The euro area crisis: need for a supranational fiscal risk sharing mechanism?

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4th SEEK Conference
Mannheim, May 15-16, 2014

Outline

1. Motivation and Contribution
2. Risk sharing
3. Stabilization fund
4. Conclusions and Further Issues

Institutional policy framework proved inadequate during the crisis (I)

Motivation

- The stability of a monetary union depends on the capacity to deal with idiosyncratic shocks affecting its member countries in the absence of independent monetary policy.

- In principle, fiscal policy could serve this purpose but:
  - Sometimes, domestic fiscal policy cannot fully offset output shocks.
  - In addition, counter-cyclical expansionary measures may have significant and long-lasting adverse effects on public debt sustainability (Reinhart and Rogoff, 2009; Furceri and Zdzienicka, 2013).

- In this context, the existence of risk sharing mechanisms for achieving income insurance and consumption smoothing is essential

Institutional policy framework proved inadequate during the crisis (II)

Motivation

- **Large country specific shocks**

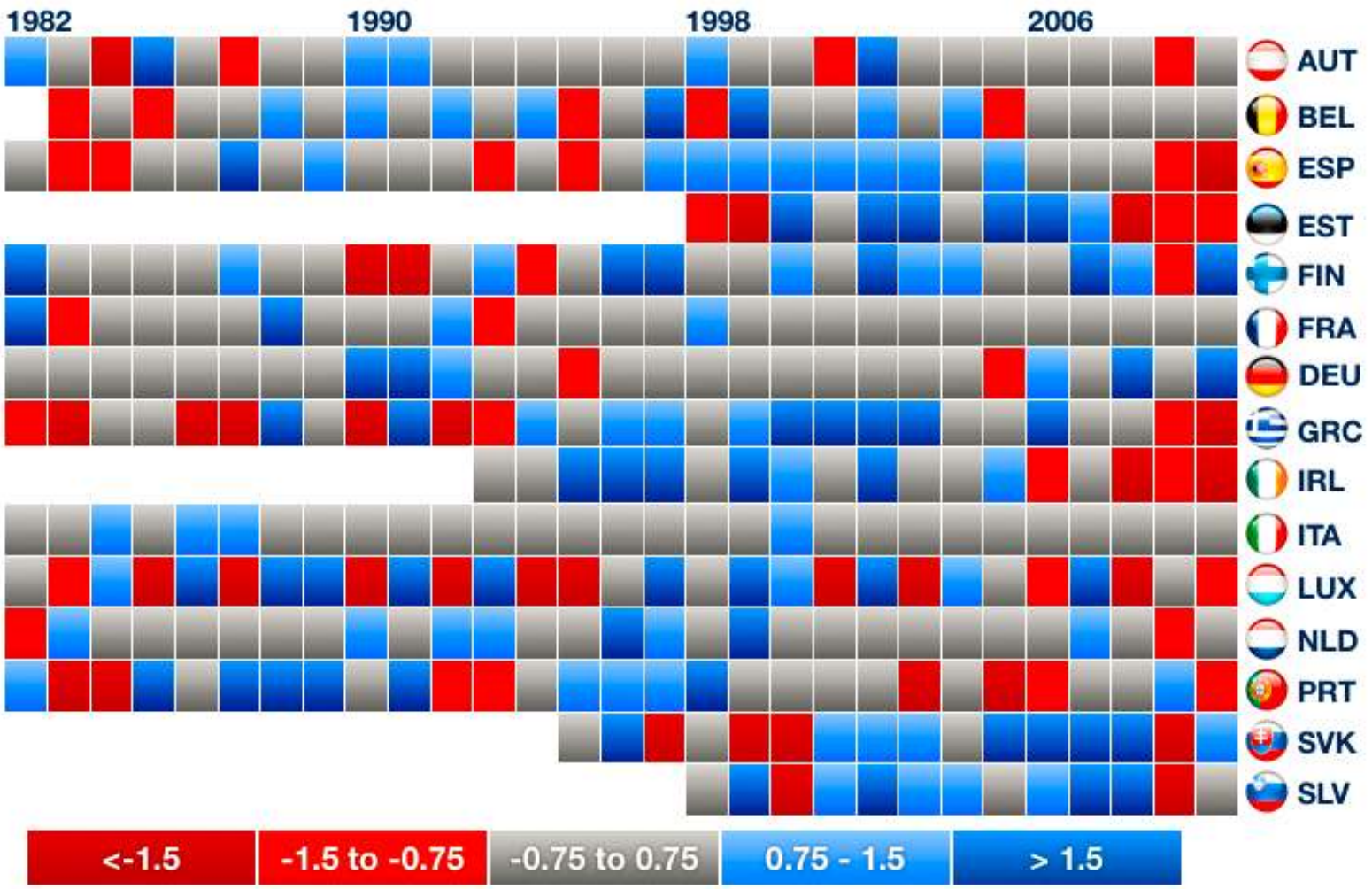
- **Government failures** (The windfall from lower interest and debt payments were not saved, and by the time the crisis hit, countries had insufficient buffers)

- **Market Failure** (Labor market and price rigidities; ineffective risk-sharing, Missing incentives for markets to enforce discipline)

- **Sovereign-bank feedback loops**

- **Contagion**

Large country-specific shocks



SOURCE: OECD and IMF staff calculations

NOTE: The idiosyncratic growth shocks are derived as the part of the country-specific growth shocks that are not explained by euro area-wide growth shocks. Growth shocks (both for the euro area and individual countries) are computed as the residuals from a regression of the country's (resp. Euro Area's) growth rate over two lags.

