Transmission of Uncertainty Shocks: Learning from Heterogeneous Responses on a Panel of EU Countries

29 January 2019

DG ECFIN workshop

"Fiscal policy in an uncertain environment"

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The opinions expressed in this paper are solely those of the authors and do not reflect the views of the European Commission.

Key

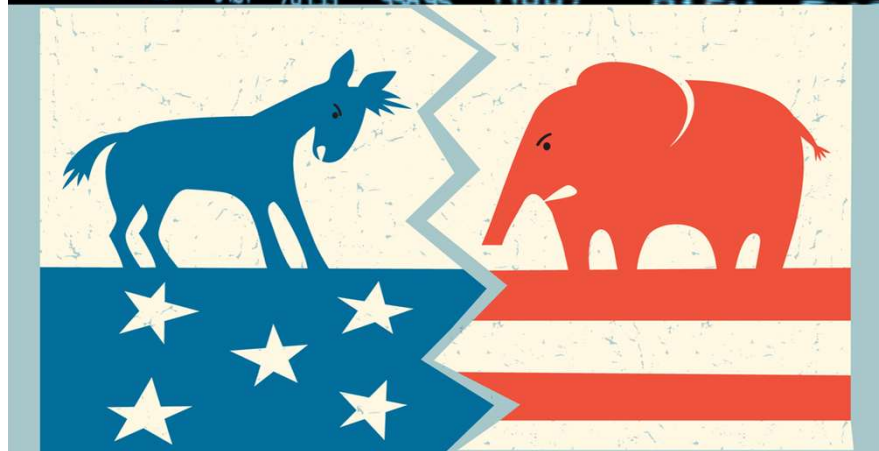uncertainty and economic activity

panel BVAR

3 proxy indicators
1. idiosyncratic BCS
2. common factor
3. global factor

standard results (investment)

not size but transmission matters

resilience

Literature

uncertainty
  1. wait & see
  2. credit rationing
  3. risk aversion
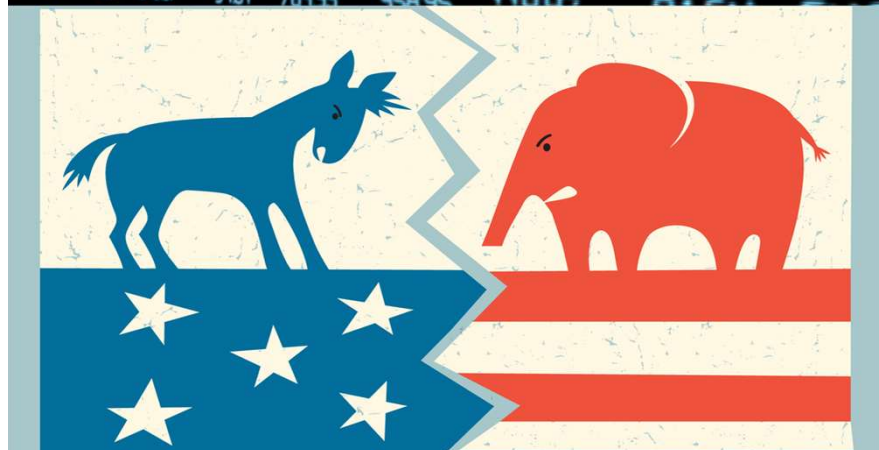
little (DS)GE insights

need frictions

latent indicator

1% industrial production

25% variability GDP

overshooting

Indicators

- **Financial markets**
  implied or historical volatility of stock market returns, e.g. VIX or VSTOXX (Bloom, 2009)

- **News-based indicators**
  frequency of key words in selected newspapers

- **Micro-based**
  the cross-sectional (firm-level or industry-level) dispersion of profits or productivity (Bloom et al., 2012).

- **Survey-based**
  dispersion of answers regarding expectations for the future in surveys

- **Macroeconomic forecasts**
  forecast dispersion (e.g. CF, SPF), forecast errors, or the unforecastable component of large sets of macroeconomic (and financial) variables (Jurado et al., 2016)

Problems

- real time

- latent

  is it uncertainty or

  risk aversion? or

  financial markets?

- availability

- **Business and Consumer Surveys (BCS)** are administered by the EC. The monthly BCS asks around 120,000 businesses about production, orders and employment and around 40,000 consumers about their financial situation and their evaluation of macroeconomic developments.

- Building on Bachmann et al. (2013), who proposed to measure uncertainty as **the dispersion of businesses' expectations about the future**, Girardi and Reuter (2015) developed three uncertainty indicators using the full scope of the BCS datasets for the aggregated EA. **We calculate these for individual EU countries**:

  - **FW_DISP** is based on the dispersion of the responses to 22 forward-looking questions (monthly and quarterly).

  - **BW_DISP** accounts for the backward-looking versions of the questions, which allows for comparison between the ex-ante and ex-post dispersion.

  - **IQ_DISP** is based on the dispersion of the scores across different questions (rather than responses to single question). If the economic situation changes, the responses to different questions can evolve in different directions and the dispersion of the scores across questions increases.
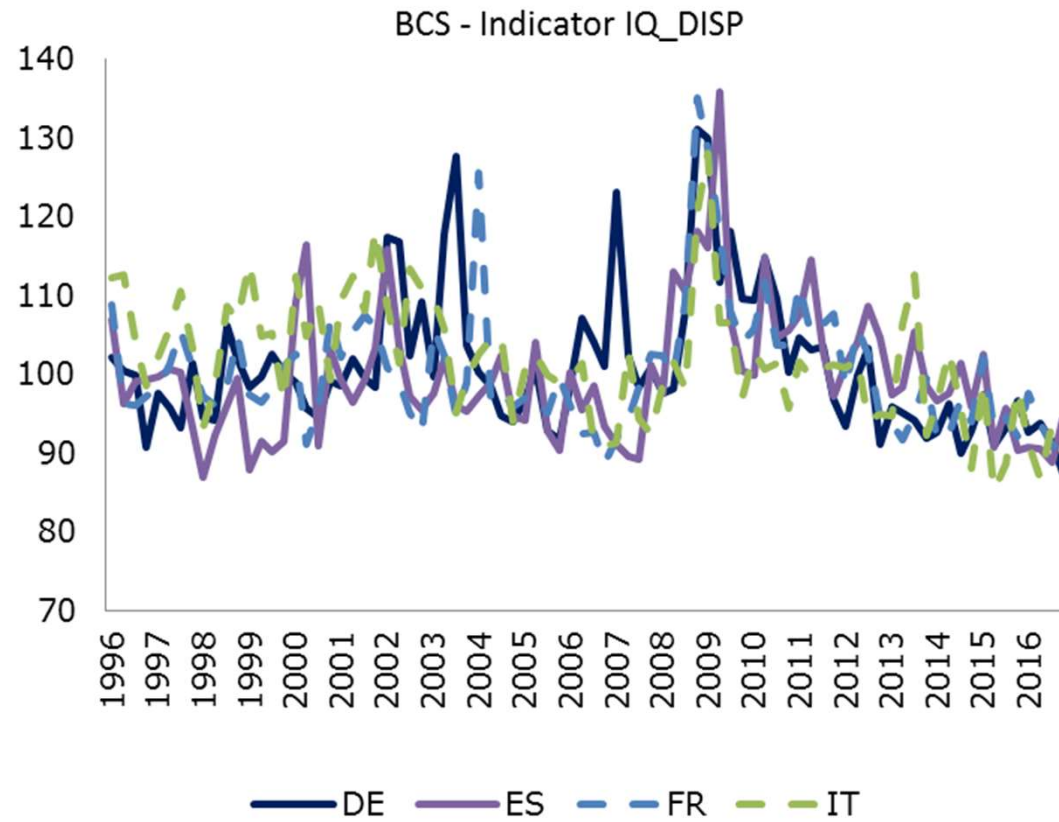
Indicators

1. **BCS, EC**

   large scale survey on industry, services, retail, … → +/- scale

   Girardi & Reuter (2016)
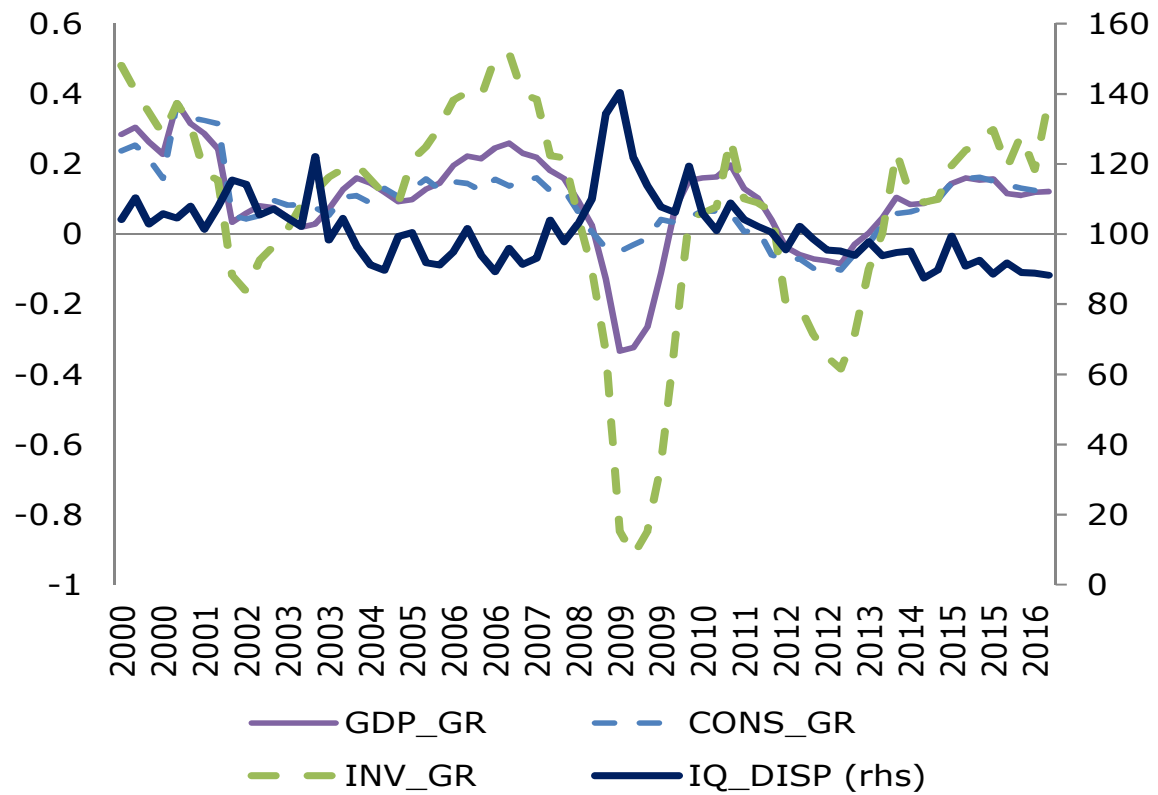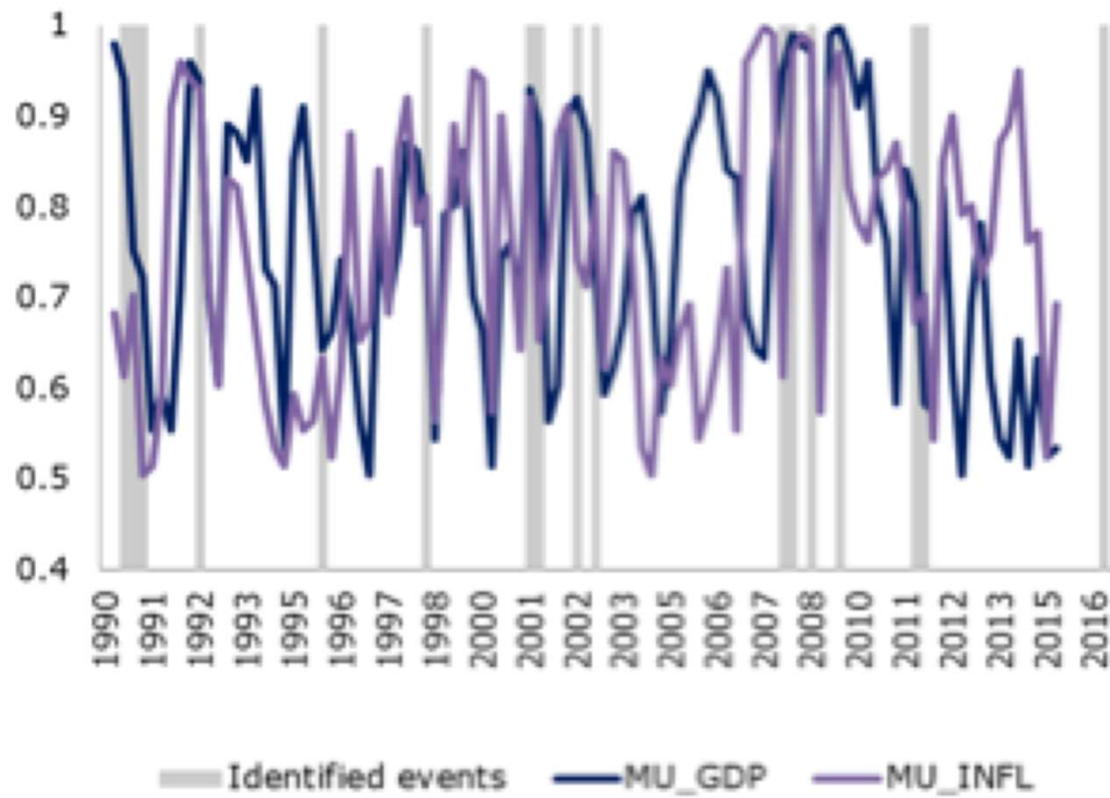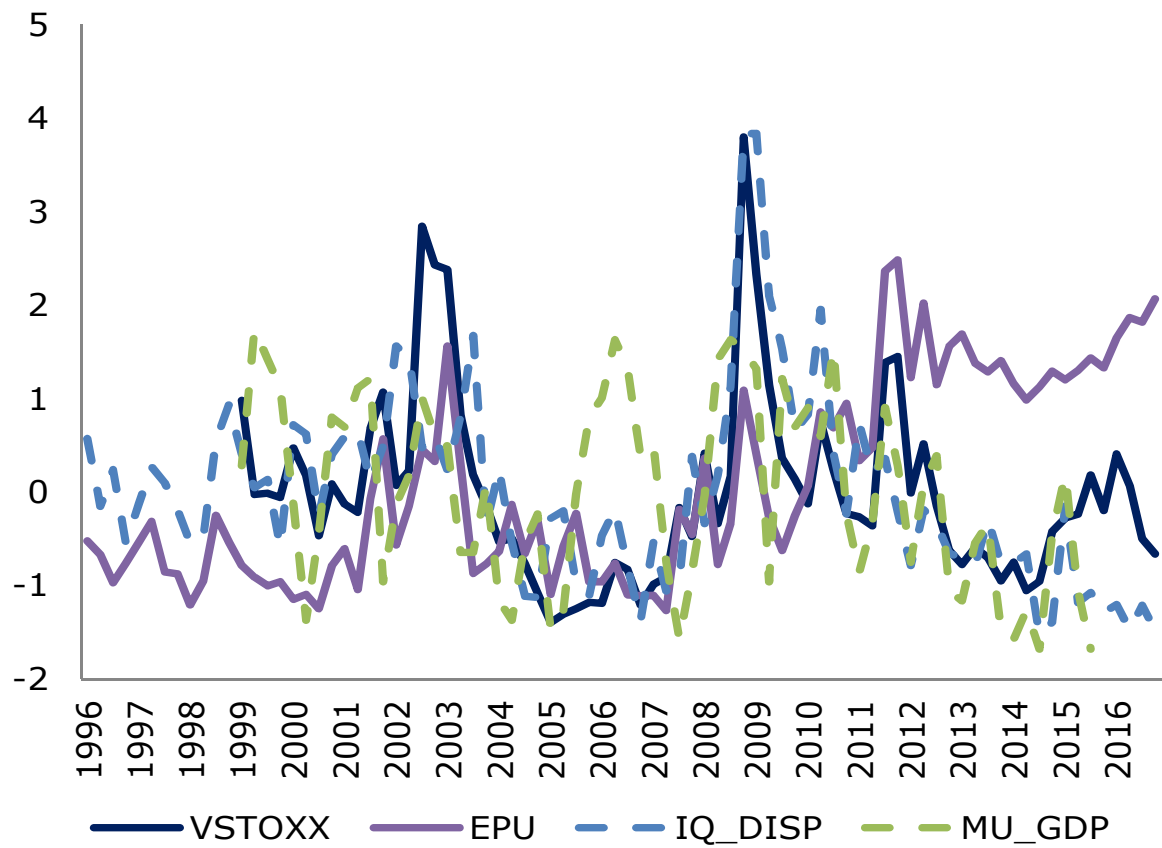
   3 types

