Risk Sharing in Fiscal Federations: What the Data Say

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Macro reading group
October 2018

Introduction

- **What is risk-sharing?**
  - The capacity to share the impact of asymmetric shocks on output.
- **Where?**
  - Federations, but also...
  - Among countries.
- **Channels:**
  - Savings/borrowing
  - Capital Markets
  - Fiscal Transfers
- **Types:**
  - Public vs private
  - Ex-ante vs Ex-post
  - Intertemporal vs Interspacial
- **Why bothering?**
  - It is specially relevant in the debate on reforms in the EU. (Fiscal union vs banking union vs Capital Markets Union)

- **Channels of Interstate Risk Sharing**, 1996 *Asdrubali, Pierfederico and Sorensen, Bent E and Yosha, Oved*
  - Provides the empirical methodology to identify different channels of risk sharing.
- **Risk Sharing in the Euro Zone: the Role of European Institutions**, 2007 *Milano, Valentina*
  - Extend the results for UE and use more updated data.
- **Dynamic risksharing in the United States and Europe** 2004 *Asdrubali, Pierfederico and Kim, Soyoung*
  - Use VAR to extend to dynamics and talk about substitutability/complementarity of channels.
- **Fiscal Unions**, 2017 *Farhi, Emmanuel and Werning, Ivan*
  - Model that accounts for some of the evidence.

Asdrubali et al. 1996

Empirical methodology

- The empirical strategy relies on the following identity:

$$GDP_t^i = \frac{GDP_t^i}{GNP_t^i}\frac{GNP_t^i}{NI_t^i}\frac{NI_t^i}{DNI_t^i}\frac{DNI_t^i}{C_t^i}C_t^i \tag{1}$$

  where:
  - $GNP = GDP$+net factor income
  - $NI = GNP$- capital depreciation
  - $DNI = NI$+international transfers
  - $C = DNI$−total net savings
- Taking logs, first differences and taking Cov with $\Delta \log GDP$:

$$\begin{aligned} var[\Delta \log GDP] &= cov[\Delta \log GDP - \Delta \log GNP, \Delta \log GDP] \\ &= cov[\Delta \log GNP - \Delta \log NI, \Delta \log GDP] \\ &= cov[\Delta \log NI - \Delta \log DNI, \Delta \log GDP] \\ &= cov[\Delta \log DNI - \Delta \log C, \Delta \log GDP] \\ &= cov[\Delta \log C, \Delta \log GDP] \end{aligned} \tag{2}$$

Asdrubali et al. 1996

Empirical methodology

- Then:

$$1 = \beta_{Kflows} + \beta_{dep} + \beta_{gov} + \beta_{sav} + \beta_{unsmoothed} \tag{3}$$

where, e.g:

$$\beta_{Kflows} = \frac{cov[\Delta \log GDP - \Delta \log GNP, \Delta \log GDP]}{var[\Delta \log GDP]} \tag{4}$$

and we just have to regress $\Delta \log GDP - \Delta \log GNP$ over $\Delta \log GDP$ to get β_{Kflows}.

- If $\beta_{unsmoothed} = 1$, then there is no smoothing.
- If $\beta_{sav} = 1$, all smoothing happening through savings.
- This methodology have been widely used since this paper.

