Getting through: Communicating complex information

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[1]University of Oxford, CEPR and CfM
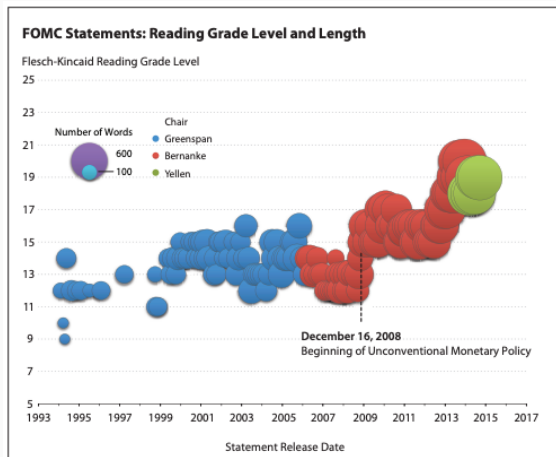Irish Fiscal Advisory Council → Usual Disclaimer Applies

[2]University of Oxford
Bank of England → Usual Disclaimer Applies

Motivation

- "**Twin deficits problem**" (Haldane & McMahon 2018)
    - low levels of **informedness**
    - low levels of **trust**

- CB communications are very **complex**
    - FOMC: 19 years of schooling, ECB: 16 years, BoE MPR: 15 years
      (Hernandez-Murillo & Shell 2014) ▸ FOMC

  ⇒ Recent efforts to simplify language (Visual Summary, BoE)

    - Focus on Flesch-Kincaid (simple avg of word and sentence length).

Motivation

Source: Hernandez-Murillo and Shell 2014

This Talk

Our Question

In a world where central banks are trying to *get through* to a broader cross-section of society, what dimensions of complexity should their communication be focused on?

Research questions

- How might complex language influence the formation of inflation expectations?
- What actually *is* linguistic complexity and how can we measure it?
- Which dimensions of complexity matter most?

This Talk

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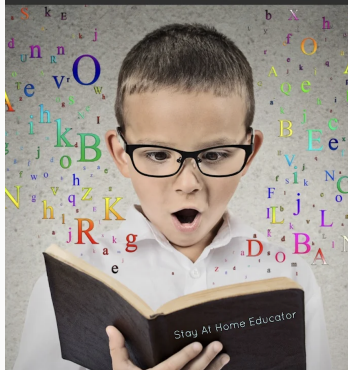
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- Which dimensions of complexity matter most?

Approach

- **Theory**: What *should* complexity mean for informedness and expectations?
- **Measurement**: Construct novel measures of complexity that capture *broader* dimensions.
- **Empirical**: RCT to test causal impact of complexity on informedness and **trust**.

Semantic Complexity vs **Conceptual Complexity**

BIG words   DiFfiCuLt ideas

Looooooong sentences   Things you have
                                             never heard of

Non-Monosyllabic words   Technical terms

Jargon	Relatable
inflation	prices
wages	pay
unemployment	jobs
firms	companies
agents	people
percentages	GBP values

- Motivated by study conducted by Bholat et al., 2018

What we find

1. *True* complexity reduces attention paid to CB messages
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   - For both **informedness** and **trust**
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4. This result holds among people who have studied economics at university.

Outline of the Talk

A Simple Model of Complexity

Simple Rational Inattention Model

Two agents

(i) Central Bank. Perfectly informed. Minimises shocks by anchoring exps.

(ii) Household h. Imperfectly informed: rationally inattentive.

Setup

CB transmits a message revealing the true state of the economy.

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h chooses how much attention to pay to it based on $u_h(informed)$ and $c_h(complexity)$.

Result
Optimal attention: $\frac{\partial(attention)}{\partial(complexity)} < 0$, and inaccuracy of updated belief: $\frac{\partial(accuracy)}{\partial complexity} < 0$.

What Complexity of Language?
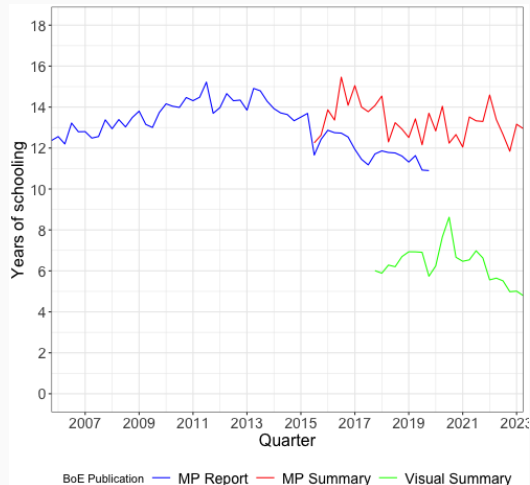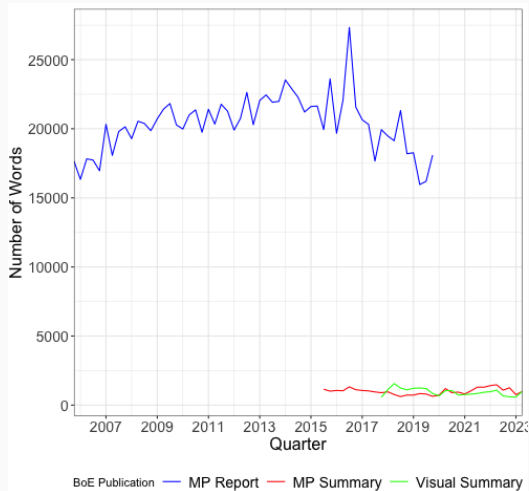
What Complexity?

- Most studies focusing on semantic complexity (Flesch-Kincaid (FK) score)
- Conceptual complexity may be more important
  - Proportion of Jargon (PJ)
  - Frequency of Technical Concepts (FTC))

Traditional measures: Semantic Complexity

- Word Count
- Flesch-Kincaid

$$\text{Flesch Kincaid Score} = 0.39 \frac{n(Words)}{n(Sentences)} + 11.8 \frac{n(Syllables)}{n(Words)} - 15.59$$

Jargon Dictionary

- Curated based on A-Z lists of economics, business, and financial terms published by the Economist, the Guardian, and Investopedia.

