

# Uncertainty and Economic Activity: Does it Matter for Thailand?

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- Measuring uncertainty
  - several proxies capturing various aspects: economic policy, macroeconomic, and financial uncertainty
- Analyzing the impact on Thai economy
  - GDP/consumption/investment/export
  - Dynamic impact along various dimensions such as persistence, time horizon, asymmetry
  - Different between types of measures
- Assessing spillover effect of external uncertainty
  - US and global shocks

# Why does it matter?

- key reason for the weak recovery from the global financial crisis (GFC) and persistently high unemployment rates (FOMC, 2009; Balta et al., 2013)
- Spillover impact (Colombo, 2013; IMF, 2013; Berger et al. 2016)
- Channels of impacts on real activity:
  - Adjustment costs (Bloom, 2009; Bernanke, 1983)
  - Precautionary savings (Kimball, 1990; Carroll, 1997)
  - Credit provisions (Gilchrist et al. 2014)



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# Measuring Uncertainty

# Measuring Uncertainty

## 1) Economic Policy Uncertainty



- Baker et al. (2016)

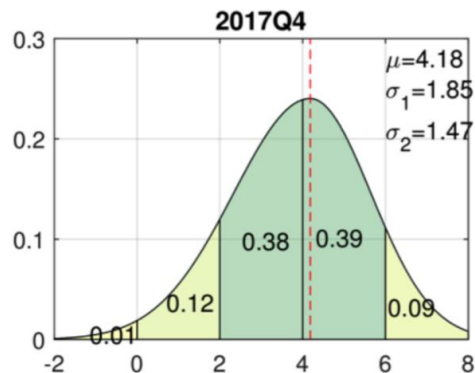
## 2) Aggregate Macroeconomic and Financial Uncertainties

Table A1: List of Macroeconomic and Financial Variables

No.	Name and Description	Fr
<b>Group 1: National Account Data (Quarterly Series)</b>		
1	Total Gross Domestic Product	
2	Consumption	
3	Government Consumption	
4	Investment	
5	Exports of goods and services	
6	Imports of goods and services	
<b>Group 2: Output and Income (Monthly Series)</b>		
7	PI: Personal Income	
8	MPI: Manufacturing Production Index	
9	MPL10: Manufacture of food products	
10	MPL12: Manufacture of tobacco products	
11	MPL13: Manufacture of textiles	
12	MPL14: Manufacture of wearing apparel	
13	MPL15: Manufacture of leather and related products	
14	MPL19: Manufacture of coke and refined petroleum products	
15	MPL20: Manufacture of chemicals and chemical products	
16	MPL22: Manufacture of rubber and plastic products	
17	MPL23: Manufacture of other non-metallic mineral products	
18	MPL24: Manufacture of basic metals	
19	MPL25: Manufacture of fabricated metal products, except machinery and equipment	

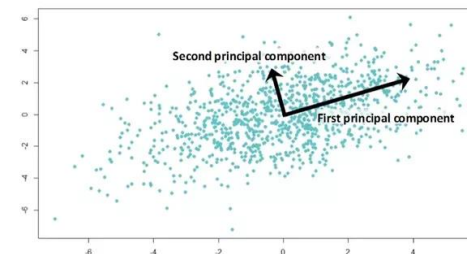
- Jurado et al. (2015)

## 3) Bank of Thailand's Economic Uncertainty



- Rossi and Sekhposyan (2015)