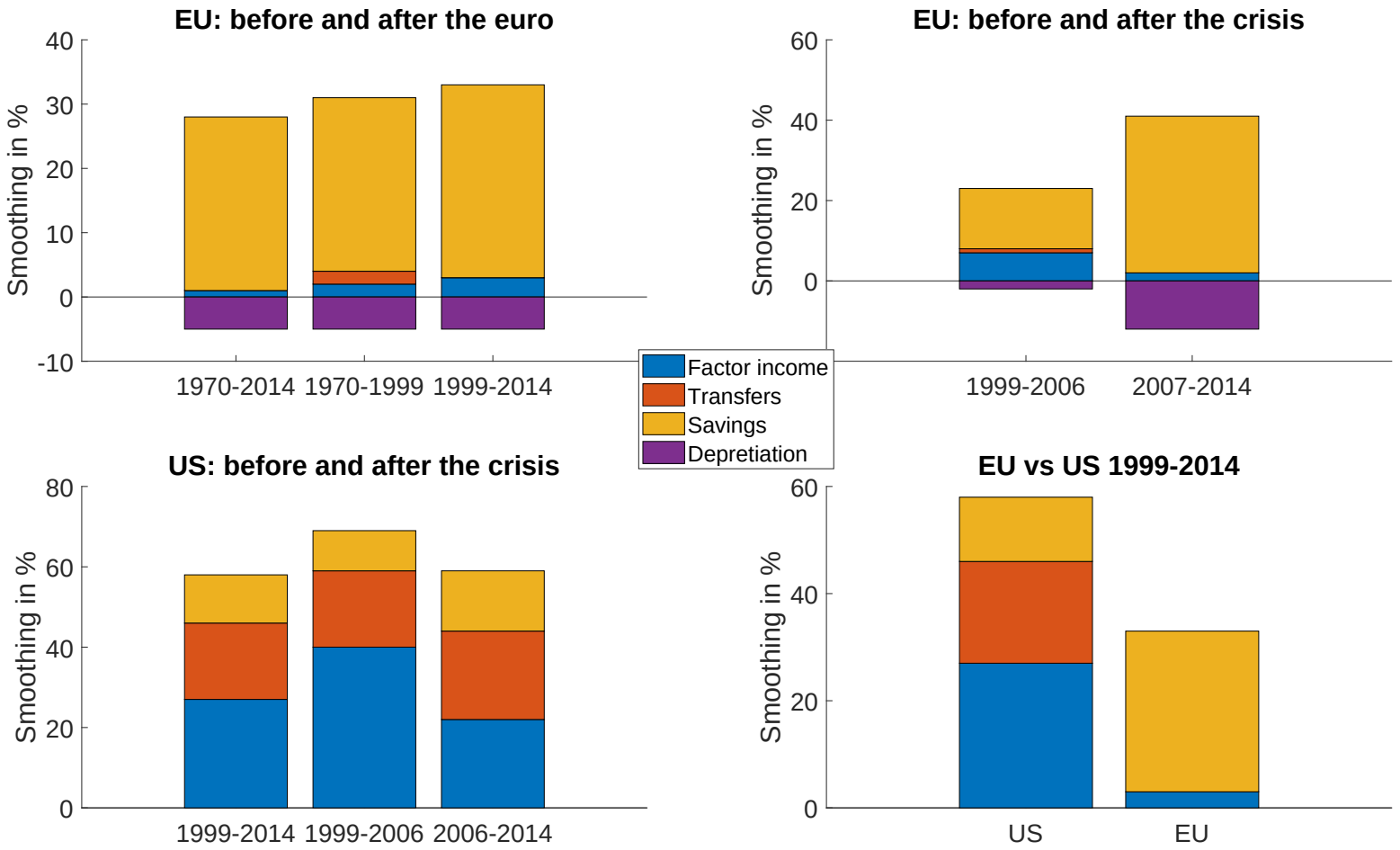
Asdrubali et al. 1996

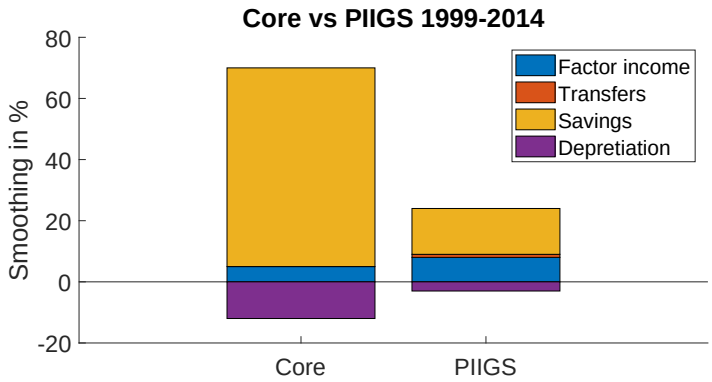
Results

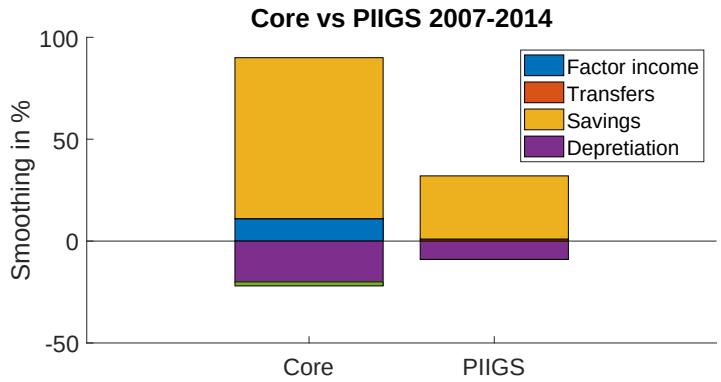
- Data cover period 1963-1990 in US.
- Find that **39%** of shocks are smoothed by **capital markets**, **23%** by **savings**, **13%** by **federal government** and **25 % are not smoothed**.
- **Federal smoothing** is classified into **categories**. Major part is due to federal direct transfers to individuals, unemployment benefits and federal grants.