- Contains 350 jargon terms in total

- We then manually categorise these into 10 topics:

1	Monetary policy	6	Open economy
2	Inflation	7	Labour
3	Output, production & supply side	8	Financial markets
4	Private demand (C & I)	9	Financial stability & macroprudential policy
5	Fiscal	10	Other

Novel measure 1: Proportion of Jargon

- Proportion of Jargon

$$\text{PoJ} = \frac{\sum\limits_{j=1}^{J} w_j}{\sum\limits_{i=1}^{N} w_i} \equiv \frac{W_j}{W_i}$$

w_j: number of instances *jargon* term $j \in \{1, ..., J\}$ is mentioned.

w_i: number of instances *any* word $i \in \{1, ..., N\}$ is mentioned.

Novel measure 2: Conceptual Complexity Index

- Conceptual Complexity Index (CCI) increases in:
    1. the proportion of jargon used;
    2. the breadth and dispersion of *distinct* jargon terms used *within* a given topic;
    3. the number of topics covered.

Novel measure 2: Conceptual Complexity Index

- Within-topic intensity of jargon via a version of the Herfindahl index of concentration:

$$\psi_{t,d} = \sqrt{\sum_{j_t=1}^{J_t} s_{j,t}^2}$$

where $s_{j,t} \equiv \frac{w_{j,t}}{W_{j,t}}$ represents the share of references, $w_{j,t}$, to jargon term $j_t \in \{1, ..., J_t\}$ in topic t in the total count of references to *all* jargon terms, $W_{j,t} \equiv \sum_{j_t=1}^{J_t} w_{j,t}$, in that topic.

- $\psi_{t,d} \in [0, 1]$ is equal to 1 if only a single jargon term j_t is used within topic t.
- $\psi_{t,d}$ falls towards zero as more jargon terms within the topic are used, and specifically they are used in a less concentrated (or, equivalently, more dispersed) manner.

Novel measure 2: Conceptual Complexity Index

- Transform $\psi_{t,d}$ to avoid exponential increases in $W^*_{j,t,d}$ as $\psi_t \to 0$:

$$\Psi_t = 2^{log_{10}\psi_t}$$

Novel measure 2: Conceptual Complexity Index

- Scale the within-topic t jargon count as follows:

$$W_{j,t,d}^* = \frac{W_{j,t}}{\Psi_t}$$

- Where $\psi_t = 1$, it is also the case that $\Psi_t = 1$
  and the adjusted jargon count $W_{j,t,d}^*$ in topic t is equal to the baseline jargon count $W_{j,t,d}$.
- As ψ_t decreases, the jargon count is adjusted upwards to reflect the greater conceptual complexity arising from a lower within-topic concentration (or, equivalently, greater breadth and dispersion) of jargon terms.

Novel measure 2: Conceptual Complexity Index

- Topic-coverage weight:

$$\Phi_d = \frac{\log_{10}\left(T + v\right)}{\log_{10}\left(T + v\right) - \log_{10} T_d}$$
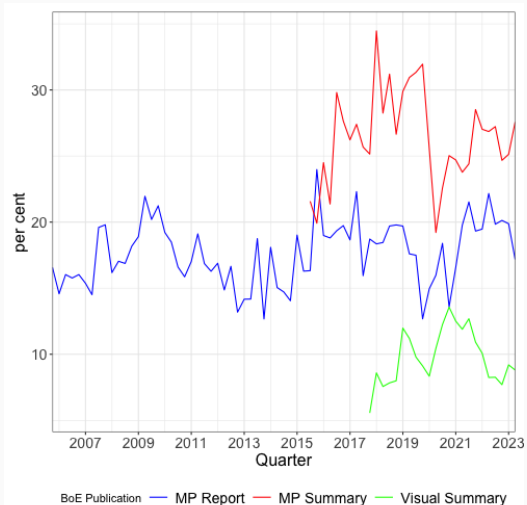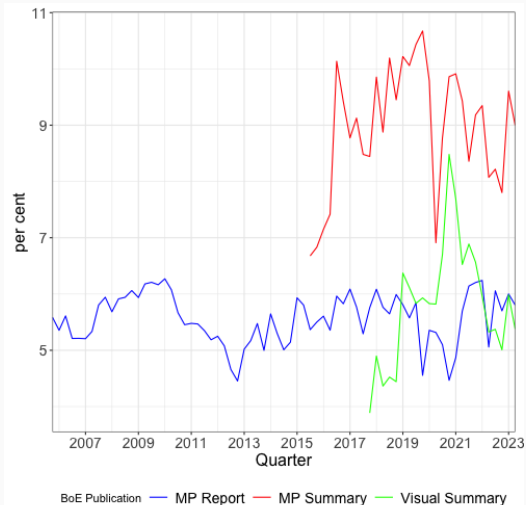
- T is the total number of topics
- T_d is the number of topics covered in the particular document d
- v allows the user to adjust how extra topic coverage is penalised in the weighting
    - $v = 90$: covering all topics doubles the difficulty compared to a baseline of covering only 1.
    - $v = 990$: covering all topics adds 50% to the adjusted jargon count.

Novel measure 2: Conceptual Complexity Index

- Putting it all together:

$$\text{CCI} = \frac{\sum\limits_{t=1}^{T} W_{j,t}^* \times \Phi}{W_i}$$

Novel measures: Conceptual Complexity

Experimental Approach

Experimental Methodology

- We conduct a survey with 1856 respondents.
- We randomly assign respondents to a piece of text
    - 6 different texts in total

		Semantic		
		Low	Medium	High
	Low	Text 1	Text 2	
Conceptual	Medium	Text 3	Text 4	
	High		Text 5	Text 6

- Same fundamental information but are written with varying degrees of linguistic complexity, across semantic (SC) and conceptual complexity dimensions (CC).

