LEARNING FROM POTENTIALLY-BIASED STATISTICS

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FORGET ABOUT ARGENTINA

- Say I asked you:

What do you think was the annual U.S. inflation rate with respect to one year ago?

- Would get a distribution:
  - Some of you better informed.
  - Some of you more confident.
  - Some of you interpret question in one way, others somewhat differently.

- Learn that people disagree, aren't perfectly informed.

NOW I RANDOMIZE AND ASK

1/3) According to official indicators published by the BLS, the annual inflation rate with respect to a year ago was approximately 0.1%.

1/3) According …. approximately ***1.4****%.*

1/3) According …. approximately ***2.2****%.*

What do you think was the annual inflation rate with respect to one year ago?

- My guess: bottom 1/3 give higher answer than top 1/3.

ALTERNATIVELY TELL YOU…

113) According to ***other indicators*** *published by* ***the BEA****, the annual inflation rate with respect to a year ago was approximately -2.0%.*

113) According …. approximately 0.3%

113) According …. approximately 1.0%

What do you think was the annual inflation rate with respect to one year ago?

- My guess: still increasing, but differences across slides

WHAT CAN WE LEARN

1) From information having an effect on your answer.

- *Authors:* You don't ignore the piece of information.
- But, Bayesian would only ignore completely useless data
  - All numbers true, just not for CPI or GDP deflator.
  - If survey gives you information, infer it must be useful.
- But, non-Bayesian even considers useless piece of data
  - Cues and anchoring
  - Hawthorne effect.

WHAT CAN WE LEARN

2) From different response to BLS and BEA.

- *Authors:* Know one of them is biased by a constant, $\mathbf{x \sim (\pi - b, \sigma)}$ so rationally subtract estimate of ***b*** from forecasts.

- But, bias is not the same as cheating
  - I know that CPI suffers from substitution bias.

- But, can you reject alternative bias:
  - Bias that is multiplicative: $\mathbf{x \sim (a\pi, \sigma)}$.

- But, can you reject unbiasedness:
  - Different in precision/informativeness so $\mathbf{x \sim (\pi, c\sigma^2)}$.

WHAT CAN WE LEARN

3) From responding more to positive rather than negative information.

- *Authors:* I distrusted BLS as understating inflation.
  - Not in their model, which is symmetric.
  - Maybe because if higher, must be really bad, respond more.
- But, same asymmetry for official and unofficial data
  - So, not about the data, rather about the person
- But, arguably better alternative, asymmetric loss function:
  - Because higher inflation means losses, and concave utility.
  - Even more if some loss aversion.

CAN WE CONCLUDE THAT…

Authors isolated the effect of information?

- Their statistical approach:
  - They never elicited priors. Ideally want to calculate:

$$\sum_{i \in \mathbf{T}}(\pi^{post}(i) - \pi^{prior}(i)) - \sum_{i \in \mathbf{C}}(\pi^{post}(i) - \pi^{prior}(i))$$

  - But calculated instead:

$$\sum_{i \in \mathbf{T}} \pi^{post}(i) - \sum_{i \in \mathbf{C}} \pi^{prior}(i)$$

  - Correct if randomization ensures that

$$\sum_{i \in \mathbf{T}} \pi^{prior}(i) = \sum_{i \in \mathbf{C}} \pi^{prior}(i)$$

- But, source of differences across **T** and **C** group:
  - Proportion of women (?)
  - Income, marital status, economic literacy.

CAN WE CONCLUDE THAT…

There is a constant inflation bias in official data?

- Persuasive that can't reject null (move away from prior) that there is a constant inflation bias of 10% and that people discount it.

- But, with only their data I have:
  - Freedom picking loss function people use $L(\pi^{post} - \pi)$
  - Freedom picking distributions of the two signals $x \sim G(\pi - b, .)$ and $y \sim F(\pi, .)$.
  - I can get ***any*** estimate for ***b*** consistent with Bayes rule