- **How it varies over time?** Federal gov. smoothing increased from 5% in the 60' to 16 % in the 70'. In the 80', the decrease in transfers and credit smoothing only partially compensated by capital.
- Persistence of shocks: c**redit smoothing is lower in states with highly persistent shocks.** Transfers and capital channels are higher.
- **Sectoral composition:** Farm states relies more on credit. Oil states more on capital.

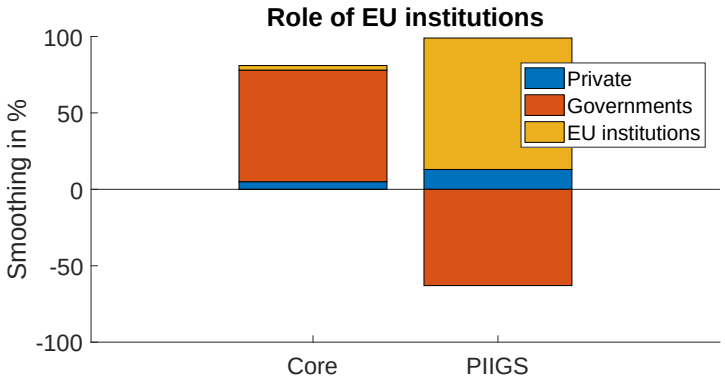
Milano, Valentina 2017

EU and US




Core vs PIIGS 1999-2014
Smoothing in %
80
60
40
20
0
-20
Core
PIIGS
Factor income
Transfers
Savings
Depretiation