Survey Design

- **Respondents**: 2000 representative members of the public
- **Pre-treatment questions**: Demographics, interests, state of UK economy
- **Treatment**: Read a CB report. Texts vary in complexity across dimensions
- **Post-treatment questions**: Capture levels of **informedness** and **trust**

		Semantic		
		Low	Medium	High
Conceptual	Low	Text 1	Text 2	
	Medium	Text 3	Text 4	
	High		Text 5	Text 6

- Text $1 = 2018$ Q1 VS
- Text $3 = 2019$ Q4 VS
- Text $6 = 2018$ Q1 MPS

Treatment

Degree of Complexity	Semantic	Conceptual	
	FK	PoJ	MNCC
Low	6.0	5	10
Medium	10.5	10	15
High	14.5	10	30

Example of Vignettes

Text 1 = SC Low, CC Low:

Over the past year, prices have been rising faster than wages. That means people have not been able to afford as much. We think that is changing. The share of people out of work is now at its lowest level since 1975. And there are a lot of job vacancies. This means that companies are having to compete hard with each other to recruit and retain workers. One way they do that is by offering higher wages – so we expect bigger pay rises over the next few years. We think that pay will rise faster than prices this year, easing the squeeze on living standards.

Example of Vignettes

Text 2 = SC Med, CC Low:

Over the past year, prices have been rising faster <u>than wages, meaning that people have not been able to afford as much.</u> We think that <u>is changing, with the share of people out of work now at its lowest level since 1975 as well as the fact that there are a lot of job vacancies.</u> This means that companies are having to compete hard with each other to recruit and retain workers. One way they do that is by offering higher wages – so we expect bigger pay rises over the next few years. We think that pay will rise faster than prices this year, easing the squeeze on living standards.

Example of Vignettes

Text 4 = SC Med, CC Med:
Over the past year, prices have been rising faster than wages, meaning that people have not been able to afford as much. We think that is changing, with unemployment now at its lowest level since 1975 as well as the fact that the labour market is tight. This means that firms are having to compete hard with each other to recruit and retain labour. One way they do that is by offering higher wages - so we expect bigger wage rises over the next few years. We think that wages will rise faster than prices this year, easing the squeeze on living standards.

Example of Vignettes

Text 6 = SC High, CC High:
Household consumption growth is expected to remain relatively subdued, reflecting weak real income growth... The firming of shorter-term measures of wage growth in recent quarters, and a range of survey indicators that suggests pay growth will rise further in response to the tightening labour market, give increasing confidence that growth in wages and unit labour costs will pick up to target-consistent rates.
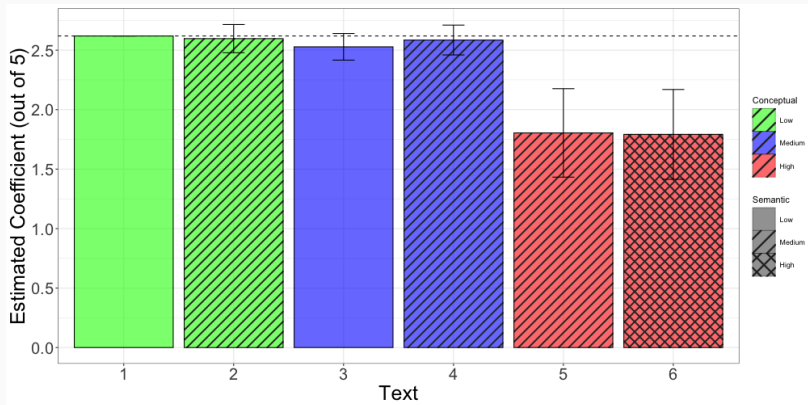
Post-Treatment Questions

i **Understanding**
- Perceived
- Actual

ii Attitude towards CB (such as **trust**)

iii What matters most?

Results

Results

i **Understanding**
   - Perceived
   - Actual

ii Attitude towards CB (such as **trust**)

iii What matters most?

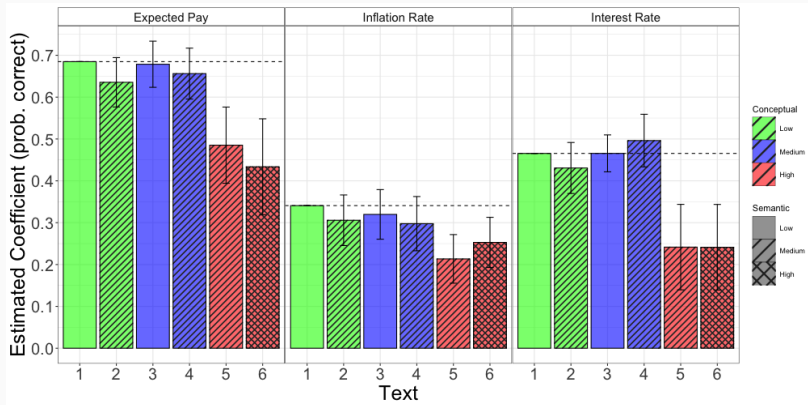Q: To what extent are you able to understand the content and messages of the material you just read?

Explained exclusively by the CCI ▸ Complexity scores

Results

i **Understanding**
   - Perceived
   - Actual

ii Attitude towards CB (such as **trust**)

iii What matters most?

Results: Actual Understanding

- What is the current inflation rate in the economy described?

- What is the interest rate in the economy described?

- What do you expect to happen to pay (adjusting for price changes) in the coming years?
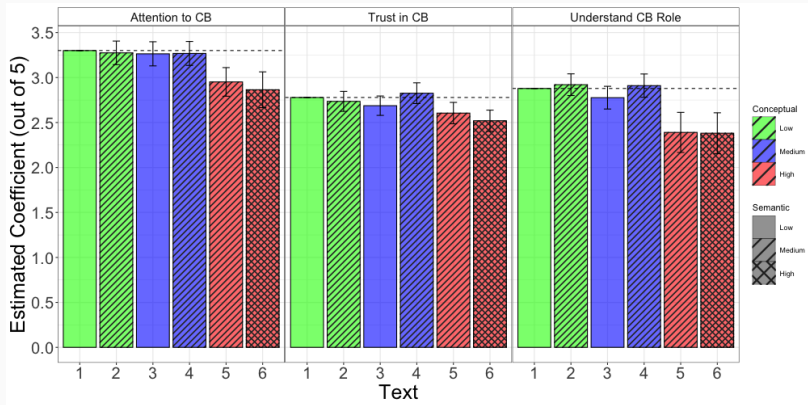
Results

  i **Understanding**
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 iii What matters most?