2. **macro forecasts**

   Rossi & Sekhposyan (2016)

   SPF (ECB)

   forecast errors: when in tail of unconditional distribution, U

France

BCS - Indicator IQ_DISP
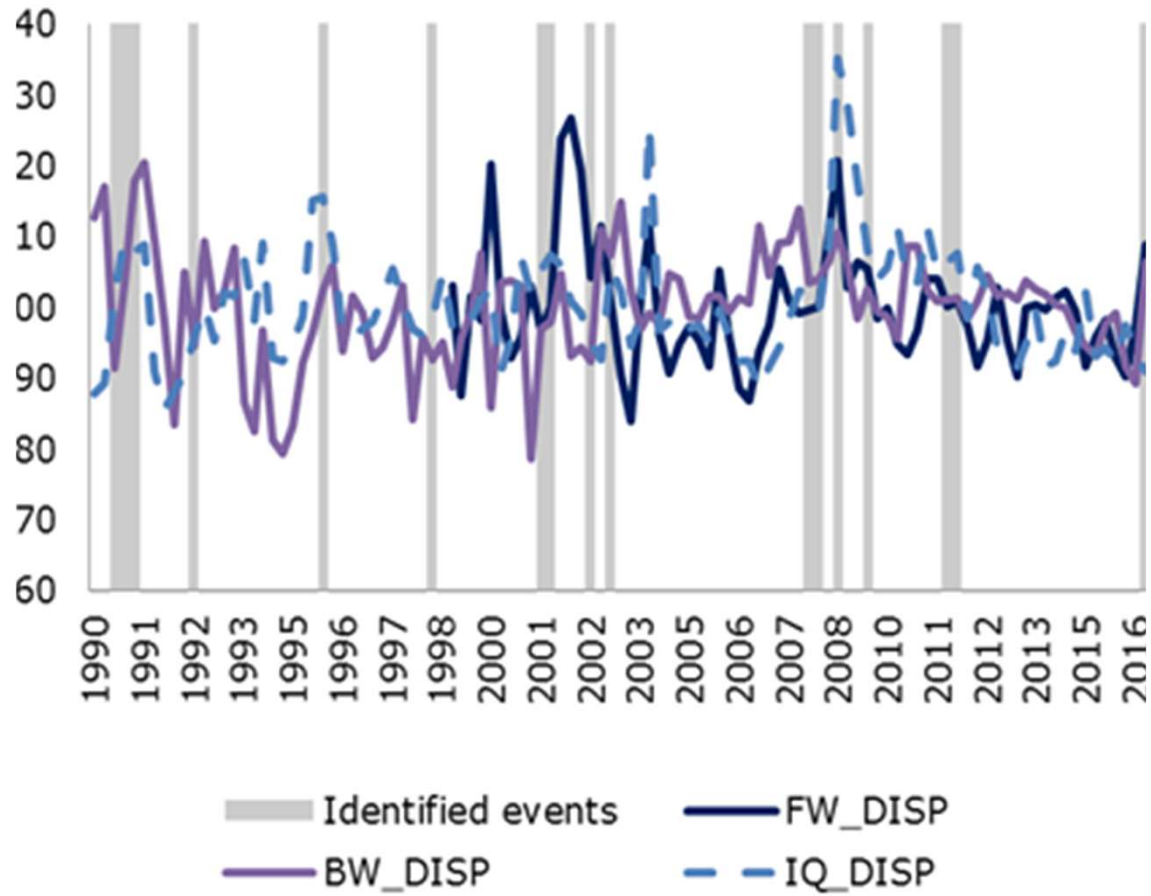
Germany
Spain
France
Italy

EA common factor

Indicators

1. **BCS, EC**
   large scale survey on industry, services, retail, … → +/- scale
   Girardi & Reuter (2016)
   3 types

2. **macro forecasts**
   Rossi & Sekhposyan (2016)
   SPF (ECB)
   forecast errors: when in tail of unconditional distribution, U

EA

EA

Indicators

1. **BCS, EC**
   large scale survey on industry, services, retail, … → +/- scale
   Girardi & Reuter (2016)
   3 types

2. **macro forecasts**
   Rossi & Sekhposyan (2016)
   SPF (ECB)
   forecast errors: when in tail of unconditional distribution, U

3. **macro forecasts**
   Claeys (2017)
   factor model on 259 CEF forecast errors in G7
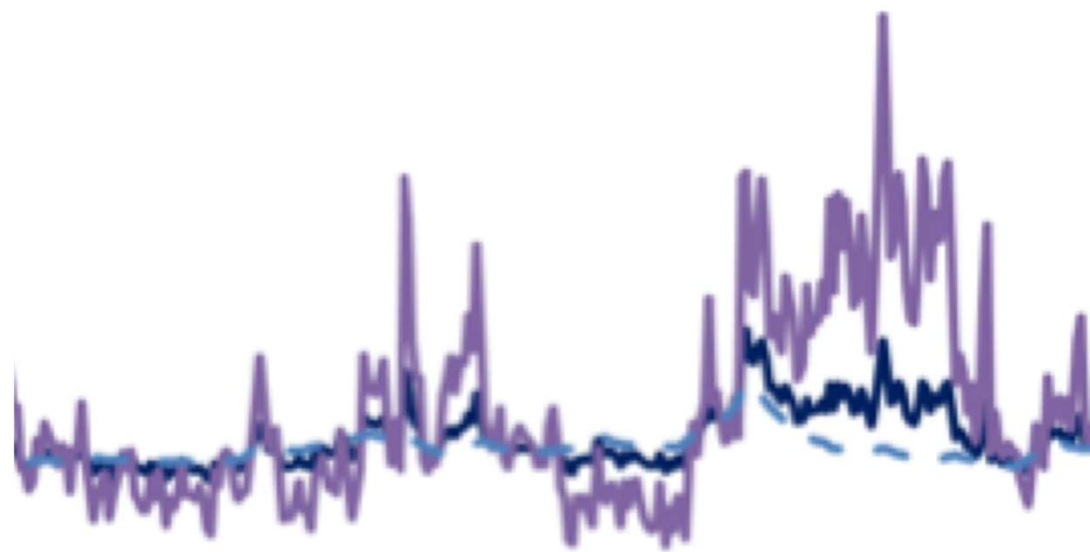
global
G7

1994 1995 1996 1997 1998 1999 2000 2001 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014

al unc. ——— EPU — — Macro unc. (Jurado et al.)

Methodology

- panel VAR

- 1996 – 2016

- 18 EU countries

  (AT, BE, CZ, DE, DK, EE, EL, ES, FI, FR, HU,

  IT, NL, PT, SE, SI, SK, UK)

Methodology

- Bayesian (panel) VAR:

  pooled mean group estimator

- [stock, ESI, **U**, interest, inflation, GDP, C or I]

- Cholesky ordering

- uncertainty shock: on 2nd moment

  confidence shock: 1st moment

  financial shock: 1st moment

Methodology

- difference between idiosyncratic and common uncertainty shocks

- the interactions between uncertainty (2nd moment shock) and other related shocks (namely, confidence and financial shocks, i.e. 1st moment shocks)

- the link between impact of uncertainty shocks and structural characteristics
  (sub-panel of EU countries)

Results: EU panel
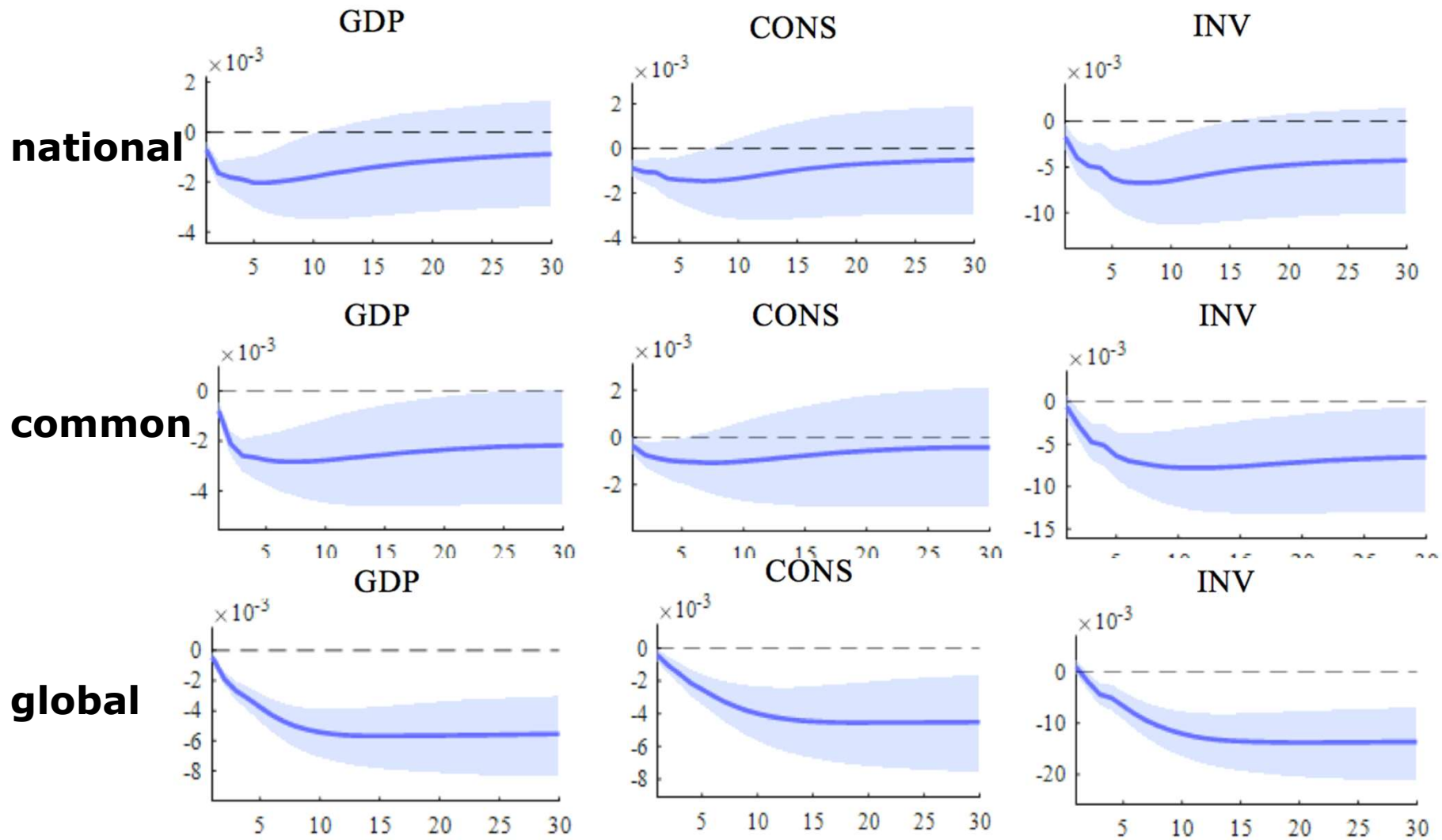
Results: other shocks
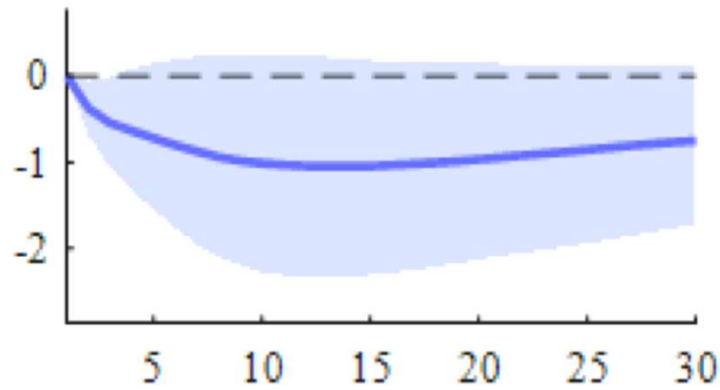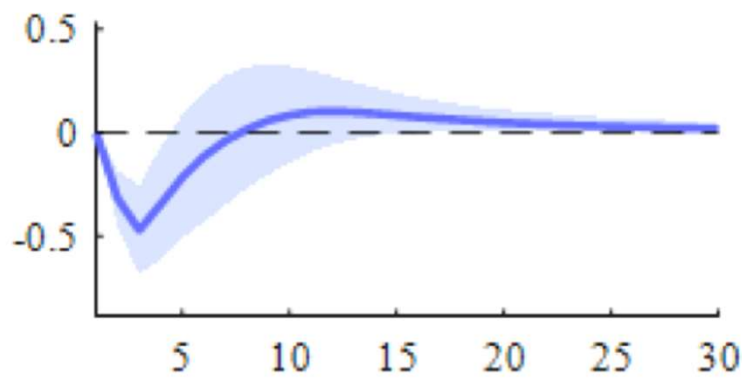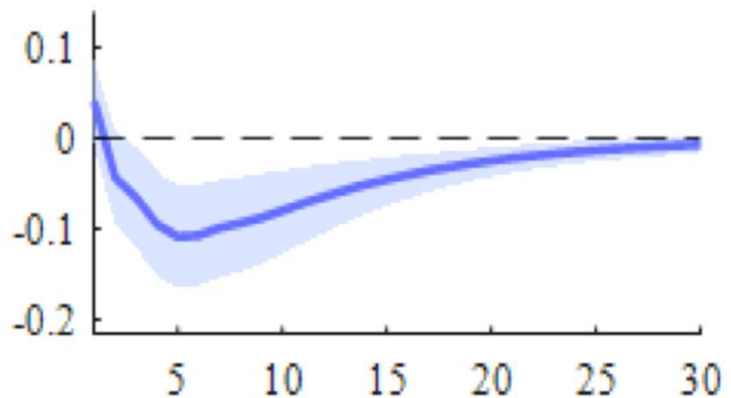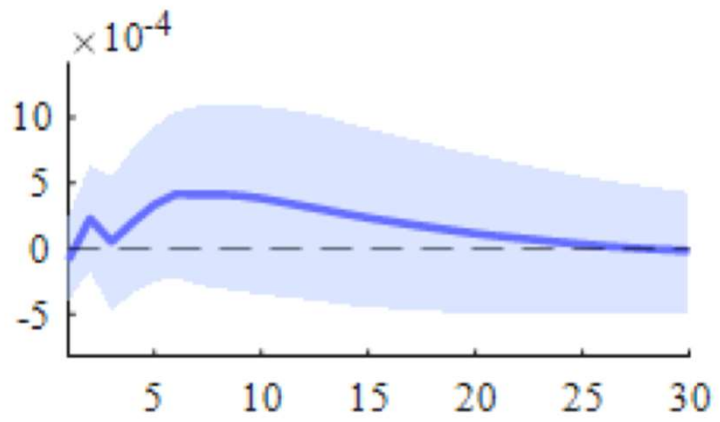
Results: heterogeneity

