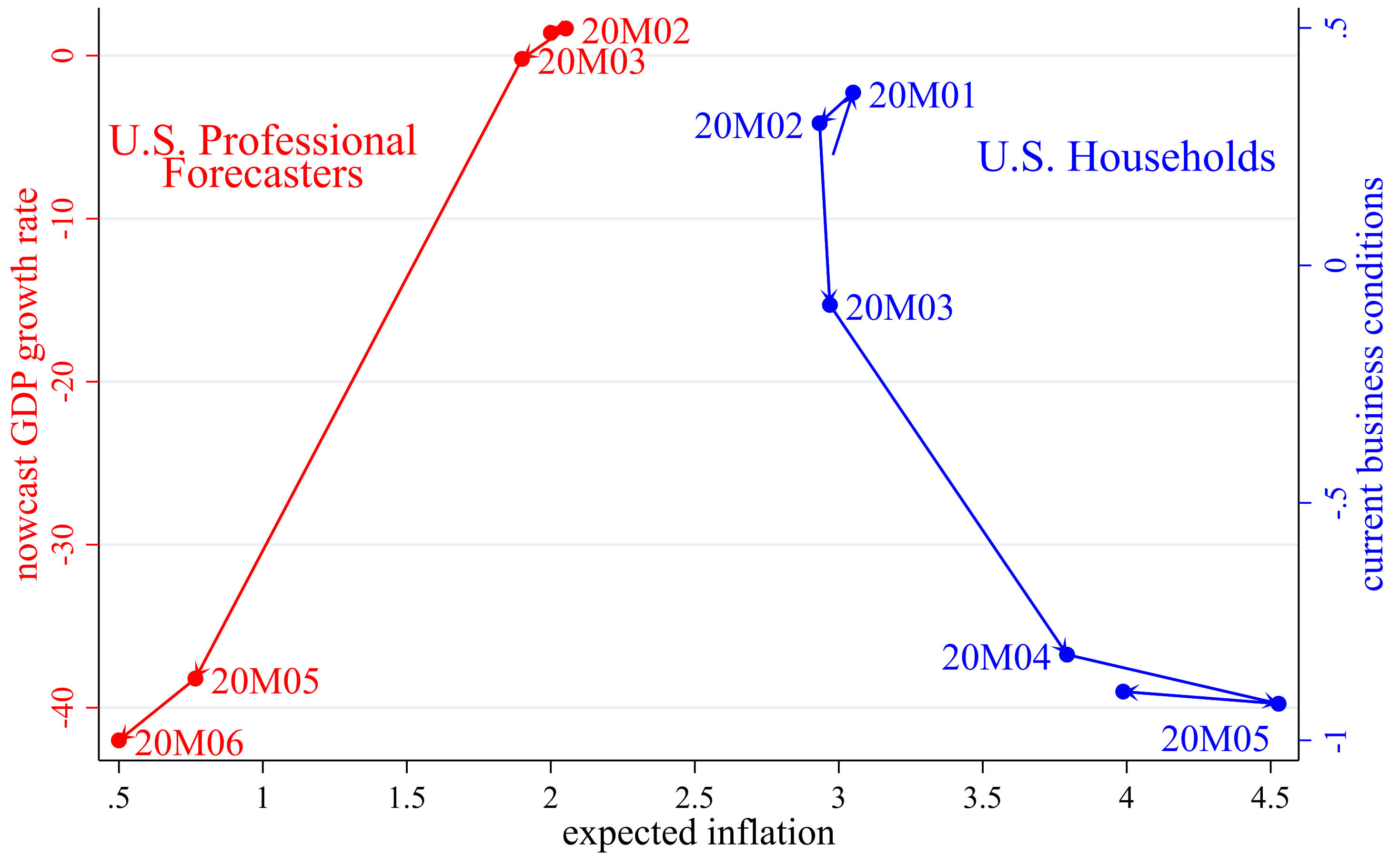
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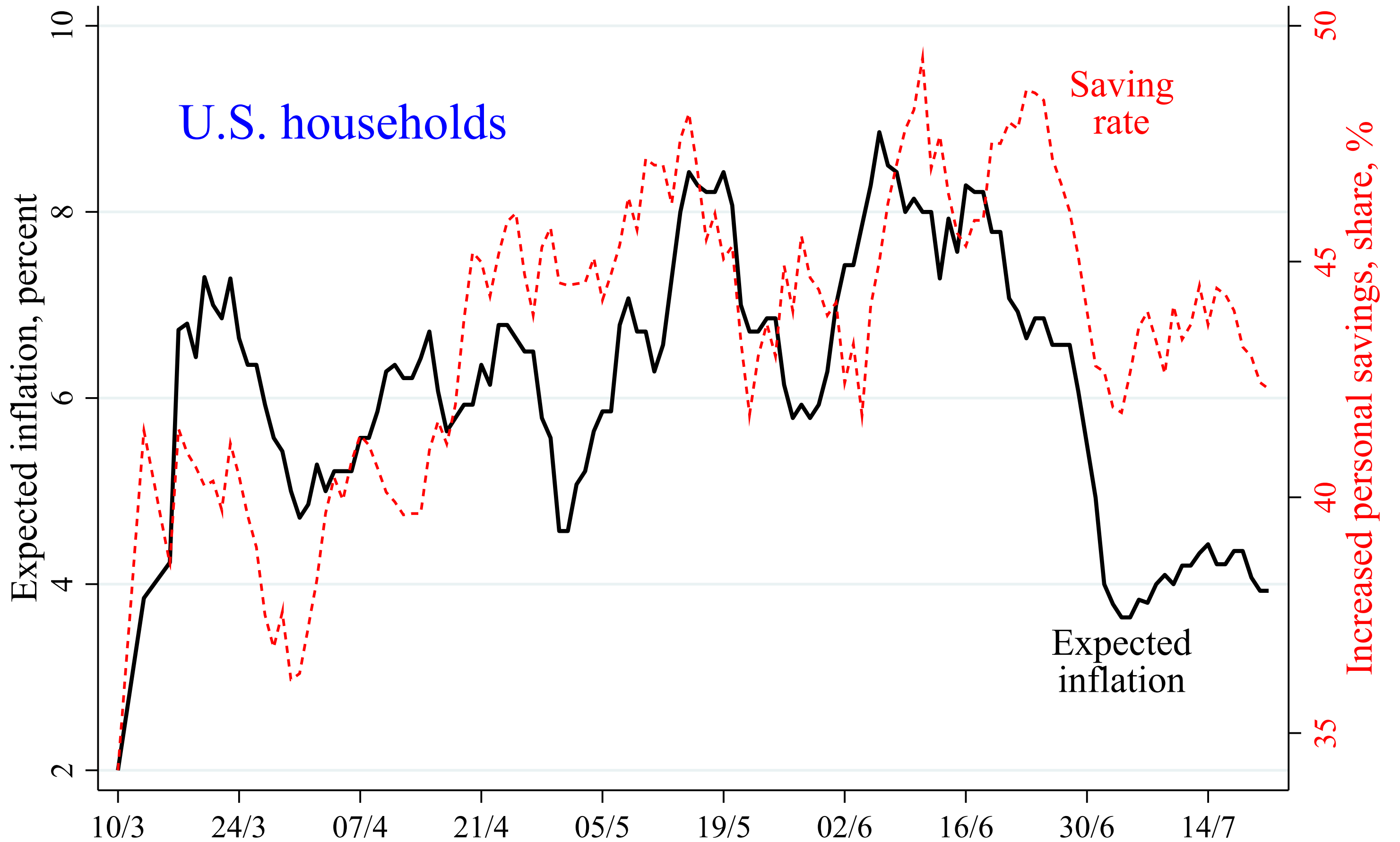
Is this how it works in the data?