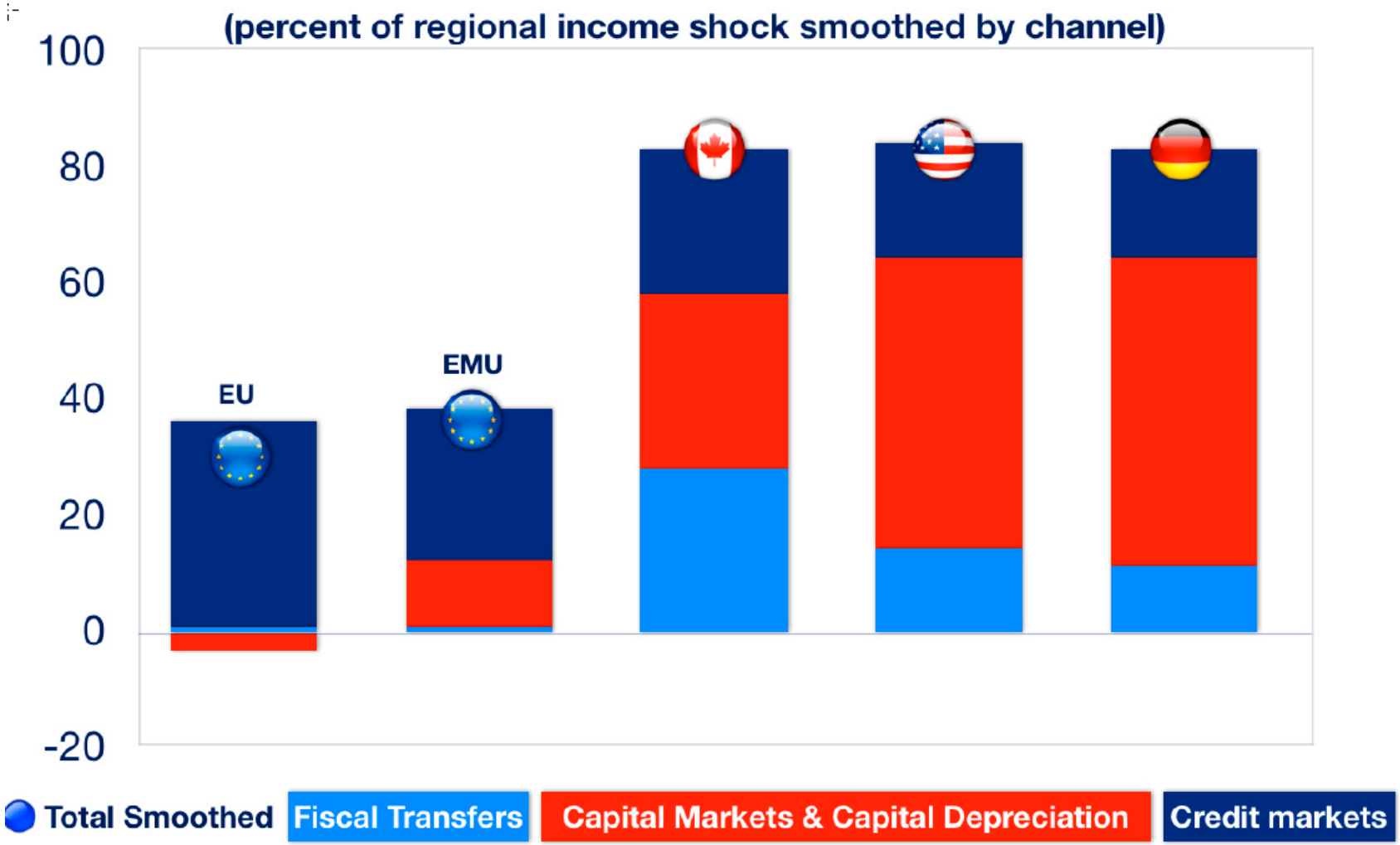

Core vs PIIGS 2007-2014
Smoothing in %
100
50
0
-50
Core
PIIGS
Factor income
Transfers
Savings
Depretiation


Role of EU institutions
Smoothing in %
100
50
0
-50
-100
Core
PIIGS
Private
Governments
EU institutions

- European integration increase slightly risk sharing but does not change the composition.
- It is **during the crisis** that **credit channel increases**.
- Compared with US, **transfers and capital channels are almost non-existent.** Not surprising given the fiscal rules on US vs EU.
- **Core vs PIIGS:** data seems consistent with 'prudent CORE vs PIIGS'
- Disaggregating source of credit, the PIIGS actually dismooth with sovereign credit. **ESM, EFSF replace austerity.**
- No role for QE.