compare effect of EU shocks on Germany v Spain
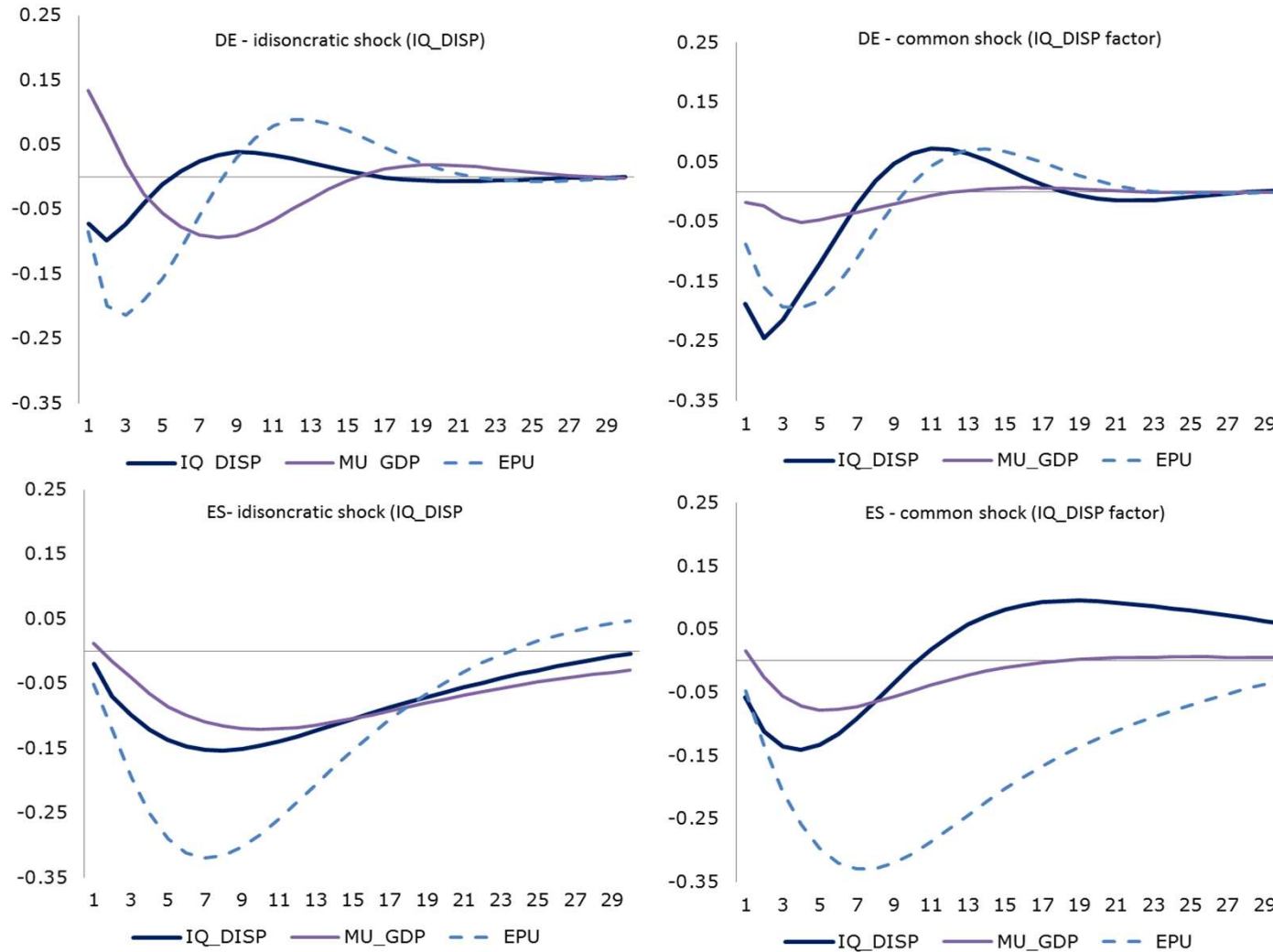
Notes: The graph represents estimated response of GDP, consumption and investment following unexpected uncertainty shock in the BVAR model. Uncertainty is proxied by three alternative indicators: IQ_DISP, MU_GDP, EPU. The x-axis represents quarters. The y-axis represents percentage points.

Results: heterogeneity

compare effect of EU shocks on Germany v Spain

**Historical decomposition of GDP (YoY growth rates)-
Germany and Spain**

DE

ES
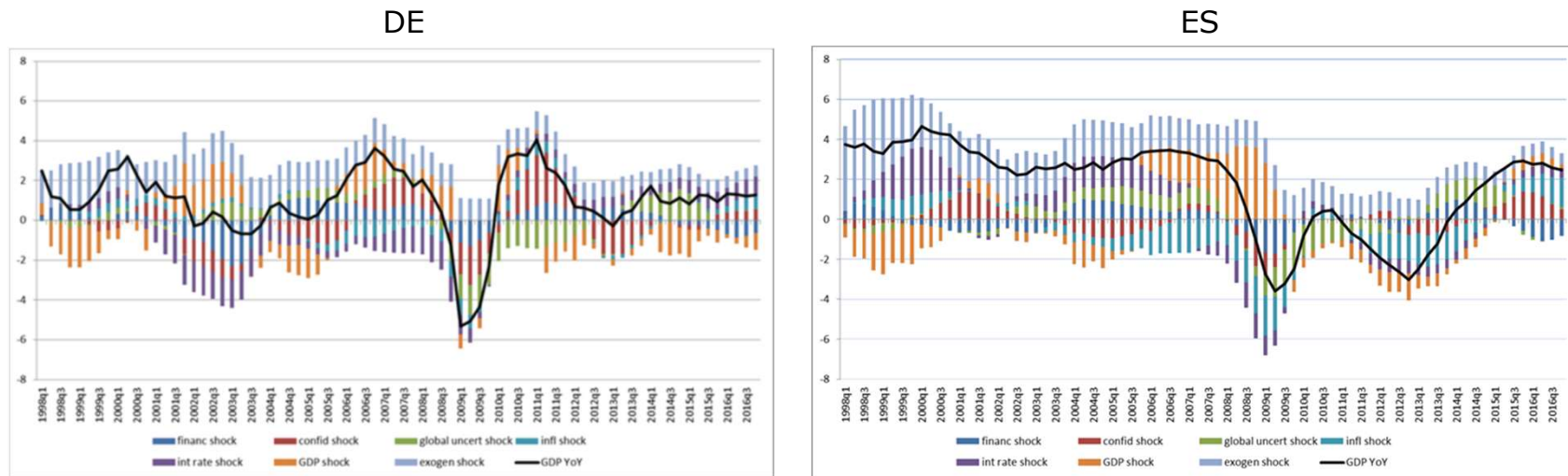
Notes: The graph represents the estimated historical variance decomposition of GDP growth as attributed to shocks in the endogenous variables included in the BVAR model containing 18 EU countries and to exogenous shocks (of one standard deviation) in the panel BVAR model containing 18 EU countries.

21

Results: heterogeneity

Idiosyncratic shock

GDP	CONS	INV

Common shock

GDP	CONS	INV
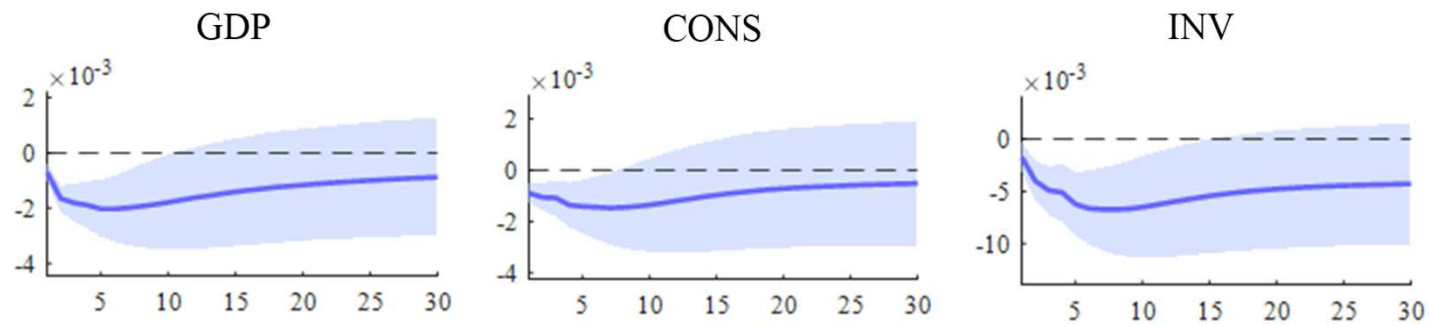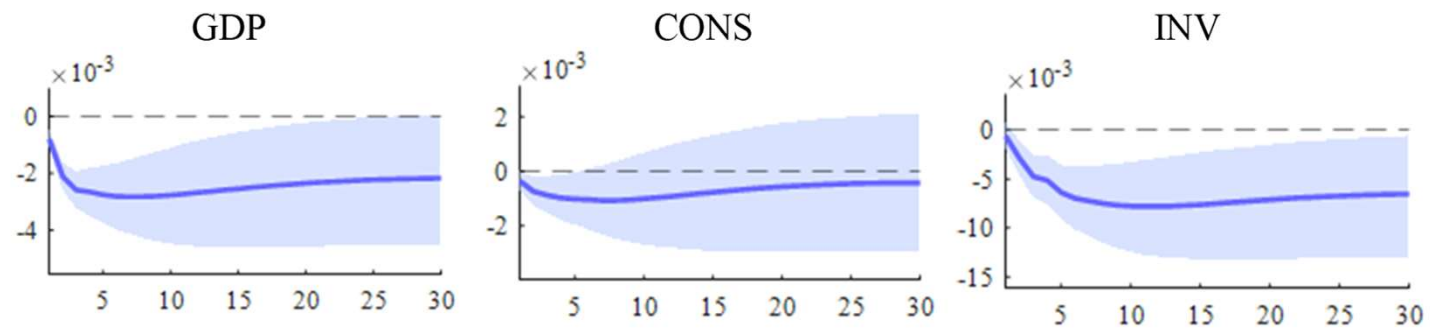
Results: heterogeneity

- economic resilience:

  flexibility of labour and product markets (WEF

  Competitiveness database)

- openness:

  trade (WDI Worldbank)

  export concentration (HHI)(UNCTAD)

- sectoral structure:

  manufacturing share
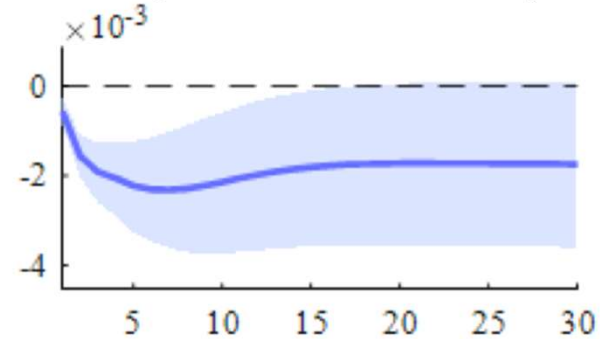
  sd shares NACE10 sectors