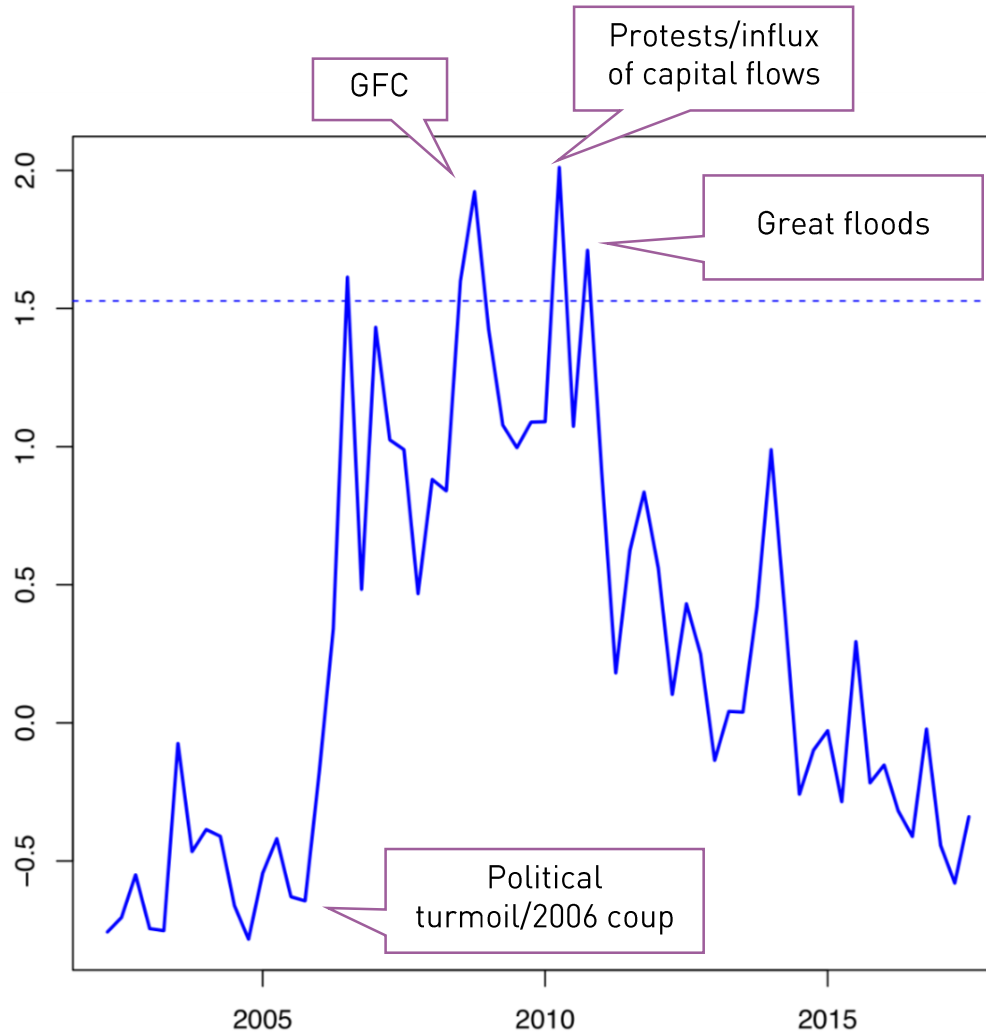
## 4) Principal Component Uncertainty



# 1) Economic Policy Uncertainty

- To count the number of news with keywords:
  - {"Thailand" or "Thai"} and economy} AND
  - {"uncertain" or "uncertainty" or "uncertainties" or "risk"} AND
  - {"bank of thailand" or "central bank" or "monetary policy" or "baht" or "currency" or "exchange rate" or "capital flow" or "ministry of finance" or "finance ministry" or "budget" or "tax" or "government spending" or "public debt" or "budget"}
- Source: Bloomberg and the Bangkok Post

# 1) Economic Policy Uncertainty



## 2) Aggregate Macroeconomic and Financial Uncertainties

- To measure uncertainty as the conditional variance of the unforecastable component of macroeconomic and financial variables
- Factor augmented forecasting model:

$$y_{jt+1}^C = \phi_j^y(L)y_{jt} + \gamma_j^F(L)\hat{\mathbf{F}}_t + \gamma_j^W(L)\mathbf{W}_t + v_{jt+1}^y$$

- Forecast error:

$$V_{jt+h}^{y^C} = y_{t+h}^C - E[y_{jt+h}^C | I_t]$$

- Uncertainty measure:

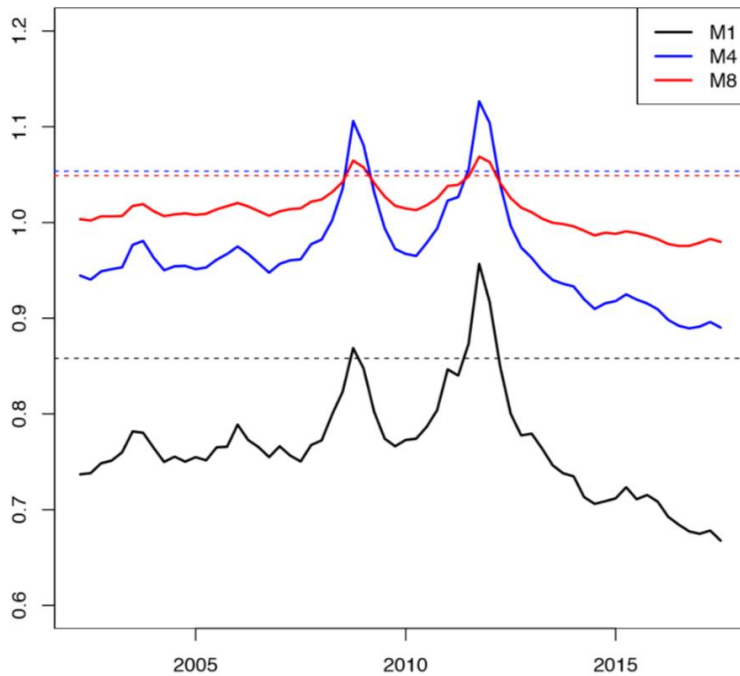
$$U_{jt}^{y^C}(h) \equiv \sqrt{E[(V_{jt+h}^{y^C})^2 | I_t]}$$



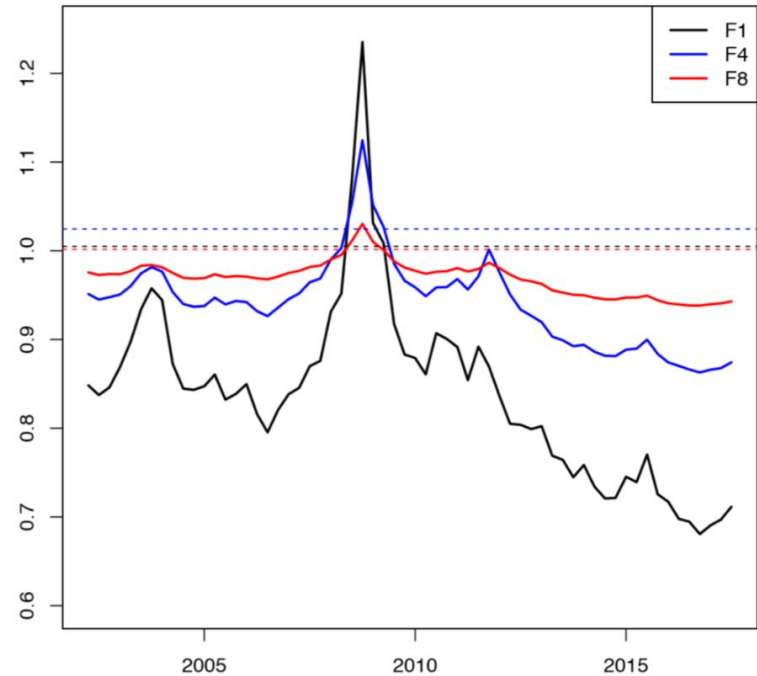
## 2) Aggregate Macroeconomic and Financial Uncertainties