Institutional policy framework proved inadequate during the crisis (II)

Motivation

- **Large country specific shocks**

- **Government failures** (The windfall from lower interest and debt payments were not saved, and by the time the crisis hit, countries had insufficient buffers)

- **Market Failure** (Labor market and price rigidities; ineffective risk-sharing, missing incentives for markets to enforce discipline)

- **Sovereign-bank feedback loops**

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Aim of the paper

Motivation

- Analyze whether risk sharing mechanisms are effective when they are most needed, i.e. crisis

- Answer the following questions:

  - could a centralized fiscal transfer mechanism provide significant risk sharing?; and

  - what would be the size of the budget needed at the euro area level to achieve significant risk sharing as, for example, in the United States?

Main results

Motivation

- Less degree of risk sharing in euro area than in other federations (e.g. the U.S. and Germany)

- Risk sharing mechanisms ineffective when they are most needed

- A supranational fiscal risk sharing mechanism, funded by a relatively small contribution, can guarantee full stabilization

Risk sharing

Methodology

Risk sharing

- GDP-GNP =*international income transfers (factor income flows),*
- GNP-NI = *capital depreciation,*
- NI-DNI = *net international tax and transfers*,
- DNI-(C+G) = *total saving*.

$$GDP_i = \frac{GDP_i}{GNP_i}\frac{GNP_i}{NI_i}\frac{NI_i}{DNI_i}\frac{DNI_i}{(C+G)_i}(C+G)_i$$

Methodology

Risk sharing

$$\Delta \log GDP_{i,t} - \Delta \log GNP_{i,t} = \alpha_t^m + \beta^m \Delta logGDP_{i,t} + \varepsilon_{i,t}^m$$

$$\Delta \log GNP_{i,t} - \Delta \log NI_{i,t} = \alpha_t^d + \beta^d \Delta logGDP_{i,t} + \varepsilon_{i,t}^d$$

$$\Delta \log NI_{i,t} - \Delta \log DNI_{i,t} = \alpha_t^g + \beta^g \Delta logGDP_{i,t} + \varepsilon_{i,t}^g$$

$$\Delta \log DNI_{i,t} - \Delta \log(DNI + G)_{i,t} = \alpha_t^p + \beta^p \Delta logGDP_{i,t} + \varepsilon_{i,t}^p$$

$$\Delta \log(DNI + G)_{i,t} - \Delta \log(C + G)_{i,t} = \alpha_t^s + \beta^s \Delta logGDP_{i,t} + \varepsilon_{i,t}^s$$

$$\Delta \log(C + G)_{i,t} = \alpha_t^u + \beta^u \Delta logGDP_{i,t} + \varepsilon_{i,t}^u$$

β measures the incremental percentage of smoothing achieved by each channel of the GDP decomposition. If β^u=0 then full stabilization is achieved, if not, a part of a shock remains unsmoothed. No constraints are imposed on each β coefficient, it could be the case that some of these factors could amplify the shock ($\beta > 1$), or dis-smooth it ($\beta < 0$). By construction, $\sum \beta = 1$

Methodology

Risk sharing

$$\Delta \log GDP_{i,t} - \Delta \log GNP_{i,t} = \alpha_t^m + \beta^m (1 - D_{i,t}) \Delta logGDP_{i,t} + \delta^m D_{i,t} \Delta logGDP_{i,t} + \gamma D_{i,t} + \varepsilon_{i,t}^m$$

$$\Delta \log GNP_{i,t} - \Delta \log NI_{i,t} = \alpha_t^d + \beta^d \left(1 - D_{i,t}\right) \Delta logGDP_{i,t} + \delta^d D_{i,t} \Delta logGDP_{i,t} + \gamma D_{i,t} + \varepsilon_{i,}^d$$

$$\Delta \log NI_{i,t} - \Delta \log DNI_{i,t} = \alpha_t^g + \beta^g \left(1 - D_{i,t}\right) \Delta logGDP_{i,t} + \delta^g D_{i,t} \Delta logGDP_{i,t} + \gamma D_{i,t} + \varepsilon_{i,}^g$$

$$\Delta \log DNI_{i,t} - \Delta \log (DNI + G)_{i,t} = \alpha_t^p + \beta^p \left(1 - D_{i,t}\right) \Delta logGDP_{i,t} + \delta^p D_{i,t} \Delta logGDP_{i,t} + \gamma D_{i,t} + \varepsilon_{i,t}^p$$

$$\Delta \log (DNI + G)_{i,t} - \Delta \log (C + G)_{i,t} = \alpha_t^s + \beta^s \left(1 - D_{i,t}\right) \Delta logGDP_{i,t} + \delta^s D_{i,t} \Delta logGDP_{i,t} + \gamma D_{i,t} + \varepsilon$$

$$\Delta \log (C + G)_{i,t} = \alpha_t^u + \beta^u (1 - D_{i,t}) \Delta logGDP_{i,t} + \delta^u D_{i,t} \Delta logGDP_{i,t} + \gamma D_{i,t} + \varepsilon_{i,t}^u$$

