

Eliciting Expectation Uncertainty from Private Households

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Motivation

- Macroeconomic uncertainty treated as a relevant variable at least since the Great Recession and the seminal paper by Bloom (2009)
- Inherently unobservable concept
- Many different proxies used in literature:
 - ▶ Financial market data (e. g., VIX)
 - ▶ Media publications (text mining, Baker et al. (2016))
 - ▶ Statistical models (Jurado et al., 2015)
 - ▶ Survey data (Manski, 2018)
- Dispersion of point forecasts imprecise proxy for expectation uncertainty (Lahiri and Sheng, 2010)
- Uncertainty commonly extracted from density forecasts (stated as a collection of interval probabilities)

This Paper

- New Online Survey of Consumer Expectations by Deutsche Bundesbank
- One question that elicits expectation uncertainty for six different macroeconomic variables:
 - ▶ Qualitative measure
 - ▶ Easy to answer
- First analysis of survey responses:
 - ▶ Are responses reasonable?
 - ▶ Can we identify differences across socioeconomic groups?
 - ▶ How does new measure relate to commonly used measure based on density forecasts?
 - ▶ How does new measure relate to volatility/predictability of target variables?

Data - Eliciting Expectation Uncertainty

- Three waves of Bundesbank Online Pilot Survey on Consumer Expectations
- Qualitative Assessment of Expectation Uncertainty
- Focus is on:
 - ▶ Six target variables (unempl., GDP growth, stock prices, inflation, overnight savings rate, real estate prices)
 - ▶ Germany
 - ▶ Horizon: 12 months
- Respondents answer on a 5-points scale, from (1) “very uncertain” to (5) “very certain”

Data - Eliciting Expectation Uncertainty

Nun noch eine Frage zu Ihrer Einschätzung hinsichtlich der wirtschaftlichen Entwicklung in Deutschland im weiteren Sinne. Bei dieser Frage geht es darum, wie sicher Sie sich fühlen, für einzelne Entwicklungen eine Abschätzung vorzunehmen.

Wie sicher sind Sie sich bei der Einschätzung ...

Bitte wählen Sie für jede Zeile eine Antwort aus.

	sehr unsicher	eher unsicher	weder besonders sicher noch besonders unsicher	eher sicher	sehr sicher
der Arbeitslosenquote in zwölf Monaten	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
des Wachstums des realen Bruttoinlandsprodukts über die nächsten zwölf Monate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
der Entwicklung der Aktienkurse über die nächsten zwölf Monate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
der Inflation über die nächsten zwölf Monate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
des Zinsniveaus (Tagesgeld) in zwölf Monaten	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
der Entwicklung der Immobilienpreise über die nächsten zwölf Monate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Data - Eliciting Expectation Uncertainty

One more question concerning your assessment of the wider economic development in Germany. The point is to assess how certain you feel when making predictions for individual economic developments.

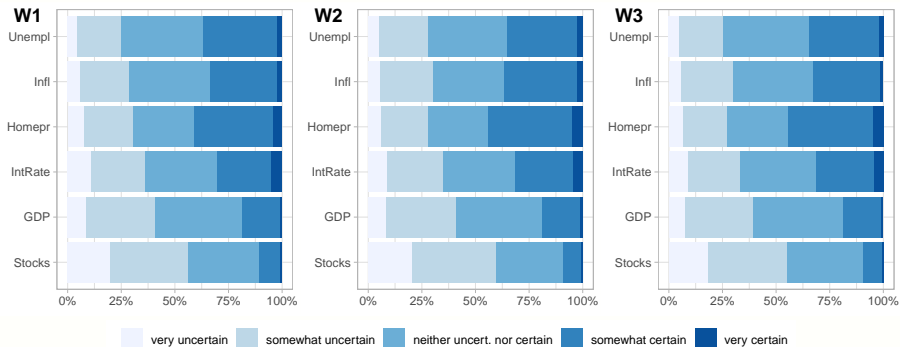
How certain are you when it comes to predicting . . .

- a the unemployment rate twelve months from now;*
- b real GDP growth over the next twelve months;*
- c the development of stock market prices over the next twelve months;*
- d inflation over the next twelve months;*
- e the interest rate (for overnight money) twelve months from now;*
- f the development of real estate prices over the next twelve months.*

Data - Density Expectations

- In addition, I use of density **inflation** expectations from core survey
 - ▶ Only waves 2 and 3
- Question asks:
How likely do you think the inflation rate will develop as follows during the next twelve months?
- Respondents give probabilities for different outcome intervals:
 - ▶ More than 12 % deflation;
 - ▶ Deflation between 8 % and 12 %
 - ▶ ...
 - ▶ Inflation between 0 % and 2 %
 - ▶ ...
 - ▶ More than 12 % inflation
- Data used to compute (ex ante) subjective forecast error variance \Rightarrow expectation uncertainty

Qualitative Assessment of Expectation Uncertainty



Qualitative Assessment of Expectation Uncertainty

Table: Correlation of Answers across Variables

	Unempl	GDP	Stocks	Infl	IntRate	Homepr
Unempl	1.00					
GDP	0.39	1.00				
Stocks	0.22	0.36	1.00			
Infl	0.43	0.41	0.25	1.00		
IntRate	0.34	0.34	0.23	0.44	1.00	
Homepr	0.33	0.29	0.19	0.41	0.37	1.00

Notes: Numbers are Kendall rank correlation coefficients computed based on information from all three survey waves.

