INFLATION TARGETING DOES NOT ANCHOR INFLATION EXPECTATIONS: EVIDENCE FROM FIRMS IN NEW ZEALAND

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IMPORTANCE OF WELL-"ANCHORED" EXPECTATIONS

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"*Indeed, expectations matter so much that a central bank may be able to help make policy more effective by working to shape those expectations.*"

Ben Bernanke (2013)

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- Standard framework:
  - Expectations are the same across agents (FIRE).
  - The central bank can influence expectations of all agents in the economy.
  - Forward guidance is very powerful.

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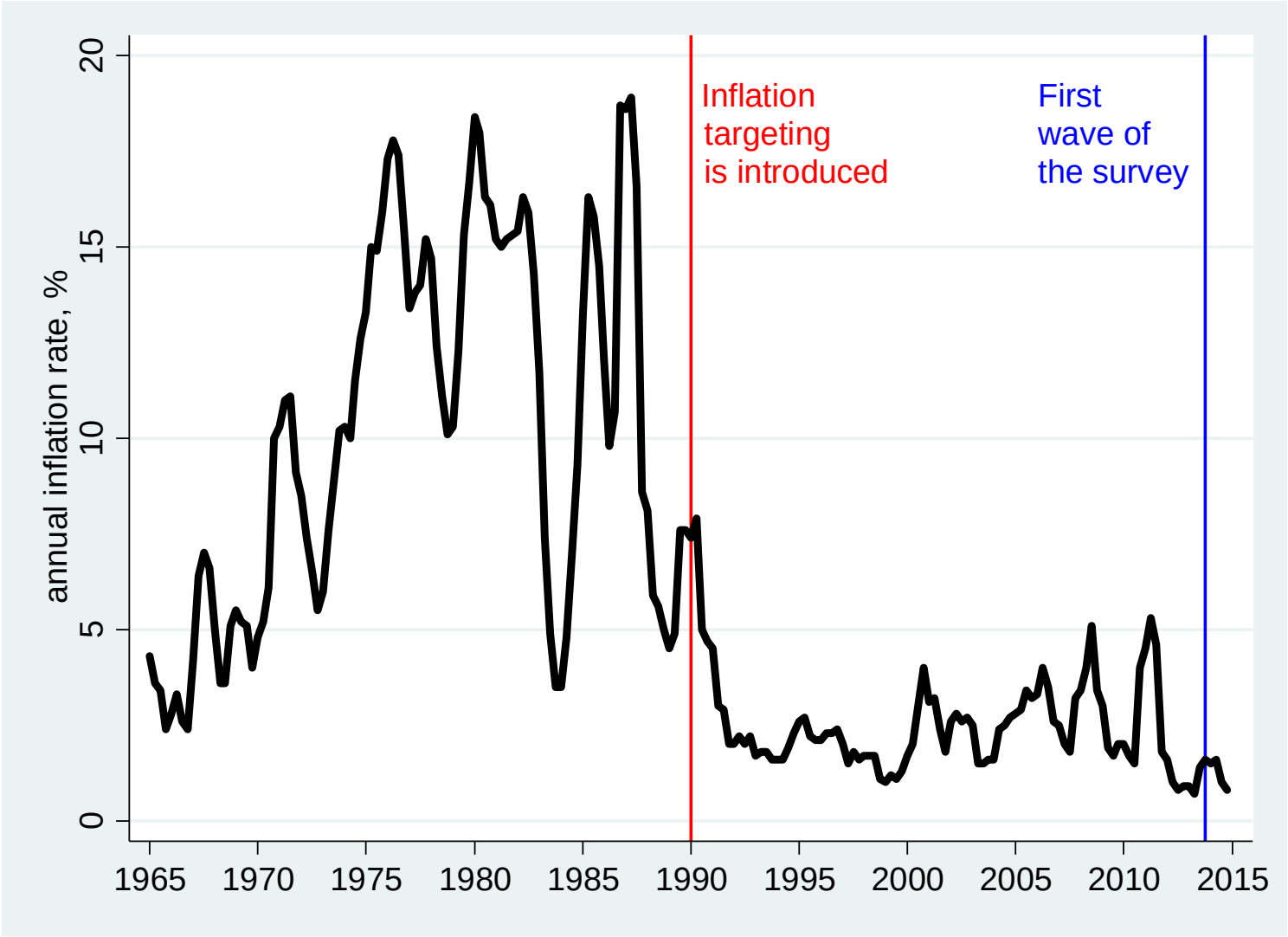
    - Managers are remarkably ill-informed about the objectives and actions of monetary policy.
  - Similar results apply to U.S. households. There is no more evidence of anchored expectations in the U.S. than in New Zealand.

WHY NEW ZEALAND?



We study a country with a long history of inflation targeting and, hence, presumably anchored inflation expectations.

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  - Main survey: Late Sept 2013 to Early Dec 2013 (3,150 firms)
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  Questions about expectations, firm and manager characteristics.

Are Inflation Expectations Anchored in New Zealand?

Five predictions that should hold under well-anchored expectations:

1. Are average beliefs close to the inflation target?

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Survey Date	Recent Data	Forecast		
		Central Bank	HH	Firms
1-year inflation				
2013Q4	1.5	1.3	3.4	5.3
2014Q1	1.5	1.9	3.6	5.9
2014Q3	1.6	1.6	3.5	4.3
2014Q4	1.0	1.1	3.1	4.7

During the next 12 months, by how much do you think prices will change overall in the economy?

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2014Q4	1.0	1.1	3.1	4.7
5-to-10-year inflation				
2014Q3	2.1	2.1	4.1	3.4

Over the next five to ten years, at what average percentage rate per year do you think that overall prices in the economy will be changing?

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1-year inflation						
2013Q4	1.5	1.3	3.4	5.3	2.9	4.8
2014Q1	1.5	1.9	3.6	5.9	2.9	5.3
2014Q3	1.6	1.6	3.5	4.3	2.9	n.a.
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5-to-10-year inflation						
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During the last 12 months, by how much do you think prices changed overall in the economy?

ARE INFLATION EXPECTATIONS ANCHORED IN NEW ZEALAND?

Five predictions that should hold under well-anchored expectations:

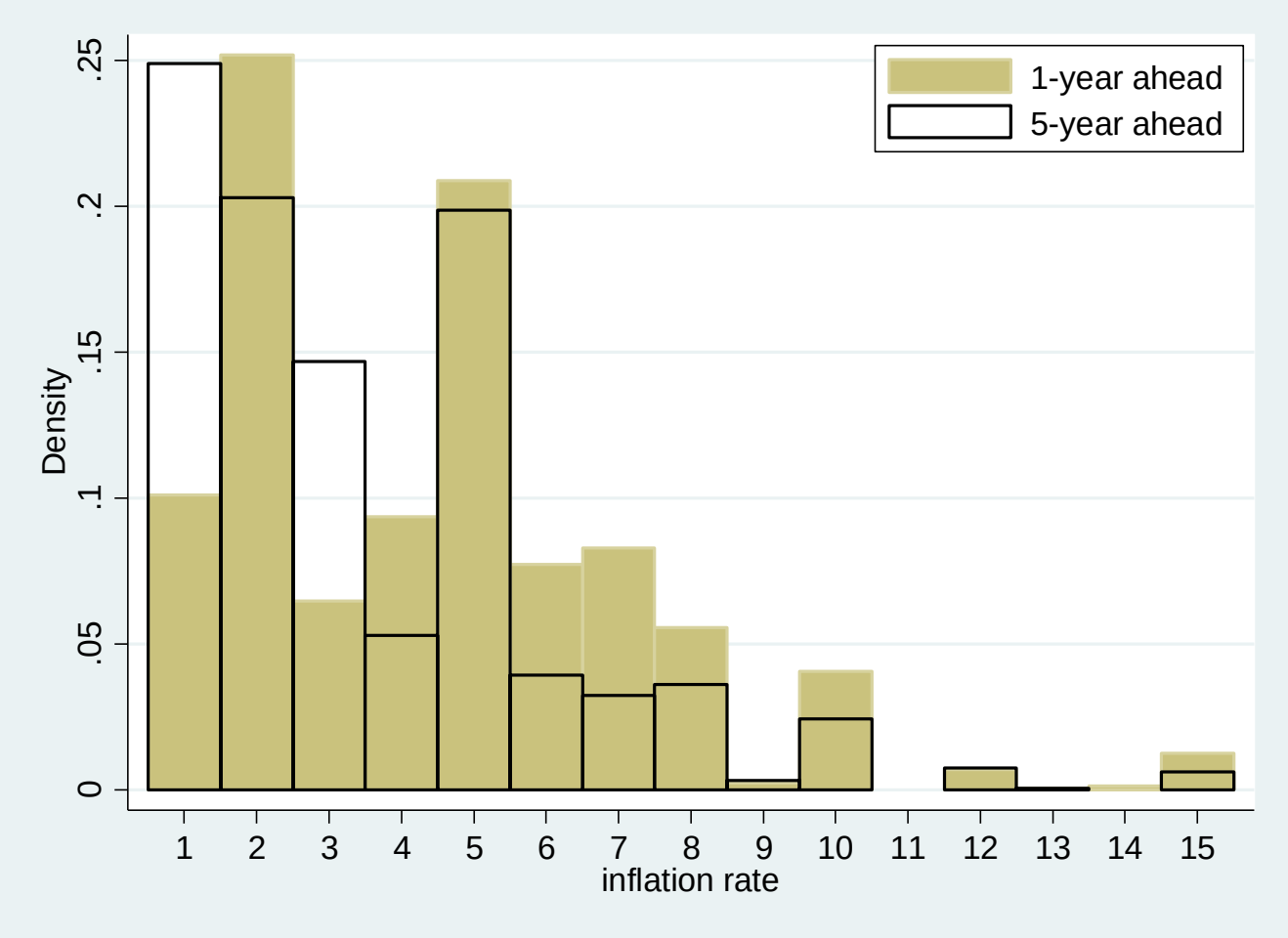
~~1. Are average beliefs close to the inflation target?~~

2. Are beliefs concentrated around a common a value?

- Maybe, expectations deviate from the target due to transitory shocks, but agents agree about the future path of inflation.