- We use 200+ macroeconomic and financial time series obtained from the BOT and SET databases:
  - National Account Data
  - Output and Income
  - Labor Markets
  - Housing
  - Consumption, Orders, and Inventories
  - Money and Credit
  - Bonds and Exchange Rate Measures
  - Prices
  - Stock Market Indices
  - Trade
  - Financial Variables

# 2) Aggregate Macroeconomic and Financial Uncertainties



(a) Macroeconomic Uncertainty



(b) Financial Uncertainty

## 3) Bank of Thailand's Economic Uncertainty

- To compare the realized forecast error to the percentile in the historical distribution of forecast errors
- The index is defined as the cumulative of realized forecast errors:

$$U_{t+h} = \int_{-\infty}^{e_{t+h}} p(e) de$$

- Distinguish between “positive” and “negative” uncertainty

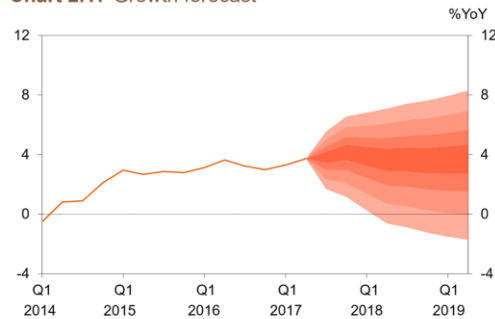
$$U_{t+h}^+ = \frac{1}{2} + \max\{U_{t+h} - \frac{1}{2}, 0\}$$

$$U_{t+h}^- = \frac{1}{2} + \max\{U_{t+h} - \frac{1}{2}, 0\}$$

# 3) Bank of Thailand's Economic Uncertainty

- We use the underlying forecast distribution from BOT's fan chart.

Chart 2.17 Growth forecast



Note: Fan chart covers 90% of the probability distribution

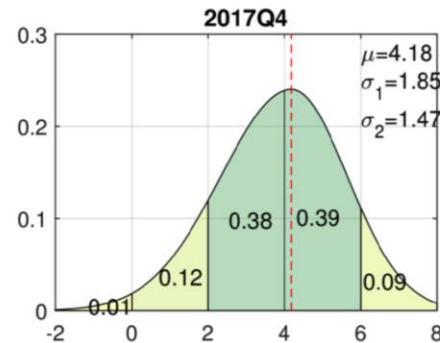


Table: Probability distribution of GDP growth forecast

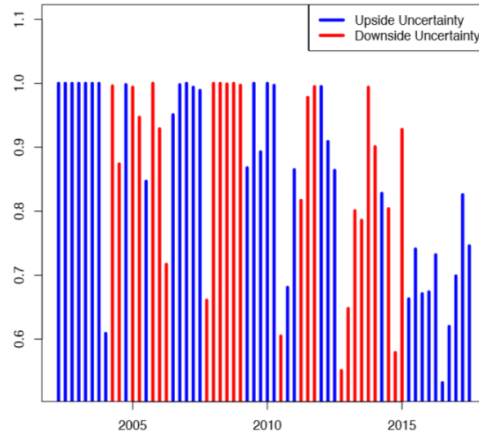
Percent	2017		2018				2019	
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
10-12	0	0	0	0	0	0	1	1
8-10	0	0	1	2	2	3	4	5
6-8	2	9	10	10	12	12	13	13
4-6	37	39	32	27	26	25	24	23
2-4	51	38	35	31	29	28	26	25
0-2	9	12	18	20	19	20	19	18
(-2)-0	0	1	4	8	8	9	10	10
< (-2)	0	0	1	2	3	4	4	5



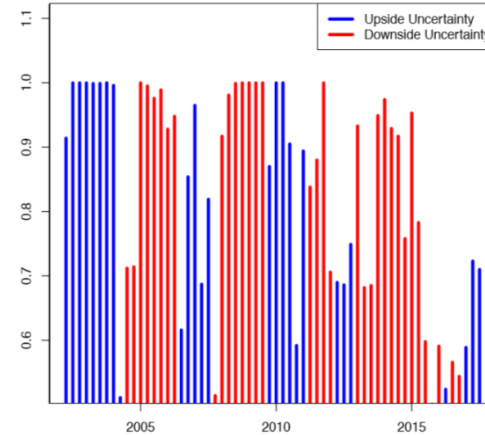
Assume split normal distribution



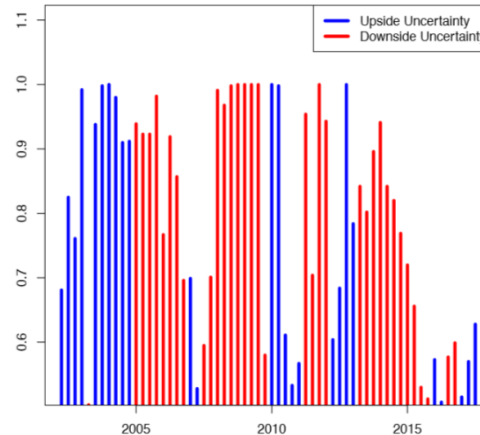
# 3) Bank of Thailand's Economic Uncertainty