Should we raise inflation expectations of households and firms?

Does the public think that inflation is desirable?





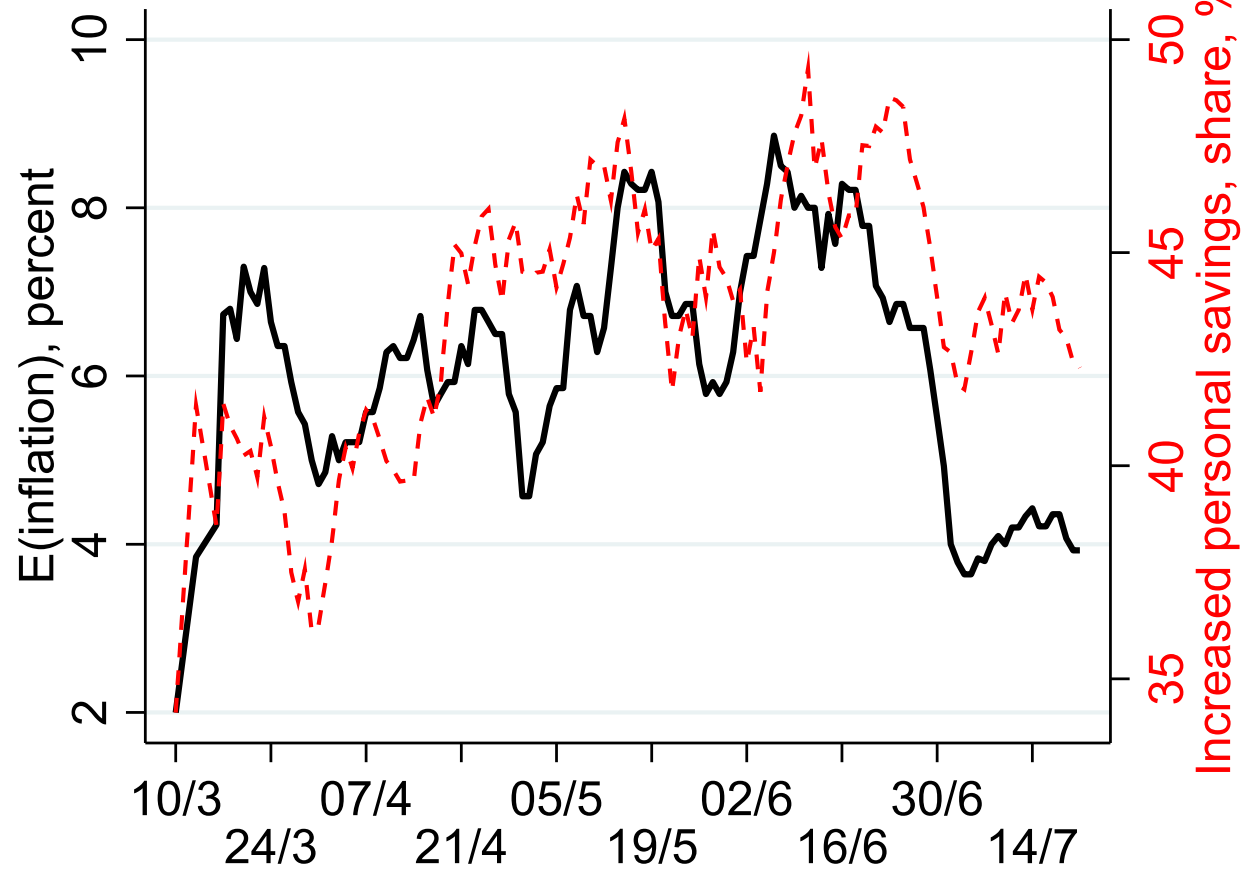