ARE BELIEFS CONCENTRATED AROUND A COMMON VALUE?

- Distribution of Inflation Forecasts (wave #3):



- 20% correctly identified the target rate: 2% inflation.
- 20% predicted inflation is going to be 5% in next 5 years.
- Another 20% predicted inflation will average between 5 and 10%.

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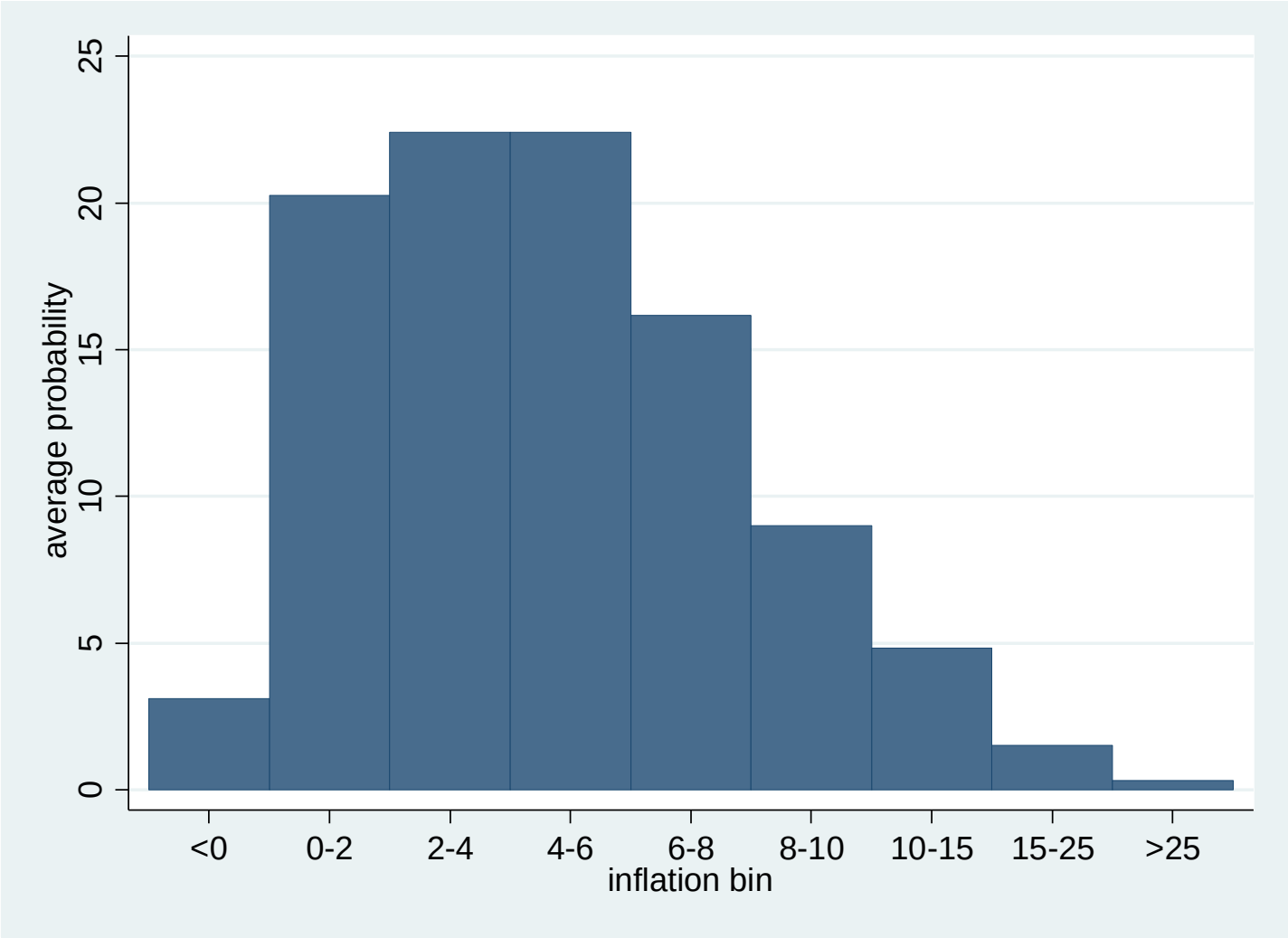
- In a world of anchored expectations, inflation outcomes should be limited and agents should be relatively confident in their forecasts.

DO AGENTS SHOW CONFIDENCE IN THEIR FORECASTS?

- We ask managers to assign probabilities to future inflation bins.
- Average (across managers) probability assigned to an inflation bin:



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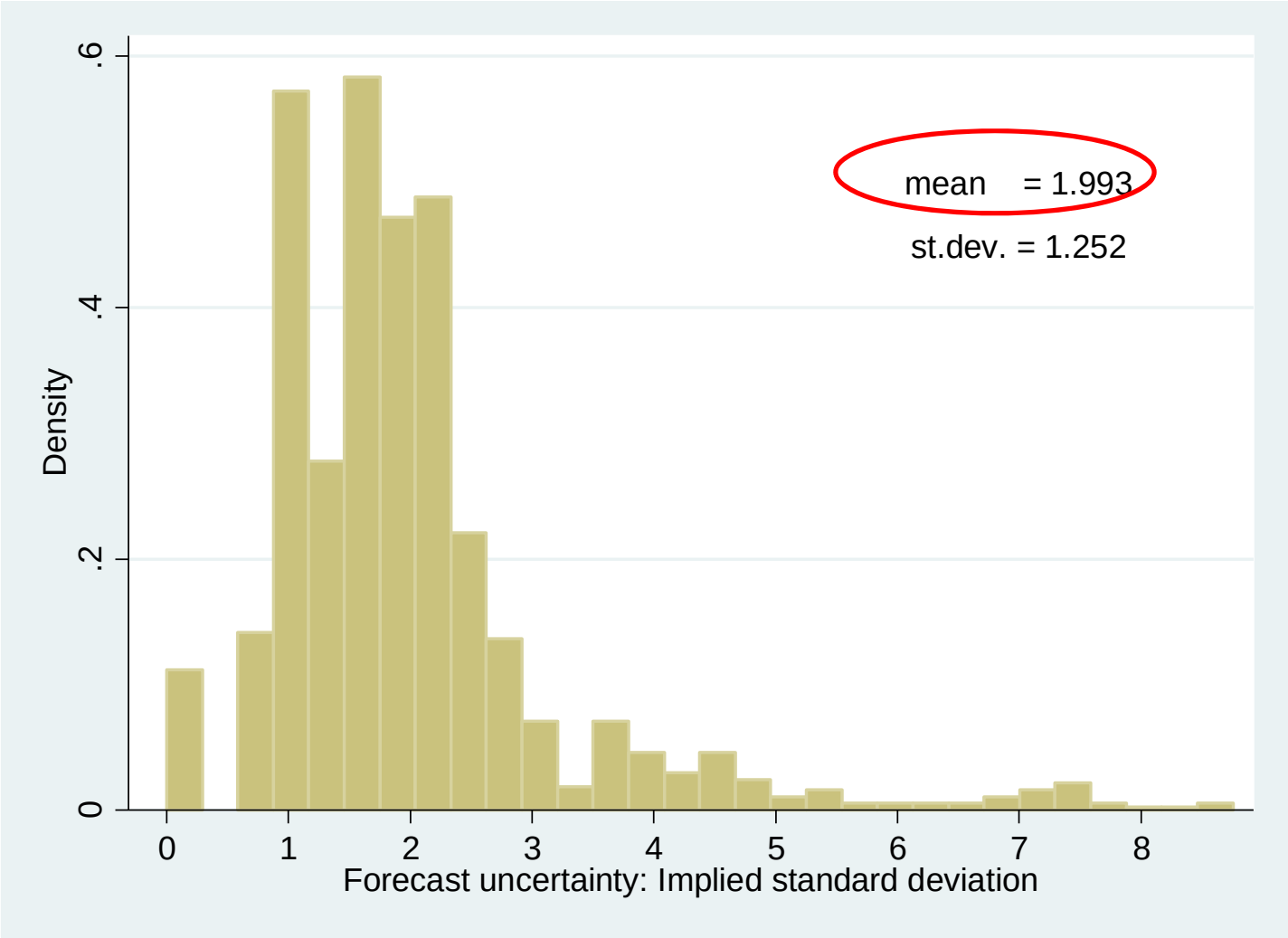
- Standard deviation of managers' forecasts:



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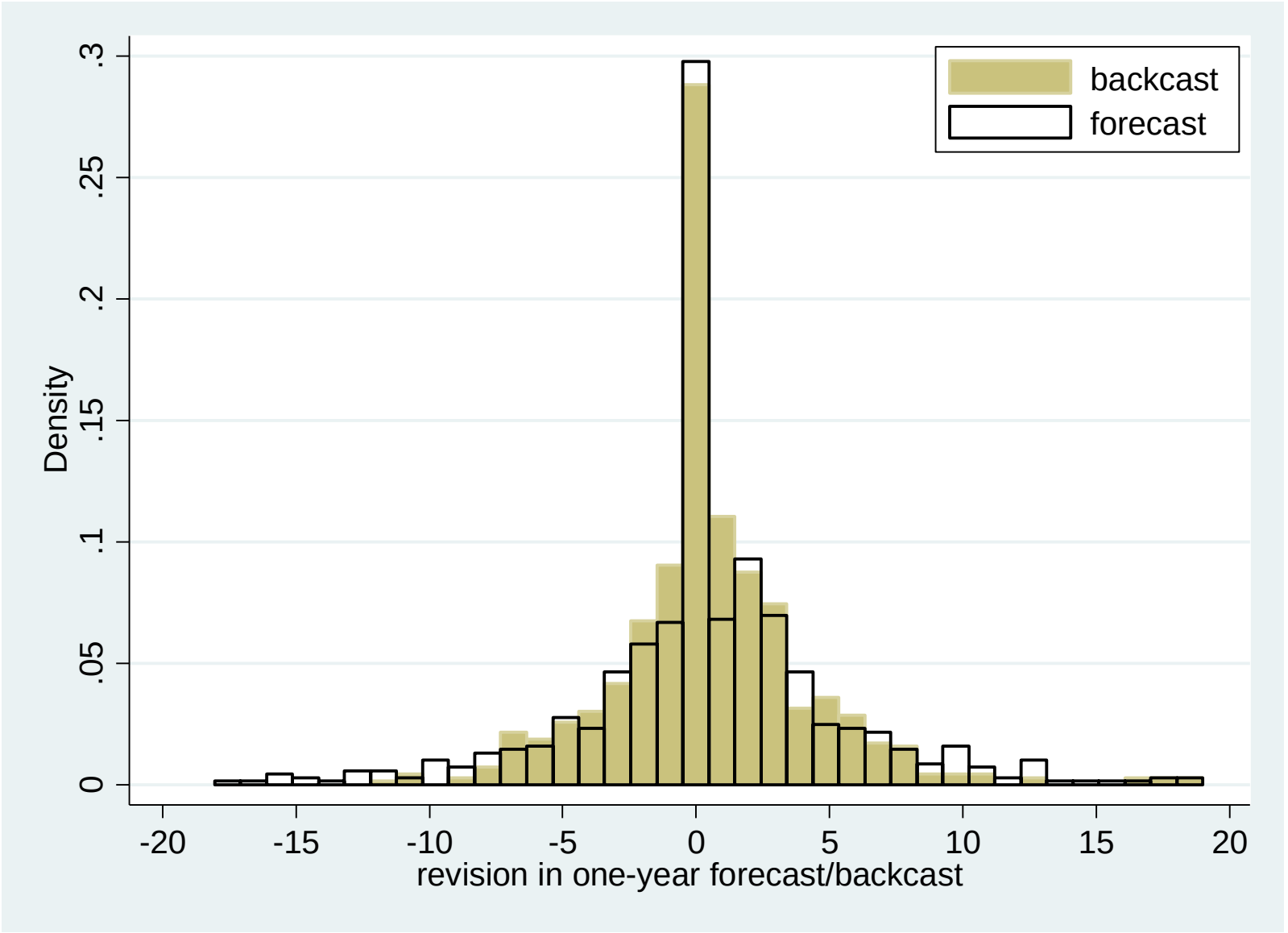
4. Do agents make small revisions in their forecasts?

- Maybe each agent has a different long-run target in mind, which could explain high dispersion of beliefs. But one would still expect small revisions in forecasts.

DO AGENTS MAKE SMALL REVISIONS?



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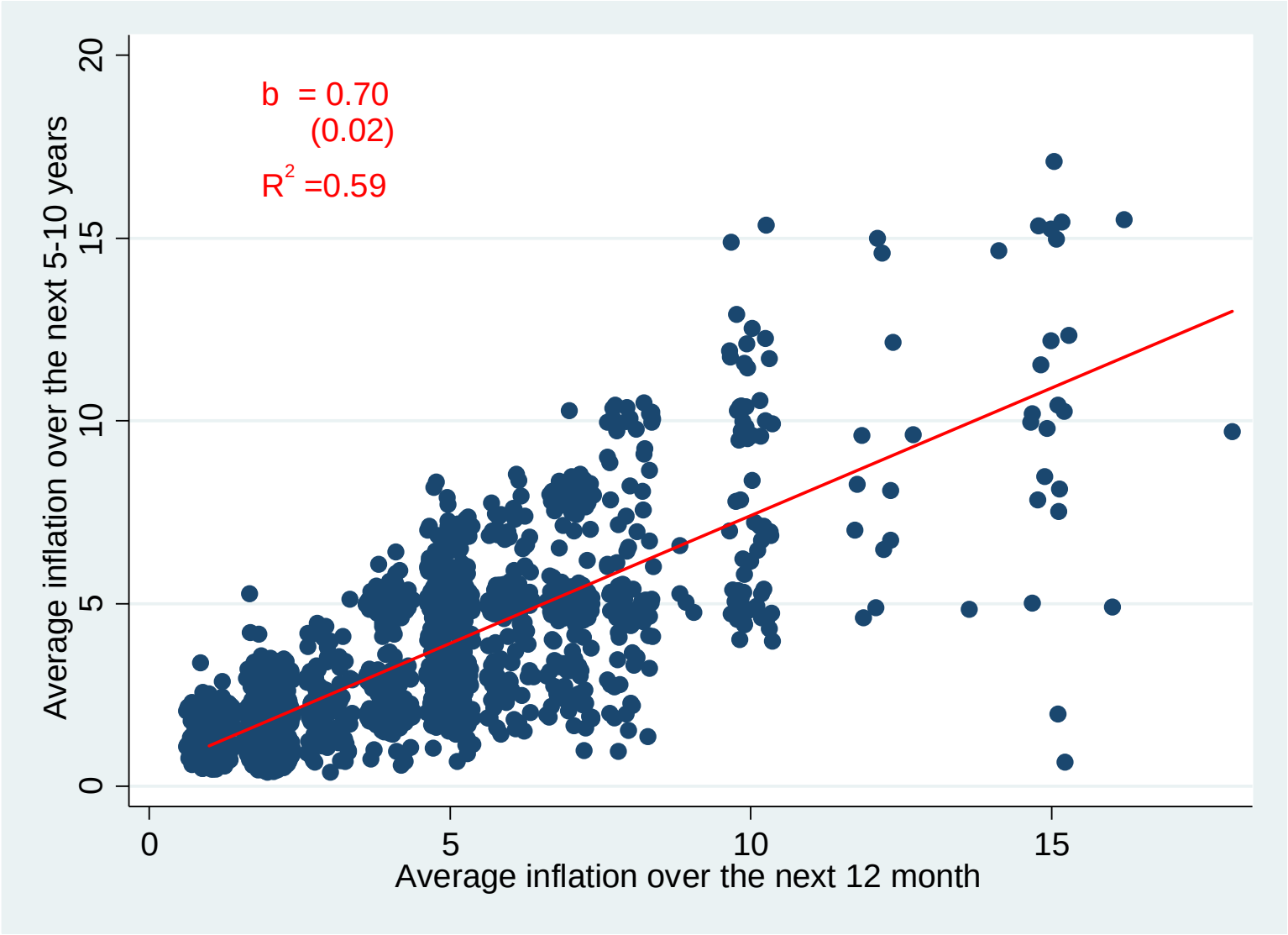
5. Are long-run inflation forecasts "independent" of short-run inflation forecasts?
   - If expectations are anchored, what matters is the long-run inflation expectation because the central bank can control inflation only in the long-run. What happens in the short-run should have little bearing on the behavior of inflation over longer horizons.

ARE LONG-RUN INFLATION EXPECTATIONS INDEPENDENT OF SHORT-RUN EXPECTATIONS?



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- Managers do not get the right information ("inputs") to form expectations.

MANAGERS CARE/KNOW ABOUT INFLATION

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How can managers perceive such different levels of inflation than the official data?

How Can Managers Perceive Different Levels of Inflation?

- Inflation is the weighted sum of price changes for different goods.

$$\pi = \sum_{s} w_s \pi_s$$

- Two possible explanation:
  - They are mistaken about the weights.
  - They are mistaken about the price changes of different categories.

How Can Managers Perceive Different Levels of Inflation?

- We asked firms:
  - How much weight do they believe statistical agencies assign to different categories of goods and services?
  - How much inflation do they believe there was for each of these categories?

- The set of categories:
  - house prices,
  - stock prices,
  - food prices,
  - health care costs,
  - gasoline prices,
  - cost of rent,
  - car prices.

FIRMS' PERCEPTIONS OF MEASUREMENT OF INFLATION

	Perceived		Actual	
	Weight	Inflation, %	Weight	Inflation, %
Housing prices	**21.7**	7.5	**4.4**	5.3
	(14.3)	(1.6)		
Stock prices	**8.4**	3.7	**0.0**	13.3
	(5.7)	(2.8)		
Food prices	**8.9**	4.0	**18.8**	0.2
	(6.4)	(2.0)		
Healthcare costs	8.4	0.7	4.0	1.8
	(6.4)	(1.7)		
Gasoline prices	**18.9**	-6.3	**4.7**	-7.4
	(12.7)	(6.0)		
Cost of rent	9.4	3.5	9.4	2.3
	(6.4)	(1.8)		
Car price	10.3	3.3	3.3	-3.8
	(9.7)	(1.6)		

Result 1: Firms vastly overweight housing prices, stock prices, and gasoline prices but underweight food prices.

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Result 2: Firms disagree tremendously about weights on categories of goods.

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	(9.7)	(**1.6**)		

Result 3: Firms disagree *more* about aggregate inflation than they do about inflation rates for most categories of goods.

Decomposition of Errors

$$\tilde{\pi}_i^p - \tilde{\pi}^a = \sum_s w_{s,i}^p \pi_{s,i}^p - \sum_s w_s^a \pi_s^a$$

$$= \left\{\sum_s w_s^a \left(\pi_{s,i}^p - \pi_s^a\right)\right\} + \left\{\sum_s \left(w_{s,i}^p - w_s^a\right)\pi_s^a\right\} + \left\{\sum_s \left(w_{s,i}^p - w_s^a\right)\left(\pi_{s,i}^p - \pi_s^a\right)\right\}$$

- First term: firm's error about category-specific inflations rates.
- Second term: firm's error about the weights applied to each category.
- Third term: covariance between these two errors.