Results: heterogeneity

Resilience

Labour market flex. - Higher

Labour market flex. - Lower

Product market flex. - Higher

Product market flex. - Lower

Openness

Economy openess - Higher

Economy openess - Lower
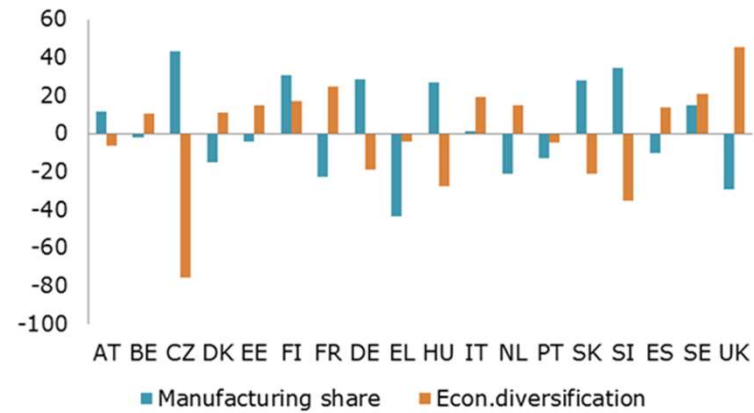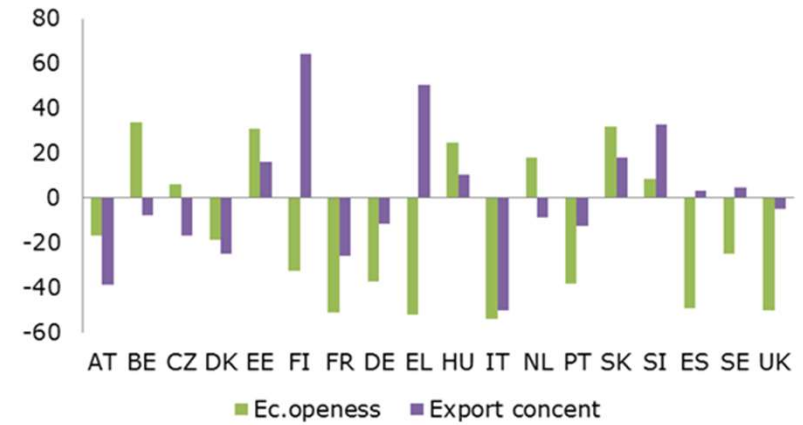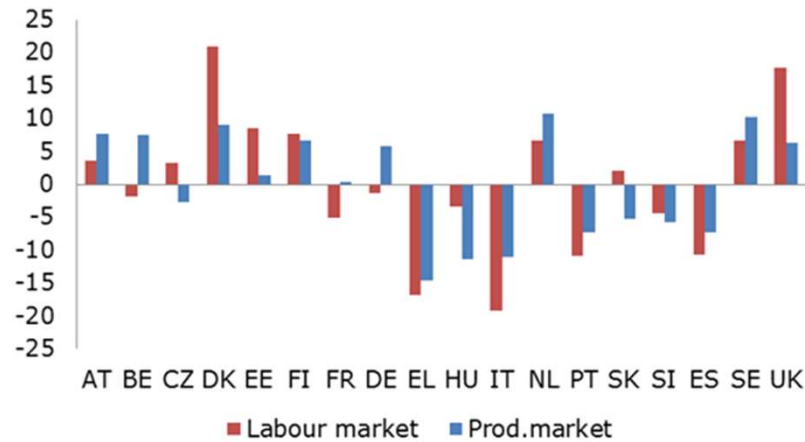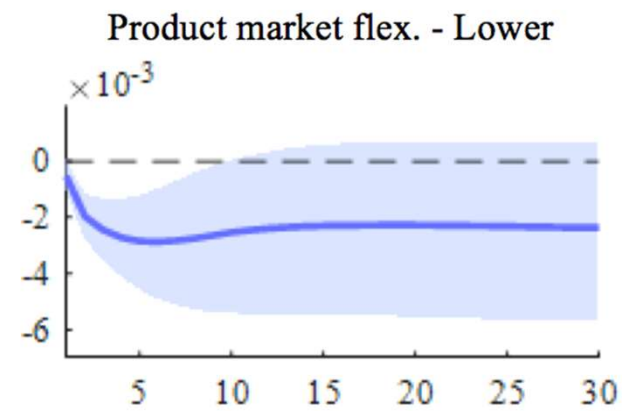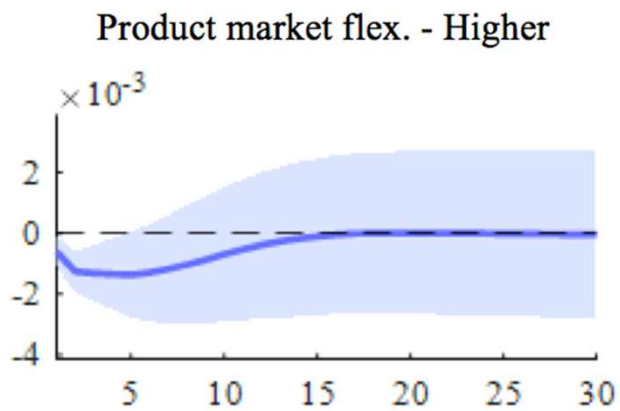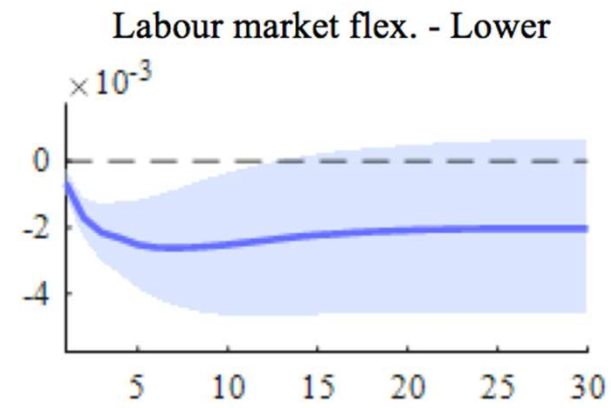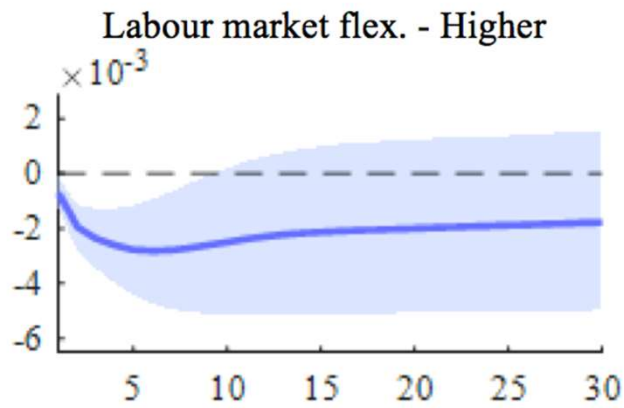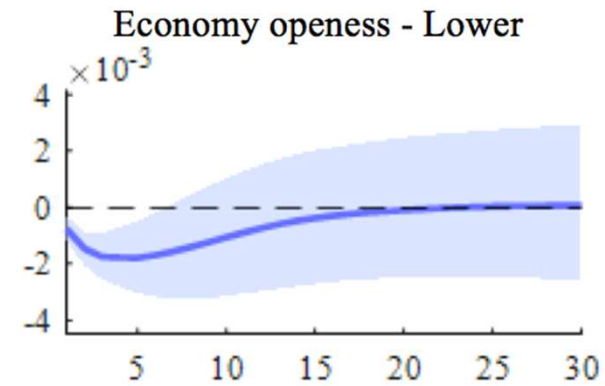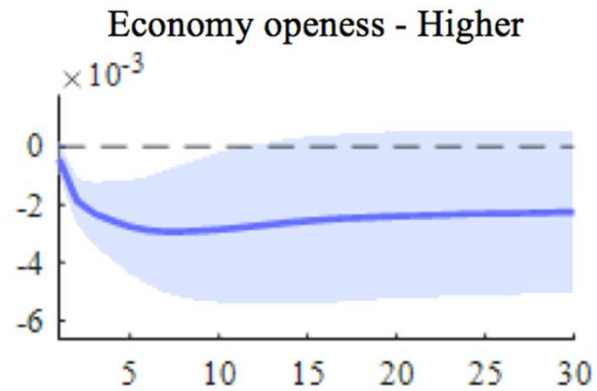
Export conc. (Herfindahl-Hirschman.) - Higher
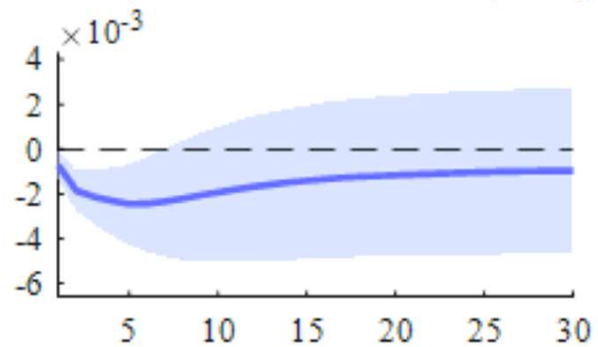
Export conc. (Herfindahl-Hirschmann) - Lower

Sectors

Manufacturing share – Higher
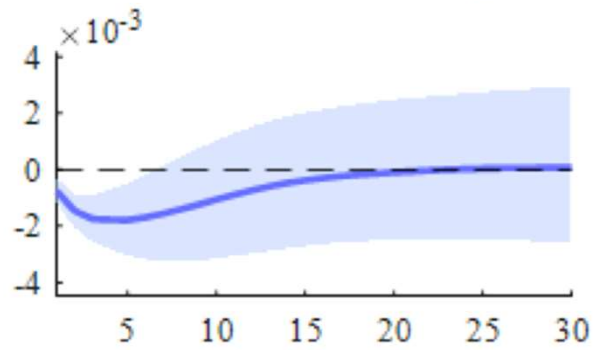
Manufacturing share – Lower
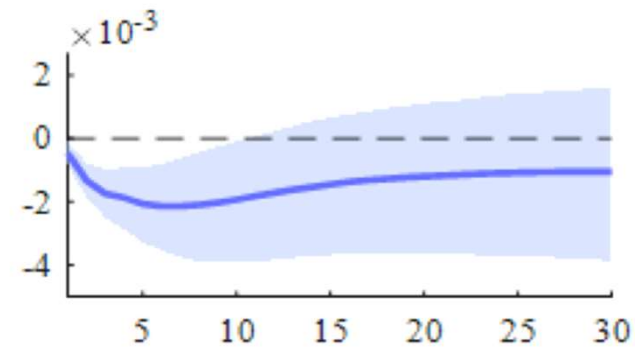
Sector diversification - Higher
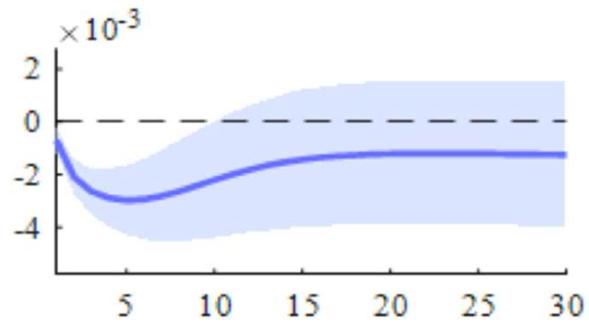
Sector diversification - Lower
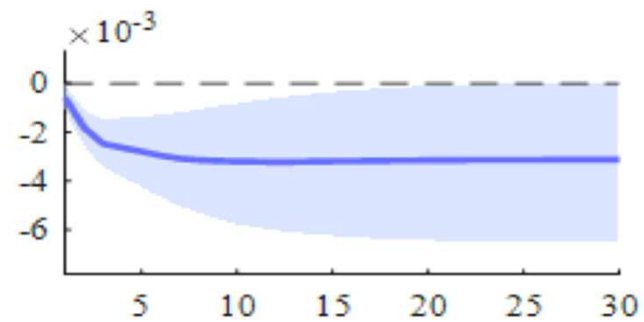
Contribution

characteristics of the

drivers of transmission

of uncertainty

+ **policy reaction**

stabilisation policy is
ineffective when
uncertainty hits

hence, policy should
become more aggressive?
or be more rules-based?

focus on a particular
channel?

Theory		fiscal policy	monetary policy
		ineffective, discretionary or procyclical (Fernandez-Villaverde et al, 2012; Tang, 2015; Ferrière and Karantounias, 2016)	
financial development	economies are more robust, as constraints do not bite (Arrelano et al., 2010; Neumeyer and Perri, 2005; Uribe and Yue, 2006)	fiscal policy matters if financial markets are not developed - financial market as substitute?	exacerbate crisis or shield economy (transmission)
diversification	withstand external shocks	fiscal policy matters if economies are not diversified, but constrained (Kaminsky, 2010)	shield economy (transmission) (Novy and Taylor, 2016)

Evidence		fiscal policy	monetary policy
		Bernal et al. (2010) Colombo (2013) Klössner and Sekkel (2014) Pellegrino (2015)	Alessandri and Mumtaz (2015) Bordo and Koch (2015)
financial development	Carrière-Swallow and Cespedes (2013)	?	?
diversification	Carrière-Swallow and Cespedes (2013)	?	?