Results: Conceptual complexity also drives the degrading of attitudes towards the CB

Q: To what extent do you agree with each of the following statements:

- I now have a better understanding of the role of the Bank of England
- I am now more likely to pay attention to future documents published by the Bank of England
- I now have more trust in the Bank of England as an institution
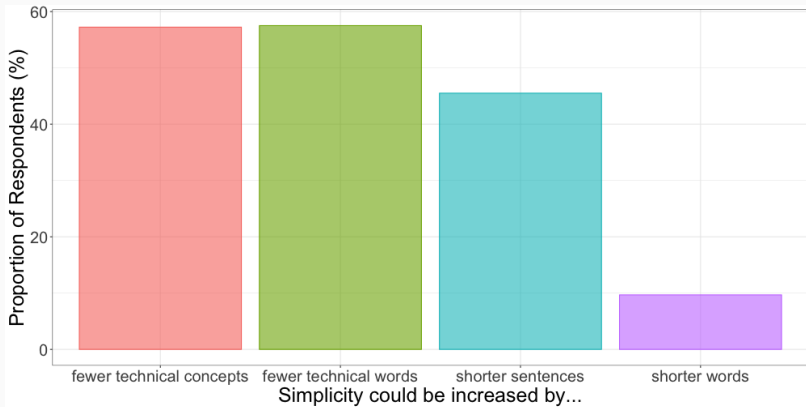
Results

i **Understanding**
   - Perceived
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ii Attitude towards CB (such as **trust**)

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Results: Respondents identified *conceptual* complexity as the greatest barrier

Which of the following do you think would have made the text easier to understand?

Conclusion and Implications

Conclusions

1. If agents are rationally inattentive, complexity reduces the accuracy of beliefs formed

2. Efforts by the BoE to reduce complexity have focused on *semantic* dimensions, while evidence across *conceptual* dimensions is more mixed

3. Conceptual complexity matters more than semantic complexity. It reduces:
   - *perceived* understanding
   - *actual* understanding
   - attitudes towards the central bank

4. This remains the case among people who have studied economics at university.

Policy Implications

- Targeting a broader range of dimensions of complexity could enable more effective communications ...

- ... potentially with *all* economic agents, not just the general public.

The 3 Es of Central Bank Communication

1. Explanation
   - This paper and many others

2. Engagement
   - Did inflation do the job for us?

3. Education
   - Implied causation vs explicit communication *McMahon, Rholes and Rickard (WiP)*

END

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Stage 4. Update beliefs: $\tilde{x}_h = E[x|s_h] = (1 - \xi_h)\bar{x}_h + \xi_h s_h$

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Following Mackowiak, Matejka & Wiederholt (2018), the weight attached to the signal, ξ_h, is:

$$\xi_h \equiv \left(1 - \frac{\sigma_{x|s}^2}{\sigma_x^2}\right) \tag{1}$$

Optimal Choice of Attention

Choose ξ_h based on:

- Utility from being informed, $u_h(x, \tilde{x}_h) = -b(x - \tilde{x}_h)^2$

- Cost of attention, $c_h(\mu) = \underbrace{(1 + \mu)}_{\text{marginal cost}} \cdot \underbrace{\lambda_h}_{\text{quantity}}$

Optimal Choice of Attention

Households seek to maximise their expected utility subject to their constraint on attention:

$$\max \left\{ E[u_h(x, \tilde{x}_h)] - c_h \right\}$$

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Households seek to maximise their expected utility subject to their constraint on attention:

$$\max \left\{ E[u_h(x, \tilde{x}_h)] - (1 + \mu) \underbrace{\frac{1}{2} \log \left(\frac{1}{1 - \xi_h} \right)}_{\lambda_h} \right\}$$

Optimal Choice of Attention

Optimal weight:

$$\xi_h^* = max\left(0, 1 - \frac{(1+\mu)}{2b\sigma_x^2}\right)$$

The deviation of the posterior belief from the true message:

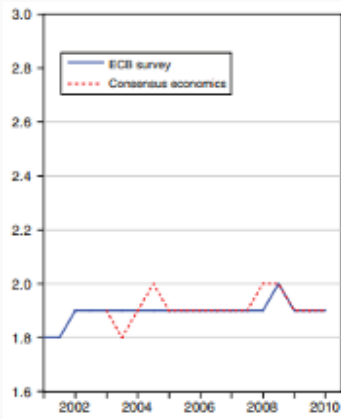$$x - \tilde{x}_h = \frac{(1+\mu)x}{2b\sigma_x^2} - \eta_h$$

where $\eta_h \equiv \xi_h^* \epsilon_h \sim \mathcal{N}(0, \sigma_\eta^2)$ can be interpreted as resulting noise in actions.
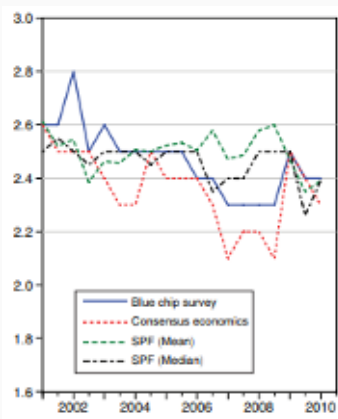
Result

1. Optimal attention: $\frac{\partial \xi_h^*}{\partial \mu} < 0$

2. Inaccuracy of updated belief: $\frac{\partial(x-\tilde{x}_h)}{\partial \mu} > 0$.
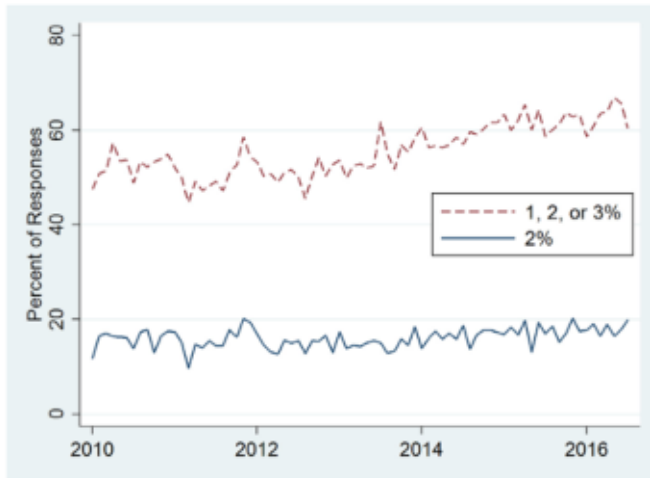
Motivation