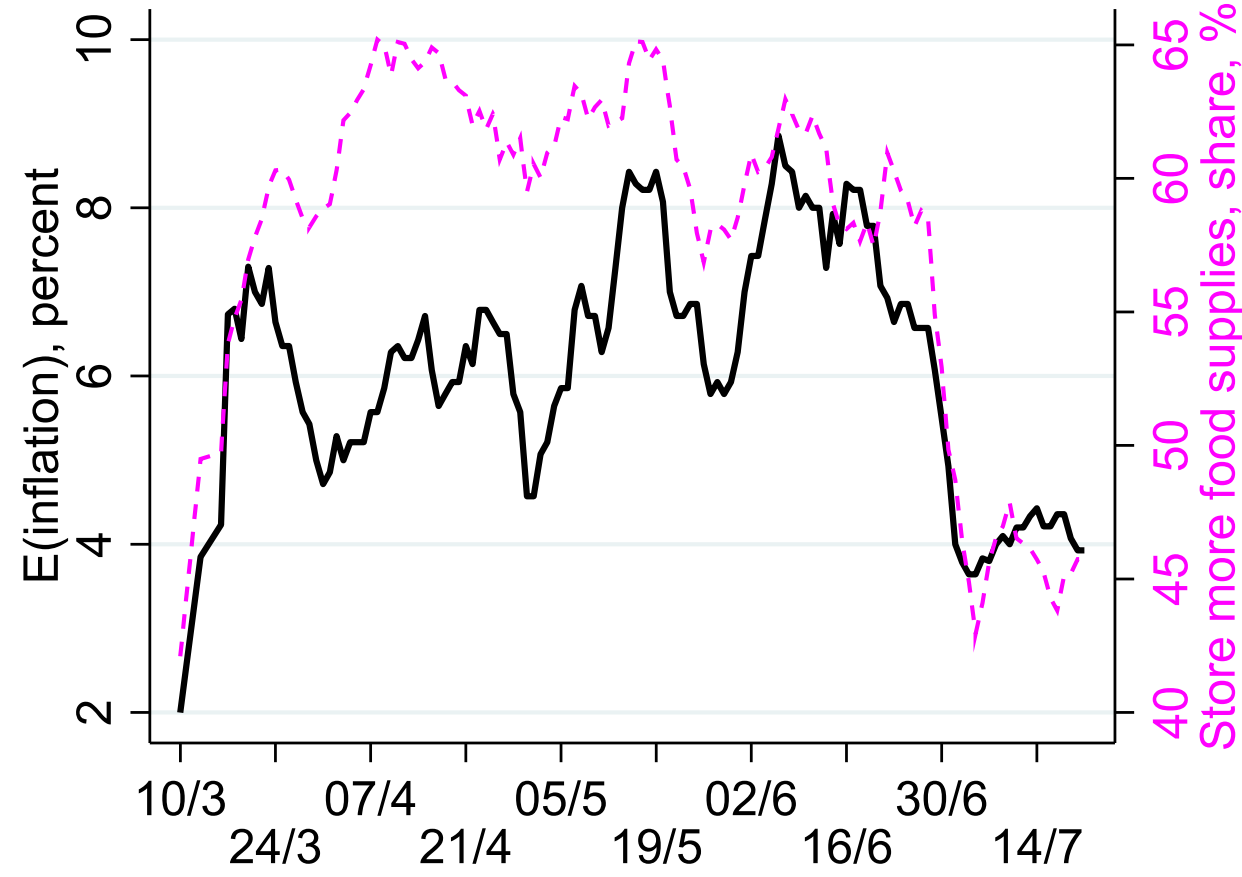
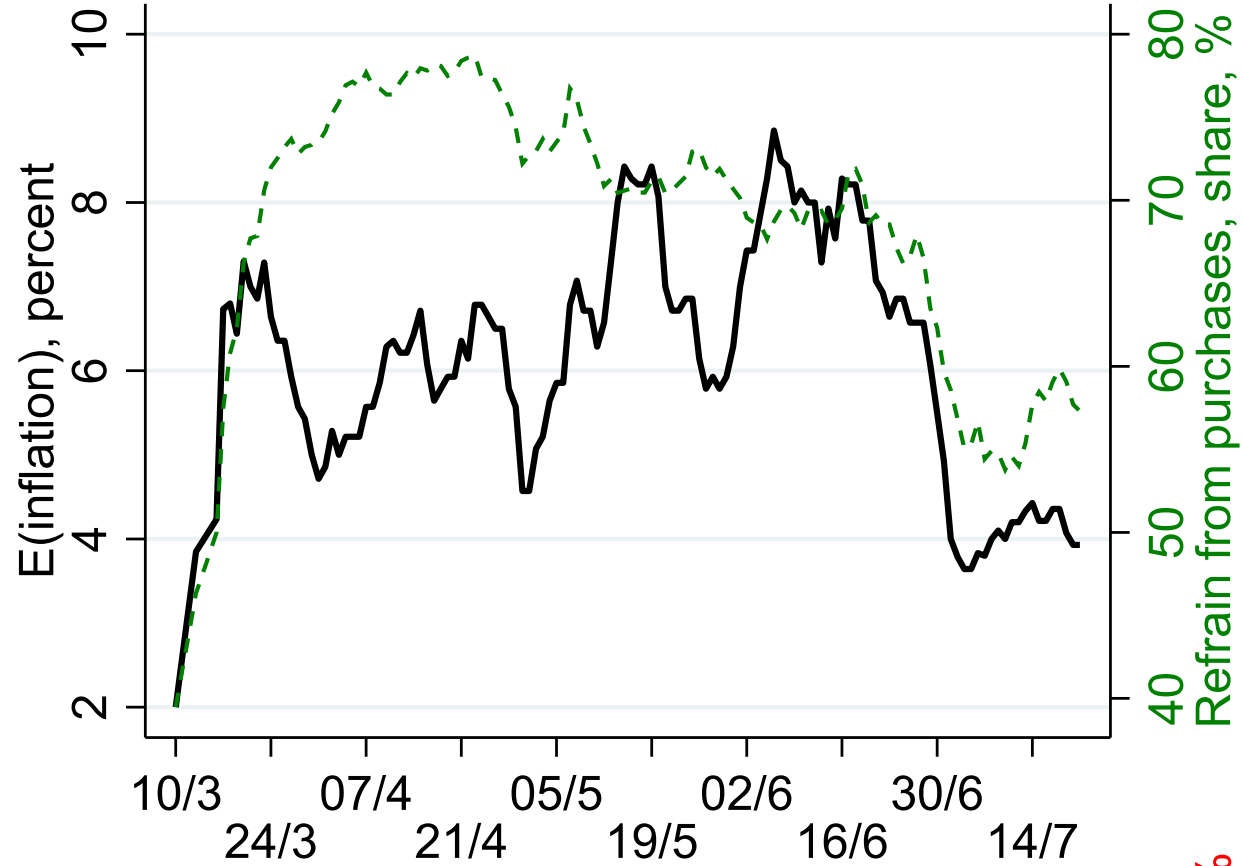
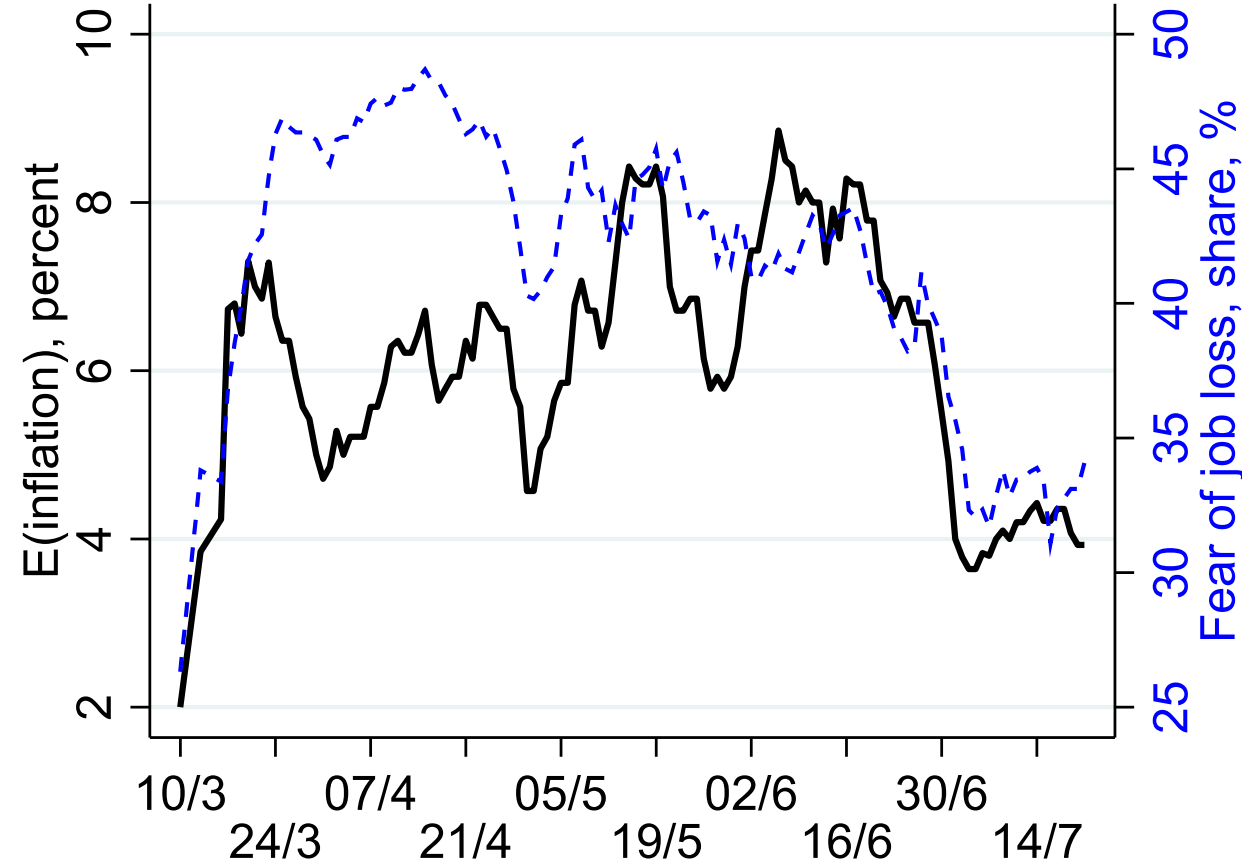