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panel VAR: interact response to uncertainty
with economic characteristics and policy
like Towbin and Weber (2013)

➔ 50 countries, 1990:1-2014:4

BBD ---- JLN factor
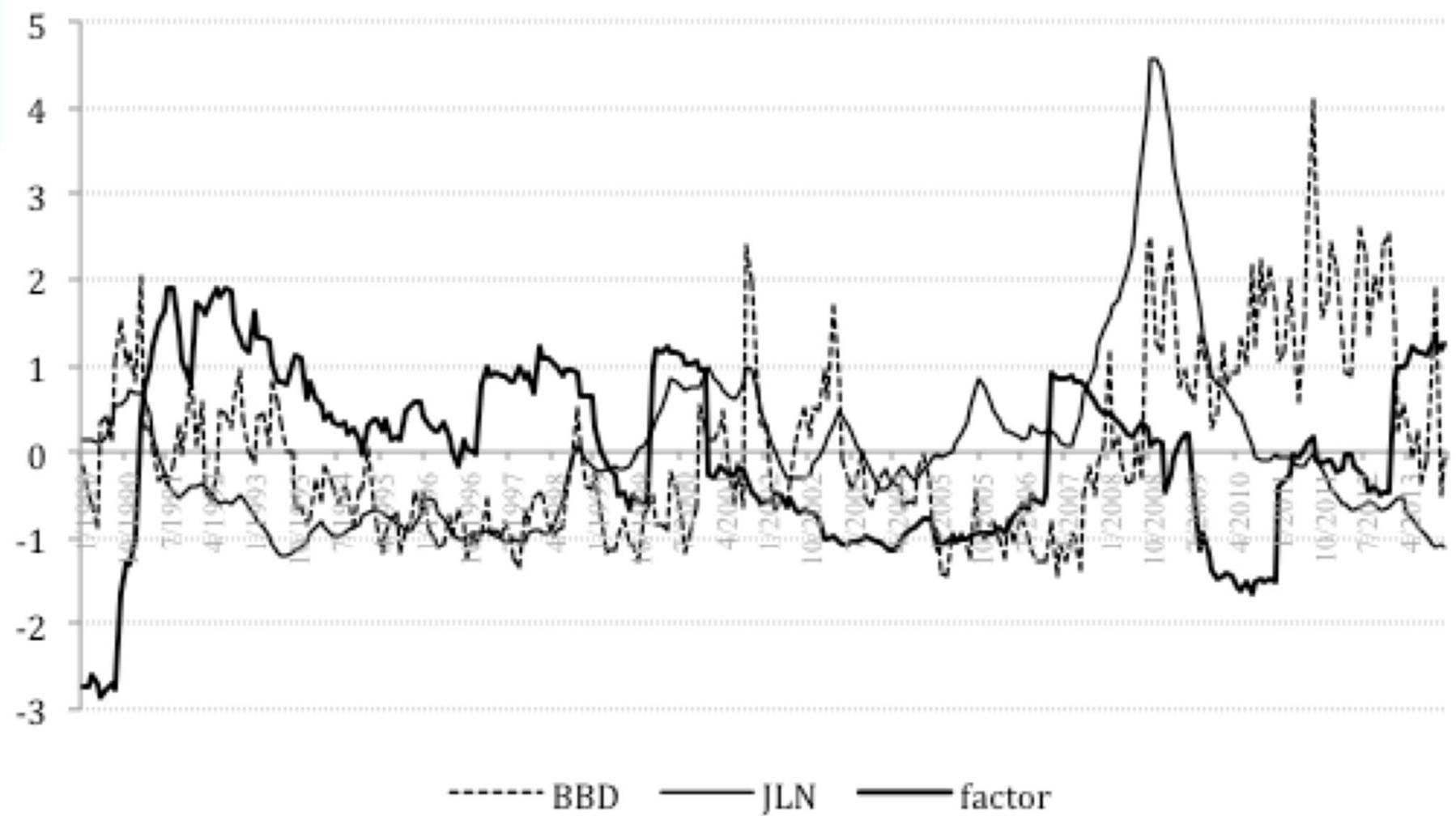
panel VAR

Y = [U, Consumption, Investment]

→ quarterly accounts IMF, OECD

Y = [U, Consumption, Investment]

→ quarterly accounts IMF, OECD

characteristics condition the response (Towbin and Weber, 2013):
VAR coefficients vary *deterministically* with different characteristics
of the panel units

X_1 = financial development
→ World Bank – Čihák et al. (2012)
X_2 = diversification
→ GGDC – 10 sector database
Z_1 = fiscal policy
→ level of debt ratio – IMF, Abbas et al. (2010)
Z_2 = monetary policy
→ fixed or float – Rose (2014)

$$Y_{it} = A_{0i} + A(L)Y_{it-1} + \varepsilon_{it} \quad \text{and } A(L)=f(X_{it}, Z_{it})$$

- impulse responses

  for the continuous variables at 10th-90th percentile; for a dummy, the evaluation is at 0 or 1

  95% error bands

- Wald test

$$\alpha_{p,it}^{m,n} = \beta_{p,1}^{m,n} + \beta_{p,2}^{m,n} X_{it} + \beta_{p,3}^{m,n} Z_{it} + \beta_{p,4}^{m,n} X_{it} Z_{it}$$

Panel VAR
no interaction
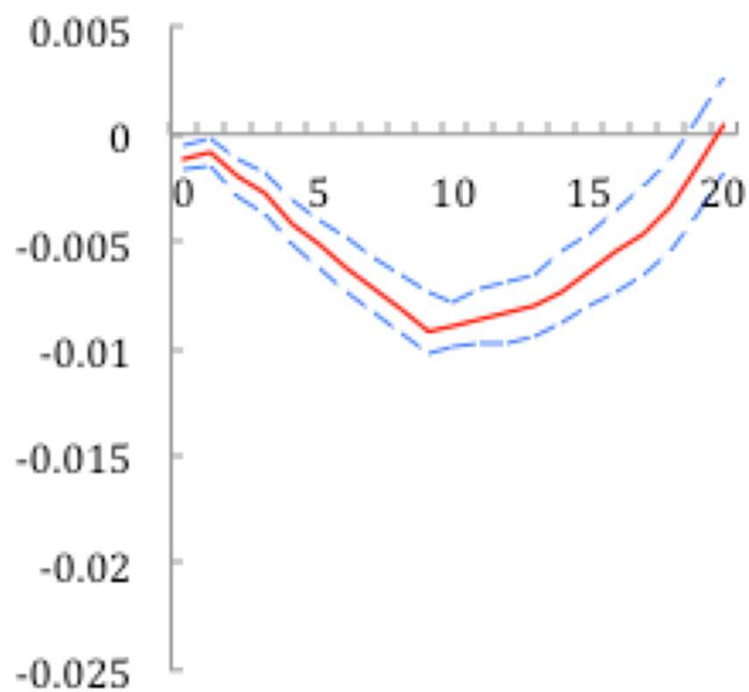
investment
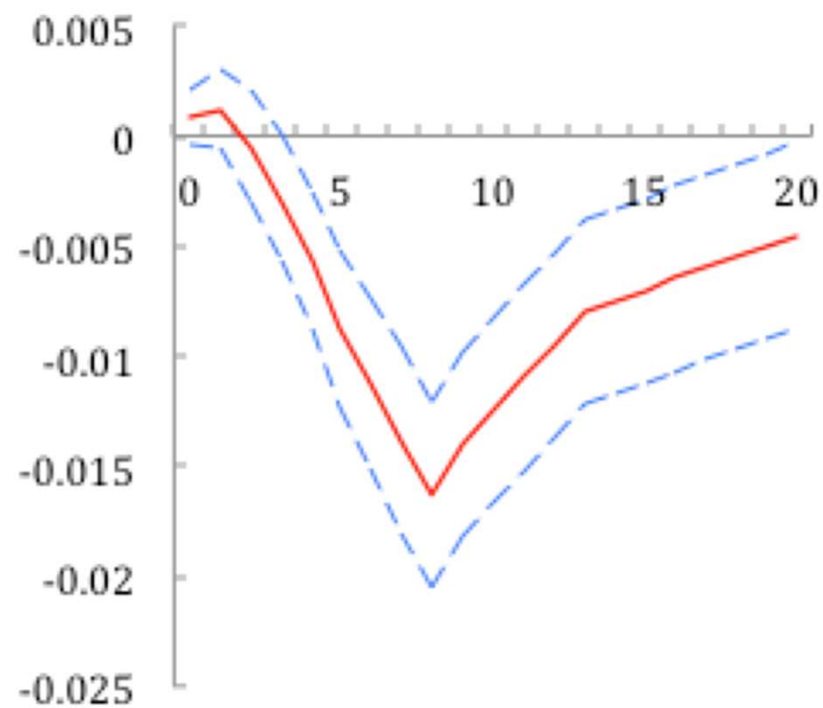
consumption

X = financial development

Financial Development Database (Svirydzenka, 2016)

X = financial development

Financial Development Database (Svirydzenka, 2016)
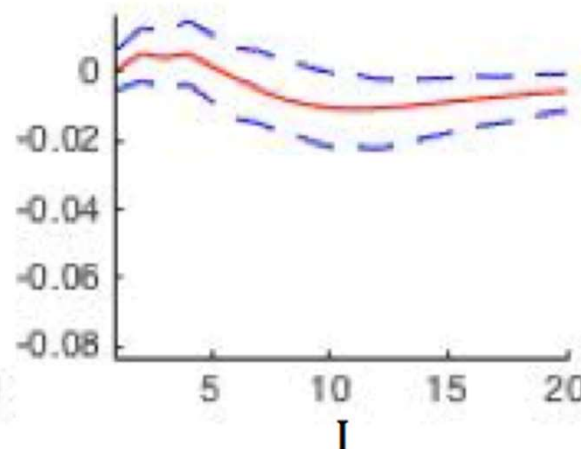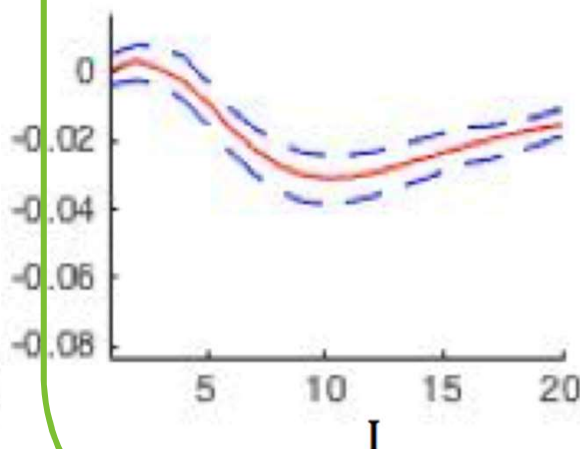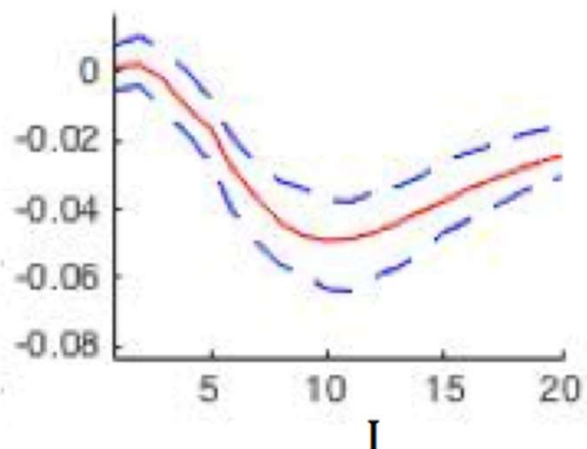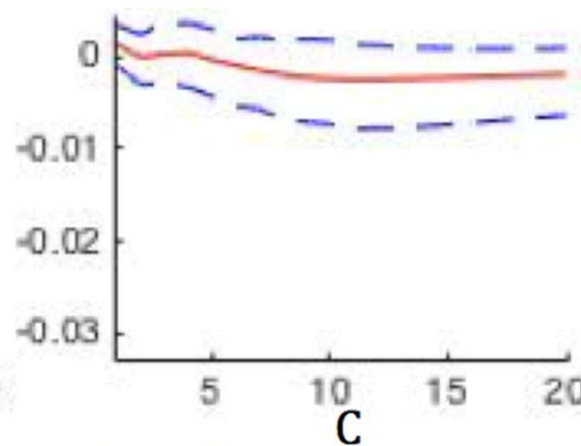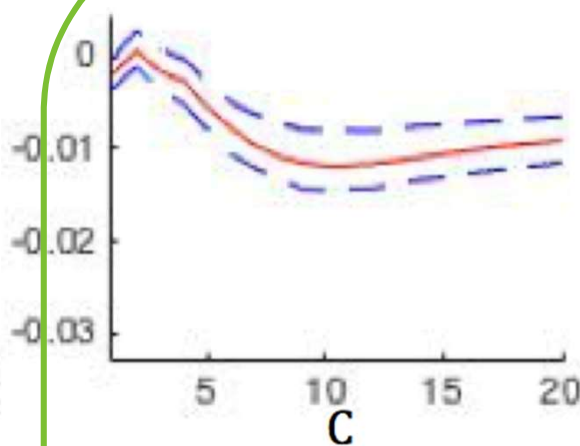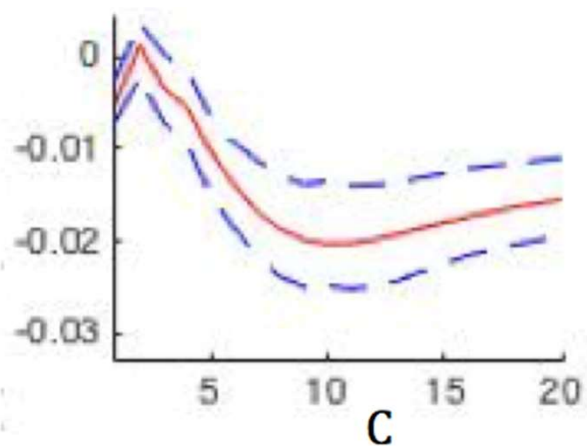
low financial development　　median financial development　　high financial development
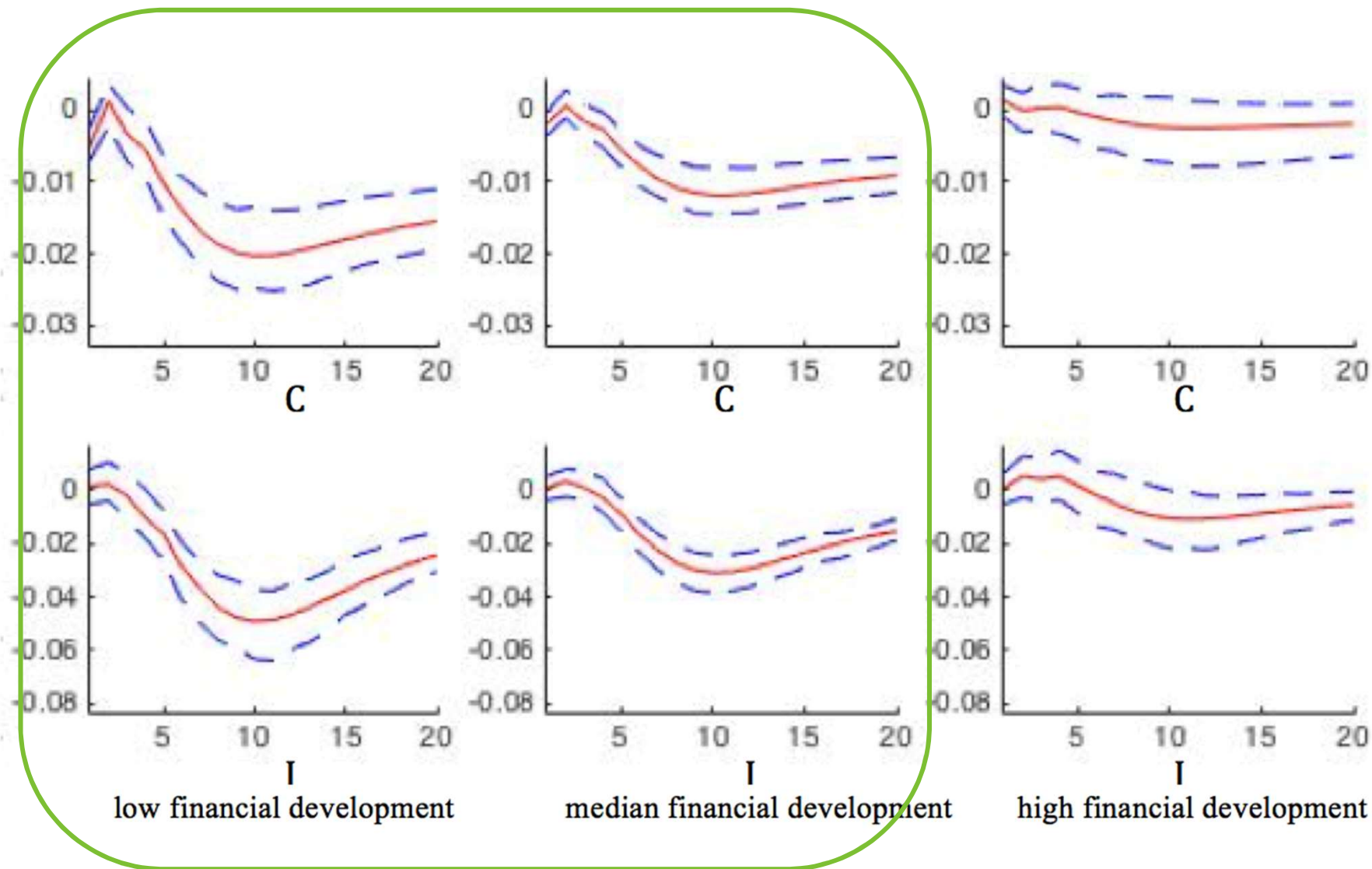
X = industrial diversification