(a)  $h=1$



(b)  $h=4$



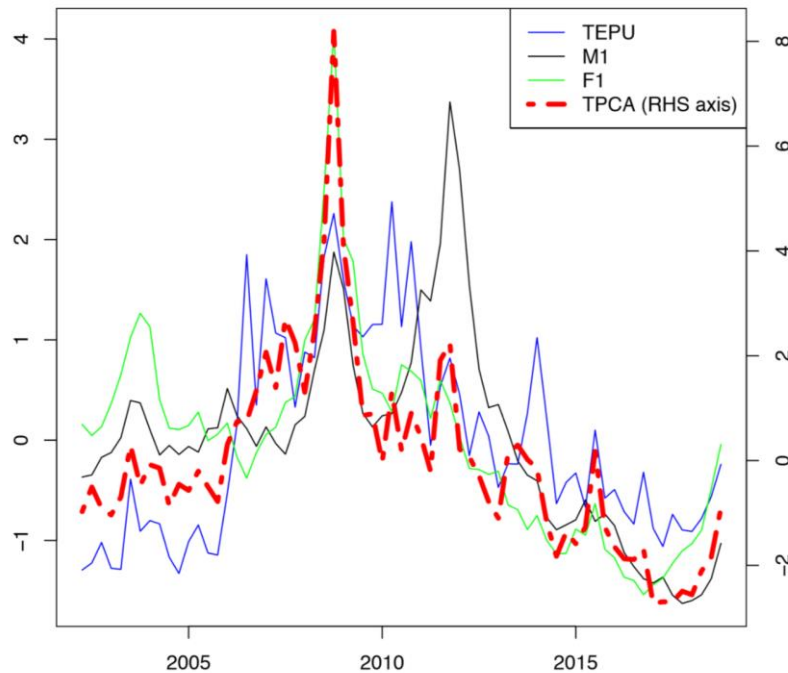
(c)  $h=8$

## 4) Principal Component Uncertainty

- To extract the first principal component (PC) from a swathe of uncertainty measures
- We use...
  - Thai consumer confidence index (CCI)
  - Thai business sentiment index (BSI)
  - M1 and F1
  - SET50 historical volatility index (SETVOL)
  - 3-month moving-average of the US dollar to Thai baht exchange rate option implied volatility (USDTHBVOL)
  - TEPU

# 4) Principal Component Uncertainty

Correlation	M1	F1	TEPU	CCI	BSI	SETVOL	USDTHBVOL	PCA	RGDP
M1	1								
F1	0.67	1							
TEPU	0.51	0.50	1						
CCI	0.04	0.26	-0.46	1					
BSI	-0.22	-0.47	-0.36	0.14	1				
SETVOL	0.47	0.70	0.41	0.13	-0.44	1			
USDTHBVOL	0.31	0.47	0.53	-0.32	-0.65	0.47	1		
PCA	0.69	0.84	0.75	-0.14	-0.69	0.77	0.77	1	
RGDP	-0.21	-0.13	-0.26	0.46	0.35	-0.20	-0.24	-0.32	1





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# Uncertainty and Real Economic Activity