D= crisis/ downturns dummies (Harding and Pagan, 2002)

Baseline

Risk sharing

	Coefficient (z-stat)	N	R^2
International factor income flows	0.076** (2.21)	376	0.107
Capital depreciation	-0.084*** (-6.13)	376	0.387
Net international tax and transfers	0.039*** (3.35)	376	0.140
Saving	0.310*** (5.40)	376	0.512
Public	0.092*** (4.25)	376	0.450
Private	0.218*** (4.48)	376	0.417
Unsmoothed	0.658*** (12.18)	376	0.644

***, **, *denotes significance at 1%, 5%, 10%, respectively. z-statistics in parenthesis.

Baseline- robustness check

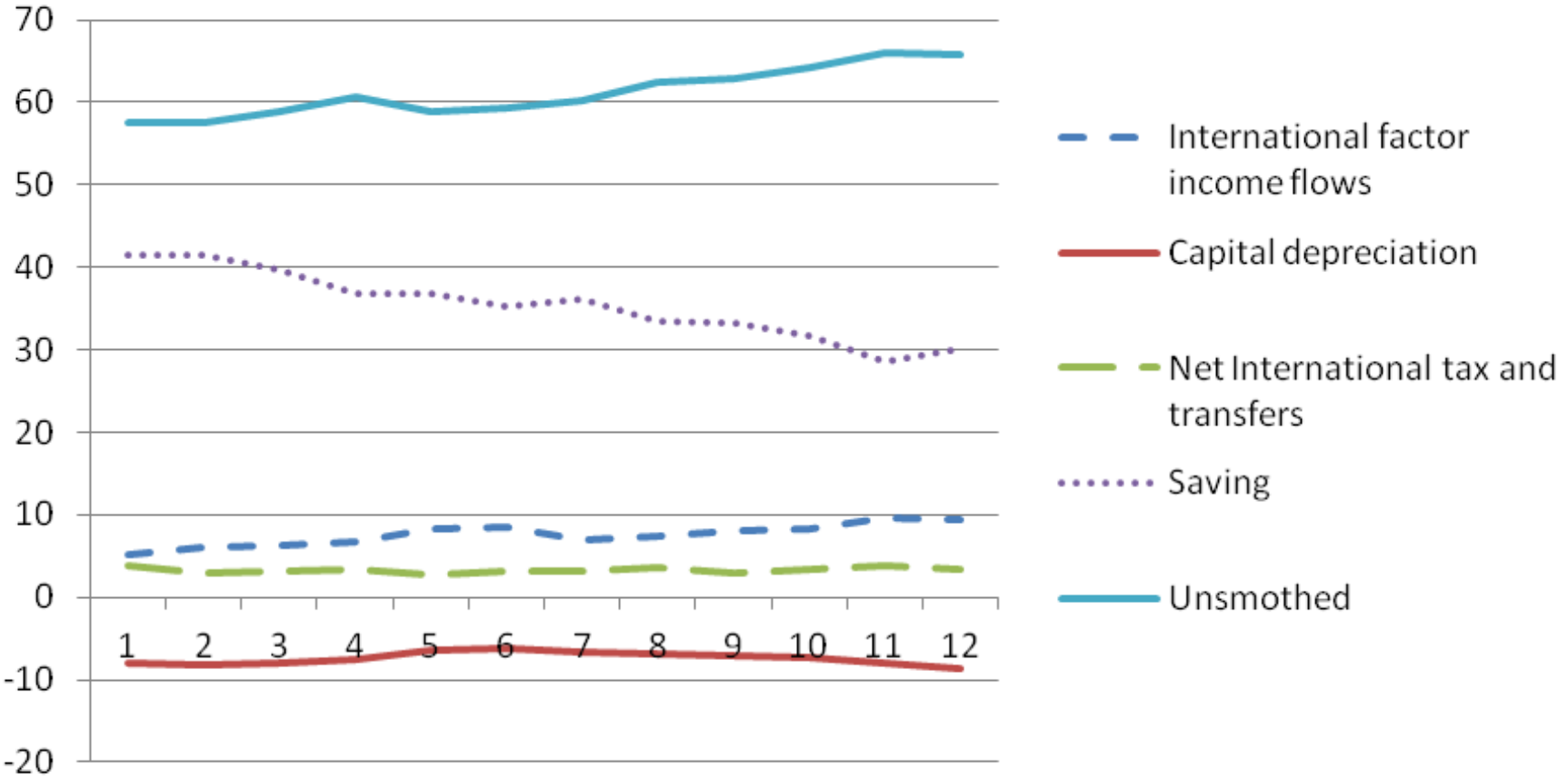
Risk sharing

	(I) Baseline	(II) OLS & time trends	(III) Country & time-FE	(IV) AR (1)	(V) 2-step GLS	(VI) GMM	(VII) IV
International factor income flows	0.076**	0.041*	0.065	0.032*	0.033**	0.041*	-0.012
	(2.21)	(1.63)	(1.26)	(1.76)	(2.49)	(1.83)	(-0.33)
Capital depreciation	-0.084***	-0.102***	-0.092***	-0.114***	-0.115***	-0.133***	-0.069***
	(-6.13)	(-8.92)	(-4.31)	(-12.70)	(-13.44)	(-16.52)	(-3.81)