Euro Area   United States

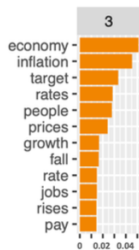Source: Beechey & Johansen 2011

Motivation

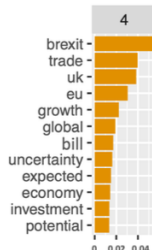Source: Binder 2017 (US Michigan Survey of Consumers)

Motivation

	Central bank (1)	Professional forecasters		Households		Firms	
		Mean (2)	SD (3)	Mean (4)	SD (5)	Mean (6)	SD (7)
Panel A. 2013:IV (wave 1, number of observations: 3,144)							
Inflation	1.3	2.0	0.2	3.6	2.4	5.3	3.2
Panel B. 2014:I (wave 2, number of observations: 712)							
Inflation	1.9	2.0	0.3	3.7	2.1	6.1	2.7
Unemployment	4.9	5.3	0.3	NA	NA	5.2	0.7
GDP growth	3.5	3.4	0.5	NA	NA	3.1	0.7
Panel C. 2014:III (wave 3, number of observations: 1,601)							
Inflation	1.6	1.9	0.2	3.5	2.4	4.1	2.5
Panel D. 2014:IV (wave 4, number of observations: 1,257)							
Inflation	1.1	1.7	0.3	3.1	2.0	4.5	2.8
Unemployment	5.2	5.2	0.3	NA	NA	5.9	1.2
GDP growth	3.5	3.0	0.3	NA	NA	3.6	1.0
Panel E. 2016:II (wave 5, number of observations: 2,040)							
Inflation	1.6	1.3	0.2	2.3	2.1	2.8	2.3
Unemployment	5.2	5.5	0.2	NA	NA	5.5	0.6
GDP growth	3.4	2.6	0.3	NA	NA	2.7	0.5
Panel F. 2016:IV (wave 6, number of observations: 1,404)							
Inflation	1.7	1.6	0.2	2.8	2.6	2.7	2.4
Unemployment	4.7	4.8	0.3	NA	NA	5.5	0.6
GDP growth	3.4	3.0	0.4	NA	NA	2.4	0.6

Source: Coibion, Gorodnichenko and Kumar 2018 (New Zealand 5-year ahead expectations)
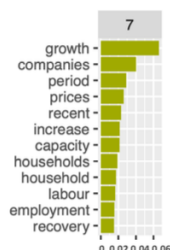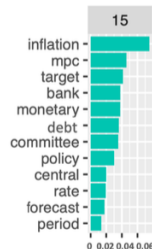
Topics discussed in BoE publications

(i) Topic 3

(ii) Topic 4

(iii) Topic 7

(iv) Topic 9

(v) Topic 15

(vi) Topic 20

Results: Understanding (alternative)

	Dependent variable: Self-reported Understanding						
Baseline	SC low	SC low	SC med	CC low	CC low	CC low	CC med
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
SC med	−0.050	0.084					
	(0.085)	(0.088)					
SC high			−0.028				
			(0.088)				
CC med				−0.076	0.037		
				(0.081)	(0.090)		
CC high						−0.748***	−0.787***
						(0.087)	(0.093)
Sample	CC low	CC med	CC high	SC low	SC med	SC med	SC med
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	482	470	432	505	447	439	410
R^2	0.180	0.188	0.169	0.254	0.139	0.233	0.251

Note: $^*p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

Results: Understanding

	Perceived	Actual Understanding				
	Understanding	GDP(t)	Inflation(t)	Interest Rate(t)	Pay	Interest Rate Response
	(1)	(2)	(3)	(4)	(5)	(6)
Conceptual						
High Conceptual	−0.791***	−0.0004	−0.079*	−0.186***	−0.130***	−0.030
	(0.084)	(0.028)	(0.043)	(0.043)	(0.042)	(0.039)
age	0.004*	0.0005	−0.001	0.003***	−0.001	0.003***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
UK country of birth	0.044	0.012	−0.001	−0.009	−0.013	0.024
	(0.059)	(0.020)	(0.030)	(0.030)	(0.030)	(0.027)
income	0.168***	0.010	0.012	0.026**	0.017	0.021**
	(0.022)	(0.007)	(0.011)	(0.011)	(0.011)	(0.010)
econ at uni	0.450***	−0.033*	−0.032	0.022	−0.048*	−0.039*
	(0.051)	(0.017)	(0.026)	(0.026)	(0.026)	(0.024)
pre-anchored exps	0.518***	0.077***	0.233***	0.174***	0.093***	0.093***
	(0.047)	(0.016)	(0.024)	(0.024)	(0.024)	(0.022)

More results

How would your borrowing and savings preferences change under various interest rates?

Results: Attitudes towards CB

	Dependent variable:		
	Trust	**Attention**	**Role of BoE**
	(1)	(2)	(3)
Conceptual			
High Conceptual	−0.185**	−0.313***	−0.546***
	(0.081)	(0.098)	(0.093)
age	0.007***	0.003	0.0003
	(0.002)	(0.002)	(0.002)
UK country of birth	−0.106*	−0.236***	−0.038
	(0.056)	(0.069)	(0.065)
income	0.056***	0.032	0.072***
	(0.021)	(0.026)	(0.025)
econ at uni	0.118**	0.224***	0.252***
	(0.049)	(0.059)	(0.056)
pre-anchored exps	0.146***	0.122**	0.322***
	(0.045)	(0.055)	(0.052)
Constant	1.418***	2.148***	1.750***
	(0.094)	(0.115)	(0.109)

Model - Extension 2

Journalists receive a *clean* signal from the central bank: $\tilde{x}_m^B = x$ but in seeking to simplify it, generates 'unintentional bias':

$$s_p^B = (1 - \mu\sigma_x^2)x + \epsilon_p \tag{2}$$

The public optimally allocates attention to this simplified, but now biased signal, generating posterior belief:

$$x - \tilde{x}_p^B = \mu\sigma_x^2 x + \frac{\tau x}{2b_p\sigma_x^2}(1 - \mu\sigma_x^2) - \eta_p \tag{3}$$

In a nutshell. Interest rates kept at 0.5%. The fall in the value of the pound has led to higher prices. The world economy is growing strongly. The squeeze in living standards is easing. Inflation will fall back towards our 2% target.

