

ECB Conference on Monetary Policy

Policymakers' uncertainty

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Introduction and Motivation

A pervasive feature

- ▶ “(...) *uncertainty is not just a pervasive feature of the monetary policy landscape; it is the defining characteristic of that landscape.*” – Alan Greenspan (2004)
- ▶ “*Most fundamentally, our discussions of the pervasive uncertainty that we face as policy-makers is a powerful reminder of the need for humility about our ability to forecast and manage the future course of the economy.* ” – Ben Bernanke (2007)

- ▶ *(How) does uncertainty affect monetary policymaking?*
- ▶ **Challenges:**
 - Diverse set of theoretical predictions
 - Measurement of uncertainty
 - Identification of causal effects

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 - Quantify PMU in the policymaking process using text
 - Automated analysis and human audit of FOMC transcripts

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 - Uncertainty about real and nominal variables, financial markets, models, ...
 - Distinct from existing proxies of public uncertainty about monetary policy

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 - Automated analysis and human audit of FOMC transcripts
2. Identify different sources of PMU
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 - Distinct from existing proxies of public uncertainty about monetary policy
3. Analyze the effects of PMU on policymaking
 - New textual measure of policy preferences
 - Ability to study aggregate and individual-level outcomes

Channels through which uncertainty can affect policymaking

- ▶ Suppose the central bank sets policy rate in reaction to economic conditions to achieve its objectives:

$$i_t = \phi' \Omega_t + \epsilon_t^{MP} \quad (1)$$

i_t : policy rate; ϕ : response of policymakers to the state of the economy Ω_t ; ϵ_t^{MP} : monetary policy shock

- ▶ The effects of uncertainty on monetary policy broadly classified into three types:
 1. No effect
 2. Uncertainty as a demand shock reflected in Ω_t
 3. Uncertainty changes the ϕ coefficients

Channels through which uncertainty can affect policymaking

1. No effect (certainty equivalence)

- Economic uncertainty as time-varying volatility of shocks to Ω_t
- Central bank reacts optimally to Ω_t but not to changes in uncertainty per se

[linear-quadratic models]

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[linear-quadratic models]
2. Economic uncertainty as a demand shock to which monetary policy reacts
 - Uncertainty affects Ω_t (hiring, investment, and inflation)
[Bloom (2009); Basu and Bundick (2017); Leduc and Liu (2016)]
 - Central bank cuts rates in response to higher uncertainty

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 - Central bank cuts rates in response to higher uncertainty
3. Uncertainty about parameters and/or models:
 - Uncertainty about the *impact of policy* on the economy → **Cautious response**
[Brainard's (1967) conservatism]
 - Uncertainty about the *economic dynamics* (inflation persistence) → **Aggressive response**
[Söderstrom (2002)]
 - Uncertainty about the *model specification* → **Aggressive response**
[Hansen and Sargent (2001); Giannoni (2002); Giordani and Söderlind (2004)]

Measuring policymakers' uncertainty

- ▶ Wealth of information allows to construct proxies for policymakers' beliefs, uncertainty, and preferences in a mutually consistent way rarely feasible in other contexts
 - Manually labelled FOMC transcripts
 - Granularity: Speaker-sentence level
 - Sample: 1987:07–2015:12 (227 meetings)
 - Controls for first moments with staff forecasts in Greenbooks/Tealbooks
- ▶ Exploit the regular structure of the FOMC meetings for identification

Structure of FOMC meetings reflected in transcripts

1. **[Market round]** Discussion of financial market conditions
 - 1.1 Staff presentation on market conditions and OMO
 - 1.2 Q & A on staff presentation
 - 1.3 FOMC member discussions
2. **[Economy round]** Discussion of economic conditions
 - 2.1 Staff presentation on economic conditions
 - 2.2 Q & A on staff presentation
 - 2.3 FOMC member presentations on economic conditions
3. **[Policy round]** Discussion of appropriate monetary policy
 - 3.1 Staff presentation on policy alternatives
 - 3.2 Q & A on policy alternatives
 - 3.3 FOMC members state and justify preferred alternative
4. Other sections include pleasantries, post elections, special topics, etc.