IMF (2014) UN-NBER data
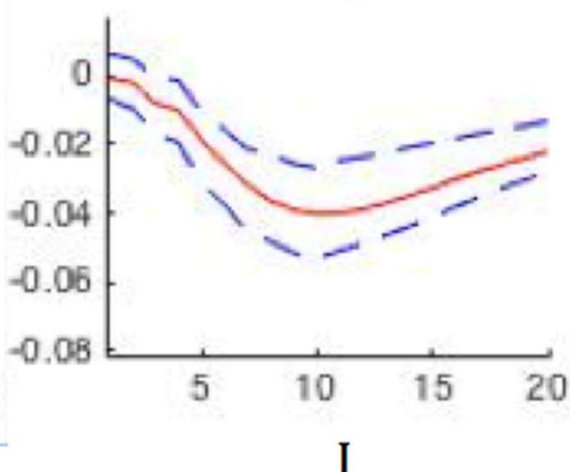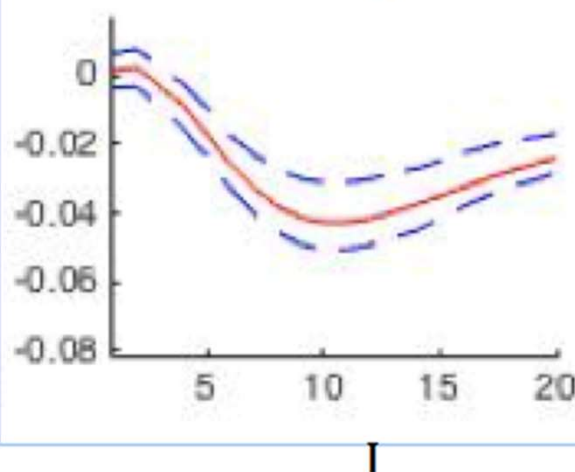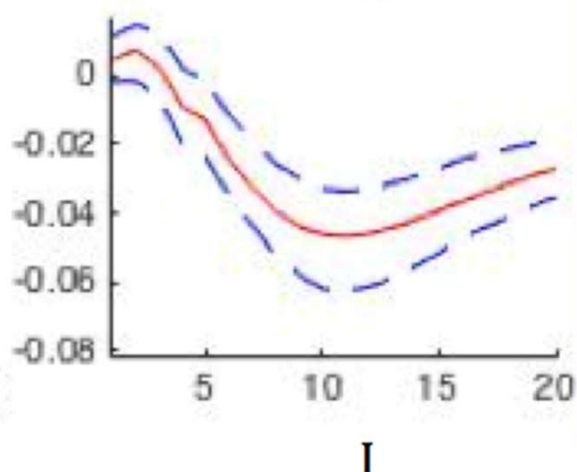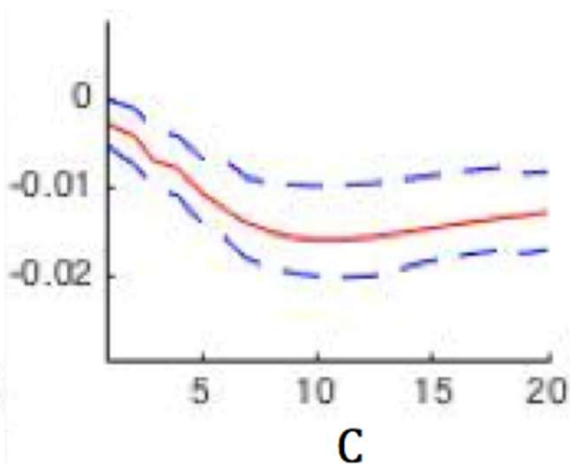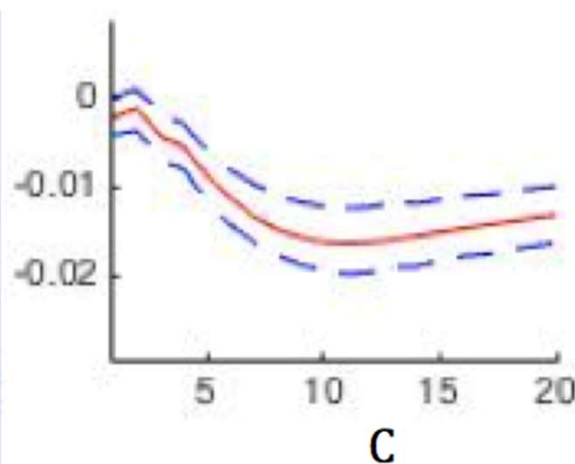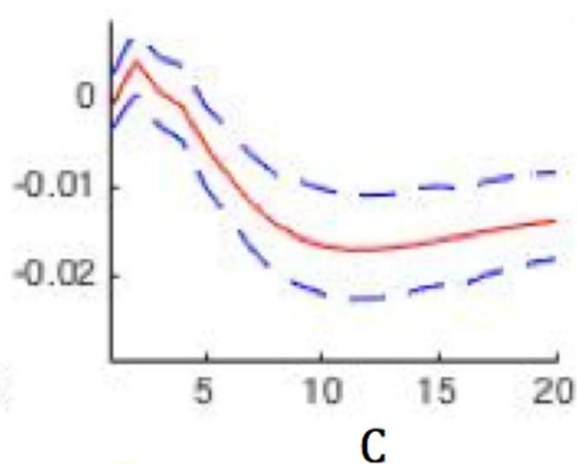
low industrial diversification   median industrial diversification   high industrial diversification
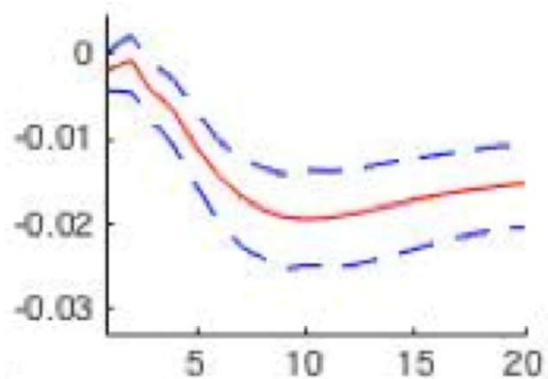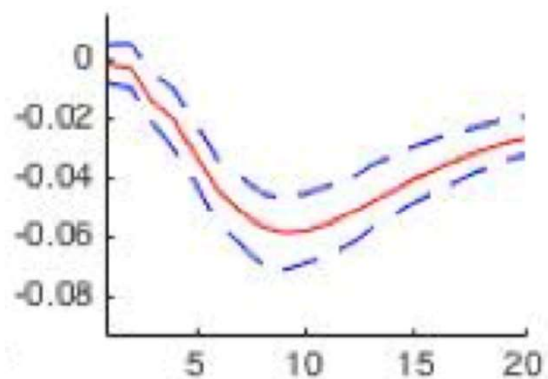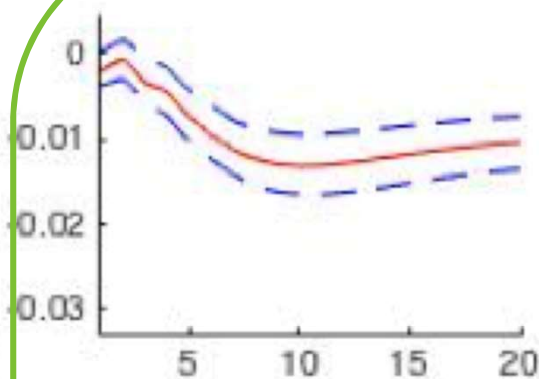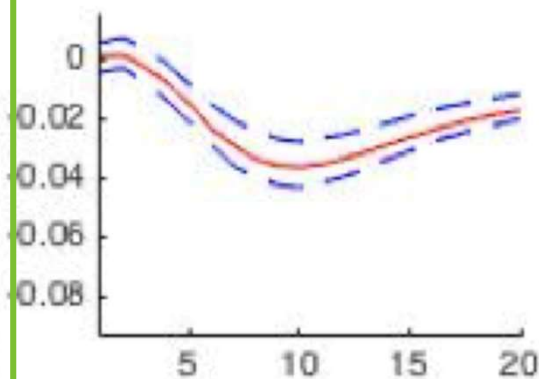
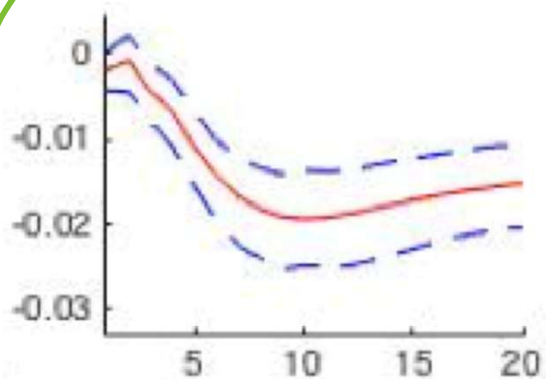**IMF IFS**
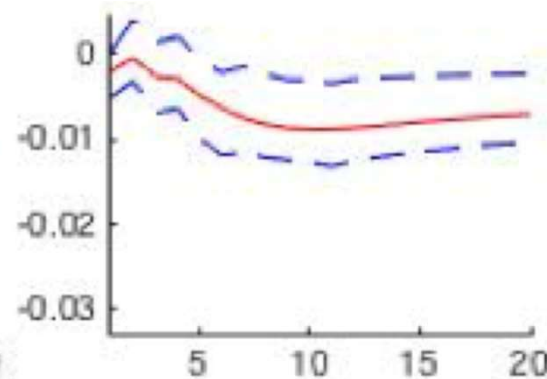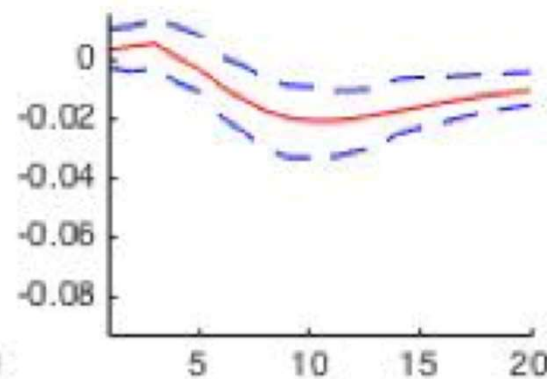
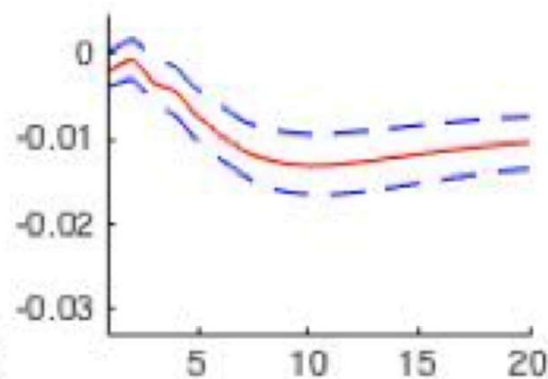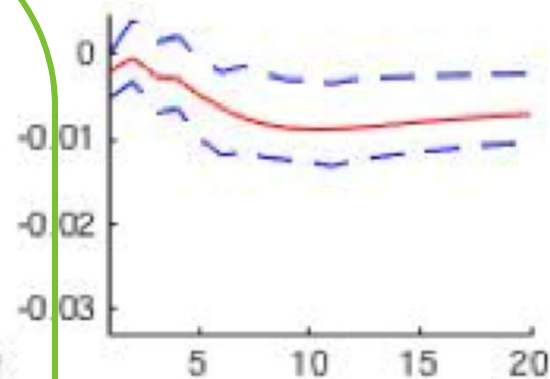low public debt   median public debt   high public debt