Canada and Germany

Source: IMF



SOURCES: Hepp and von Hagen (2012) for Germany; Sorensen and Yosha (1998) for the United States; Balli, Basher and Rosmy (2011) for Canada; and Afonso and Furceri (2008) for the Economic Monetary Union and the European Union.

Follow up evidence

- **Asymmetric Shocks among U.S. States** (2001) *Marco Del Negro*
  - Using factor model the claim that risk sharing is much lower if you account for measurement error. Silent about composition.
- **Interregional and international risk-sharing and lessons for EMU** (1999) *Melitz and Zumer*
  - With a similar methodology find capital channel in UK and Italy similar to US. Find savings and government channels almost non-existent.
- **Interstate Risk Sharing in Germany** (2010) *Ralf Hepp and Jurgen von Hagen*
  - Replicate analysis for Germany before and after reunification. Before reunification main channel is government. After is capital markets. Main government instrument is social security and unemployment insurance.

Asdrubali-Kim 2004

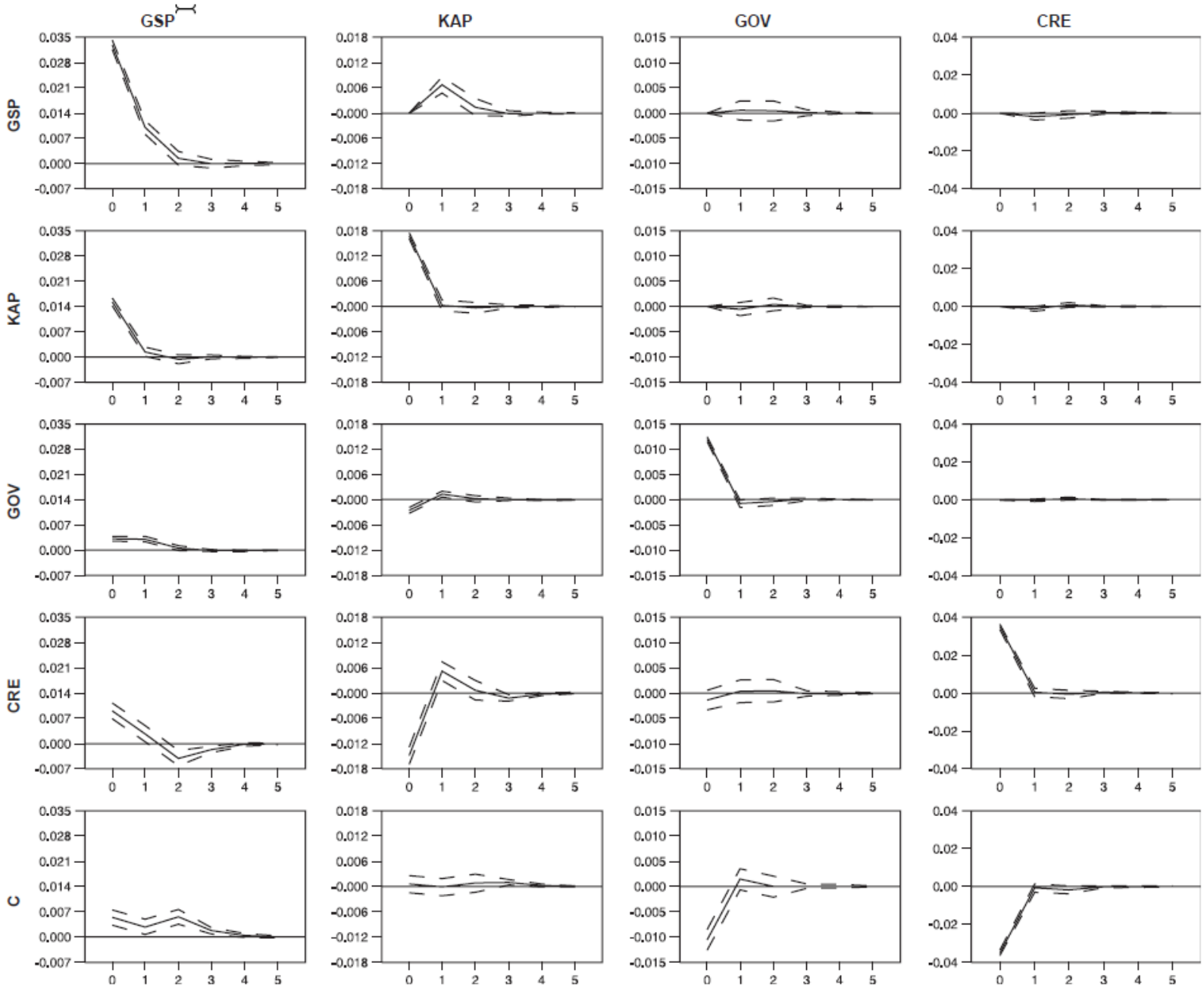
Dynamic setting

- Use VAR to talk about dynamic effects and cross effects.
- Structural specification:

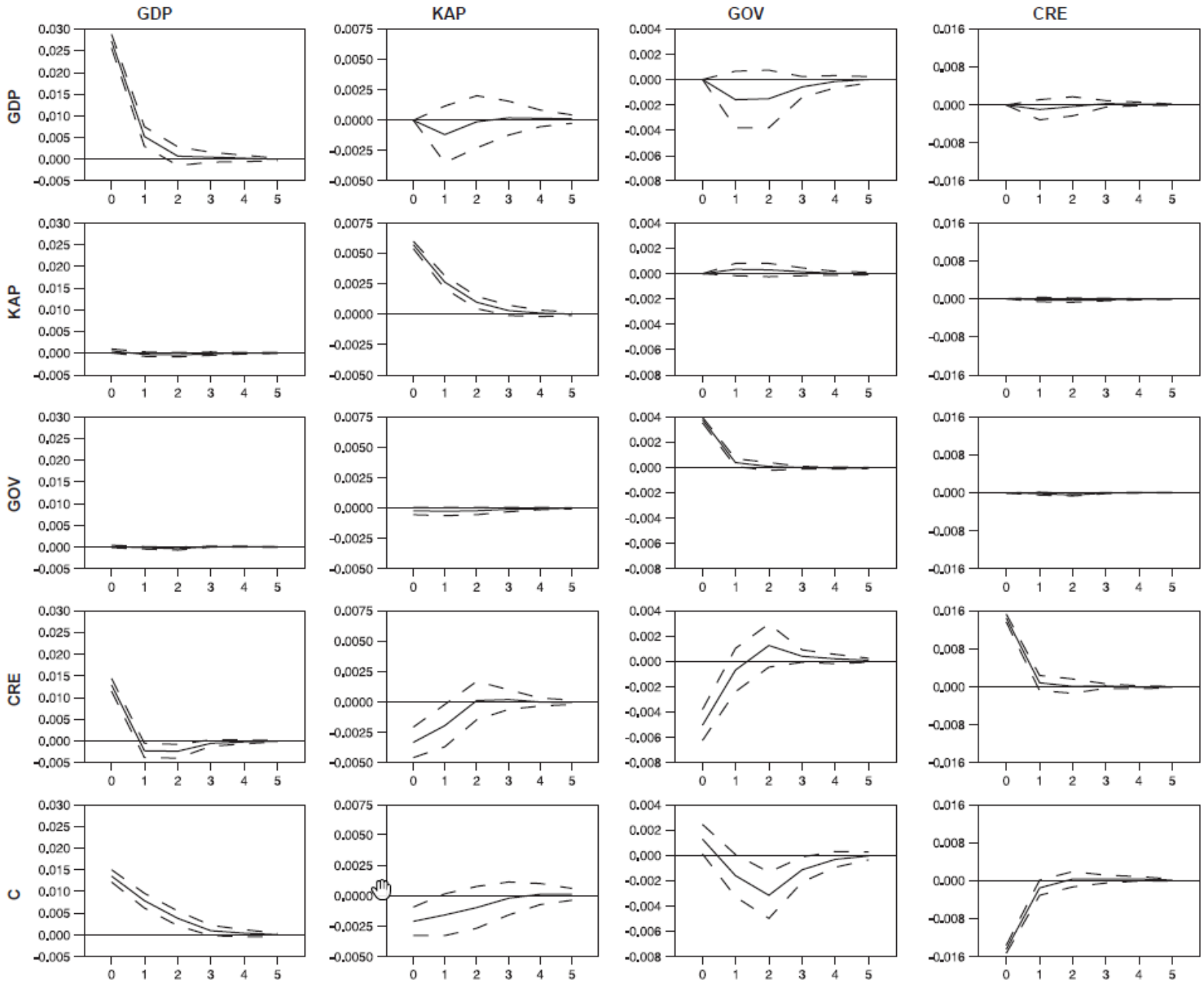
$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ g_{21} & 1 & 0 & 0 \\ g_{31} & g_{32} & 1 & 0 \\ g_{41} & g_{42} & g_{43} & 1 \end{bmatrix} \begin{bmatrix} \Delta \log GDP_t^i \\ \Delta \log GDP_t^i - \Delta \log GNP_t^i \\ \Delta \log GNP_t^i - \Delta \log GDI_t^i \\ \Delta \log GDI_t^i - \Delta \log C_t^i \end{bmatrix}$$