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Error	Mean	(s.d.)
Total: $(\tilde{\pi}^p - \tilde{\pi}^a)$, %	1.71	(**2.12**)
Of which		
$\sum_s w_s^a \left(\pi_{s,i}^p - \pi_s^a\right)$	1.18	(0.48)
$\sum_s \left(w_{s,i}^p - w_s^a\right)\pi_s^a$	0.78	(**1.48**)
$\sum_s \left(w_{s,i}^p - w_s^a\right)\left(\pi_{s,i}^p - \pi_s^a\right)$	-0.24	(1.85)

Most of the cross-sectional standard deviation in errors comes from disagreement about weights applied to different categories of goods.

WHERE DO MANAGERS GET THEIR INFORMATION?

- We asked managers the following open-ended question:

  "How do you typically form your inflation expectations?"

How do you typically form your inflation expectations?	Share of firms	Absolute backcast error, %		Inflation forecast, %	
		Mean	SD	Mean	SD
	(1)	(2)	(3)	(4)	(5)
Media					
Meetings and discussions					
Shopping experience					
Prices of competitors and suppliers					
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Meetings and discussions	0.10	3.10	1.52	4.00	1.22
Shopping experience					
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Managers who reported getting their information from the media on average had better knowledge of inflation than other firms.

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Shopping experience	0.43	4.27	1.47	4.95	1.12
Prices of competitors and suppliers	0.10	4.50	2.17	5.20	2.39
Total		3.31	1.81	4.24	1.95

Managers who reported getting their information from their own shopping experience had much worse information on average.

WHERE DO MANAGERS GET THEIR INFORMATION?

- We also asked managers to rank different sources of information in terms of their usefulness to them in forming their inflation expectations, thereby providing additional quantitative measures.

Three key additional insights:

- 88% of managers report their personal shopping experience as being very or extremely useful to them in forming their inflation expectations.
- 76% of managers report gasoline prices in particular as being very or extremely useful to them in forming their inflation expectations.
- Only 20% report professional forecasts as being very or extremely useful to them, but these managers have much better knowledge of inflation dynamics than other firms.

CREDIBILITY OF VS. KNOWLEDGE ABOUT RBNZ?

- Two additional potential reasons for why answers are very dispersed:
  - Managers do not believe that RBNZ is able to achieve its target.
  - Managers are unaware of the objectives of the central bank.

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- Credibility:
  - When asked if the central bank could control inflation over the next 5-10 years, 98% said yes.

  - When asked if the central bank could control inflation over the next 12 months, 94% said yes.

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- We assess the managers' knowledge about the central bank using three targeted questions
  - What is the main objective of the RBNZ?
    - *Keep the exchange rate stable*
    - *Promote full employment*
    - *Keep interest rates low and stable*
    - *Keep inflation low and stable*
    - *Help the government finance its spending*

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  - What is the main objective of the RBNZ?
    - *Keep the exchange rate stable* [23%]
    - *Promote full employment* [25%]
    - *Keep interest rates low and stable* [11%]
    - *Keep inflation low and stable* [31%]
    - *Help the government finance its spending* [10%]

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- We assess the managers' knowledge about the central bank using three targeted questions:
  - What is the main objective of the RBNZ?
  - Who is the governor of the RBNZ?
    - *Graeme Wheeler (correct)*
    - *Alan Bollard (previous chair)*
    - *Bill English (minister of finance)*
    - *Charles Cowley (random person in NZ!)*
    - *I don't know*

CREDIBILITY OF VS. KNOWLEDGE ABOUT RBNZ?

- Two additional potential reasons for why answers are very dispersed:
  - Managers do not believe that RBNZ is able to achieve its target.
  - Managers are unaware of the objectives of the central bank.

- We assess the managers' knowledge about the central bank using three targeted questions:
  - What is the main objective of the RBNZ?
  - Who is the governor of the RBNZ?
    - *Graeme Wheeler (correct)* [30%]
    - *Alan Bollard (previous chair)* [39%]
    - *Bill English (minister of finance)* [17%]
    - *Charles Cowley (random person in NZ!)* [9%]
    - *I don't know* [4%]

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  - What annual percentage rate of change in overall prices do you think the Reserve Bank of New Zealand is trying to achieve?

Perceived target	Share of firms
1	14.96
2	12.41
3	10.26
4	11.46
5	14.96
6	8.91
7	7.80
8	8.75
9	5.49

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- Those who answered all questions correctly:
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  - Their mean backcast of inflation was 1.5% (actual inflation: 1.6%).
- Those who got at least one question wrong:
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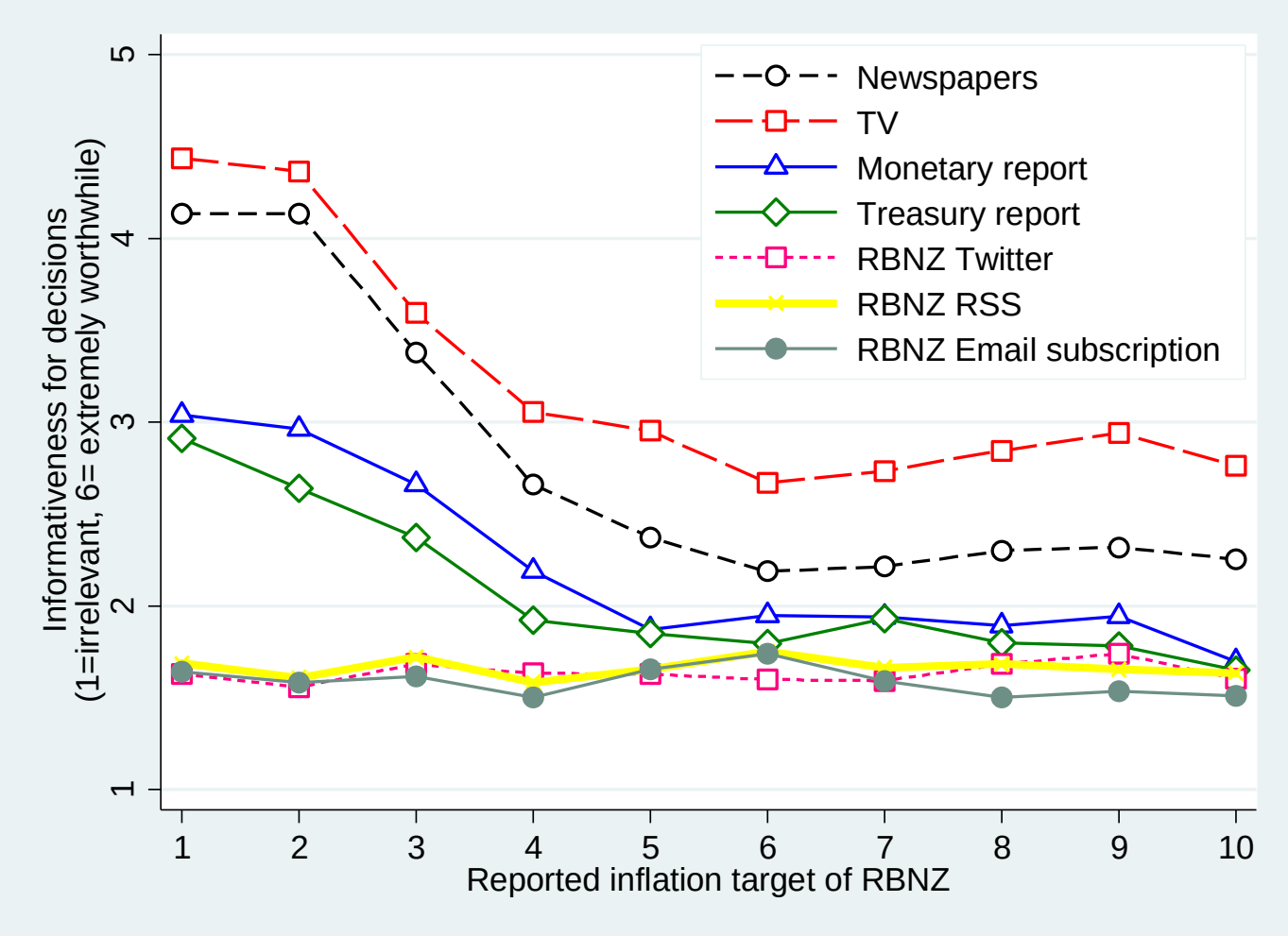
- Knowledge about the RBNZ actions and objectives is reflected in managers' beliefs.

WHY DIFFERENCES IN KNOWLEDGE ABOUT THE TARGET?



Managers who know the target report that the media as being more informative to their business decisions, follow news more closely, and would be willing to pay more for inflation forecasts.

WHY DIFFERENCES IN KNOWLEDGE ABOUT THE TARGET?

If we try to explain the size of backcast errors or the errors made about monetary policy questions made in terms of observable characteristics of the firm, the manager and industry fixed effects, we find:

- More educated managers make smaller errors. (*quality effect*)
- Managers facing more competitors make smaller errors. (*incentive effect*)
- Managers who sell more abroad make larger errors. (*incentive effect*)
- Managers whose firms have a steeper slope of profits wrt to prices make smaller mistakes. (*incentive effect*)
- Managers of larger firms make larger errors.

Is New Zealand unique?

- Do the results for New Zealand extend to other countries?

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- There are no firms' surveys in U.S., so we focus on Michigan Survey of Consumers, Survey of Consumer Expectations and polling data (compiled in Binder 2015).