Net international taxes and transfers	0.039***	0.023**	0.049***	0.021***	0.003	0.020**	0.072***
	(3.35)	(2.45)	(3.22)	(2.68)	(0.58)	(2.10)	(4.16)
Saving	0.310***	0.452***	0.351**	0.509***	0.512***	0.601***	0.187**
	(5.40)	(8.09)	(2.65)	(12.89)	(13.26)	(16.32)	(2.22)
Public	0.092***	0.158***	0.096***	0.171***	0.183***	0.205***	0.059*
	(4.25)	(9.25)	(3.08)	(11.66)	(13.66)	(15.28)	(1.87)
Private	0.218***	0.294***	0.255*	0.334***	0.355***	0.385***	0.128**
	(4.48)	(6.29)	(1.82)	(10.75)	(11.45)	(12.72)	(1.99)
Unsmoothed	0.658***	0.586***	0.627***	0.552***	0.539***	0.586***	0.823***
	(12.18)	(12.63)	(7.28)	(17.68)	(18.10)	(176.64)	(12.16)

***, **, * denotes significance at 1%, 5%, 10%, respectively. The number of observations is 376.

Baseline-over time

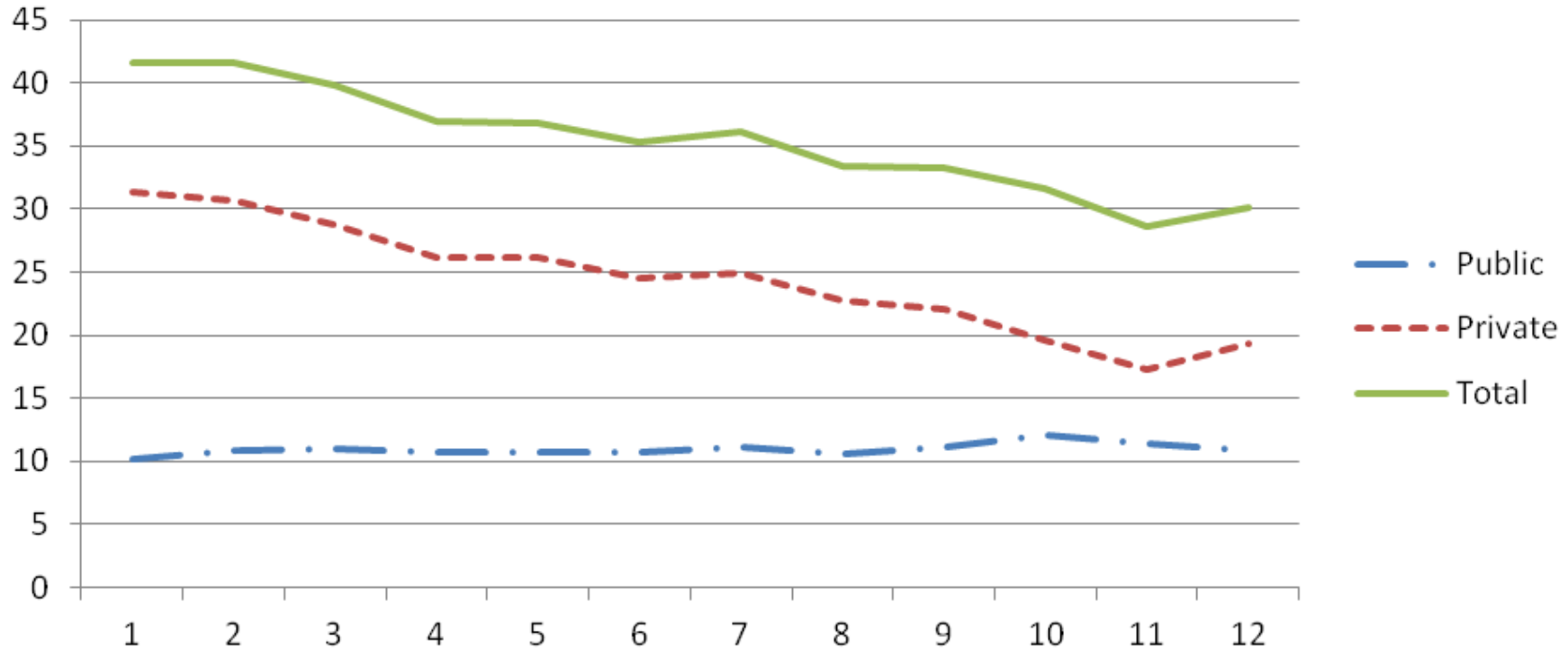
Risk sharing



equations (2)-(6) have been estimated using 20-year rolling windows over the period 1979-2010

Baseline-over time

Risk sharing



equations (2)-(6) have been estimated using 20-year rolling windows over the period 1979-2010