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Construction of policymakers' uncertainty (PMU) indices

▶ Assumptions:

- Economy round discussions identify *uncertainty that the Fed faces* at the meeting
- PMU correlates with the frequency of policymakers' expression of uncertainty

▶ Approach:

- Word embeddings for risk and uncertainty in the economy round
- Identification of topic-specific uncertainty language
- Textual controls for topic-specific "sentiment" (directional language)

“The term “uncertainty” is meant here to encompass both “Knightian uncertainty,” in which the probability distribution of outcomes is unknown, and “risk,” in which uncertainty of outcomes is delimited by a known probability distribution. In practice, one is never quite sure what type of uncertainty one is dealing with in real time, and it may be best to think of a continuum ranging from well-defined risks to the truly unknown.” – Alan Greenspan (2004)

Word embeddings

Risk embeddings

Term	Similarity	# in Eco round
risks	0.69	3183
downside risk*	0.60	1118
threat	0.59	135
upside risk*	0.52	585
danger	0.50	121
probability	0.48	524
possibility	0.48	1010
likelihood	0.47	224
vulnerability	0.44	72
chances	0.39	65
fragility	0.37	106
sensitivity	0.34	82
probabilities	0.34	87
uncertainty	0.34	2317
odds	0.33	190
concern	0.33	1047
potentially	0.32	275
tension	0.31	101
possibly	0.31	290
unease	0.30	25
vulnerabilities	0.30	59
fear	0.30	194
skew	0.29	29
worries	0.29	132
skewed	0.29	101
volatility	0.28	360
doubts	0.28	65
...		

Uncertainty embeddings

Term	Similarity	# in Eco round
uncertainties	0.66	505
anxiety	0.52	70
angst	0.43	24
skepticism	0.43	68
tension	0.43	101
uncertain	0.43	399
downside risk*	0.42	1118
pessimism	0.41	179
fragility	0.40	106
gloom	0.38	65
risks	0.36	3183
volatility	0.36	360
concerns	0.36	628
lclarity	0.35	89
sensitivity	0.35	82
worries	0.34	132
lcertainty	0.33	91
doubts	0.33	65
concern	0.33	1047
optimism	0.32	498
ambiguity	0.32	18
error	0.32	234
nervousness	0.32	31
unknown	0.32	32
tensions	0.31	51
upside risk*	0.31	585
worry	0.29	402
...		

- ▶ Word embeddings
 - Neighbors for 'risk(s)' contain terms associated with the quantification of known probability (e.g., 'probability', 'likelihood', 'odds')
 - Neighbors for 'uncertain(ly)' include suggest unquantifiable uncertainty and associated concerns (e.g., 'angst', 'unclear', 'skepticism', 'ambiguity')
- ▶ Treatment of word "risk":
 - Exclude phrases like "risk spread", "balance of risks," ...
- ▶ Deal with negations:
 - Not, no, don't, never, less, ...
 - Neutralises rather than reduces uncertainty

Constructing the policymakers' uncertainty index (PMU)

- ▶ Denote by \mathcal{U} phrases identified from word embeddings and let $\mathbf{w}_{t,s} = (\mathbf{w}_{t,s,1}, \dots, \mathbf{w}_{t,s,N_{t,s}})$ be list of terms in sth sentence of meeting t
- ▶ Sentence-level count of risk/uncertainty terms:

$$u_{t,s} = \sum_n \mathbb{1}(\mathbf{w}_{t,s,n} \in \mathcal{U}) \quad (2)$$

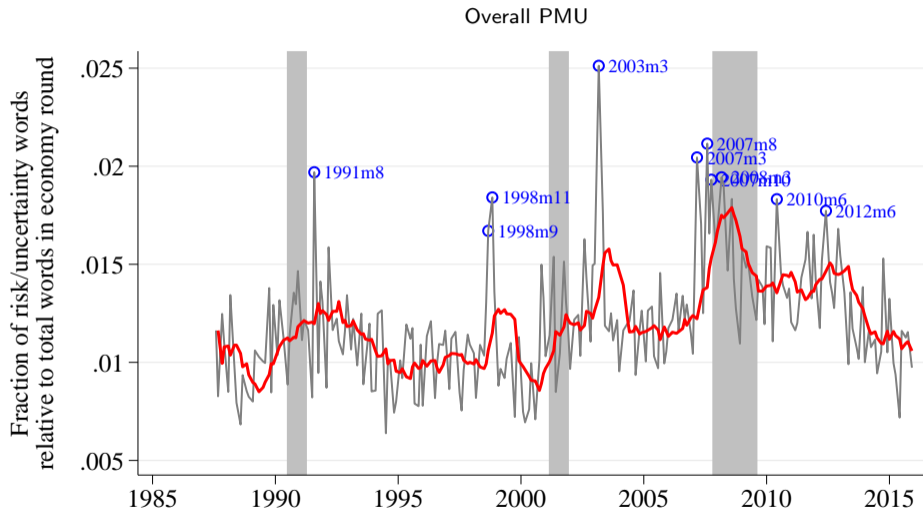
- ▶ Overall policymakers' uncertainty index:

$$PMU_t = \frac{\sum_s \mathbf{u}_{t,s}}{\sum_s |\mathbf{w}_{t,s}|} \quad (3)$$

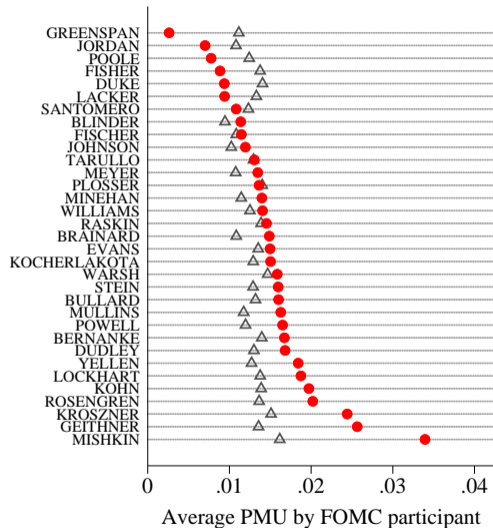
where $|\mathbf{w}_{t,s}|$ is sentence length after standard pre-processing steps

- ▶ PMU_t is based on all sentences in the economy round, including Fed staff
 - Staff assessment of the economy informs policymakers' views in addition to their personal views

Overall PMU index



Individual-level PMU



● Speaker average △ Meeting average

- ▶ PMU can be disaggregated in alternative ways
- ▶ Here: Average speaker-level PMU compared to the meeting-level average overall PMU, by speaker
- ▶ Substantial heterogeneity in expressed uncertainty

Measuring topic-specific PMU

- ▶ Policymakers' uncertainty is multi-dimensional
- ▶ Different types of uncertainty can induce different policy behavior
- ▶ Isolate four types of uncertainty to construct topic-specific PMUs
 - Inflation: *InfPMU*
 - Economic growth: *EcoPMU*
 - Financial markets: *MktPMU*
 - Models and parameters: *ModPMU*
 - Other (unclassified category, e.g., wars, political events, other policy): *OthPMU*

Measuring topic-specific PMU: Steps

1. Identify (non-negated) uncertainty sentence according to \mathcal{U}
2. Search this sentence for topic phrases:
 - If an inflation phrase appears in the window, $InfPMU \uparrow +1$
 - If a real economy phrase appears in the window, $EcoPMU \uparrow +1$
 - If a financial markets phrase appears in the window, $MktPMU \uparrow +1$
 - If a model phrase appears in the window, $ModPMU \uparrow +1$
3. If no topic phrase identified, expand to a 3-sentence window around identified uncertainty word and repeat search
4. If no topic phrase in the 3-sentence window, $Oth \uparrow +1$
5. Uncertainty indices calculated as before

Distribution of phrases in topic-specific PMU

Inflation PMU



Economy PMU



Market PMU



Model PMU

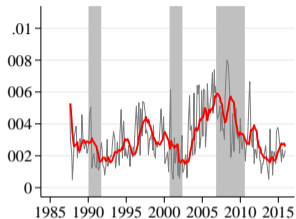


Other PMU

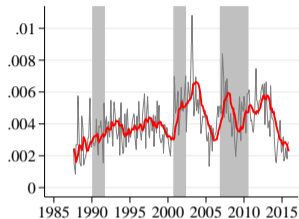


Topic-specific PMU

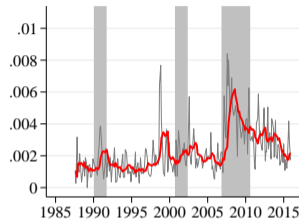
Inflation PMU



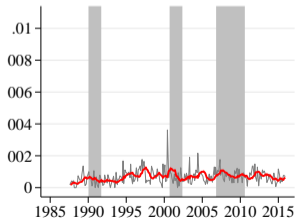
Economy PMU



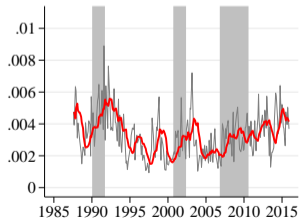
Market PMU



Model PMU



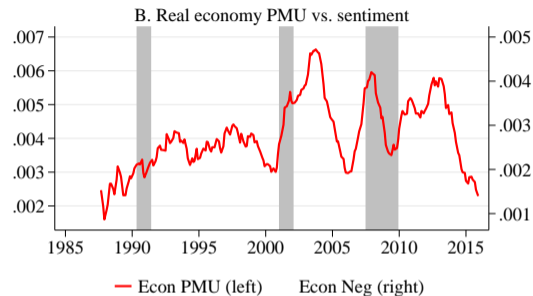
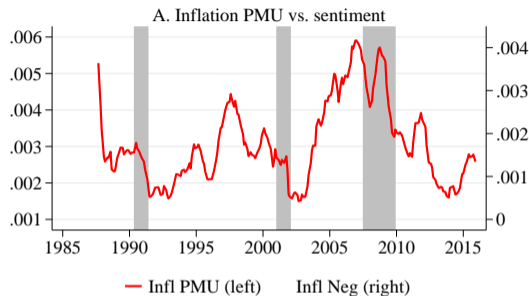
Other PMU