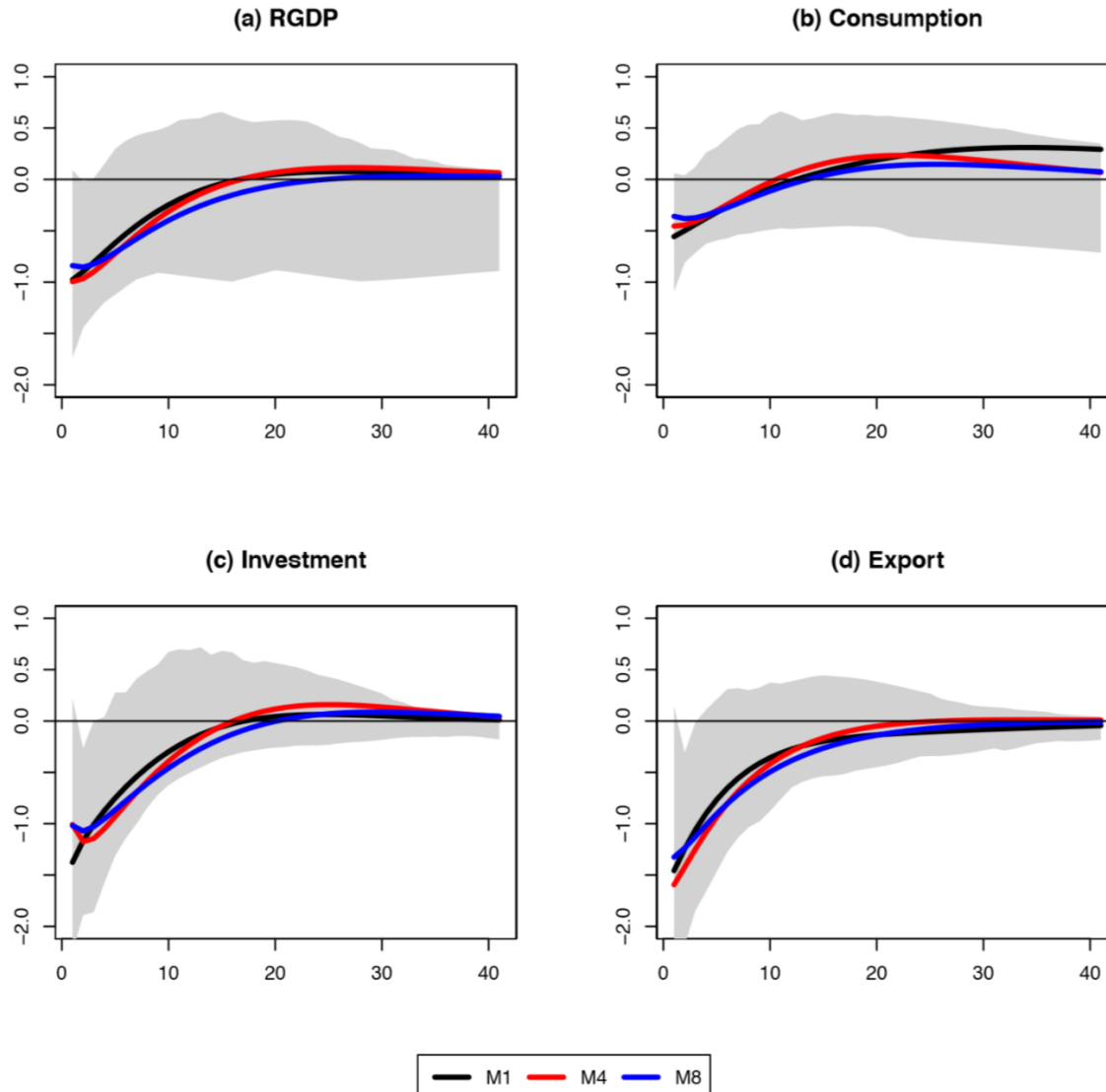


# Data and Empirical Set Up

- Based on structural vector autoregression (SVAR)
  - $[U_t, \text{Log}(\text{SET}), \text{policy rate}, \text{Log}(\text{CPI}), \text{Log}(\text{real activity})]'$
  - To examine the responses of RGDP, C, I, and X
  - $U_t$  includes:
    - $\{\text{TEPU}, \text{M1}, \text{M4}, \text{M8}, \text{F1}, \text{F4}, \text{F8}, \text{BOT}+1, \text{BOT}+4, \text{BOT}+8, \text{BOT}-1, \text{BOT}-4, \text{BOT}-8, \text{BOT}^*1, \text{BOT}^*4, \text{BOT}^*8, \text{TPCA}\}$
- Uncover orthogonal shocks using Cholesky decomposition, ordered as above
- Extend domestic VAR with foreign uncertainty shocks ( $U_t^*$ )
  - Add  $\{\text{M1}^*, \text{F1}^*, \text{GPU}\}$  as counterparts to  $\{\text{M1}, \text{F1}, \text{TEPU}\}$

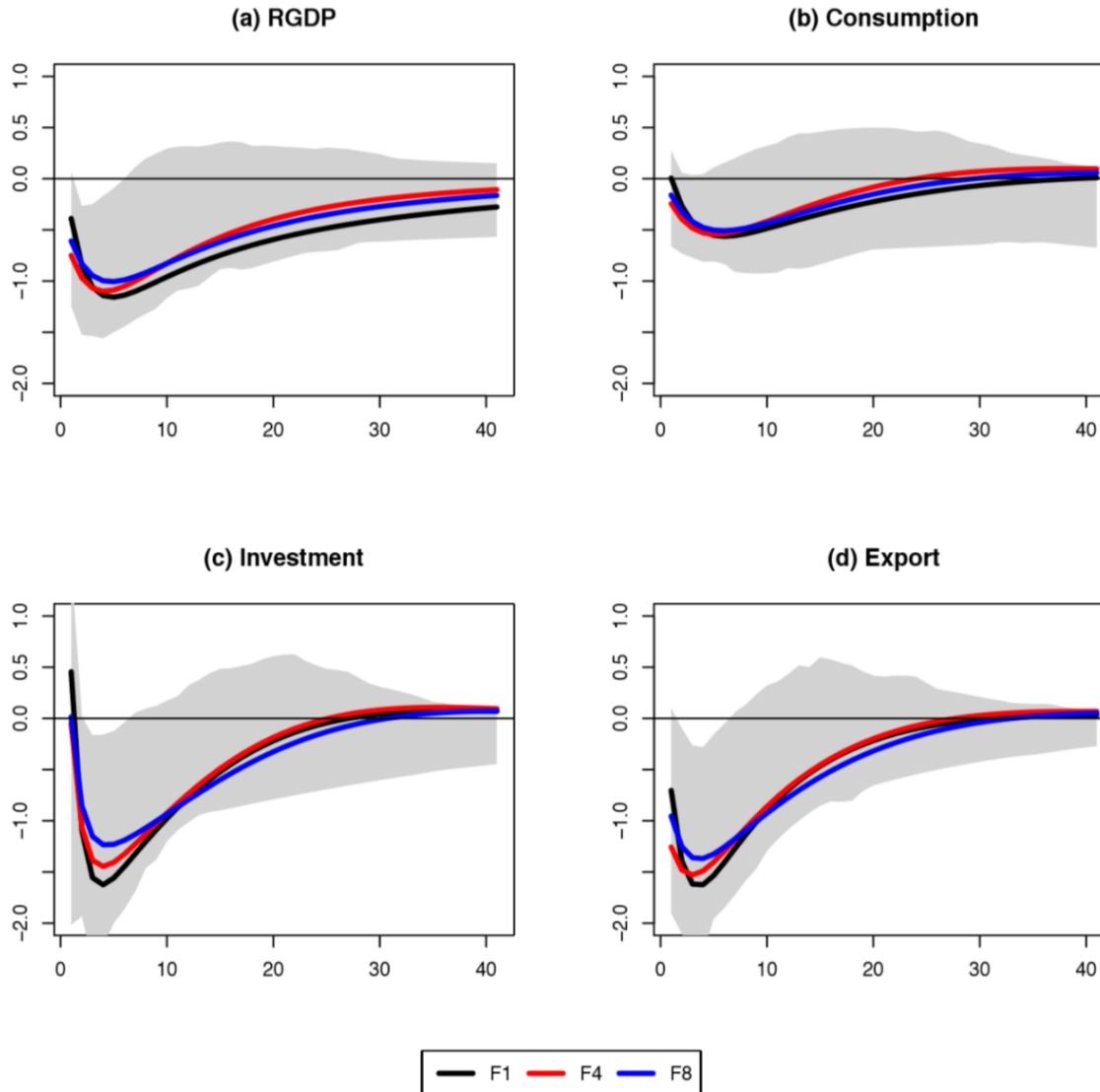
# Empirical Results (1)