Z = public debt
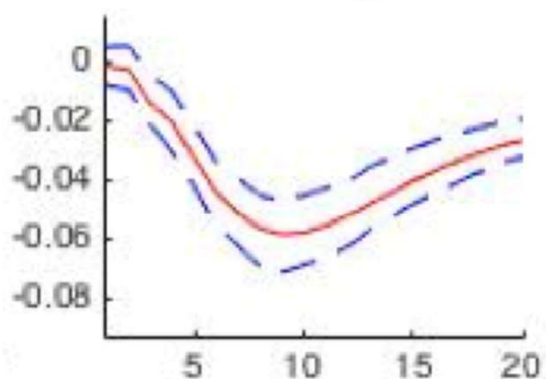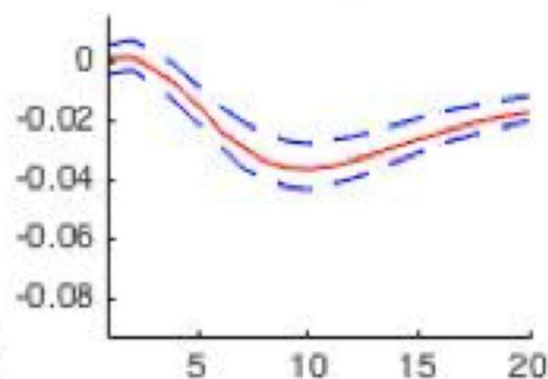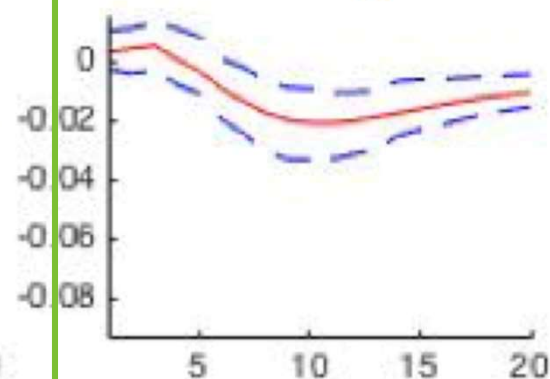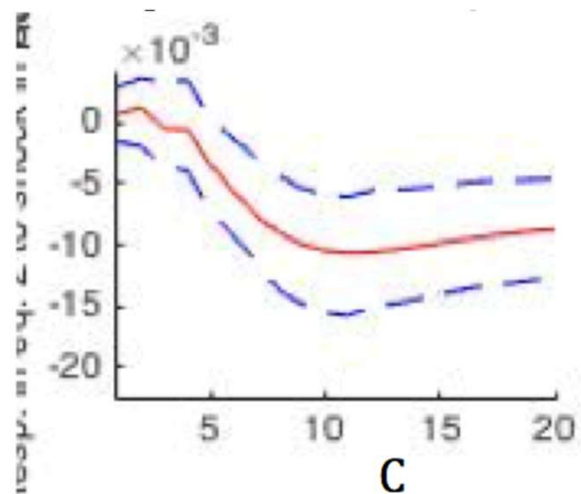
low public debt   median public debt   high public debt

Z = exchange rate regime
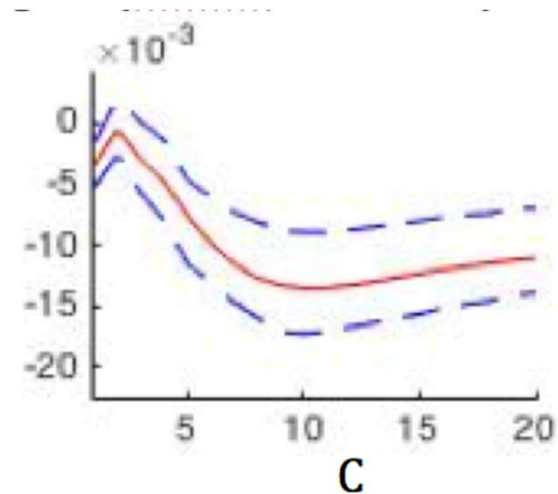
Ilzetzki et al. (2008)
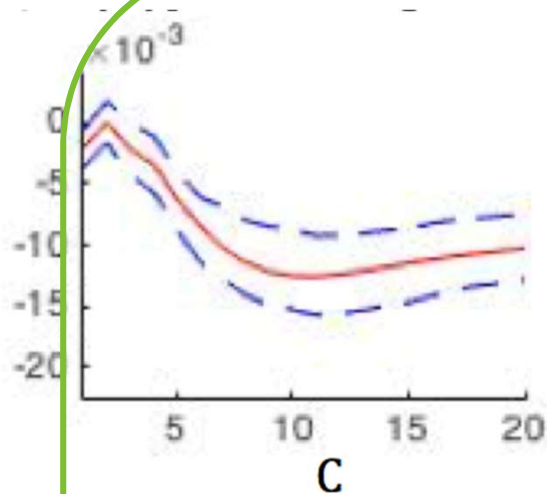
fixed peg   crawling peg   floating exchange rate

Z = exchange rate regime
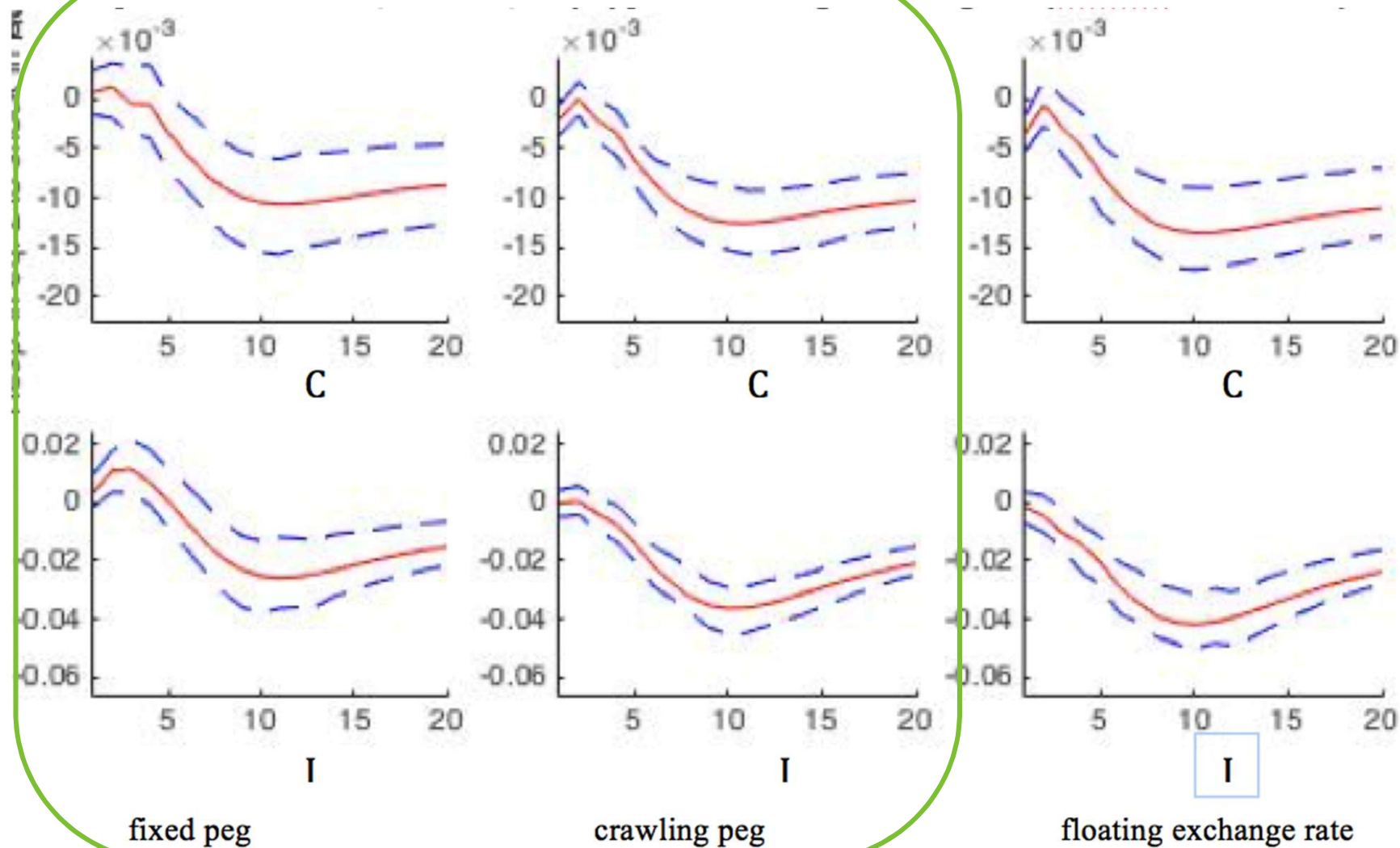
Ilzetzki et al. (2008)

fixed peg · crawling peg · floating exchange rate

Z = debt

X = financial

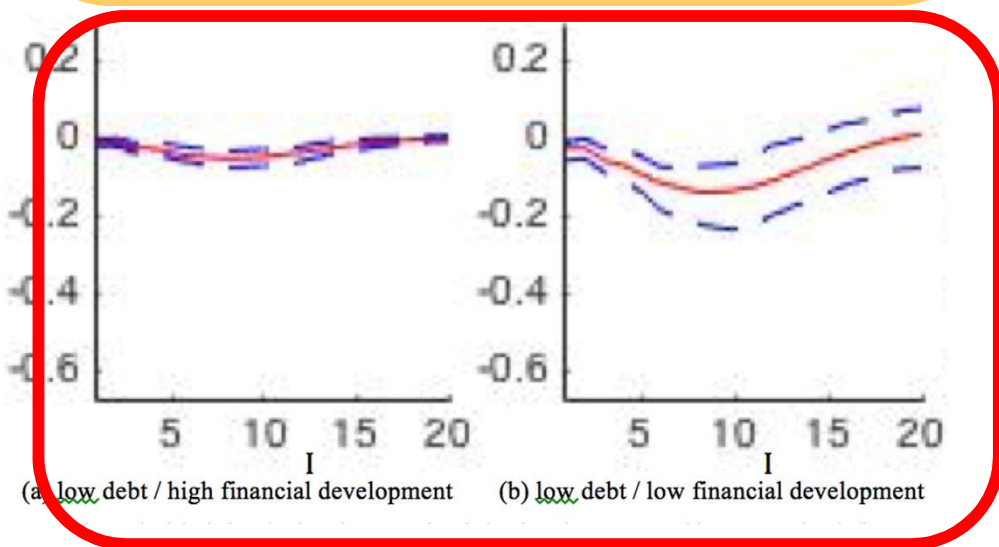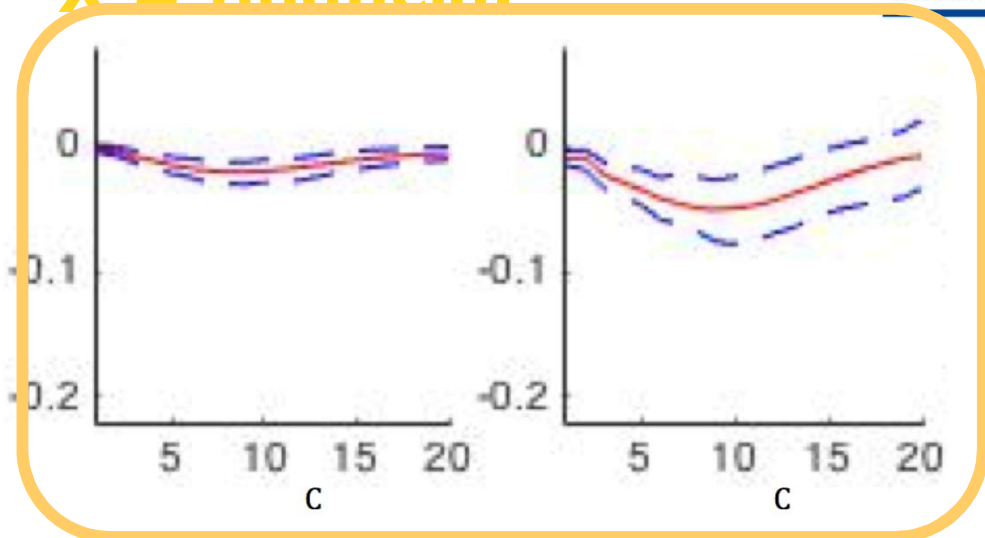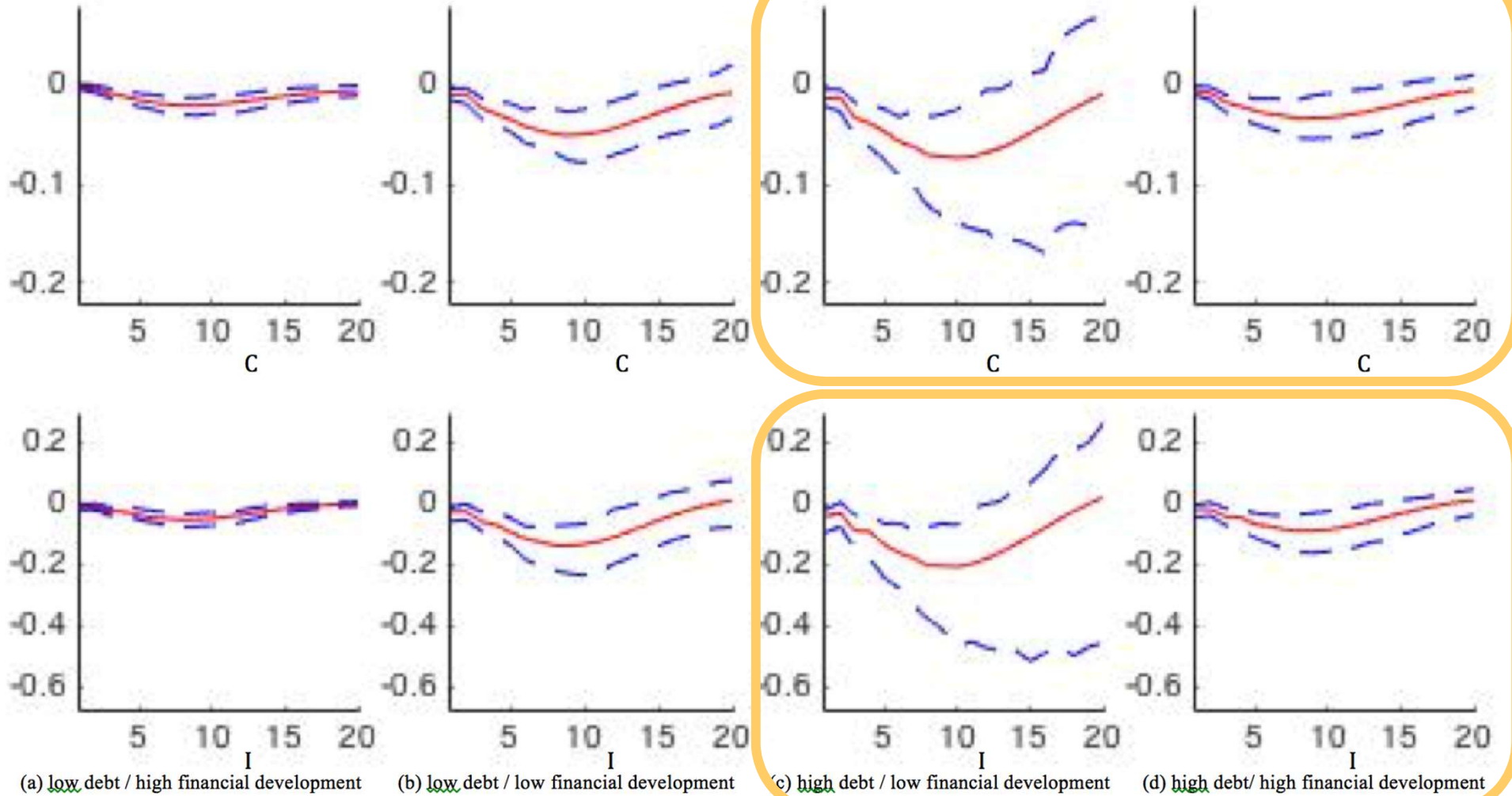(a) low debt / high financial development   (b) low debt / low financial development