- ▶ Classify on average 84% of uncertainty mentions in \mathcal{U}
- ▶ Inflation, real economy and markets PMU capture bulk of uncertainty-related discussions
- ▶ Correlations: $(InfPMU, EcoPMU) = 0.10$; $(EcoPMU, MktPMU) = 0.36$

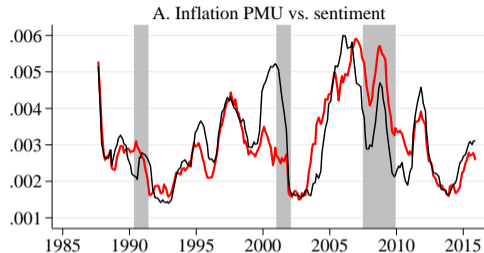
Properties of policymakers' uncertainty

Business cycle variation in PMU

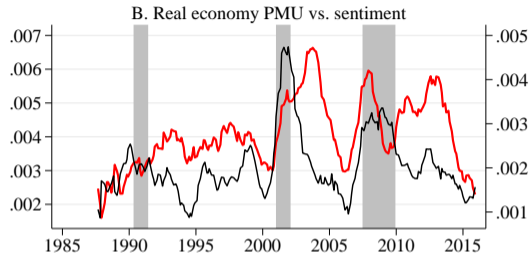


- ▶ PMU is not countercyclical (\neq proxies for public's uncertainty)
- ▶ During heights of the financial crisis, real economy PMU actually declines
- ▶ Procyclical inflation PMU: Policymakers express more inflation uncertainty when economy is expanding

Asymmetry: PMU and negative sentiment



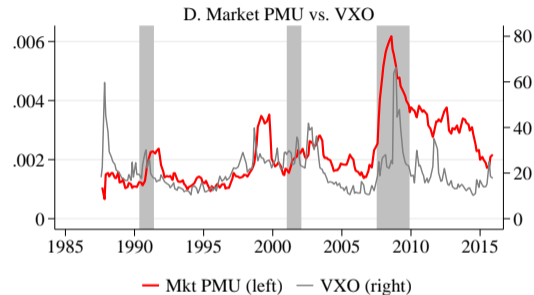
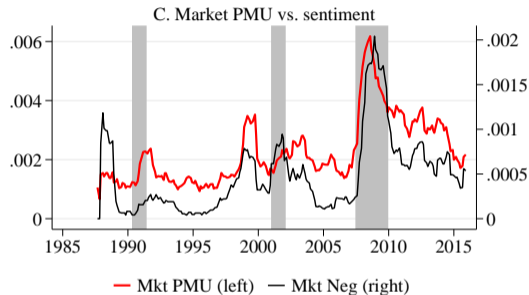
— Infl PMU (left) — Infl Neg (right)



— Econ PMU (left) — Econ Neg (right)

- ▶ Asymmetry: Elevated topic-specific PMU coincides with *negative* sentiment regarding that topic
 - Non-overlapping sentences
 - Negative inflation (growth) sentiment = inflation \uparrow (growth \downarrow)
- ▶ Comovement between inflation PMU and sentiment reflects policymakers' concerns about rising inflation that do not materialize in sample
 - Negative inflation sentiment as expression of uncertainty and/or concern
 - No predictive power for future outcomes

Asymmetry: PMU and negative sentiment



- ▶ Market PMU positively associated with policymakers' negative sentiment about markets (LHS) and with VXO (RHS)
- ▶ PMU reaches highest level in August 2007, preceding spike in the VXO by more than a year