Impulse Response of RGDP and Components to Thai Macroeconomic Uncertainty Shocks



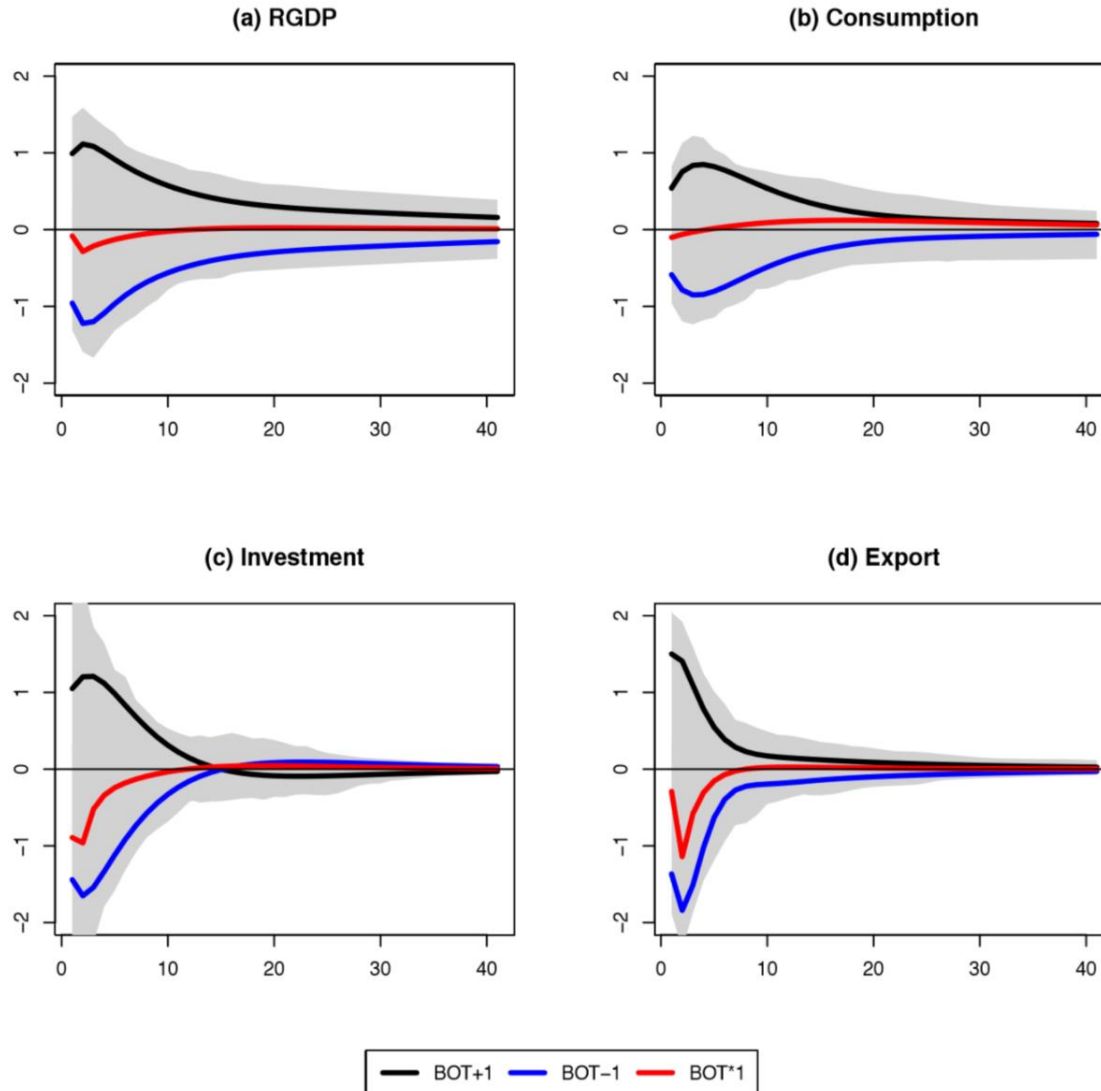
# Empirical Results (2)