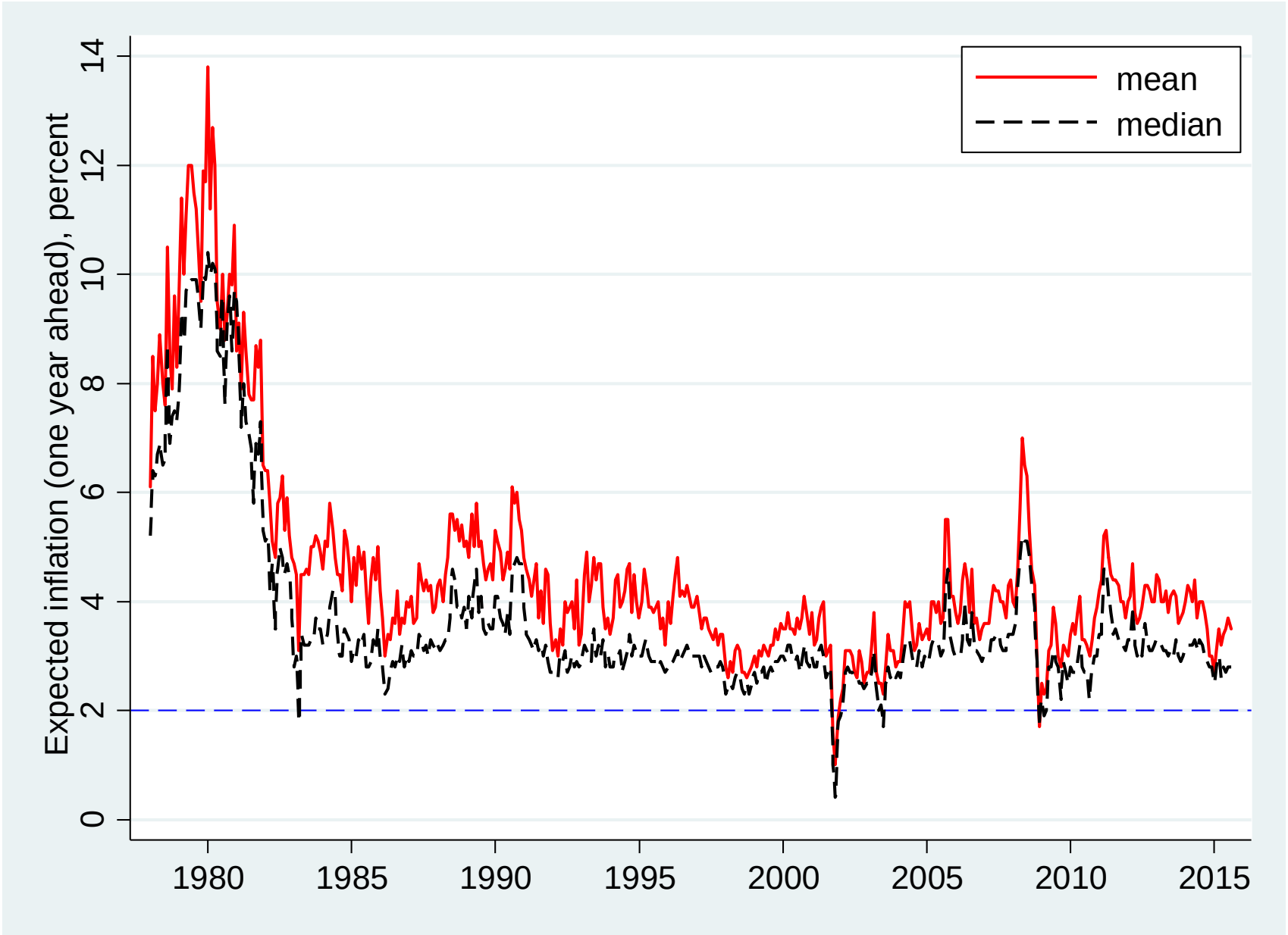
ARE U.S. EXPECTATIONS ANCHORED?

Survey Date	Recent data	Central Bank	Survey of Professional Forecasters		Households			
					Michigan Survey of Consumers		Survey of Consumer Expectations	
			Mean	SD	Mean	SD	Mean	SD
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1-year-ahead inflation forecast, %								
2013Q4	1.4	1.5	1.9	0.5	3.7	3.8	4.4	4.5
2014Q1	2.1	1.8	1.9	0.5	4.1	4.0	4.2	4.3
2014Q2	2.4	1.8	1.9	0.5	4.0	3.5	4.3	4.4
2014Q3	1.2	1.8	2.1	0.5	3.9	3.7	4.2	4.3
2014Q4	-0.9	1.3	1.9	0.5	3.1	3.6	n.a.	n.a.
Panel B: long-term inflation forecast, %								
2013Q4		2.0	2.1	0.4	3.4	3.2	4.4	4.5
2014Q1		2.0	2.1	0.4	3.4	3.1	4.1	4.4
2014Q2		2.0	2.2	0.3	3.5	3.0	4.3	4.6
2014Q3		2.0	2.2	0.4	3.3	2.9	4.2	4.5
2014Q4		2.0	2.1	0.3	3.1	2.7	n.a.	n.a.

~~1.Are average beliefs close to the inflation target?~~

~~2. Are beliefs concentrated around a common value?~~

EXPECTED INFLATION: MICHIGAN SURVEY OF CONSUMERS



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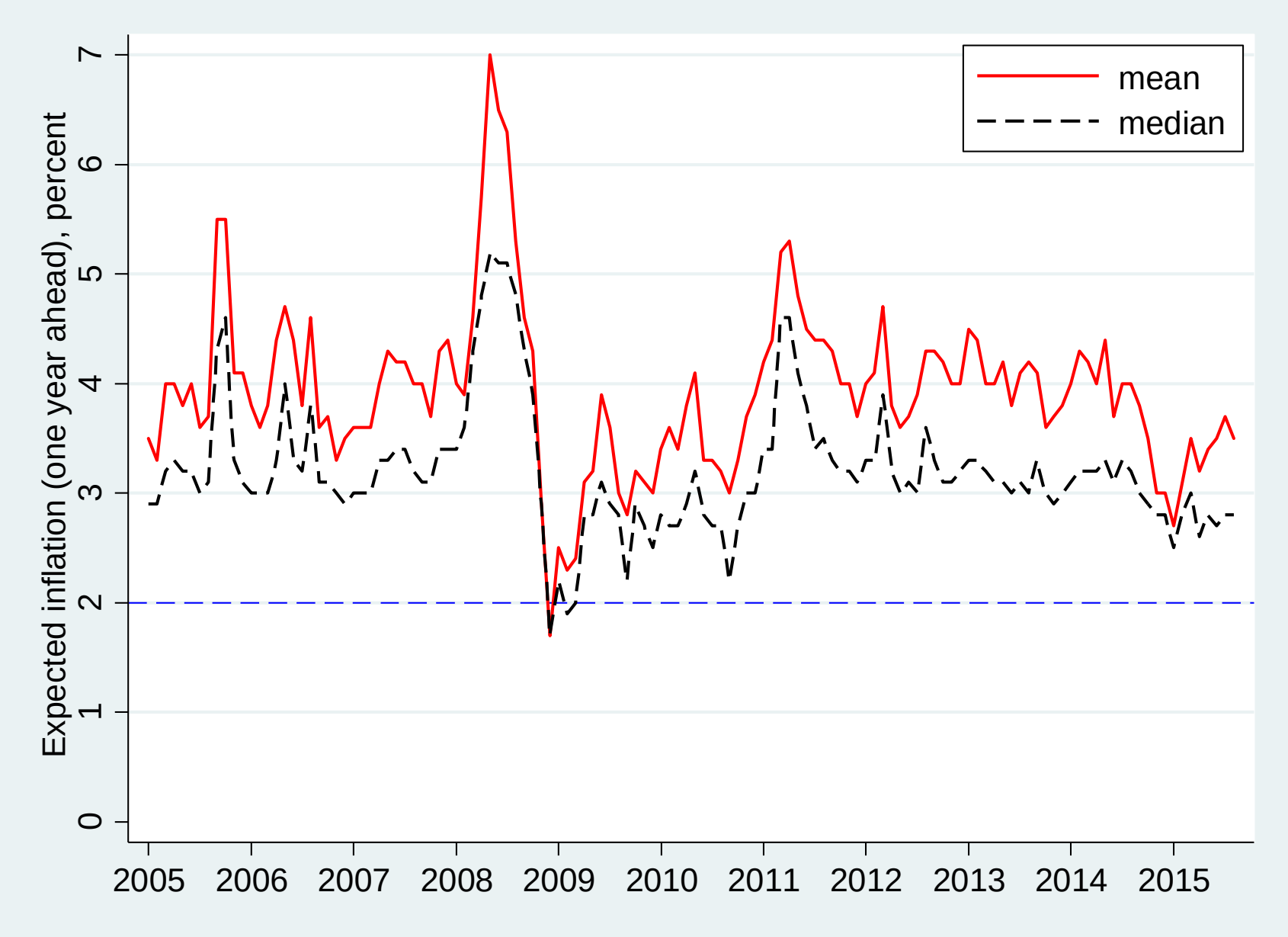
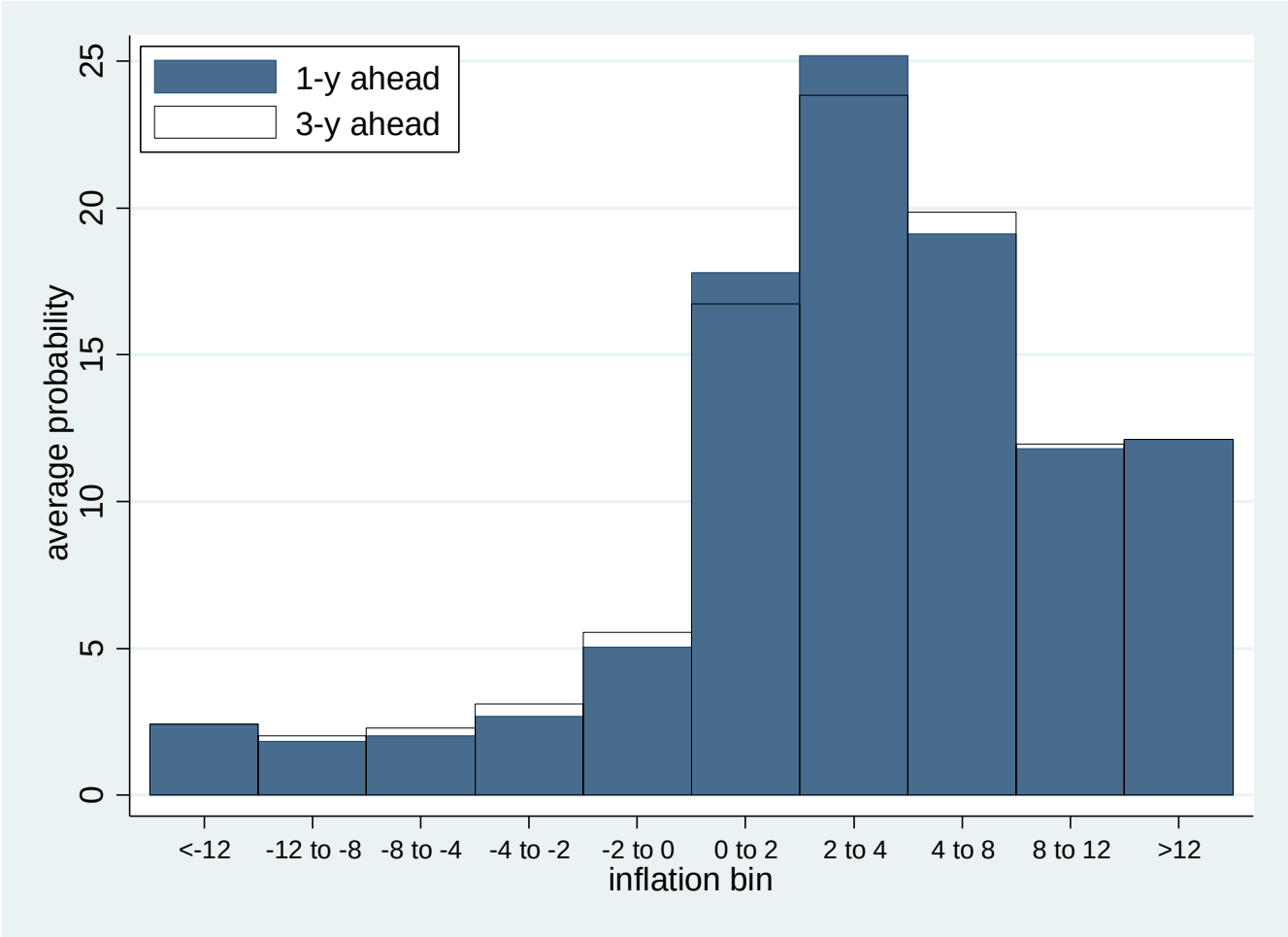