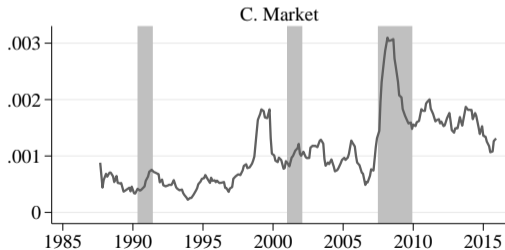
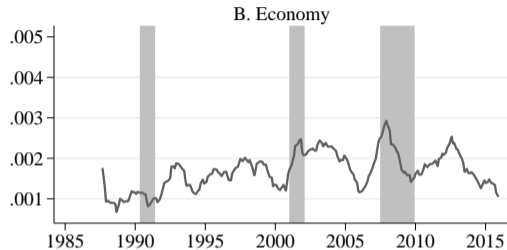
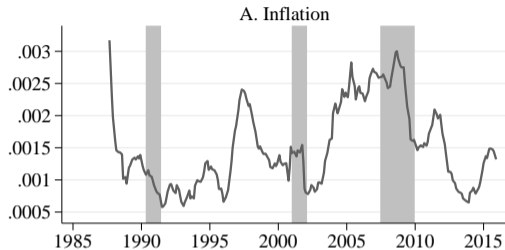
Past Greenbook forecast errors predict PMU

A. Absolute forecast errors				B. Forecast errors			
	(1)	(2)	(3)		(1)	(2)	(3)
	<i>InfPMU</i>	<i>EcoPMU</i>	<i>MktPMU</i>		<i>InfPMU</i>	<i>EcoPMU</i>	<i>MktPMU</i>
$ \overline{FE}(RGDP) $	-0.277*** (-3.68)	0.011 (0.15)	0.012 (0.21)	$\overline{FE}(RGDP)$	0.079 (0.82)	-0.193** (-2.55)	-0.167** (-2.20)
$ \overline{FE}(CPI) $	0.390*** (4.51)	-0.080 (-0.95)	0.106 (1.43)	$\overline{FE}(CPI)$	0.210* (1.89)	0.171** (2.29)	0.154* (1.74)
$ r_{t-2,t}^{SP500} $	-0.140* (-1.82)	0.053 (0.47)	0.169*** (2.76)	$r_{t-2,t}^{SP500}$	-0.032 (-0.33)	0.027 (0.33)	-0.229** (-2.54)
\bar{R}^2	0.14	0.00	0.041	\bar{R}^2	0.042	0.038	0.093
N	227	227	227	N	227	227	227

Note: In this and subsequent tables coefficients are standardized (expressed in standard deviation units)

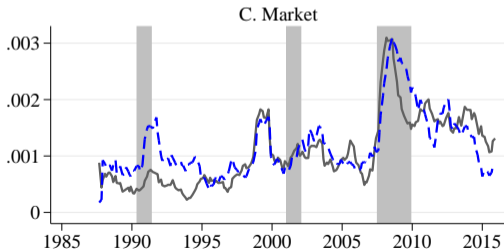
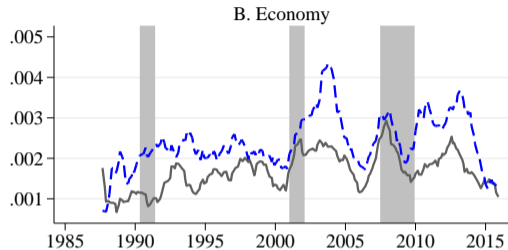
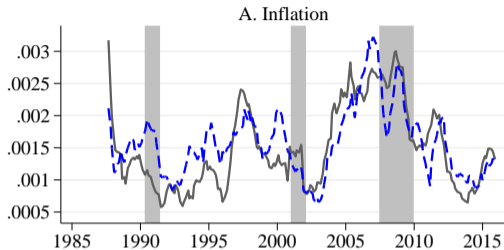
- Policymakers become more uncertain about inflation after experiencing large inflation surprises (in either direction)
- Less evidence of systematic relationship between forecast errors and uncertainty about real economy

Comovement between perceived risk and uncertainty



- ▶ Risk and uncertainty indices are highly correlated (using disjoint set of phrases)
- ▶ Similar frequency in policy deliberations
- ▶ Consistent with Greenspan's statement: the two notions are hard to disentangle in practice

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— PMU-Risk - - PMU-Uncertainty

Relationship with measures of public (monetary) policy uncertainty

	BBD EPU		BBD MPU		HRS MPU	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>PMU</i>	0.339*** (3.06)		0.340*** (4.11)		0.152 (1.34)	
<i>InfSent</i>		-0.224*** (-2.73)		-0.087 (-1.20)		-0.060 (-0.69)
<i>EcoSent</i>		0.349*** (4.02)		0.374*** (5.23)		0.126 (1.13)
<i>MktSent</i>		0.202** (2.57)		0.270*** (3.36)		0.202** (2.24)
\bar{R}^2	0.11	0.26	0.11	0.29	0.019	0.067
N	227	227	227	227	227	227

BBD = Baker, Bloom, Davis (2016); HRS = Husted, Rogers, Sun (2020)