CAN WE CONCLUDE THAT…

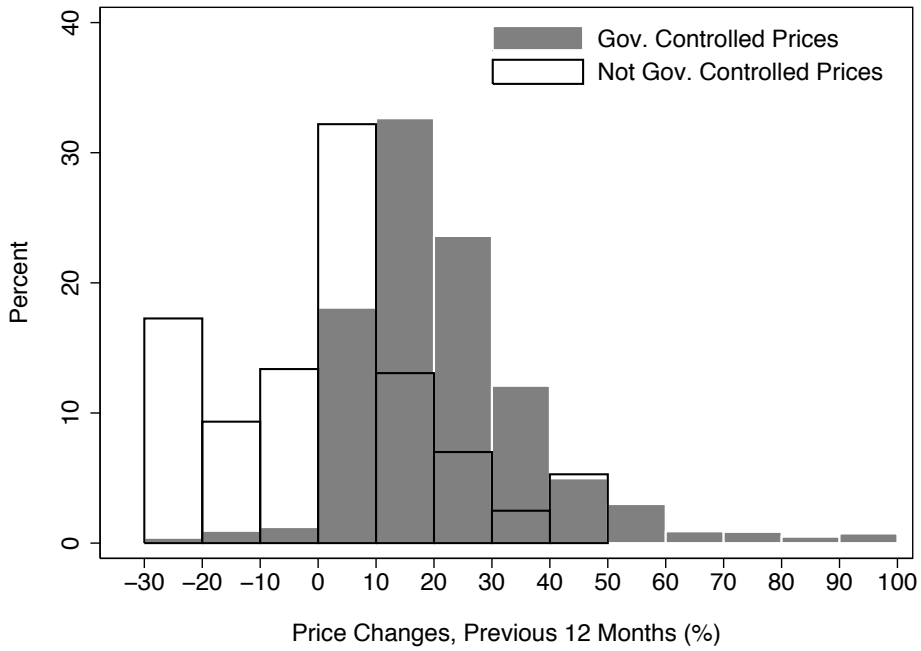
Agents are sophisticated Bayesians?

- **Results are even stronger:**
  - support theories of inattention.
  - against behavioral theories of expectations (natural, adaptive, diagnostic, …).
- **But, let me take the other side:**
  - In Argentina, why so unsophisticated inattentive?
  - In Argentina, why such loose priors? Large effect of information.
  - In the time series, why such persistence? Perceptions are the same as expectations.

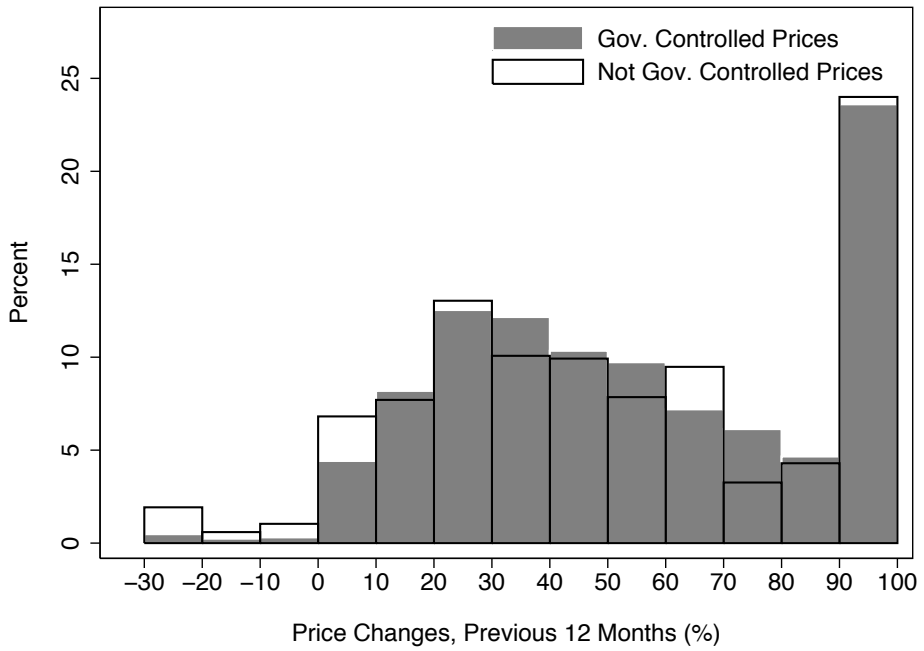
SECOND PART OF PAPER

- Ask shoppers about the change in the prices of goods you *just* bought.
  - Not asking about inflation.
  - Different issue altogether relative to first part.