Comparison across federations

Risk sharing

	(I)	(II)	(III)	(IV)	(V)	(VI)
	Euro area 1979-2010	**EU 1979-2010**	**OECD 1979-2010**	**US [a] 1963-1990**	**Germany [b] 1970-1994**	**Germany [b] 1995-2006**
Factor income flows [c]	0.076**	0.062**	0.006	0.390***	0.195**	0.505***
	(2.21)	(2.16)	(0.22)	(13.00)	(2.87)	(6.82)
Capital depreciation	-0.084***	-0.110***	-0.097***			
	(-6.13)	(-8.73)	(-6.34)			
Net taxes and transfers [d]	0.039***	0.035***	0.026***	0.130***	0.541***	0.114
	(3.35)	(3.56)	(5.22)	(13.00)	(5.15)	(1.58)
Saving	0.310***	0.322***	0.329***	0.230***	0.173**	0.175***
	(5.40)	(6.36)	(6.13)	(3.83)	(2.14)	(3.13)
Public	0.092***	0.108***	0.085***			
	(4.25)	(6.16)	(5.59)			
Private	0.218***	0.214***	0.244***			
	(4.48)	(5.09)	(5.55)			
Unsmoothed	0.658***	0.691***	0.736***	0.250***	0.085**	0.208***
	(12.18)	(15.36)	(17.23)	(4.17)	(2.02)	(3.014)

***, **, *denotes significance at 1%, 5%, 10%, respectively. [a] refers to estimates reported in Table 1 of Asdrubali et al. (1996) obtained with two-step GLS; [b] refers to estimates reported in Table 5 (column I) of Hepp and von Hagen (2013); [c] international income flows for EU, OECD and euro area, while domestic income flows for the U.S. and Germany; [d] international net taxes and transfers for EU, OECD and euro area, while federal government taxes and transfers for the U.S. and Germany.

Crisis & downturns

Risk sharing

	Normal vs. crises			Normal vs. downturns		
	(I)	(II)	(III)	(IV)	(V)	(VI)
	Normal	Financial Crises	(I)=(II) [a]	Normal	Downturns	(IV)=(V) [a]
International factor income flows	0.013	-0.065	1.36	0.085**	0.048	0.33
	(0.49)	(-1.06)	(0.24)	(2.14)	(0.79)	(0.57)
Capital depreciation	-0.094***	-0.123**	0.31	-0.085***	-0.096***	0.15
	(-6.39)	(-2.29)	(0.58)	(-5.52)	(-3.82)	(0.70)
Net international tax and transfers	0.026***	0.020	0.15	0.040***	0.028	0.31
	(5.22)	(1.19)	(0.69)	(3.03)	(1.36)	(0.58)
Saving	0.349***	0.146	1.52	0.308***	0.239***	0.40
	(6.47)	(0.89)	(0.22)	(4.68)	(2.46)	(0.53)
Public	0.088***	0.058	0.33	0.099***	0.083*	0.13
	(5.83)	(1.12)	(0.57)	(4.19)	(1.94)	(0.72)
Private	0.261***	0.088	1.77	0.208***	0.156*	0.34
	(5.87)	(0.68)	(0.18)	(3.77)	(1.92)	(0.56)
Unsmoothed	0.705***	1.023***	5.97***	0.652***	0.781***	2.06
	(16.45)	(8.01)	(0.01)	(10.77)	(9.67)	(0.15)

***, **, *denotes significance at 1%, 5%, 10%, respectively. z-statistics in parenthesis. The number of observation in each estimated equation is 376.

[a] Chi-square statistics, p-value reported in parenthesis.

Severity of downturns

Risk sharing

	Normal vs. severe downturns			Normal vs. very severe downturns		
	(I)	(II)	(III)	(IV)	(V)	(VI)
	Normal	Severe downturns	(I)=(II) [a]	Normal	Very severe downturns	(IV)=(V)[a]
International factor income flows	0.072*	0.092	0.08	0.078**	0.067	0.02
	(1.89)	(1.47)	(0.78)	(2.01)	(0.85)	(0.90)
Capital depreciation	-0.081***	-0.093**	0.19	-0.083***	-0.107***	0.44
	(-5.31)	(-3.88)	(0.67)	(-5.41)	(-3.32)	(0.51)
Net international tax and transfers	0.037***	0.047**	0.24	0.035***	0.050**	0.49
	(2.91)	(2.42)	(0.62)	(2.72)	(2.36)	(0.48)
Saving	0.350***	0.174*	3.09*	0.331***	0.111	3.24*
	(5.57)	(1.94)	(0.08)	(5.28)	(1.00)	(0.07)
Public	0.099***	0.068	0.39	0.100***	0.075*	0.19
	(4.20)	(1.55)	(0.53)	(4.21)	(1.43)	(0.67)
Private	0.251***	0.106	3.31*	0.232***	0.036	3.52*
	(4.71)	(1.46)	(0.07)	(4.43)	(0.37)	(0.06)
Unsmoothed	0.622***	0.780***	3.25*	0.639***	0.878***	5.70**
	(10.55)	(9.81)	(0.07)	(11.02)	(9.41)	(0.02)

***, **, *denotes significance at 1%, 5%, 10%, respectively. z-statistics in parenthesis. The number of observation in each estimated equation is 376.