- ▶ Positive comovement between proxies for public's policy uncertainty and PMU, but the significance is proxy-specific
- ▶ Public uncertainty tends to be high when policymakers express negative views about the economy and financial markets

Relationship with measures of public (monetary) policy uncertainty

	BBD EPU		BBD MPU		HRS MPU	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>InfPMU</i>	-0.281*** (-5.15)	-0.303*** (-4.11)	-0.150** (-2.49)	-0.188*** (-3.25)	-0.153** (-1.97)	-0.165** (-2.03)
<i>EcoPMU</i>	0.221** (2.10)	0.237*** (2.86)	0.246** (1.99)	0.284*** (2.74)	0.142 (1.03)	0.178 (1.31)
<i>MktPMU</i>	0.156 (1.48)	-0.006 (-0.06)	0.166** (2.13)	-0.063 (-0.86)	0.075 (0.74)	-0.075 (-0.65)
<i>ModPMU</i>	-0.040 (-0.85)	-0.026 (-0.50)	-0.057 (-1.15)	-0.035 (-0.86)	0.112 (1.63)	0.127* (1.91)
<i>OthPMU</i>	0.276*** (3.46)	0.200** (2.57)	0.164* (1.86)	0.076 (0.96)	0.053 (0.48)	0.007 (0.06)
Topic sentiment	No	Yes	No	Yes	No	Yes
\bar{R}^2	0.30	0.41	0.17	0.37	0.048	0.10
N	227	227	227	227	227	227

- ▶ Positive relationship is not uniform across topics
- ▶ Inflation PMU strongly negatively related with public's uncertainty

**(How) does uncertainty affect
policy preferences?**

Identifying policy preferences from language in the policy round

- ▶ Rules to classify a sentence as referring to monetary policy

Identifying policy preferences from language in the policy round

- ▶ Rules to classify a sentence as referring to monetary policy
 - A. If any of ['federal funds rate', 'funds rate', 'target rate', 'policy rate', 'interest rate', 'taylor rule', 'alternative a', 'alternative b', 'alternative c', 'directive', 'language', 'statement', 'symmetry', 'asymmetry', 'hawkish', 'dovish'] found in sentence
 - B. If **'policy'** found in sentence *but not* any of ['fiscal policy', 'supervisory policy', 'public policy', 'budget* policy', 'tax policy', 'housing policy', 'regulatory policy', 'ecb policy', 'economic policy', 'government policy', 'inventory policy', 'health care policy', 'macro policy', 'macroeconomic policy', 'spending policy'] or ['legislation', 'law', 'regulation']
 - C. If **'basis point'** is in sentence with any of ['cut*', 'hik*', 'eas*', 'tighten*', 'action*', 'mov*', 'firming', 'recommendation', 'reduction', 'increase'] but *not* when 'increase' occurs with ['cpi', 'inflation', 'yield*', 'treasury']
 - D. If **'purchase*'** is in sentence and immediately preceded by {mortgage backed securities, mbs, asset, treasur*, agency debt}, starting from 2009

Identifying policy preferences from language in the policy round

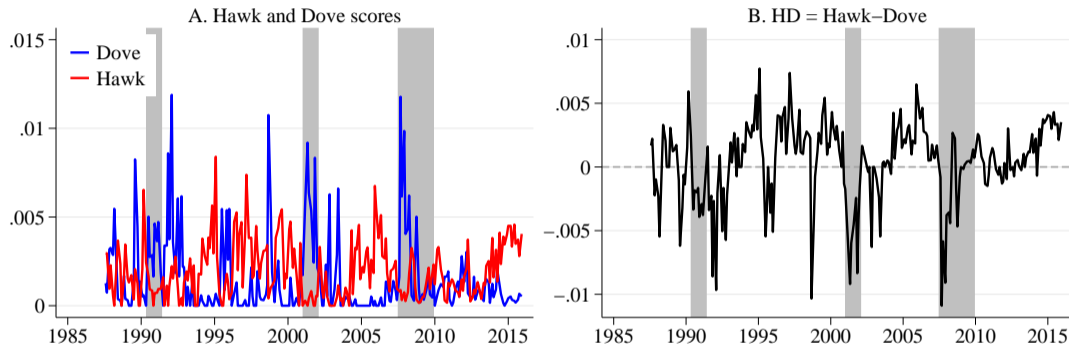
- ▶ Focus on statements by the FOMC members (not staff) in the policy round
- ▶ Separate hawk/dove preferences by matching policy terms with directional language
 - Match within subsentence for precision
 - Deal with negations
 - Measure frequency of hawk/dove language scaled by number of words in the policy round