The economy now needs a little less support. We cut interest rates to exceptionally low levels during the supply crisis to support spending and to reduce the number of people out of work. Over the past few years our economy has needed interest rates to stay very low as we recovered from the global supply crisis. But things are changing. The world economy is now growing strongly. In this country, the share of people without a job is at its lowest level for over 40 years, and businesses are finding it hard to recruit people. Our economy is probably growing about as fast as it can without overheating (at 1.6%). And inflation is above our 2% target (at 3.0%). That means the economy needs a little less support than before. So last quarter, we raised the official interest rate we set, known as Bank Rate, from 0.25% to 0.5%. In this quarter, we have kept it at 0.5%.

Our job is to meet the 2% inflation target. Inflation is currently above that target, because of the big fall in the value of the pound resulting from the trade war. The weaker pound has meant that things businesses get from abroad cost more. Businesses will need to pass those rising costs on to their customers. So that has meant higher prices in the shops. The fall in the value of the pound happened around 18 months ago. Its effect on inflation doesn't last forever. And in the next few months inflation is going to start to fall back gradually towards our target.

Just like at home, the world economy had been quite weak following the supply crisis. But across Europe, in the US and many other countries the economy is now growing strongly. Stronger growth abroad will benefit our economy by increasing demand for our exports. And it should encourage companies to invest and recruit more staff to meet this extra demand.

Over the past year, prices have been rising faster than wages. That means people have not been able to afford as much. We think that is changing. The share of people out of work is now at its lowest level since 1975. And there are a lot of job vacancies. This means that companies are having to compete hard with each other to recruit and retain workers. One way they do that is by offering higher wages – so we expect bigger pay rises over the next few years. We think that pay will rise faster than prices this year, easing the squeeze on living standards.

To make sure inflation falls back to our 2% target, we need to set interest rates (the cost of borrowing) so that the amount of spending in the economy isn't too low or too high. If we set interest rates too low, then growth in the economy will be too fast, and inflation will stay above our target. But if we set interest rates too high or raise them too rapidly then growth will be too slow, and inflation will fall below our target. Put another way, we need to keep the economy growing at its speed limit. The speed limit for the economy is determined by two things: how many people are in work; and how productive the businesses they work for are. A few years ago many more people were out of work. So there was scope for the economy to grow quite quickly as a lot of those people found jobs. Now, with a record number of people in work, there isn't much more economic growth that can come from unemployed people finding work. Instead, it will mostly need to come from higher

In a nutshell: interest rates have been kept at 0.5%, higher prices have resulted from a fall in the value of the pound, the world economy is growing strongly, the squeeze in living standards is easing, and inflation will fall back towards our 2% target.

The economy now needs a little less support. We cut interest rates to exceptionally low levels during the supply crisis to support spending and to reduce the number of people out of work. Over the past few years our economy has needed interest rates to stay very low as we recovered from the global supply crisis. However, things are changing and the world economy is now growing more strongly. In this country, the share of people without a job is at its lowest level for over 40 years and businesses are finding it hard to recruit people. Our economy is probably growing about as fast as it can without overheating (at 1.6%) and inflation is above our 2% target (at 3.0%). This means that the economy needs a little less support than before. So last quarter, we raised the official interest rate we set, known as Bank Rate, from 0.25% to 0.5%. In this quarter, we have kept it at 0.5%.

Our job is to meet the 2% inflation target. However, inflation is currently above that target, because of the big fall in the value of the pound resulting from the trade war. The weaker pound has meant that things businesses get from abroad cost more and businesses will need to pass those rising costs on to their customers, resulting in higher prices in the shops. The fall in the value of the pound happened around 18 months ago but its effect on inflation doesn't last forever and in the next few months inflation is going to start to fall back gradually towards our target.

Just like at home, the world economy had been quite weak following the supply crisis, but across Europe, in the US and many other countries the economy is now growing strongly. Stronger growth abroad will benefit our economy by increasing demand for our exports and it should encourage companies to invest and recruit more staff to meet this extra demand.

Over the past year, prices have been rising faster than wages, meaning that people have not been able to afford as much. We think that is changing, with the share of people out of work now at its lowest level since 1975 as well as the fact that there are a lot of job vacancies. This means that companies are having to compete hard with each other to recruit and retain workers. One way they do that is by offering higher wages – so we expect bigger pay rises over the next few years. We think that pay will rise faster than prices this year, easing the squeeze on living standards.

To make sure inflation falls back to our 2% target, we need to set interest rates (the cost of borrowing) so that the amount of spending in the economy isn't too low or too high. If we set interest rates too low, then growth in the economy will be too fast, and inflation will stay above our target. But if we set interest rates too high or raise them too rapidly then growth will be too slow, and inflation will fall below our target. Put another way, we need to keep the economy growing at its speed limit. The speed limit for the economy is determined by two things: how many people are in work; and how productive the businesses they work for are. A few years ago many more people were out of work so there was scope for the economy to grow quickly as a lot of those people found jobs. Now, with a record number of people in work, there isn't much more economic growth that can come from unemployed people finding work. Instead, it will mostly need to come from higher

In a nutshell. Interest rates kept at 0.5%. The depreciation of the sterling exchange rate has led to higher inflation. Global economic growth is strong. The squeeze in living standards is easing. Inflation will fall back towards our 2% target.

The economy now needs a little less support. We cut interest rates to exceptionally low levels during the supply crisis to support spending and to reduce the level of unemployment. Over the past few years our economy has needed interest rates to stay very low as we recovered from the global supply crisis. But things are changing. The world economy is now growing strongly. In this country, unemployment is at its lowest level for over 40 years. And the labour market is tight, with firms finding it difficult to recruit people. Our economy is probably growing about as fast as it can without overheating (at 1.6%). And inflation is above our 2% target (at 3.0%). That means the economy needs a little less support than before. So last quarter, we raised the official interest rate we set, known as Bank Rate, from 0.25% to 0.5%. In this quarter, we have kept it at 0.5%.