Z = debt

X = financial

(a) low debt / high financial development   (b) low debt / low financial development   (c) high debt / low financial development   (d) high debt/ high financial development

Z = exchange rate regime

X = financial development

(a) less developed financial system · (b) less developed financial system

fixed exchange rate regime · floating exchange rate regime
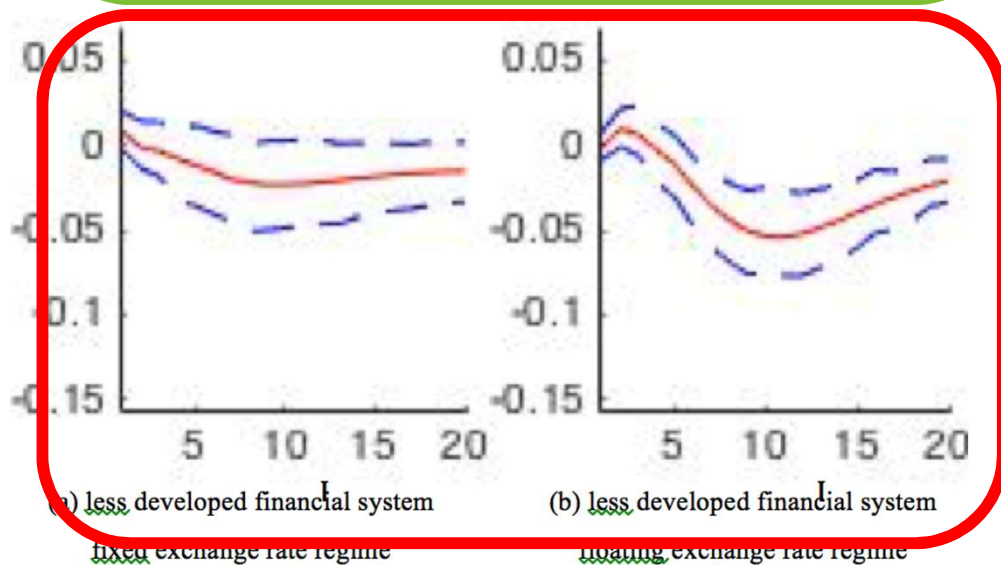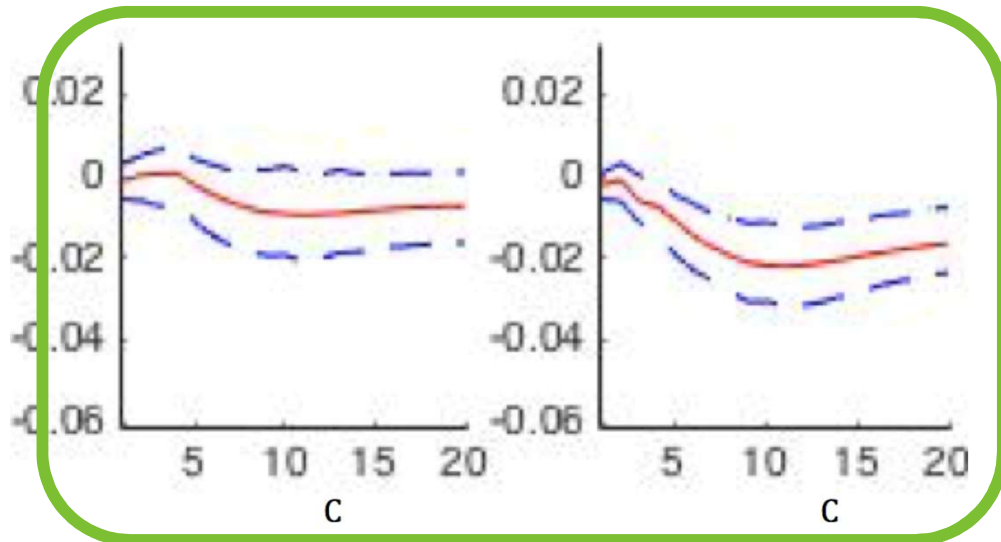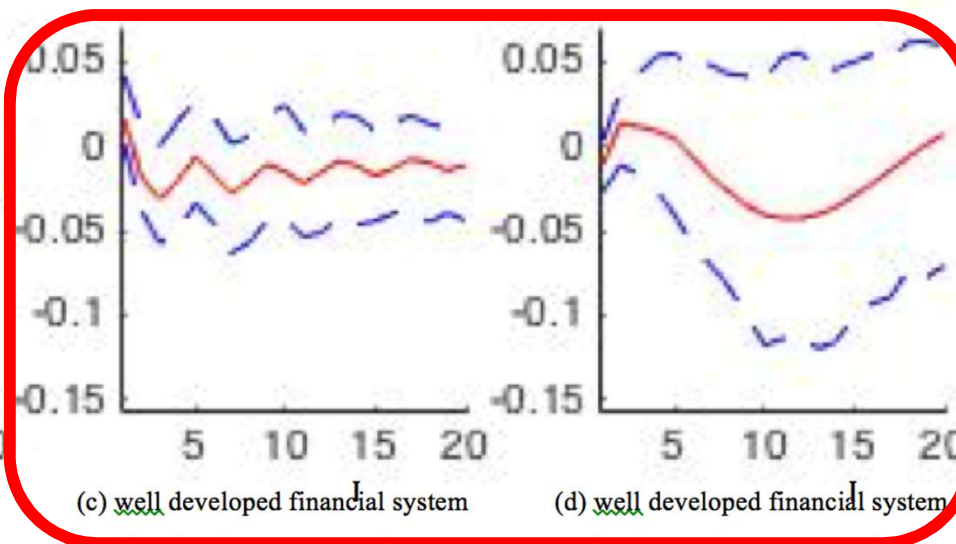
Z = exchange rate regime
X = financial development
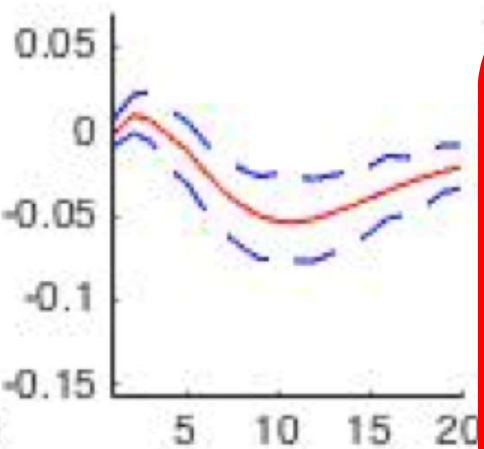
(a) less developed financial system
fixed exchange rate regime

(b) less developed financial system
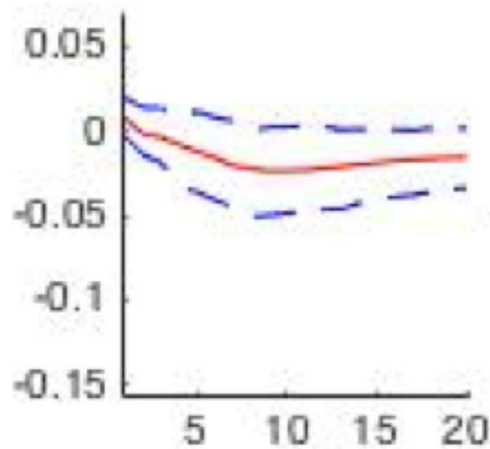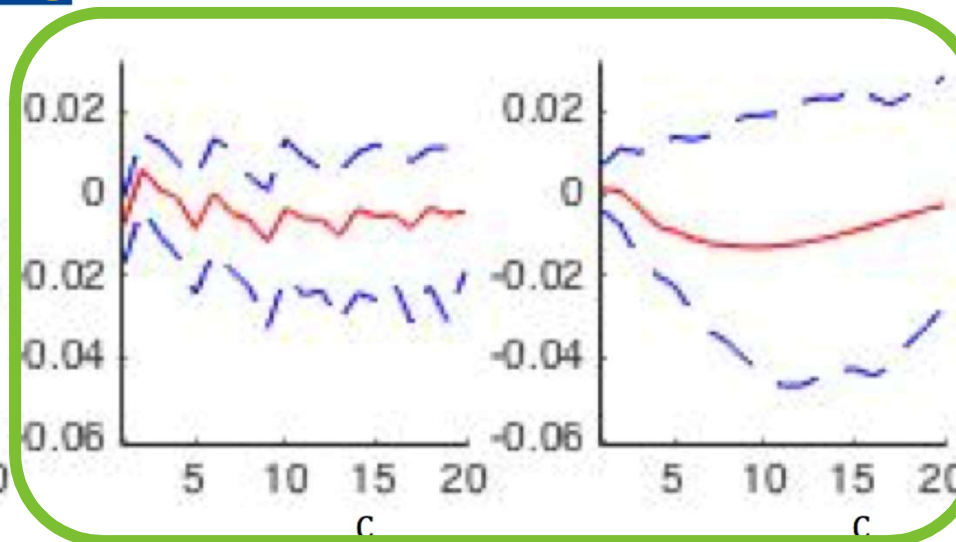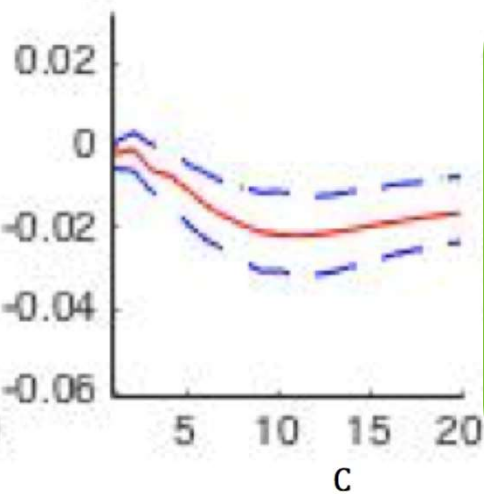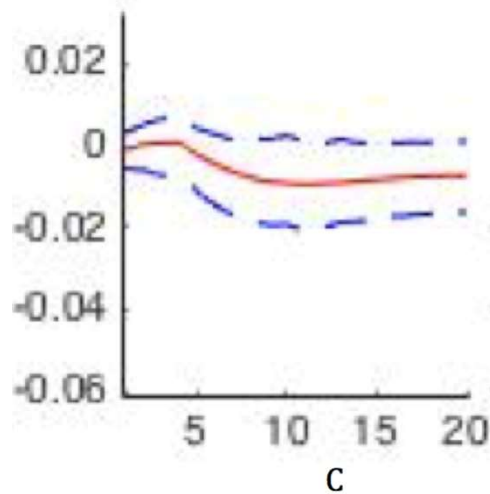floating exchange rate regime

(c) well developed financial system
fixed exchange rate regime

(d) well developed financial system
floating exchange rate regime

Conclusions

- **BCS uncertainty indicators for EU countries** and new empirical evidence on the impact of uncertainty shocks using **panel BVAR and sub-samples of EU countries**.

- The results confirm that the real economy (notably investment) is **negatively affected** by an unexpected spike in uncertainty (**no overshooting**) but also that the responses tend to **differ across the EU Member States**.

- **Individual structural characteristics** of the economy appear to determine responses to uncertainty shocks as much as **the origin of the shocks** themselves (idiosyncratic vs. common shocks).

- **More flexible labour / product markets, a higher manufacturing share and higher economic diversification.**

- policy reaction to uncertainty
  depend on fundamental characteristics
        financial development matters
        economic structure matters less
        and can make policy counter- or procyclical

Transmission of Uncertainty Shocks: Learning from Heterogeneous Responses on a Panel of EU Countries

29 January 2019

DG ECFIN workshop
"Fiscal policy in an uncertain environment"

Peter Claeys (VUB), Bořek Vašíček (DG ECFIN, EC)