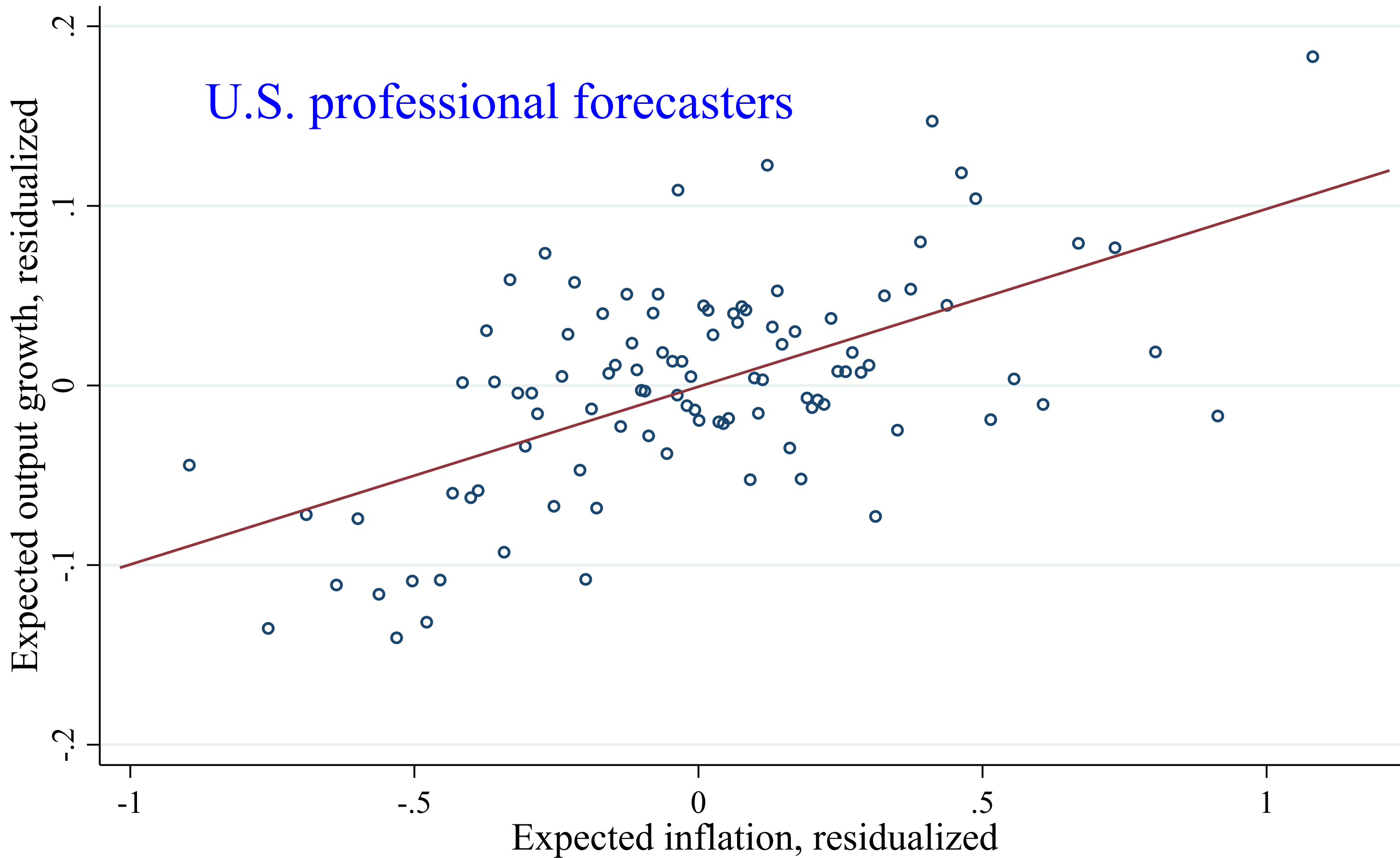
U.S. households

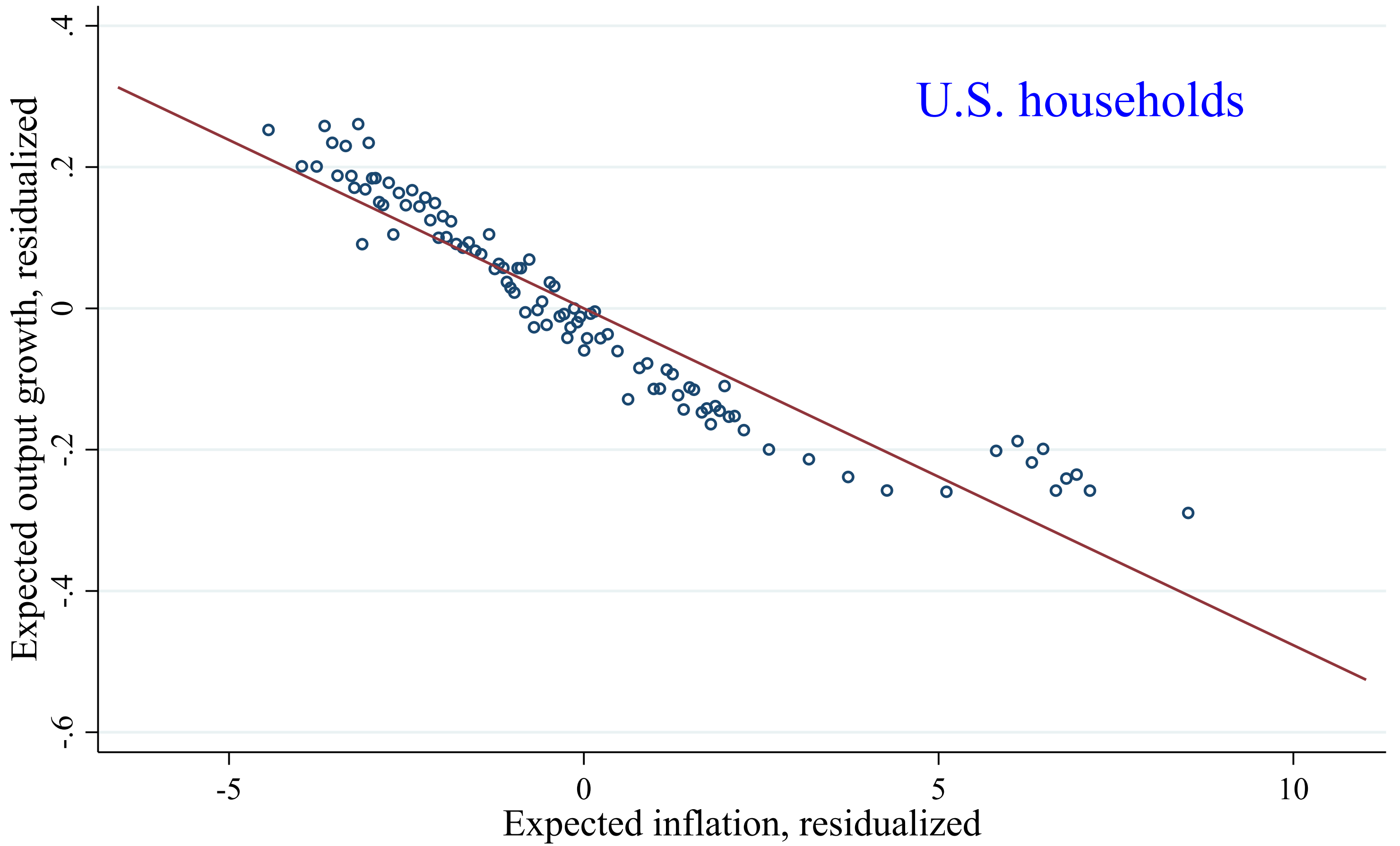
Saving rate

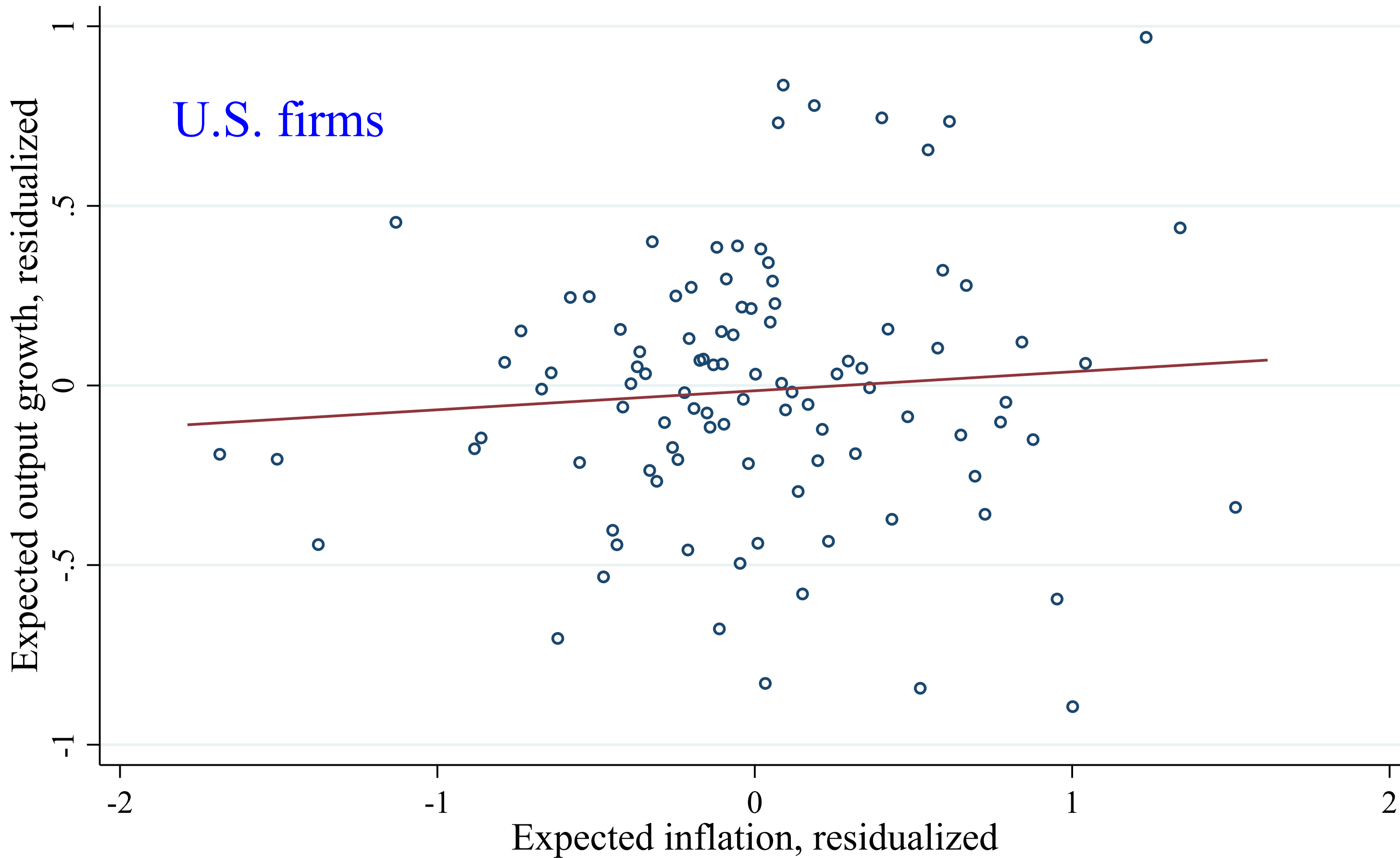
Expected inflation

Source: Cleveland Fed

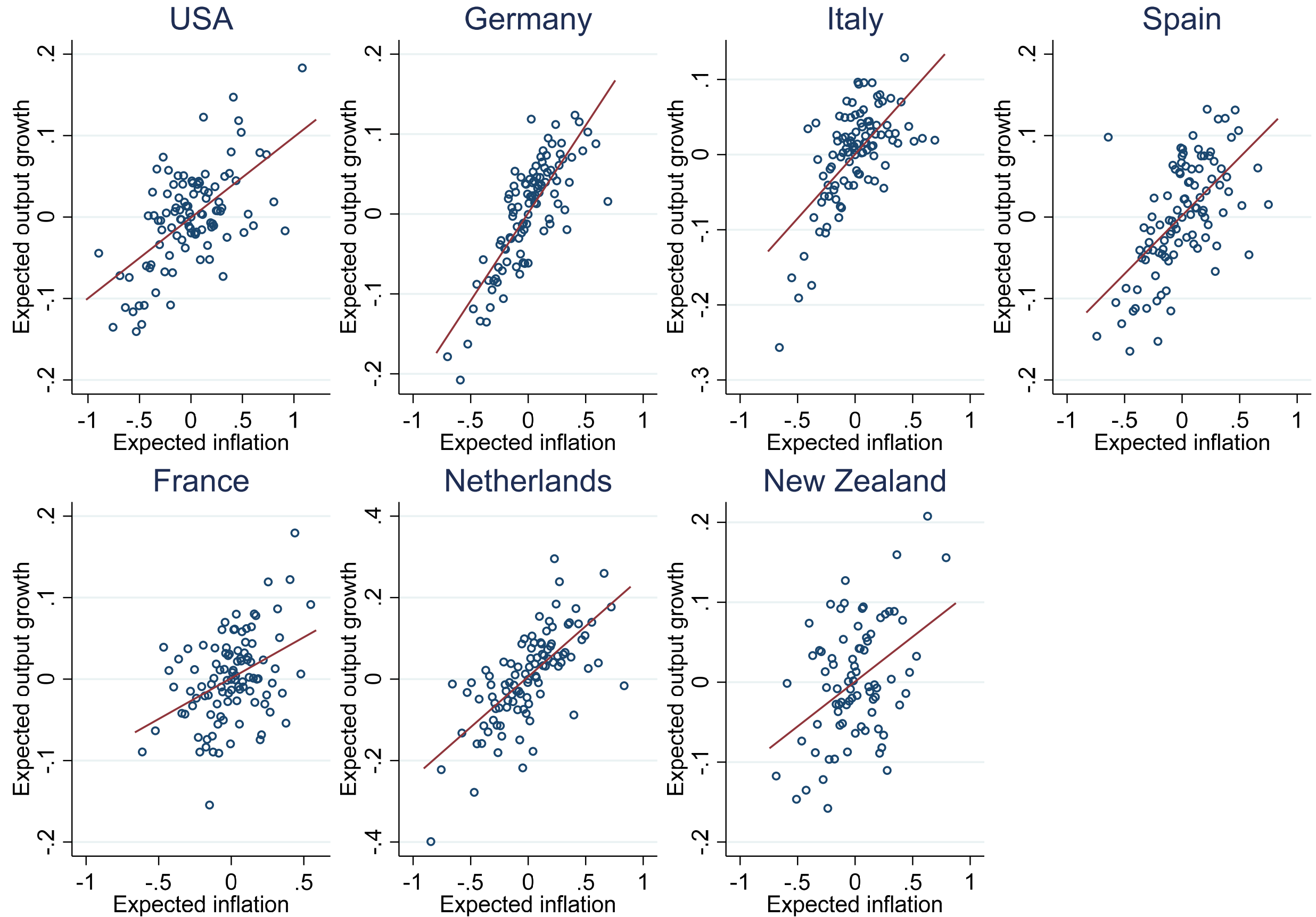