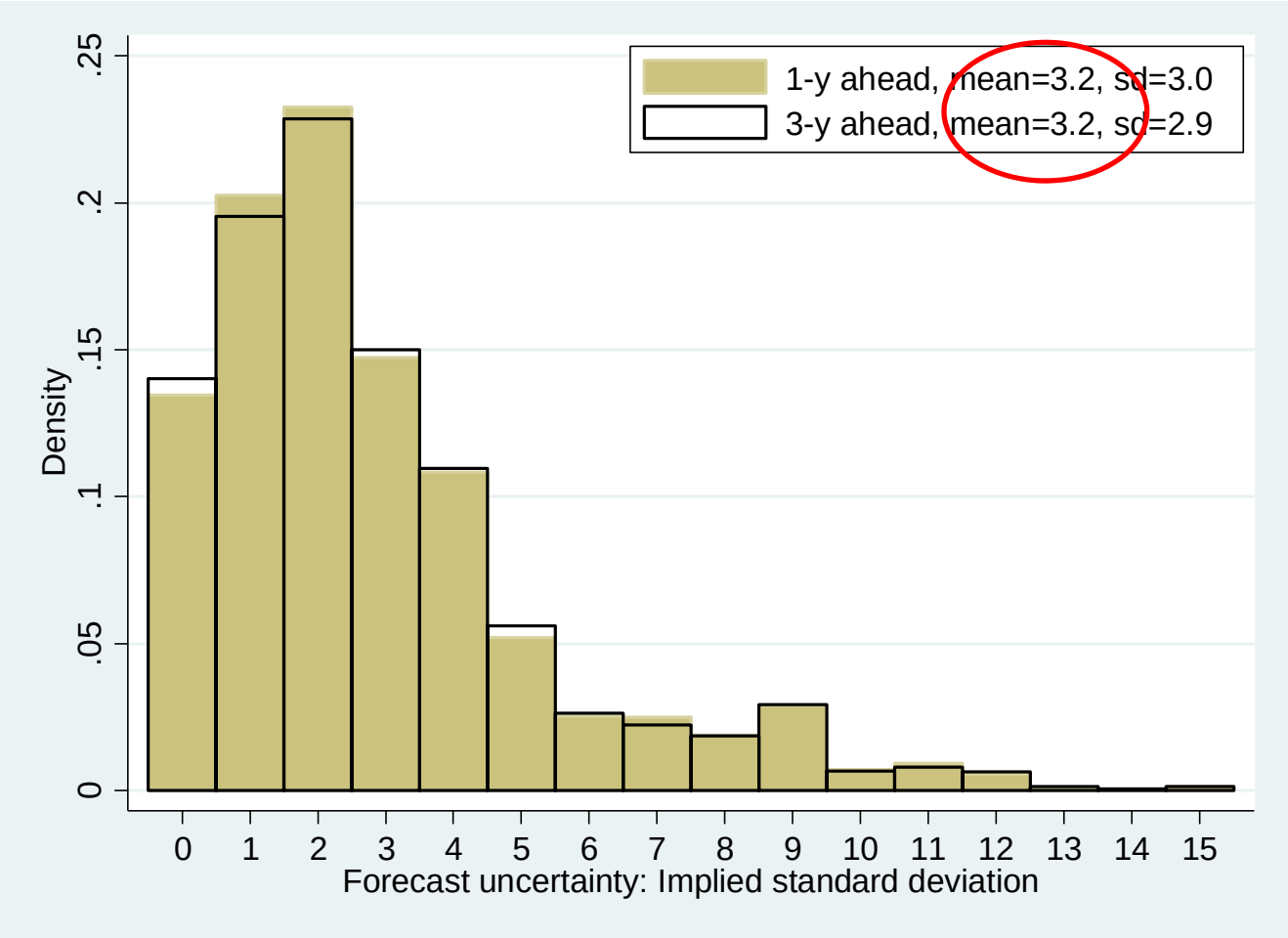
ARE U.S. EXPECTATIONS ANCHORED?

Average probability assigned to inflation bins



ARE U.S. EXPECTATIONS ANCHORED?

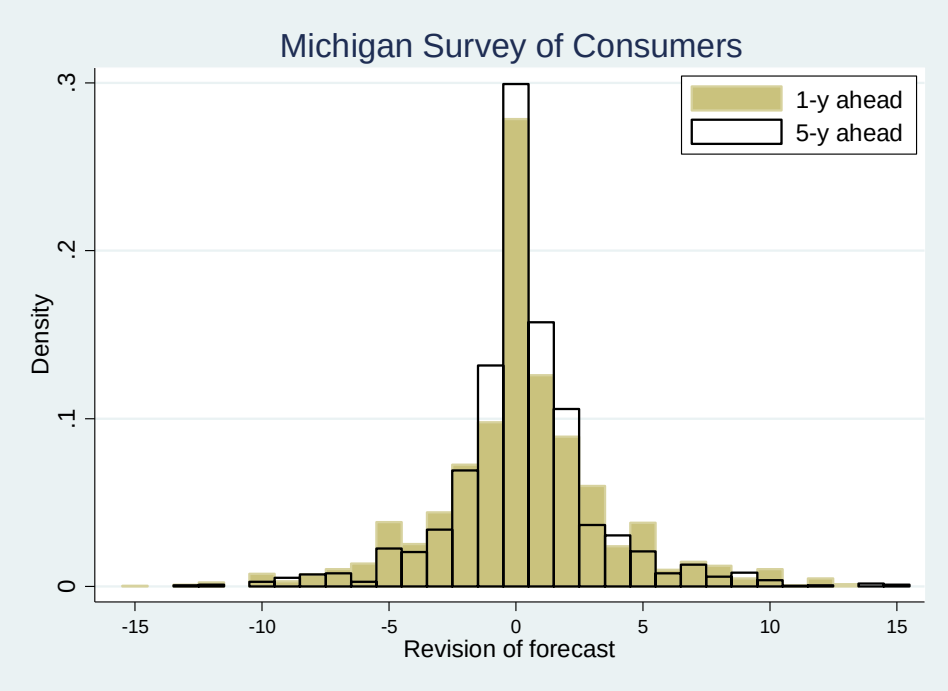
Distribution of uncertainty (implied standard deviation) across consumers