Our job is to meet the 2% inflation target. Inflation is currently above that target, because of the depreciation of the sterling exchange rate resulting from the trade war. The depreciation of the pound has pushed up the cost of imports for domestic firms. Firms will need to pass those rising costs on to consumers. So that has pushed up inflation. The depreciation of sterling happened around 18 months ago. Its effect on inflation doesn't last forever. And in the next few months inflation is going to start to fall back gradually towards our target.

Just like at home, the world economy had been quite weak following the supply crisis. But across Europe, in the US and many other countries the economy is now growing strongly. Stronger growth abroad will benefit our economy by increasing demand for our exports. And it should encourage firms to invest and recruit more labour to meet this extra demand.

Over the past year, prices have been rising faster than wages. That means people have not been able to afford as much. We think that is changing. Unemployment is now at its lowest level since 1975. And the labour market is tight. This means that firms are having to compete hard with each other to recruit and retain labour. One way they do that is by offering higher wages. So we expect bigger wage rises over the next few years. We think that wages will rise faster than prices this year. This will ease the squeeze on living standards.

To make sure inflation falls back to our 2% target, we need to set interest rates (the cost of borrowing) so that economic investment and spending isn't too low or too high. If we set interest rates too low, then economic growth will be too fast. Inflation will then stay above our target. But if we set interest rates too high or raise them too rapidly then economic growth will be too slow. Then inflation will fall below our target. Put another way, we need to keep economic growth at its speed limit. The speed limit for the economy is determined by two things: the level of unemployment; and the productivity of firms. A few years ago the level of unemployment was much higher. So there was scope for the economy to grow quite quickly as employment levels rose. Now the level of unemployment is at a record low. So there isn't much more economic growth that can come from reduced unemployment. Instead, it will mostly need to come from higher productivity - our ability to produce more

In a nutshell: interest rates have been kept at 0.5%, a rise in inflation has resulted from the depreciation of the sterling exchange rate, global economic growth is strong, the squeeze in living standards is easing, and inflation will fall back towards our 2% target.

The economy now needs a little less support. We cut interest rates to exceptionally low levels during the supply crisis to support spending and to reduce the level of unemployment. Over the past few years our economy has needed interest rates to stay very low as we recovered from the global supply crisis. However, things are changing and the world economy is now growing strongly. In this country, unemployment is at its lowest level for over 40 years and the labour market is tight, with firms finding it difficult to recruit people. Our economy is probably growing about as fast as it can without overheating (at 1.6%) and inflation is above our 2% target (at 3.0%). This means that the economy needs a little less support than before. So last quarter, we raised the official interest rate we set, known as Bank Rate, from 0.25% to 0.5%. In this quarter, we have kept it at 0.5%.

Our job is to meet the 2% inflation target. Inflation is currently above that target, because of the depreciation of the sterling exchange rate resulting from the trade war. The depreciation of the pound has pushed up the cost of imports for domestic firms, and firms will need to pass those rising costs on to consumers, resulting in inflation being pushed up. The depreciation of sterling happened around 18 months ago. But its effect on inflation doesn't last forever and in the next few months inflation is going to start to fall back gradually towards our target.

Just like at home, the world economy had been quite weak following the supply crisis, but across Europe, in the US and many other countries the economy is now growing strongly. Stronger growth abroad will benefit our economy by increasing demand for our exports and it should encourage firms to invest and recruit more labour to meet this extra demand.

Over the past year, prices have been rising faster than wages, meaning that people have not been able to afford as much. We think that is changing, with unemployment now at its lowest level since 1975 as well as the fact that the labour market is tight. This means that firms are having to compete hard with each other to recruit and retain labour. One way they do that is by offering higher wages - so we expect bigger wage rises over the next few years. We think that wages will rise faster than prices this year, easing the squeeze on living standards.

To make sure inflation falls back to our 2% target, we need to set interest rates (the cost of borrowing) so that economic investment and spending isn't too low or too high. If we set interest rates too low, then economic growth will be too fast, and inflation will then stay above our target. But if we set interest rates too high or raise them too rapidly then economic growth will be too slow, and inflation will fall below our target. Put another way, we need to keep economic growth at its speed limit. The speed limit for the economy is determined by two things: the level of unemployment; and the productivity of firms. A few years ago the level of unemployment was much higher so there was scope for the economy to grow quite quickly as employment levels rose. Now, the level of unemployment is at a record low so there isn't much more economic growth that can come from reduced unemployment. Instead, it will mostly need to come from higher productivity - our ability to produce

The Central Bank's Monetary Policy Committee (MPC) sets monetary policy to meet the 2% inflation target. It also helps to sustain growth and employment.

This month, the MPC voted to maintain Bank Rate at 0.5%. The Committee voted unanimously to maintain the stock of sterling non-financial investment-grade corporate bond purchases at £10 billion. This is financed by the issuance of central bank reserves. The Committee also voted unanimously to maintain the stock of government bond purchases at £435 billion. This is financed by the issuance of central bank reserves. More detail regarding the MPC's latest projections for output and inflation is available on Central Bank's website.

The global economy is growing at its fastest pace in five years. The expansion is becoming increasingly broad-based and investment driven. Notwithstanding recent volatility in financial markets, global financial conditions remain supportive. Net trade is benefiting from robust global demand and the past depreciation of sterling. Although business investment remains restrained by trade war-related uncertainties, it is supported by strong global activity, high rates of profitability, the low cost of capital and limited spare capacity. Household consumption growth is expected to remain relatively subdued. This reflects weak real income growth. GDP growth is currently at 1.6% and is expected to average around 1.75% over the forecast. This is a slightly faster pace than was projected last quarter despite the updated projections being conditioned on the higher market-implied path for interest rates and stronger exchange rate prevailing in financial markets at the time of the forecast. That rate of growth is expected to exceed the diminished rate of supply growth. This is still modest by historical standards.