Identifying policy preferences from language in the policy round

- ▶ Focus on statements by the FOMC members (not staff) in the policy round
- ▶ Separate hawk/dove preferences by matching policy terms with directional language
 - Match within subsentence for precision
 - Deal with negations
 - Measure frequency of hawk/dove language scaled by number of words in the policy round
- ▶ Summarize policy preferences with a balance variable at each meeting

$$HD_t = Hawk_t - Dove_t \quad (4)$$

Identifying policy preferences from language in the policy round



- ▶ Intuitive business cycle properties: *Dove* score elevated around recessions and during financial turmoil; *Hawk* score elevated in expansions
- ▶ Substantial variation post-2008 during the ZLB

Validity of policy preference proxies

FFR target changes and Romer-Romer shocks

	$\Delta FFR_t = FFR_t - FFR_{t-1}$			Romer-Romer shocks		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Hawk_t</i>	0.287*** (4.07)			0.253** (2.54)		
<i>Dove_t</i>	-0.316*** (-6.42)			-0.359*** (-3.70)		
<i>HD_t</i>		0.497*** (6.83)	0.334*** (5.30)		0.506*** (4.95)	0.601*** (5.04)
Lags of FFR	Yes	Yes	Yes	No	No	No
Greenbook controls	No	No	Yes	No	No	Yes
\bar{R}^2	0.45	0.45	0.59	0.25	0.25	0.30
N	169	169	169	163	163	163

- ▶ *HD* language predicts policy beyond Greenbook macro forecasts (interpretation: policy surprise)
- ▶ Captures 25% of variation in Romer-Romer shocks
- ▶ Expected signs: more hawkish → tightening; more dovish → easing

Validity of policy preference proxies

Market-based measures of monetary policy surprises

	(1) GSS target	(2) GSS path	(3) GK MP0	(4) GK ED12m	(5) NS news
HD_t	0.169 (1.33)	0.178*** (2.74)	0.382*** (4.00)	0.409*** (4.92)	0.290** (2.33)
R^2	0.028	0.032	0.15	0.17	0.084
N	196	196	190	199	154

GSS: Gurkaynak, Sack, Swanson (2005) and Swanson (2017); GK: Gertler, Karadi (2015); NS: Nakamura, Steinsson (2018)

- ▶ HD predicts market-based measures of monetary surprises
- ▶ And forecasts policy path several quarters ahead (forward looking)

Quantifying the impact of uncertainty on policy preferences

Dependent variable: HD_t policy preference score

	(1)	(2)	(3)	(4)
PMU_t	-0.296*** (-3.94)			
$InfPMU_t$		0.231*** (3.00)	0.229*** (3.34)	0.154** (2.37)
$EcoPMU_t$		-0.200*** (-2.74)	-0.181*** (-2.95)	-0.186*** (-2.75)
$MktPMU_t$		-0.219* (-1.83)	-0.089 (-0.97)	-0.245** (-2.15)
$ModPMU_t$		0.155*** (3.26)	0.146*** (3.74)	0.094** (2.04)
$OthPMU_t$		-0.151** (-2.00)	-0.047 (-0.69)	-0.027 (-0.40)
Topic sentiment	No	No	Yes	No
Greenbook forecasts	No	No	No	Yes
\bar{R}^2	0.084	0.24	0.39	0.38
N	227	227	227	227

- Uncertainty predicts policy preferences *controlling for* sentiment and Greenbooks
- $EcoPMU$ and $MktPMU$ → more dovish stance: ~ demand-shock channel
- $InfPMU$ and $ModPMU$ → more hawkish stance
- Unclassified category $OthPMU$ largely insignificant

Does uncertainty alter policymakers' reaction to the state of the economy?

- ▶ Existing models of optimal policy consider multiplicative effects of uncertainty
 - Uncertainty alters the strength of policy response to the economy
- ▶ Theoretical predictions are highly model-dependent
- ▶ Open questions
 - Does uncertainty actually strengthen or weaken policymakers' response?
 - Do its effects differ across state variables policymakers care about?

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 - Do its effects differ across state variables policymakers care about?
- ▶ Estimate text-based policy rule with interactions:

$$\begin{aligned} HD_t = & \beta_0 + \beta_1 \tau_t^{CPI} + \beta_2 E_t(CPI_{4q}) + \beta_3 E_t(RGDP_{0q}) \\ & + \delta_1 (E_t(CPI_{4q}) \times InfPMU_t) + \delta_2 (E_t(RGDP_{0q}) \times InfPMU_t) \\ & + \delta_3 (E_t(CPI_{4q}) \times EcoPMU_t) + \delta_4 (E_t(RGDP_{0q}) \times EcoPMU_t) \\ & + \gamma_1 InfSent_t + \gamma_2 EcoSent_t + \varepsilon_t \end{aligned}$$

Does uncertainty alter policymakers' reaction to the state of the economy?