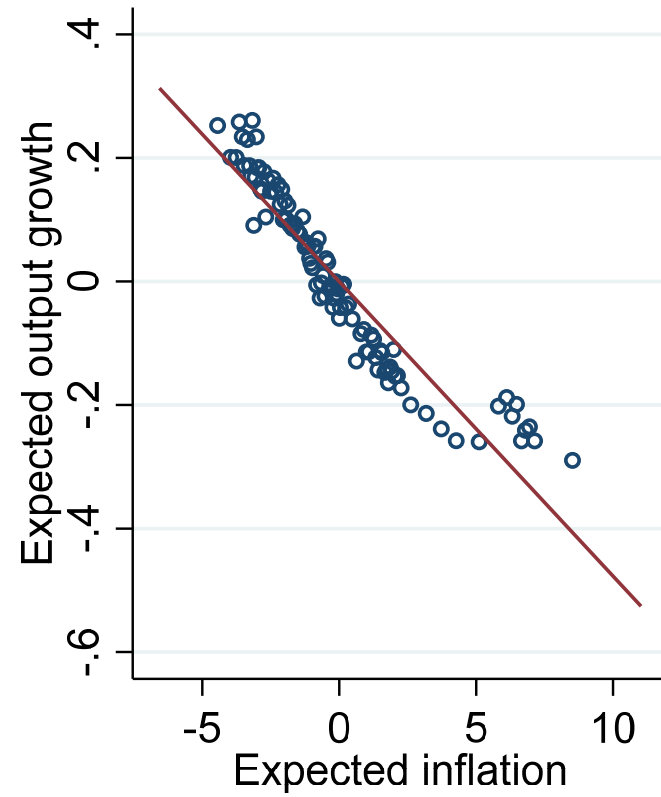


PROFESSIONAL FORECASTERS

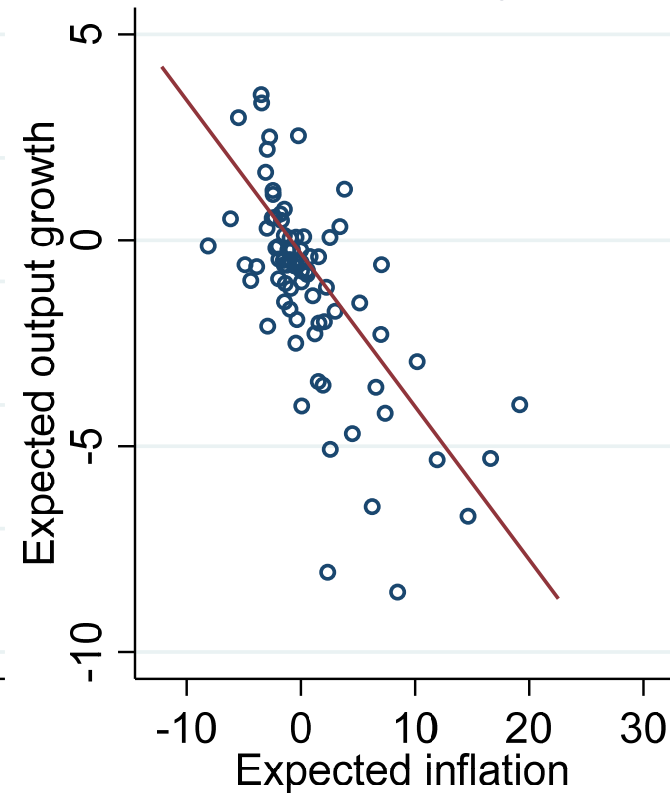


HOUSEHOLDS

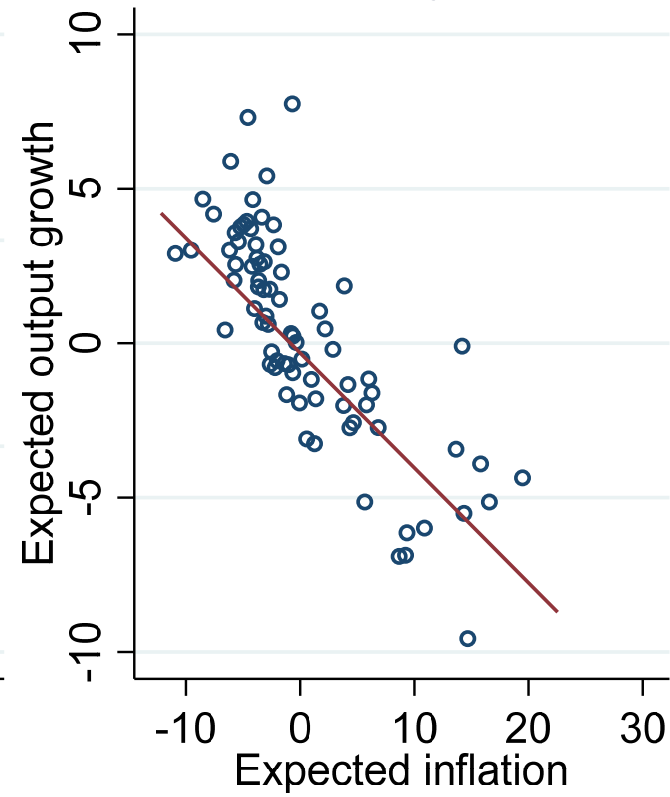
USA



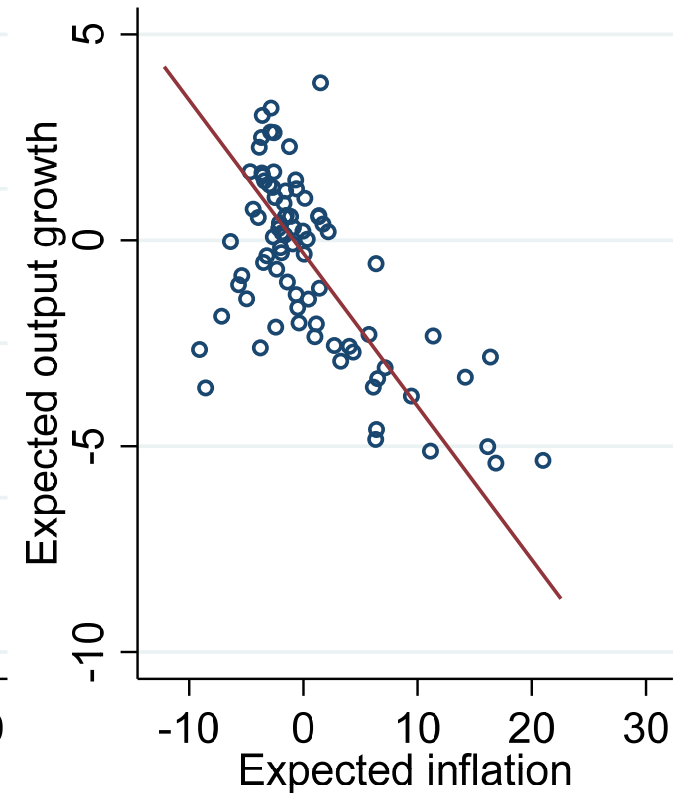