The following predictions follow from the annual assessment of the supply side of the economy. The MPC judges that the economy has only a very limited degree of slack. Its supply capacity will grow only modestly over the forecast, averaging around 1.5% per year. This reflects lower growth in labour supply and rates of productivity growth that are around half of their pre-crisis average. As growth in demand outpaces that of supply, a small margin of excess demand emerges in 24 months' time and builds thereafter. CPI inflation fell from 3.1% last month to 3.0% this month. Inflation is expected to remain around 3% in the short term. This reflects recent higher oil prices. More generally, sustained above-target inflation remains almost entirely due to the effects of higher import prices. This follows sterling's past depreciation. These external forces slowly dissipate over the forecast, while domestic inflationary pressures are expected to rise. The firming of shorter-term measures of wage growth, and survey indicators suggesting that pay growth will rise further in response to the tightening labour market, give increasing confidence that growth in wages and unit labour costs will pick up to target-consistent rates. On balance, CPI inflation is projected to fall back gradually over the forecast. Nevertheless, it will remain above the 2% target in the second and third years of the MPC's central projection.

As in previous Reports, the MPC's projections are conditioned on the average of a range of possible outcomes for the economy's eventual trading relationship with its major trading partner. The projections also assume that, in the interim, households and companies base their decisions on the expectation of a smooth adjustment to a recovered trading relationship. Developments regarding the economy's trade war with its major trading partner remain the most significant influence on the economic outlook. This is the primary source of uncertainty. The outlook is particularly dependent on the reaction of households, businesses and asset prices. In such exceptional circumstances, the MPC's remit specifies that the Committee must balance any trade-off between the speed at which it intends to return inflation sustainably to the target and the support that monetary policy provides to jobs and activity.

The Central Bank's Monetary Policy Committee (MPC) sets monetary policy to meet the 2% inflation target, and in a way that helps to sustain growth and employment.

At its meeting ending on 1st of this month, the MPC voted unanimously to maintain Bank Rate at 0.5%. The Committee voted unanimously to maintain the stock of sterling non-financial investment-grade corporate bond purchases, financed by the issuance of central bank reserves, at £10 billion. The Committee also voted unanimously to maintain the stock of government bond purchases, financed by the issuance of central bank reserves, at £435 billion. More detail regarding the MPC's latest projections for output and inflation is available on Central Bank's website.

The global economy is growing at its fastest pace in five years. The expansion is becoming increasingly broad-based and investment driven. Notwithstanding recent volatility in financial markets, global financial conditions remain supportive. Net trade is benefiting from robust global demand and the past depreciation of sterling. Along with high rates of profitability, the low cost of capital and limited spare capacity, strong global activity is supporting business investment, although it remains restrained by trade war-related uncertainties. Household consumption growth is expected to remain relatively subdued, reflecting weak real income growth. GDP growth is currently at 1.6% and is expected to average around 1.75% over the forecast, a slightly faster pace than was projected last quarter despite the updated projections being conditioned on the higher market-implied path for interest rates and stronger exchange rate prevailing in financial markets at the time of the forecast. While modest by historical standards, that rate of growth is still expected to exceed the diminished rate of supply growth.

Following its annual assessment of the supply side of the economy, the MPC judges that the economy has only a very limited degree of slack and that its supply capacity will grow only modestly over the forecast, averaging around 1.5% per year. This reflects lower growth in labour supply and rates of productivity growth that are around half of their pre-crisis average. As growth in demand outpaces that of supply, a small margin of excess demand emerges in 24 months' time and builds thereafter. CPI inflation fell from 3.1% last month to 3.0% this month. Inflation is expected to remain around 3% in the short term, reflecting recent higher oil prices. More generally, sustained above-target inflation remains almost entirely due to the effects of higher import prices following sterling's past depreciation. These external forces slowly dissipate over the forecast, while domestic inflationary pressures are expected to rise. The firming of shorter-term measures of wage growth in recent quarters, and a range of survey indicators that suggests pay growth will rise further in response to the tightening labour market, give increasing confidence that growth in wages and unit labour costs will pick up to target-consistent rates. On balance, CPI inflation is projected to fall back gradually over the forecast but remain above the 2% target in the second and third years of the MPC's central projection.

As in previous Reports, the MPC's projections are conditioned on the average of a range of possible outcomes for the economy's eventual trading relationship with its major trading partner. The projections also assume that, in the interim, households and companies base their decisions on the expectation of a smooth adjustment to a recovered trading relationship. Developments regarding the economy's trade war with its major trading partner — and in particular the reaction of households, businesses and asset prices to them — remain the most significant influence on, and source of uncertainty about, the economic outlook. In such exceptional circumstances, the MPC's remit specifies that the Committee must balance any trade-off between the speed at which it intends to return inflation sustainably to the target and the support that monetary policy provides to jobs and activity.

Over the past year, a steady absorption of slack has reduced the degree to which it was appropriate for the MPC to accommodate an extended period of inflation above the

Results: Sub-Sample of Economics graduates

	Perceived	Actual Understanding			Sentiments towards CB		
	Understanding	Inf(t)	i(t)	Exp Pay	Trust	Attention	BoE Role
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
High Conceptual	**−0.784*****	−0.053	**−0.195****	**−0.206****	**−0.339****	**−0.406****	**−0.462*****
	(0.189)	(0.092)	**(0.089)**	**(0.089)**	**(0.150)**	**(0.179)**	**(0.170)**
High Semantic	0.225	0.006	−0.052	0.004	0.248	−0.009	0.207
	(0.246)	(0.119)	(0.115)	(0.116)	(0.195)	(0.233)	(0.221)
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Econ	Econ	Econ	Econ	Econ	Econ	Econ
Observations	288	288	288	288	288	288	288
R^2	0.129	0.018	0.093	0.051	0.044	0.036	0.038

Note: *p<0.1; **p<0.05; ***p<0.01

▸ Full table

Results: Conceptual complexity matters more for forming anchored inflation expectations, but possible goldilocks…?

What do you think is the probability that the inflation rate in the hypothetical economy over the coming years will be in each of the following intervals? These should sum to 100. *Less than 1%, between 1% and 3%, between 3% and 5%, between 5% and 10%, greater than 10%*