a. Actual price changes



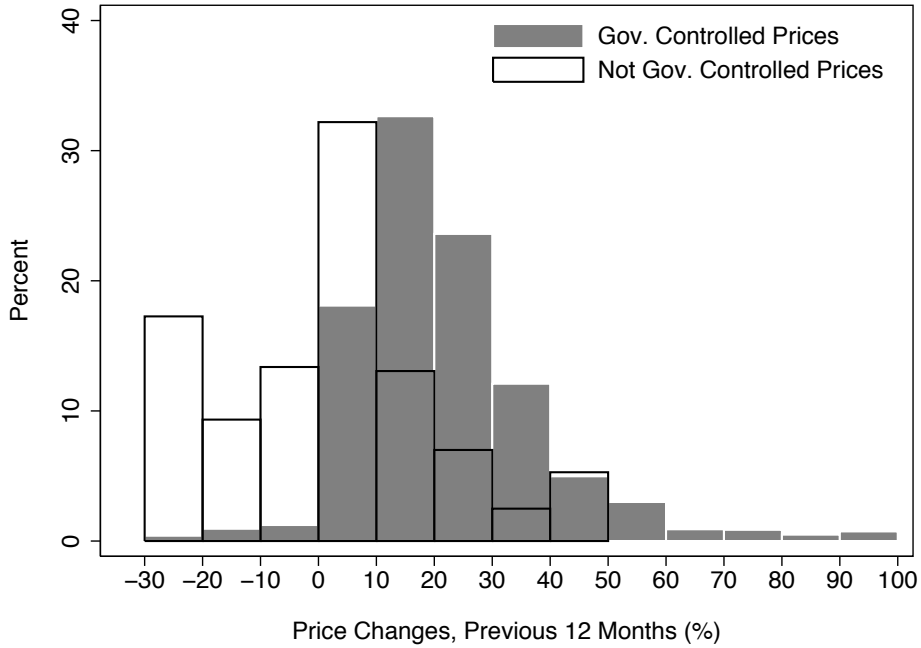
b. Remembered price changes



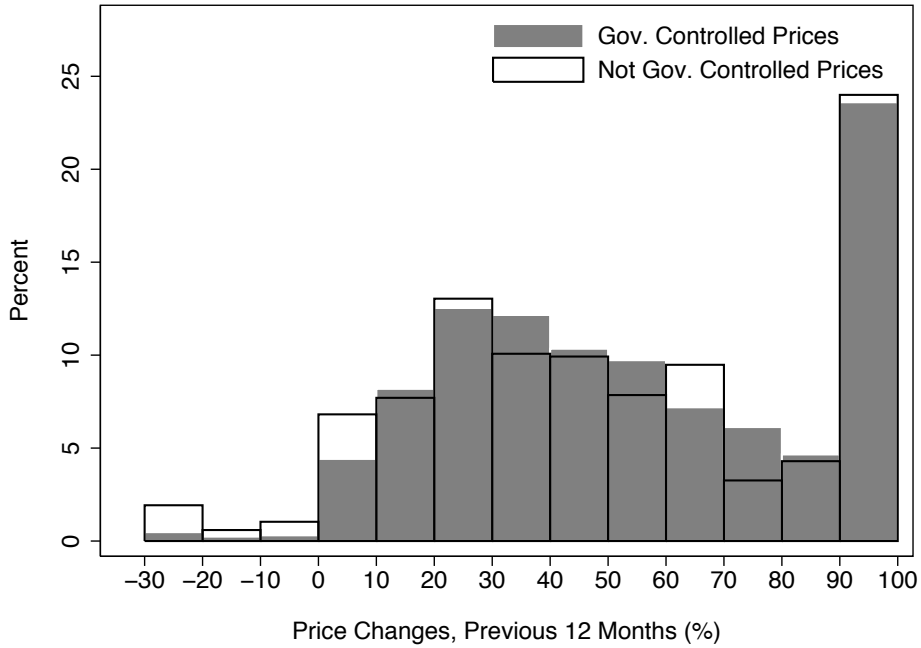
CONTROLLED VERSUS NOT

- Clear that while difference in controlled versus non controlled in prices, not in expectations