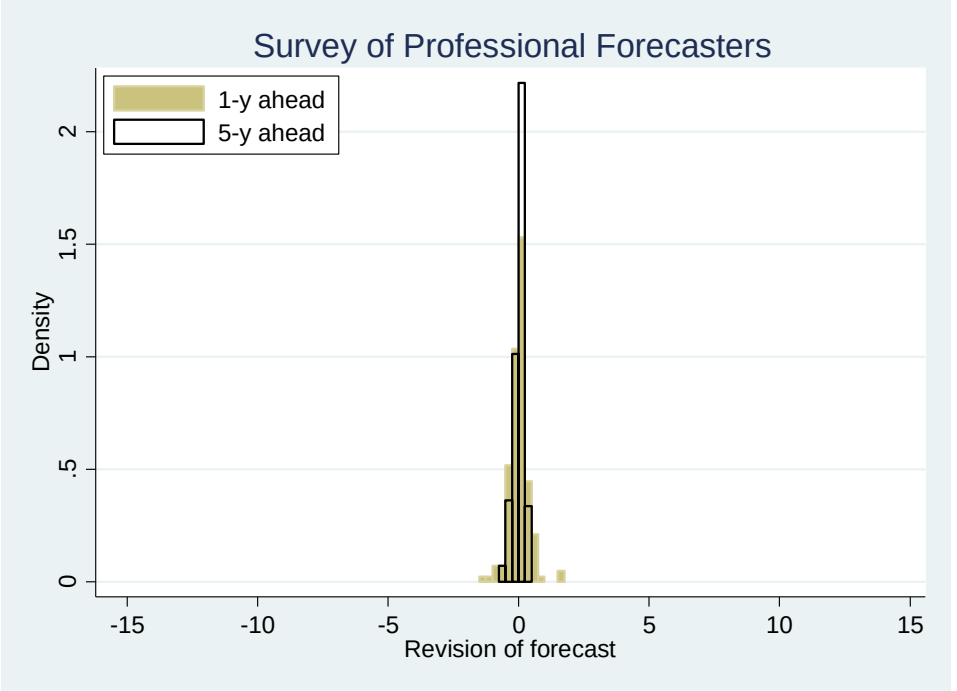


~~3.Do agents show confidence in their forecasts?~~

ARE U.S. EXPECTATIONS ANCHORED?

Forecast revisions





~~4. Do agents make small revisions in their forecasts?~~

ARE U.S. EXPECTATIONS ANCHORED?

$$E_{i,t}\pi_{t+H} = \alpha + \beta E_{i,t}\pi_{t+1} + error$$

SCE 3-year forecast	OLS	Sample weights	Robust regression
	(1)	(2)	(3)
1-y ahead forecast	0.672***	0.671***	0.932***
	(0.012)	(0.017)	(0.003)
N. obs.	17,854	17,849	17,854
R2	0.392	0.371	0.879

~~5. Are long run inflation forecasts independent of short run inflation forecasts?~~

WHAT DO PEOPLE KNOW ABOUT MONETARY POLICY?

- Who is the Chair of the Federal Reserve?

Question	*Survey*	*Answers*	*Date*
Who is the current chair of the U.S. Federal Reserve Board?	Pew Research Center for the People & the Press	Janet Yellen: 24% Don't know/refused: 48%	Sep, 2014
		Ben Bernanke: 33% Don't know/refused: 45%	Oct, 2009
		Ben Bernanke: 45% Don't know/refused: 20%	Mar, 2009
		Ben Bernanke: 35% Don't know/refused: 25%	Feb, 2008
What is the name of the chairman of the U.S. Federal Reserve Board?	Princeton Survey Research Associates International/ Newsweek Poll	Ben Bernanke: 36% Don't know/refused: 35%	Jun, 2008
		Ben Bernanke: 31% Don't know/refused: 32%	Jun, 2007

The U.S. public does not know the chair of the Fed any better than New Zealanders know the governor of the RBNZ.

SOCIAL MEDIA

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Federal Reserve Banks + Board	21,796	702,955

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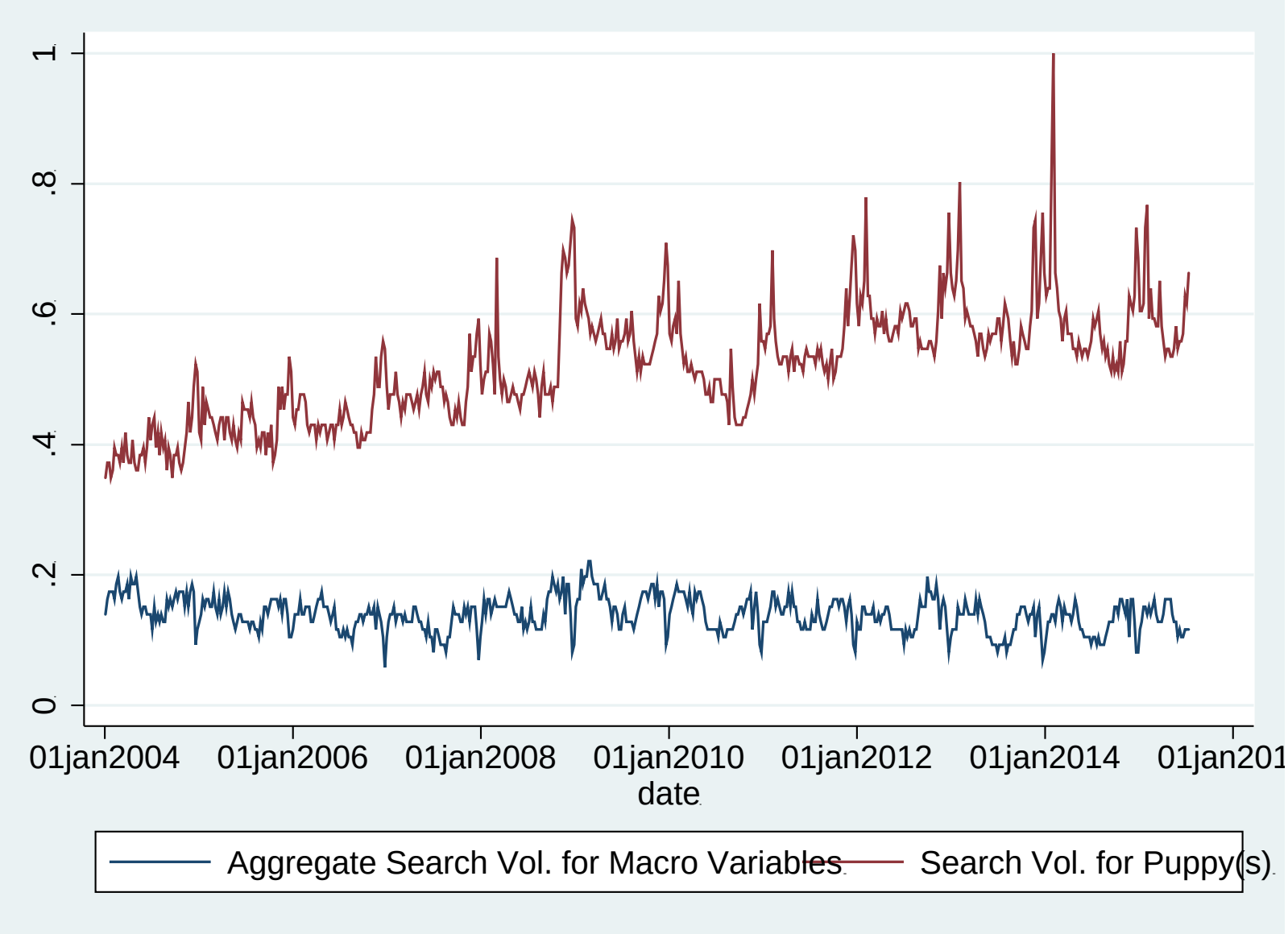
Ron Paul	1,287,106	549,344
Rand Paul	2,024,694	637,037

The U.S. public does not seem to follow or “like” the Fed.

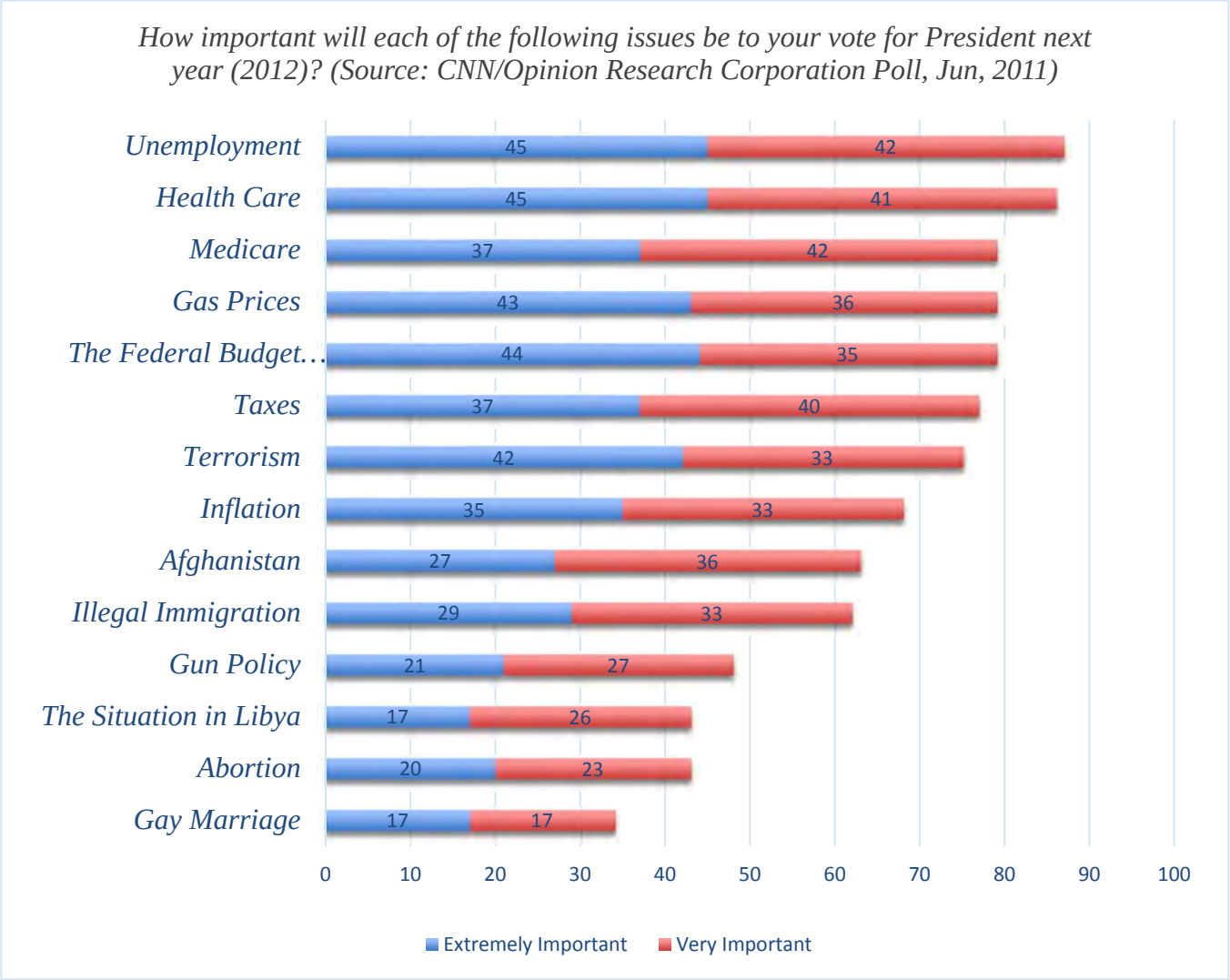
How Much Do People Search for Macro Variables?