Impulse Response of RGDP and Components to Thai Financial Uncertainty Shocks



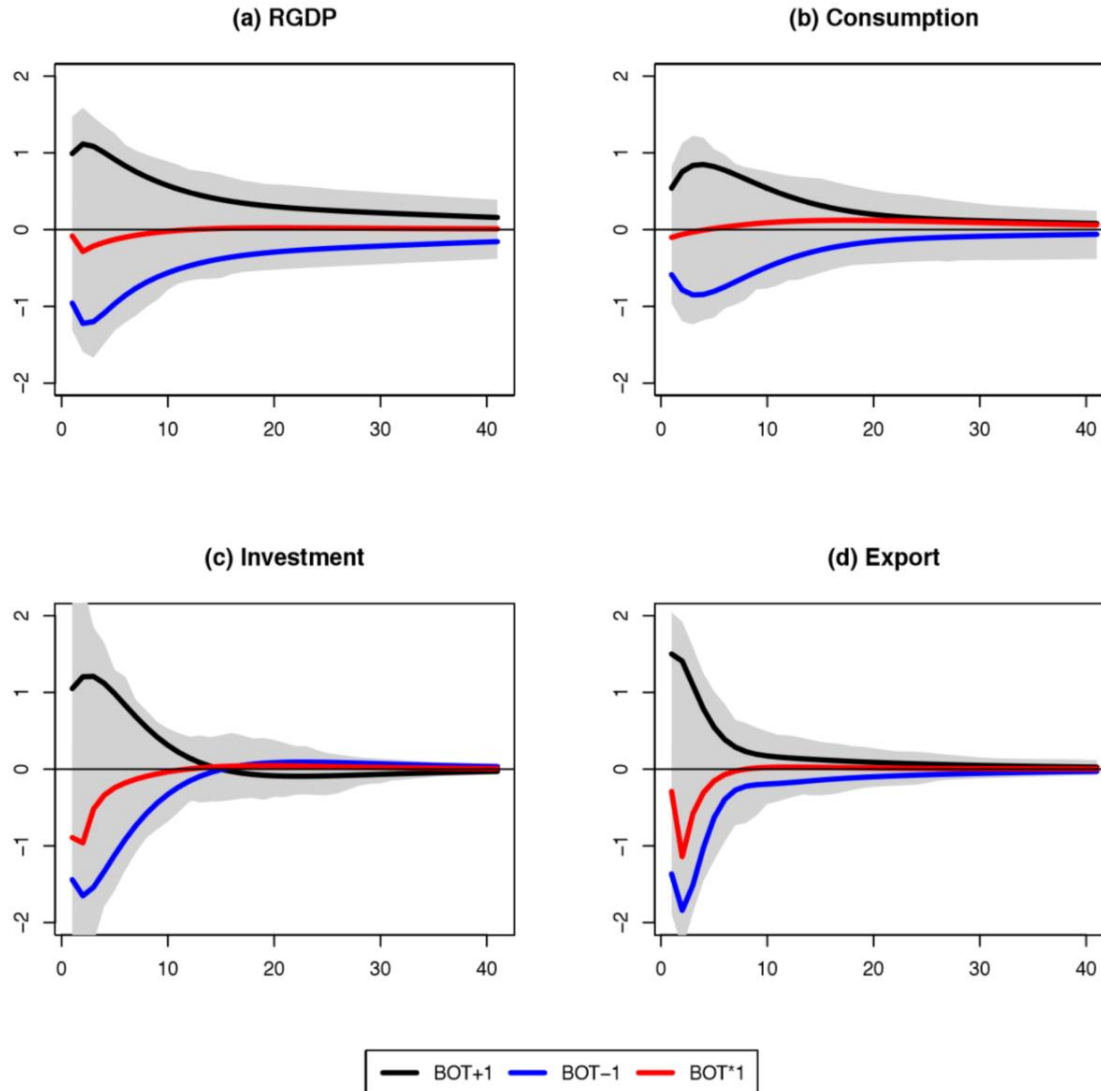
# Empirical Results (3)

Impulse Response of RGDP and Components to BOT Economic Uncertainty Shocks



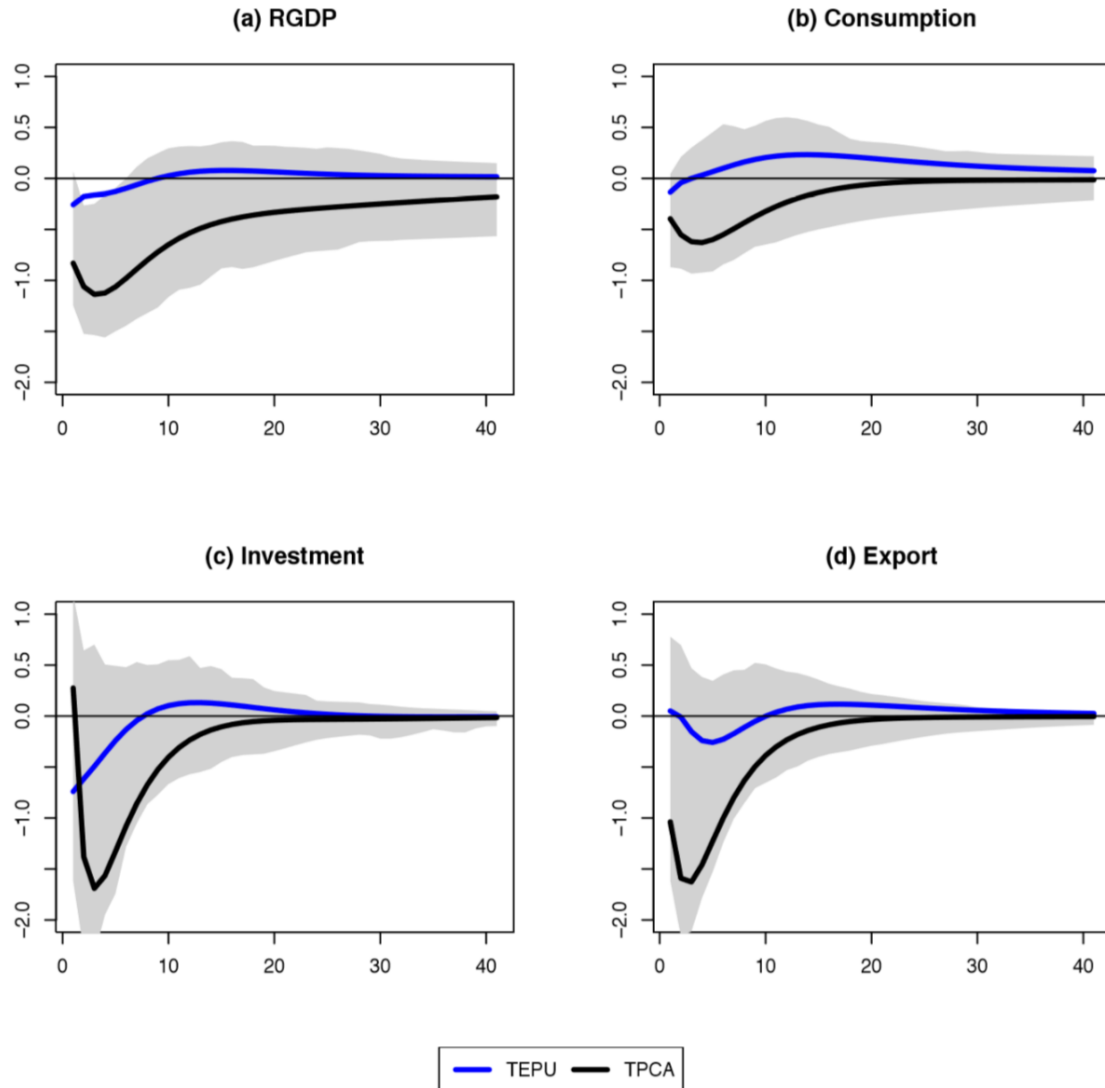
# Empirical Results (3)