$$= d + G(L) \begin{bmatrix} \Delta \log GDP_{t-1}^i \\ \Delta \log GDP_{t-1}^i - \Delta \log GNP_{t-1}^i \\ \Delta \log GNP_{t-1}^i - \Delta \log GDI_{t-1}^i \\ \Delta \log GDI_{t-1}^i - \Delta \log C_{t-1}^i \end{bmatrix} + \begin{bmatrix} e_{GDP,t}^i \\ e_{\mathrm{k},t}^i \\ e_{\mathrm{g},t}^i \\ e_{\mathrm{c},t}^i \end{bmatrix}.$$

- Shock to GDP contemporaneously exogenous. Credit is affected by all.
- Alternative specifications do not change the results significantly.
- They compare US with OCDE countries.



US



OCDE

Asdrubali-Kim 2004

Complements and Substitutes

- In US:
  - Credit and Gov. shocks do not affect other channels much.
  - Positive shocks to capital markets crowd out savings channel. Neutral in total smoothing.
- In OCDE:
  - Capital markets and international transfers do not play a significant role.
  - Shocks to capital markets only crowd out savings channel by half.
  - Shocks to international transfers decrease savings on impact.
- Results relate with *consumption-output correlation puzzle* and *international risk sharing puzzle*

Farhi-Werning 2017

Fiscal Unions

- **Model:**
  - Countries in a currency union.
  - Endowed with labor and a tradable good (one price). Produce non-tradable (sticky price).
  - Complete and incomplete markets.
  - Allow for taxes/subsidies on portfolio and international transfers.
- **Results:**
  - Even with complete markets, constrained efficient risk sharing is only achieved with government intervention.
  - Investors do not fully internalize the stability consequences of the portfolio decisions.
  - Constrained efficient only achieved either by distorting portfolios or by government transfers.
  - Benefits of fiscal union are larger the more asymmetric and persistent the shocks and the less open the economies.

Questions

- Make sense of empirical disagreements?
- Substitutability of different channels?
- What (political events, terms of trade, economic development,etc) causes changes in the composition of risk sharing?
- What are the redistributional effects of the different channels?
- Does the Eurozone need a fiscal union to improve risk sharing?