The U.S. public does not seem to search out macroeconomic information.

WHY PEOPLE PAY LITTLE ATTENTION TO MON. POLICY?

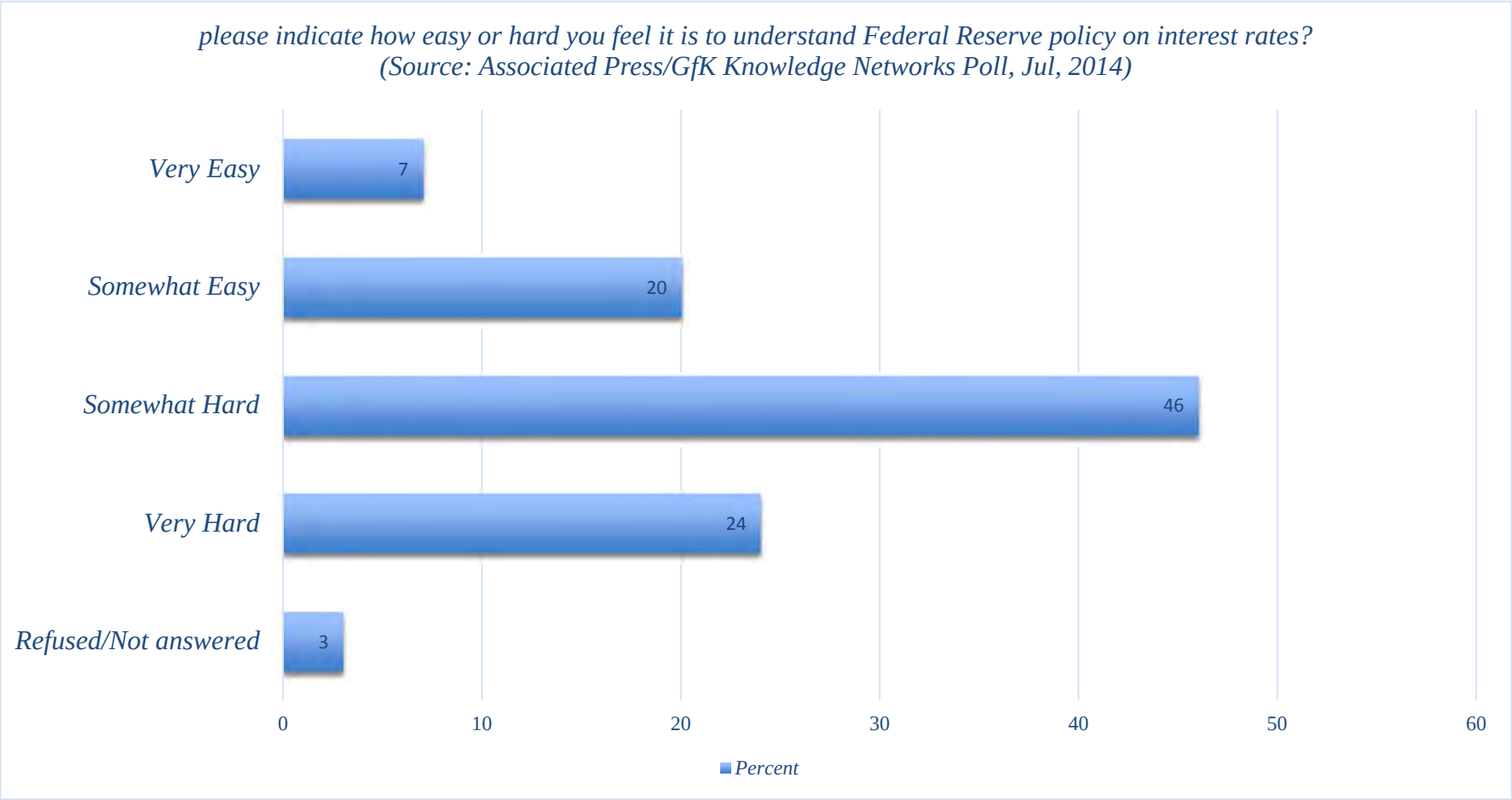
- Is it unimportant? No!



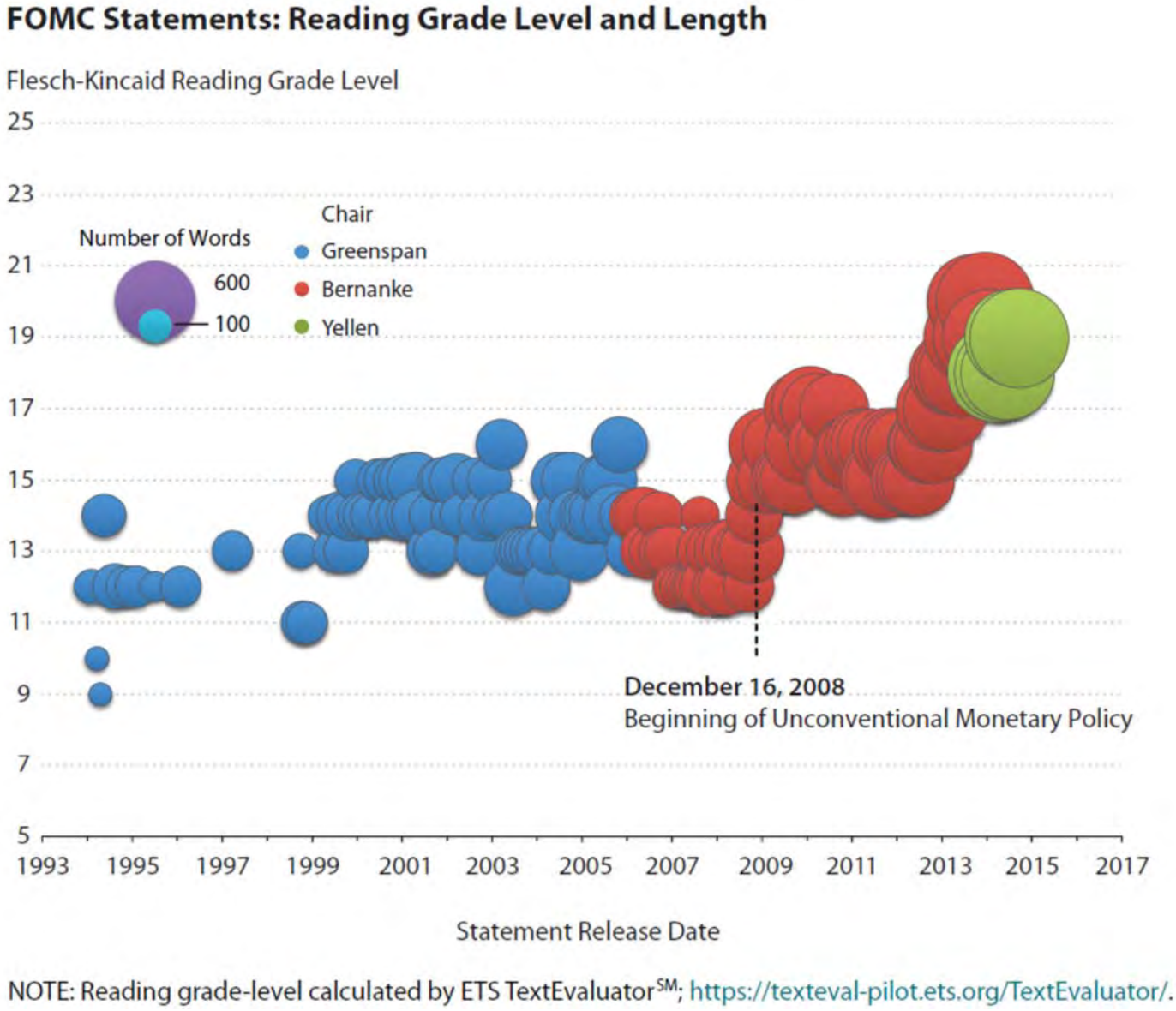
Yet like NZ'ers, U.S. claims inflation is important to them.

SO WHY PAY SO LITTLE ATTENTION TO MON. POLICY?

- Maybe people just find it too hard to understand:



FED'S COMMUNICATION: RISING COMPLEXITY



Source: Hernández-Murillo and Shell (St. Louis Fed's Economic SYNOPSES, Nov 2014)

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- Modelling: need to allow for heterogeneity in expectations formation.