[a] Chi-square statistics, p-value reported in parenthesis.

Persistence of downturns

Risk sharing

	(I)	(II)	(III)	(IV)	(V)
	Normal	Persistent	Temporary	(I)=(II) [a]	(I)=(III) [a]
International factor income flows	0.073*	0.072	0.137	0.00	0.74
	(1.90)	(0.92)	(1.88)	(0.99)	(0.39)
Capital depreciation	-0.081***	-0.105***	-0.064	0.48	0.16
	(-5.26)	(-3.33)	(-1.56)	(0.49)	(0.69)
Net international tax and transfers	0.037***	0.051**	0.039	0.34	0.01
	(2.90)	(2.32)	(1.28)	(0.56)	(0.93)
Saving	0.353***	0.119	0.308**	3.60**	0.13
	(5.65)	(1.06)	(2.45)	(0.05)	(0.72)
Public	0.098***	0.073	0.057	0.18	0.60
	(4.15)	(1.35)	(1.07)	(0.67)	(0.44)
Private	0.255***	0.046	0.251**	4.08**	0.00
	(4.84)	(0.47)	(2.38)	(0.04)	(0.97)
Unsmoothed	0.617***	0.863***	0.579***	6.00***	0.11
	(10.55)	(9.30)	(5.07)	(0.01)	(0.74)

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[a] Chi-square statistics, p-value reported in parenthesis.

Anticipated vs. non-anticipated

Risk sharing

	(I)	(II)	(III)	(IV)	(V)
	Normal	Unanticipated	Anticipated	(I)=(II) [a]	(I)=(III) [a]
International factor income flows	0.075*	0.091	0.106	0.05	0.02
	(1.85)	(1.39)	(0.55)	(0.82)	(0.88)
Capital depreciation	-0.075***	-0.078***	-0.233***	0.02	5.05**
	(-4.92)	(-3.19)	(-3.55)	(0.90)	(0.02)
Net international tax and transfers	0.037***	0.041**	0.113	0.05	1.26
	(2.98)	(2.11)	(1.69)	(0.83)	(0.93)
Saving	0.348***	0.164*	0.282	3.19*	0.04
	(5.31)	(1.68)	(0.93)	(0.07)	(0.84)
Public	0.095***	0.066*	0.080	0.52	0.01
	(4.34)	(1.79)	(0.67)	(0.47)	(0.90)
Private	0.253***	0.098	0.202	3.66**	0.03
	(4.60)	(1.28)	(0.74)	(0.05)	(0.86)
Unsmoothed	0.616***	0.782***	0.731***	3.46*	0.20
	(10.48)	(9.20)	(2.98)	(0.06)	(0.66)

***, **, *denotes significance at 1%, 5%, 10%, respectively. z-statistics in parenthesis. The number of observation in each estimated equation is 376.

[a] Chi-square statistics, p-value reported in parenthesis.

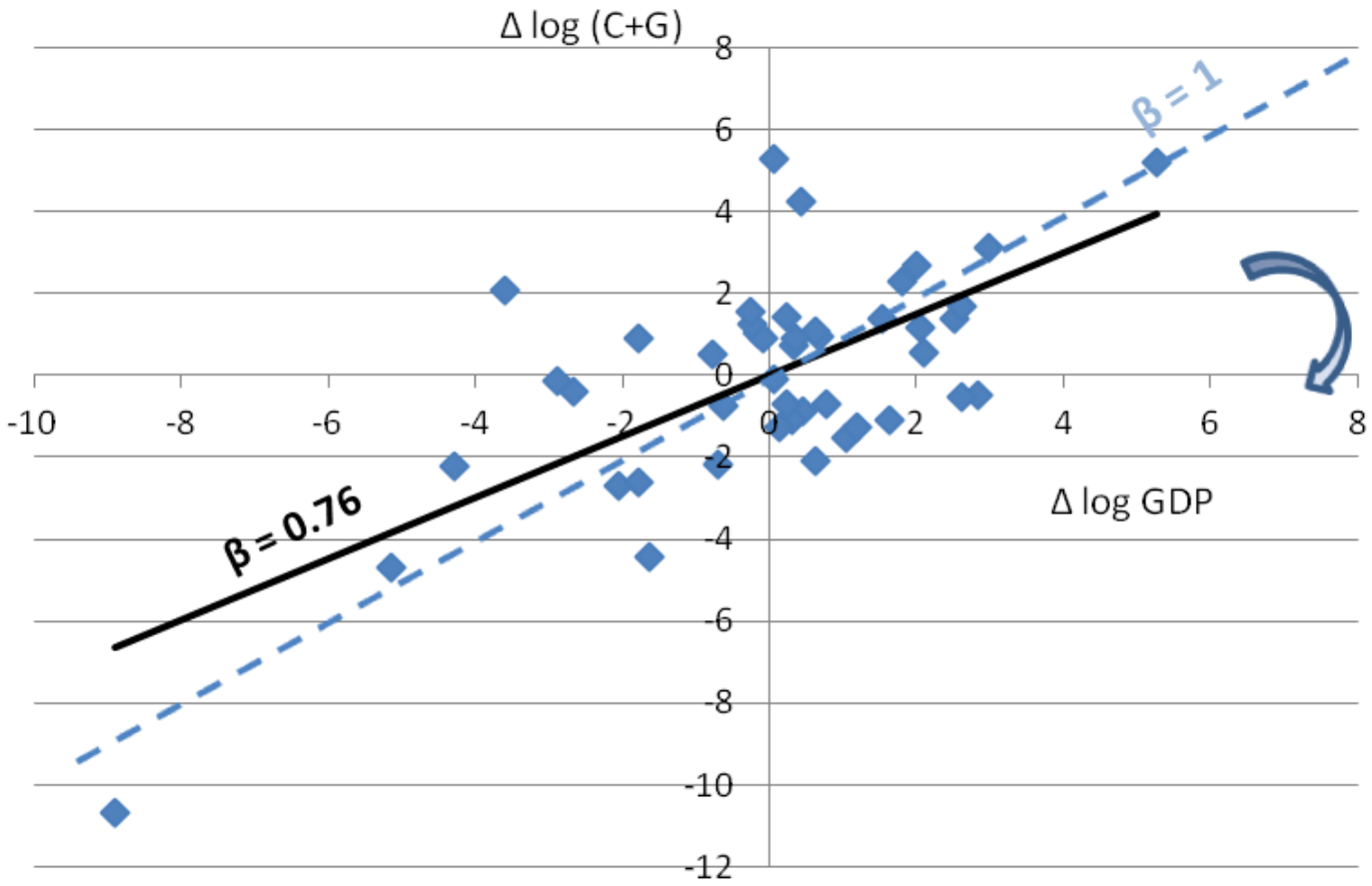
Regressing the change in GDP in periods of downturn against the lag of CLI, we find:

$$\Delta log GDP_{i,t}{}^{D} = \underset{(-14.01)}{-15.6} + \underset{(13.93)}{0.154} * CLI$$

where t-statistics are in parenthesis, and R^2 is 0.2

Great Recession

Risk sharing



Stabilization mechanism

Stabilization mechanism

- **Experiment:**
- the fund collects taxes as a share of the GNP of each member state
- pay transfers to countries negatively hit by output shocks

- **A transfer proportional to:**
- the size of the shock,
- the relative size of its economy,
- the resources available in the stabilization fund.
- no negative shock, the contributions are saved in the fund.

- **A mechanism based on smoothing cyclical fluctuations of the GDP of the member states**
- close to the fiscal mechanisms in the existing federal states,
- part of the contribution of each member is proportional to its GNP.

Characteristics

- *The mechanism should be simple and automatic*
- *Contributions to the stabilization fund and transfers should be non-regressive*
- *Transfers should be temporary*
- *Transfers should be a function of serially uncorrelated shocks*
- *The scheme should be able to offset a large part of the shock*

(Hammond and von Hagen, 1995)

Transfer mechanism

$$Stabilization\_budget_t = \sum_i \tau * GNP_{it-1}$$

$$T_{it} = 0 \qquad if \qquad \epsilon_{it} \geq 0$$

$$T_{it} = |\epsilon_{it}| * \frac{DNI_{it-1}}{\sum_i DNI_{it-1}} * \sum_i \tau * GNP_{it-1} \qquad if \qquad \epsilon_{it} < 0$$

Shocks derived as:

(i) $\Delta logGDP_{i,t} = \alpha_i + \sum_{j=1}^{2} \beta_j \Delta logGDP_{i,t-j} + \epsilon_{it}$

(ii) Output gap

(iii) Growth deviations

Transfer mechanism

Stabilization mechanism

$$\Delta \log NI_{i,t} - \Delta \log DNI^{*}_{i,t} = \alpha^{g}_{t} + \beta^{g} \Delta logGDP_{i,t} + \varepsilon^{g}_{i,t}$$

Contribution

Stabilization mechanism

	(I)	(II)	(III)	(IV)	(V)	(VI)
	Normal	**Severe downturns**	**Very Severe**	**Severe & Persistent**	**Severe & Unanticipated**	**Severe & Symmetric**
τ	3.3	4.0	4.5	4.5	4.0	4.1
Unsmoothed *after* stabilization fund	0	0	0	0	0	0
Unsmoothed *before* stabilization fund	0.658*** (12.18)	0.780*** (7.91)	0.878*** (9.41)	0.863*** (9.63)	0.782*** (9.20)	0.784*** (9.11)
Net international taxes and transfers	0.696*** (3.16)	0.828*** (3.15)	0.927*** (3.15)	0.921*** (3.14)	0.829*** (3.14)	0.847*** (3.15)