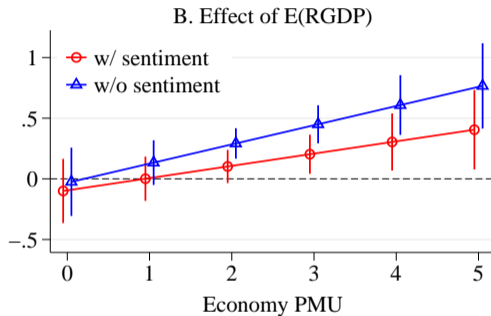
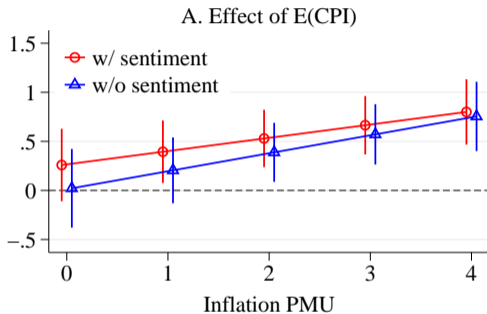
Dependent variable: HD_t policy preference score

	(1)	(2)	(3)	(4)
$E(CPI_{4q})$	0.35** (2.35)	0.52*** (3.54)	0.057 (0.24)	0.45** (2.10)
$E(RGDP_{0q})$	0.39*** (5.55)	0.17** (2.37)	-0.031 (-0.16)	-0.081 (-0.47)
τ^{CPI}	-0.50*** (-3.62)	-0.57*** (-4.50)	-0.49*** (-3.41)	-0.56*** (-4.18)
$E(CPI_{4q}) \times InfPMU$			0.18*** (3.16)	0.14*** (2.73)
$E(RGDP_{0q}) \times InfPMU$			0.0034 (0.06)	-0.011 (-0.22)
$E(RGDP_{0q}) \times EcoPMU$			0.16*** (2.68)	0.10* (1.89)
$E(CPI_{4q}) \times EcoPMU$			-0.015 (-0.27)	-0.079 (-1.44)
$EcoPMU$	-0.25*** (-4.38)	-0.15** (-2.55)	-0.43*** (-2.92)	-0.13 (-0.96)
$InfPMU$	0.17*** (3.35)	0.18*** (3.50)	-0.21 (-1.29)	-0.097 (-0.68)
Topic sentiment	No	No	Yes	Yes
\bar{R}^2	0.32	0.42	0.35	0.43
N	227	227	227	227

- ▶ Main effect: Inflation PMU strengthens policymakers' response to expected inflation (more hawkish)
- ▶ Secondary effect: Economy PMU strengthens reaction to growth (more dovish), but effect largely subsumed by sentiment

Amplification of policy response with PMU

Effect of expected inflation (growth) on policy preferences HD as function of inflation (economy) PMU



- ▶ Main effect: Amplification of inflation response with inflation PMU
- ▶ Inconsistent with oft-referenced Brainard's conservatism
- ▶ (Qualitatively) consistent with policymakers' *preference for robustness and/or uncertainty about persistence of inflation process*

Amplification of policy response with PMU

“A more aggressive monetary policy response (...) is warranted when there is clear evidence of heightened risks to price stability, i.e. when it is established that the degree of inflation persistence is likely to be high and risks disanchoring inflation expectations. In this case, a forceful, frontloaded monetary policy response to weak or excess inflation may become necessary to signal the central bank’s commitment to its objective, and thus nudge inflation expectations towards that objective and make them less backward-looking.”

– Peter Praet (2018)

Conclusions

- ▶ New text-based measures of policymakers' uncertainties (PMU) and policy preferences
- ▶ Exploit sequential structure of deliberations in regularly scheduled FOMC meetings to analyze impact of uncertainty on policy preferences during 1987–2015 sample
- ▶ Inflation uncertainty amplifies policy response to fluctuations in inflation
 - Inconsistent with Brainard's conservatism
 - Indicates concern with model misspecification and preference for robustness
 - Asymmetric relationship between PMU and policymakers' concern about rising inflation
- ▶ Independent additive effect of uncertainty on policy preferences suggests deviations from symmetric (quadratic) preferences
 - Demand-shock uncertainty channel at work
 - Some evidence that staff forecasts do not fully take the effect of uncertainty on board