a. Actual price changes



b. Remembered price changes

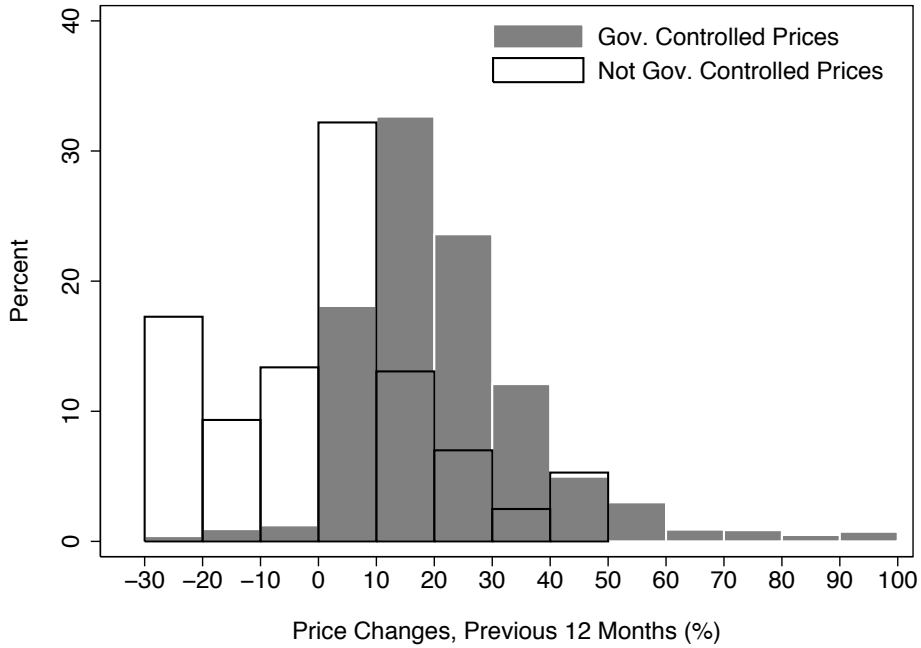


- But must control for large versus small.

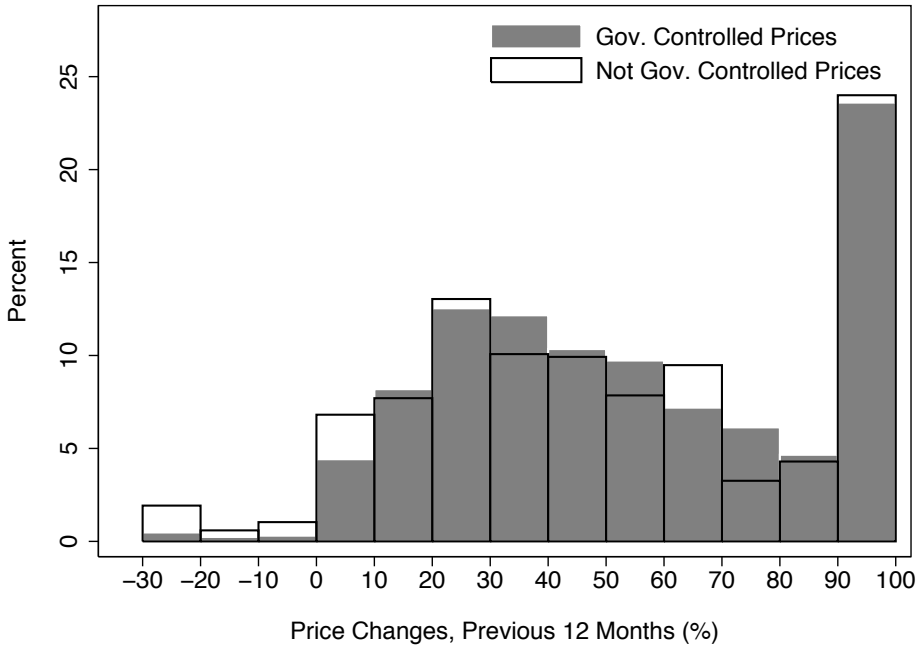
AMAZING HOW CLUELESS…

- Massive upward bias in prices remembered. Not just pessimistic, really unsophisticated.

a. Actual price changes



b. Remembered price changes



- Did they pay attention to the question?

SUGGESTION

- Right now report

$$F^c(\Delta p(j)),\ F^u(\Delta p(j)) \text{ and } G^c(\Delta p^e(j)),\ G^u(\Delta p^e(j))$$

- But I think a better comparison would be between:

$$H^c(\Delta p(j) - \Delta p^e(j)) \text{ and } H^u(\Delta p(j) - \Delta p^e(j))$$

- Also, try at least to see if using expenditure weights makes a difference (see if relevant).

CONCLUSION

Two very different readings of this paper

- Paper about Argentina, testing hypothesis that in spite of government manipulation of statistics and prices, people are not easily fooled. **Convincing**.

- Paper about how people form of inflation expectations, how much they trust different sources of data, and how they recall past prices. **Less so**.