Qualitative Assessment of Expectation Uncertainty

Table: Transition Probabilities

	1	2	3	4	5
very uncertain (1)	0.36	0.33	0.21	0.09	0.02
somewhat uncertain (2)	0.10	0.41	0.34	0.15	0.01
neither uncert. nor certain (3)	0.05	0.25	0.46	0.22	0.01
somewhat certain (4)	0.02	0.15	0.29	0.49	0.04
very certain (5)	0.06	0.09	0.10	0.52	0.23

Notes: Numbers are transition probabilities estimated from all subjects for which responses from different waves are available. Answers range from “very uncertain” (1) to “very certain” (5).

Qualitative Assessment of Expectation Uncertainty

Tabelle: Frequency of Answers for Qualitative Uncertainty Questions

	(1)	(2)	(3)	(4)	(5)
Total	0.09	0.27	0.35	0.26	0.02
Wave 1	0.10	0.27	0.35	0.26	0.02
Wave 2	0.09	0.28	0.34	0.27	0.03
Wave 3	0.09	0.26	0.36	0.26	0.02
Men	0.07	0.25	0.34	0.30	0.03
Women	0.12	0.29	0.37	0.21	0.01
High education	0.09	0.28	0.37	0.23	0.02
Low education	0.09	0.24	0.32	0.32	0.03
High income	0.11	0.28	0.36	0.23	0.02
Low income	0.07	0.26	0.34	0.30	0.03
Employed	0.13	0.26	0.32	0.26	0.03
Not employed	0.09	0.26	0.36	0.27	0.03
Below 30	0.08	0.29	0.35	0.26	0.02
30 to 60	0.09	0.26	0.35	0.27	0.03
Above 60	0.09	0.29	0.35	0.25	0.02

Qualitative Assessment of Expectation Uncertainty

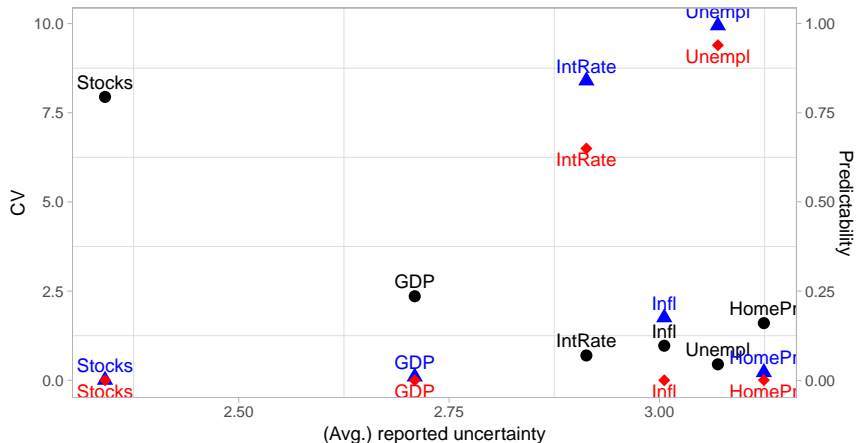
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Qualitative Assessment of Expectation Uncertainty

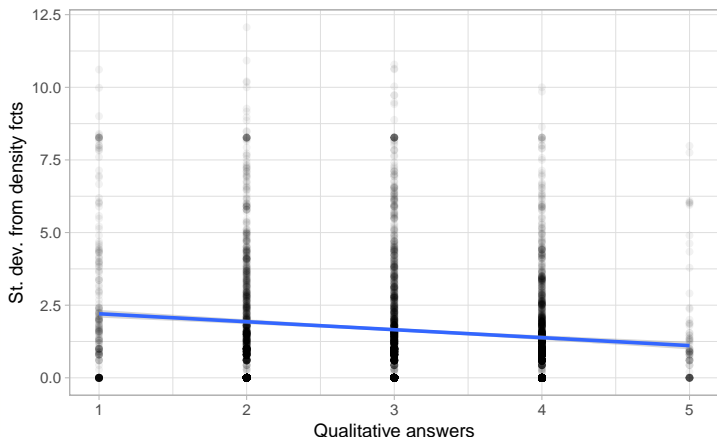
- Assessment of socioeconomic determinants of subjective uncertainty based on linear regression model
- Main results:
 - ▶ Magnitude of effects differ across target variables
 - ▶ Higher income \Rightarrow lower uncertainty
 - ▶ Women \Rightarrow higher uncertainty
 - ▶ Old respondents \Rightarrow lower uncertainty (but small effect)
 - ▶ At least high school degree \Rightarrow lower uncertainty (no additional effect of higher education)
- Overall, not much of variation is explained by socioeconomic factors

Qualitative Uncertainty and Predictability



Notes: The plot shows the relation between the average reported uncertainty for each of the target variables and the variables' coefficient of variation (black dots, left scale) and the variables' predictability (right scale) at a horizon of 1 quarter (blue triangles) and 4 quarters (red diamonds).

Qualitative Uncertainty and Expected FEV



Notes: The intensity of the color of each dot represents the number of observations with identical outcomes. The blue line indicates the slope of a linear regression of the standard deviation of the density forecasts on the reported qualitative uncertainty.

Summary

- Very simple measure of subjective expectation uncertainty:
 - ▶ Easy to understand
 - ▶ Does not require much survey time
 - ▶ Feasible to elicit uncertainty on a range of macroeconomic variables
- Properties of the measure:
 - ▶ Stable across waves
 - ▶ Differences across socioeconomic groups in line with previous evidence
 - ▶ Rel. uncertainty across variables in line with predictability/volatility of target variables
 - ▶ Positive correlation between simple measure and uncertainty as measured by FEV from density forecasts
- Longer time series required to see ...
 - ▶ how qualitative measures respond to economic shocks
 - ▶ how time-series dynamics relate to those of other macroeconomic uncertainty measures

Thank you for your attention!

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