Germany



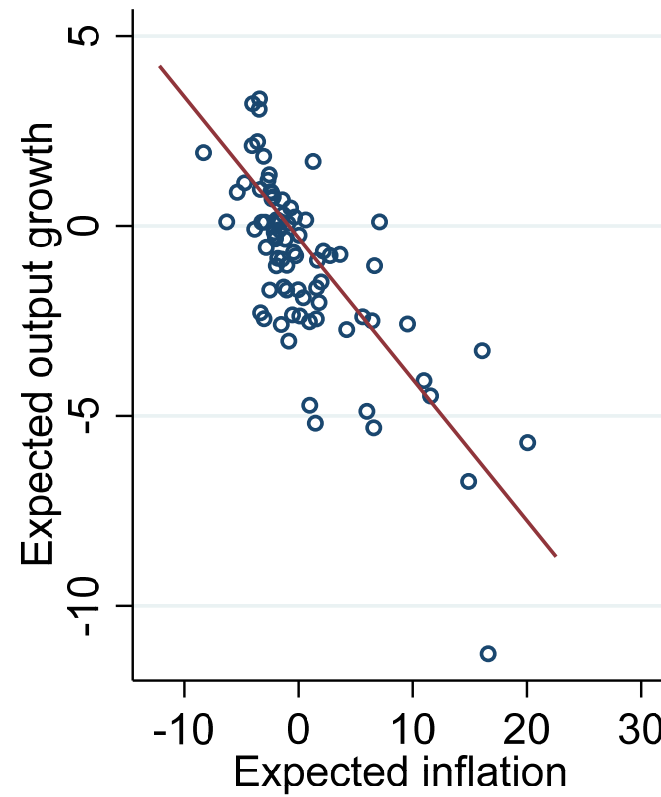
Italy



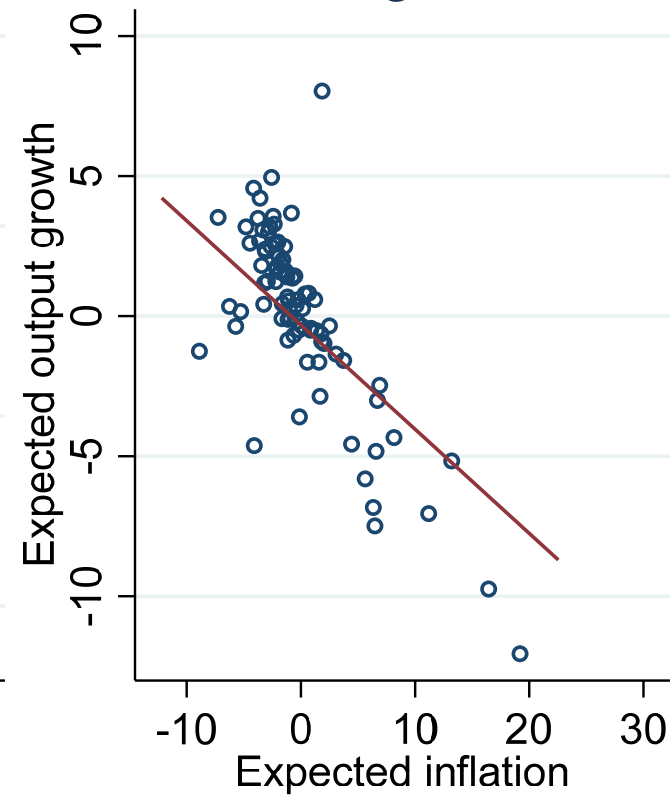
Spain



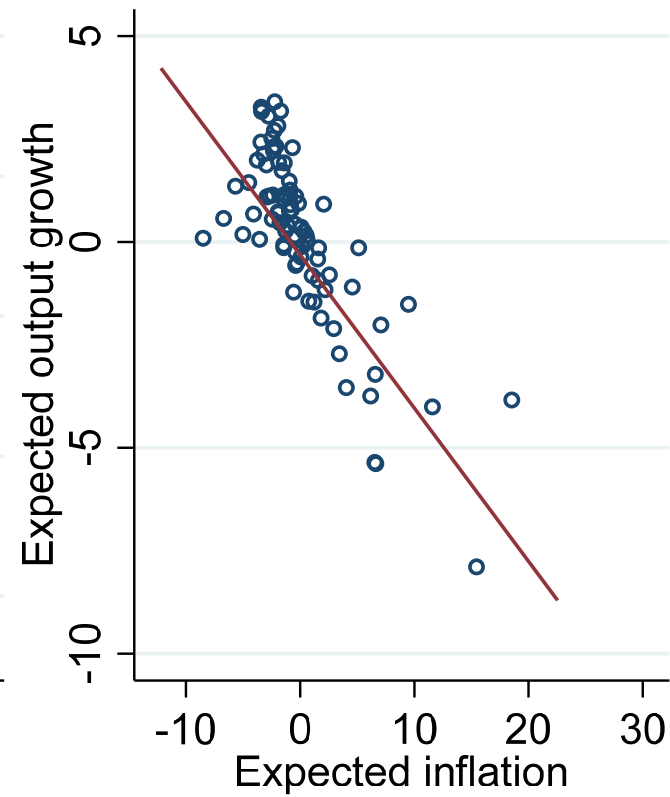
France



Belgium



Netherlands



CONCLUDING REMARKS

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- **Challenges for future work for non-FIRE models:**
 - **Current state: "theory ahead of business cycle measurement"**
 - **Few measures of real-time beliefs of firms and other price setters**
 - **How to rule out many alternative deviations from FIRE**
 - **Impose discipline on non-FIRE models**
 - **Derive testable implications and test them**

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