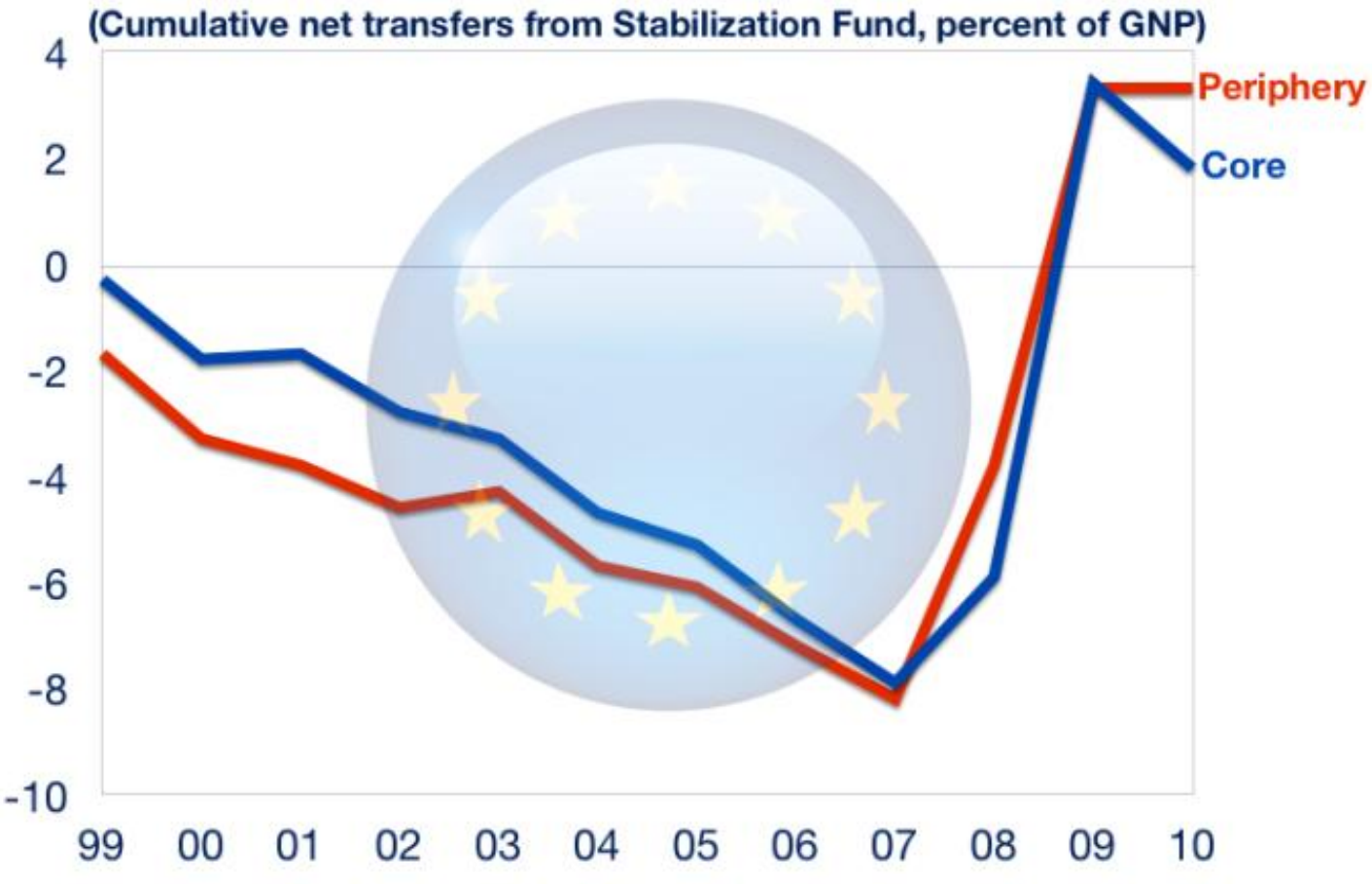
Contribution

Stabilization mechanism

	(I)	(II)	(III)	(IV)	(V)	(VI)
	Uncorrelated shocks		Output gaps		Growth deviations	
Unsmoothed	**Normal**	**Severe downturns**	**Normal**	**Severe downturns**	**Normal**	**Severe downturns**
0 percent (full stabilization)	3.3	4.5	2.7	3.8	2.1	2.9
20 percent (e.g. Germany)	2.2	3.4	1.9	2.9	1.4	2.2
25 percent (e.g. the U.S.)	2.0	3.2	1.7	2.7	1.3	2.0

Stabilization mechanism

Cumulative net transfers



Further Issues

Conclusions

- **Reducing spreads can increase risk sharing** (credit market less effective when spreads are high): an increase of 100 basis point in the ten-year spread reduces the share of smoothed shocks by about 5 percent

- **Smaller union higher contribution**: the requited contribution is a positive function of the number of participating countries (even taking out Greece)

Conclusions

Conclusions

- Less degree of risk sharing in euro area than in other federations
- Risk sharing mechanisms ineffective when they are most needed
- A supranational fiscal risk sharing mechanism, funded by a relatively small contribution, can guarantee full stabilization

Conclusions

•The analysis has also an irresolvable weakness as it is subject the *Lucas' Critique*. The implementation of the stabilization mechanism could alter the structure of the economic system, undermining the robustness of our results.

•In addition, the results abstract from possible moral hazard and commitment problems that may limit the desirability of this insurance mechanism.

• The analysis presented in the paper as contributing to a greater understanding of possible benefits associated with further fiscal integration.

Thank you!

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4th SEEK Conference
Mannheim, May 15-16, 2014