

Effects of Macro Uncertainty on Subjective Uncertainty and Mean Expectation

**The empirical study of the
macro uncertainty's effect
on subjective uncertainty
and mean expectation using
datasets of households and
professional forecasters**

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“Macro uncertainty affects the assessed probabilistic distribution of individual economic forecasts. In this study, we empirically document the effects of macro uncertainty on subjective uncertainty (second moment) and mean expectation (first moment) of GDP growth and income forecasts. Based on the four datasets of households and professional forecasters, our results show that macro uncertainty does not always increase subjective uncertainty. This finding contradicts the assumption in most macroeconomic models but is in line with the idea of limited information-processing capacity such as rational inattention. Moreover, we find evidence that macro uncertainty reduces the expectation of GDP growth and income, especially for professional forecasters. This result is in line with the assumption in most models and the prediction of Maxmin expected utility theory.”

Background

Macro uncertainty is countercyclical to economic growth since it adversely affects individual economic forecasts. In this study, we focus on the two moments of individual forecasts: subjective uncertainty (second moment), and mean expectation (first moment). Most macroeconomic models assume that macro uncertainty increases subjective uncertainty and decreases the mean expectation of income (Bloom, 2014; Fernandez-Villaverde & Guerron-Quintana, 2020). However, the relationship between macro uncertainty and individual forecasts is not fully understood. Therefore, this paper aims to empirically document these relationships by analyzing four-panel datasets of professional forecasters and households, and four measurements of macro uncertainty.

Method and Result

We perform fixed-effect-panel regressions on four datasets, which are the survey of professional forecasters of (1) the US and (2) the EU, and (3) the US and (4) the Netherlands' household survey. The datasets are from (1) the Federal Reserve Bank of Philadelphia, (2) European Central Bank, (3) the Survey of Consumer Expectations by the Federal Reserve Bank of New York, and (4) the DNB Household Survey by CentERdata respectively. Unlike mean expectations, subjective uncertainty is not directly provided in the surveys. Subjective uncertainty or second moment can be measured in two ways, which are fitting a generalized Beta distribution (Engelberg, Manski & Williams, 2009), and calculating a simple standard deviation. In this extended abstract, we present the results from simple standard deviations and the Economics Policy Uncertainty Index (EPU).

Result 1, Table 1 shows that macro uncertainty does not always increase subjective uncertainty. The positive relationship is not robust and only holds for the professional forecasters when employing EPU. Other measures of macro uncertainty do not yield the positive relationship as well. Furthermore, we even observe that the households' subjective uncertainty decreases when EPU rises.

Table 1 Effect of macro uncertainty on subjective uncertainty

Subjective uncertainty	Professional Forecasters		Households	
	US Real GDP growth	EU Real GDP growth	US Personal Income growth	Dutch HH income level
EPU_t	0.05**	0.06**	-0.15**	-0.29**
EPU_{t-1}	-0.02	-0.001	-0.03	-0.19*
Subj. uncertainty $_{t-1}$	0.30***	0.47***	0.00	-0.06*
Macro variables	Y	Y	Y	Y
Personal variables	N	N	Y	Y
N	3,028	3,520	37,880	5,327
R-squared	0.43	0.53	0.01	0.00

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$, This table reports fixed-effect panel regressions of subjective uncertainty (S.D.) against Economic Policy Uncertainty index (EPU), macro variables and personal variables. Macro variables are macroeconomic data such as GDP growth and GDP deceleration dummy. Personal variables are retrieved from household surveys such as college education dummy and personal income.

Result 2 shows the effect of macro uncertainty on mean expectation. We find that macro uncertainty measured by EPU decreases the mean expectation of GDP growth and income (the result table is not included here). With other macro uncertainty indices, this result still holds for the professional forecasters but does not hold for the households.

Discussion and conclusion

The result 1 shows that macro uncertainty does not always increase subjective uncertainty, as most macroeconomic models assume. The theory of rational inattention can explain this puzzling relationship. When facing macro uncertainty, agents can become either more uncertain or more certain, depending on the trade-off of information acquisition costs and benefits given their limited capacities to process information. The result 2 suggests that the expected income decreases with the increase of macro uncertainty, and it is especially robust among professional forecasters. The reduction in expected income fits with the theory of Maxmin expected utility. However, we cannot quantitatively prove that agents follow multiple prior Bayesian learning, which is one of the underlying mechanisms of Maxmin expected utility. As this study shows, the relation between macroeconomic

and subjective uncertainty is not quite as straightforward as currently implied by most macro models. We suggest that a theoretical study of how macro uncertainty and subjective uncertainty interact would be useful for future improvements of macroeconomic models. In practice, this new insight will have consequences for our understanding of policy effectiveness and policy making, especially those that aim to anchor people's expectations.

About the authors

Poramapa Poonpakdee is a doctoral student in Professor Giulia Piccillo at the School of Business and Economics, Maastricht University, the Netherlands. Poonpakdee and Professor Piccillo are the major contributors to this work.

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