Impulse Response of RGDP and Components to BOT Economic Uncertainty Shocks



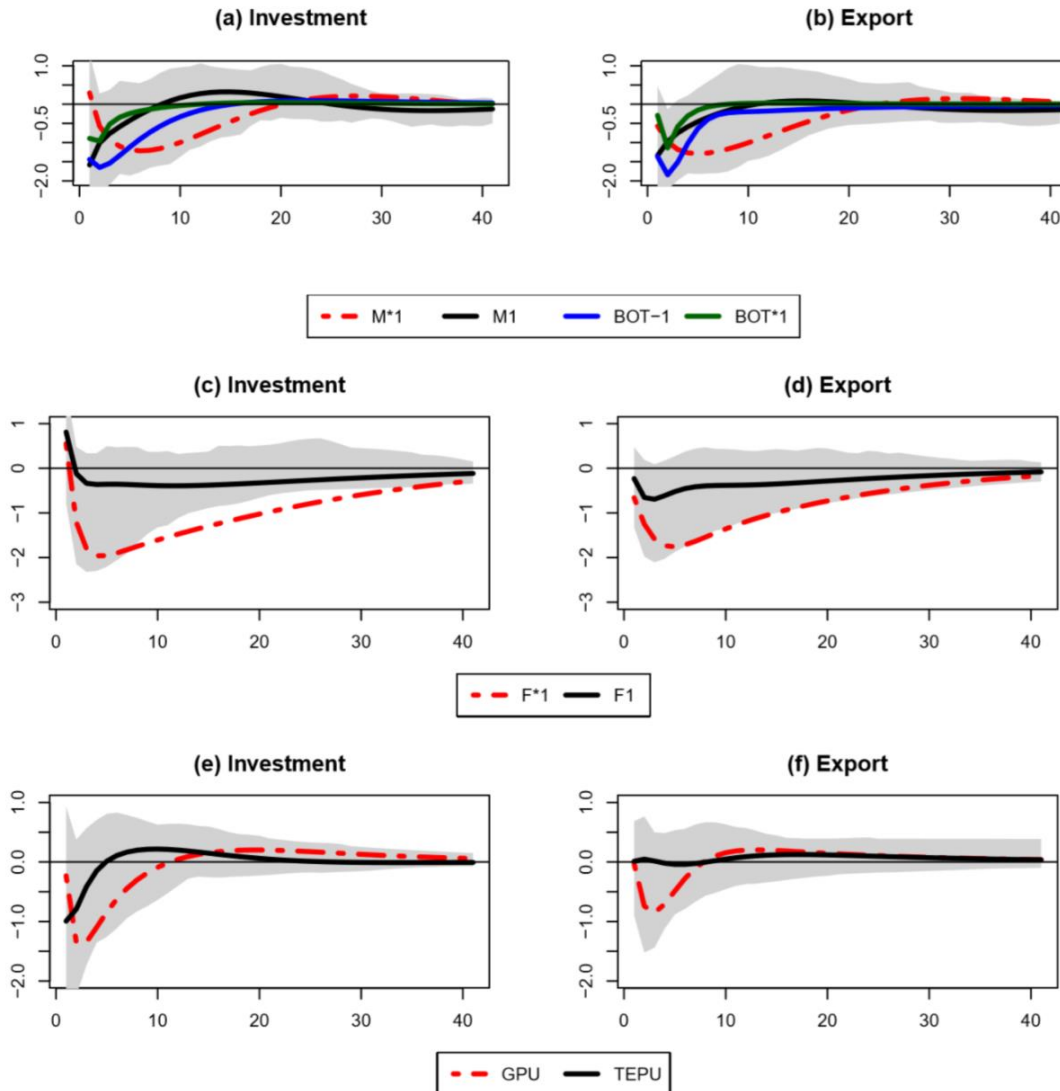
# Empirical Results (4)

Impulse Response of RGDP and Components to PC-based and News-based Uncertainty Shocks



# Empirical Results (5)

Impulse Response of RGDP and Components to Foreign versus Thai Uncertainty Shocks



# Implications & Next Steps

- For the Thai economy, uncertainty matters as well as the source.
- Macroeconomic uncertainty is predominantly driven by country-specific shocks
  - domestic policy measures are appropriate to mitigate the potential adverse effects
- Large spillovers of financial uncertainty shocks from abroad
  - Future research on how uncertainty propagates through other channels and effects credit markets in Thailand