Euro area unemployment insurance at the time of zero nominal interest rates

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Starting point

- Risk sharing limited in euro area

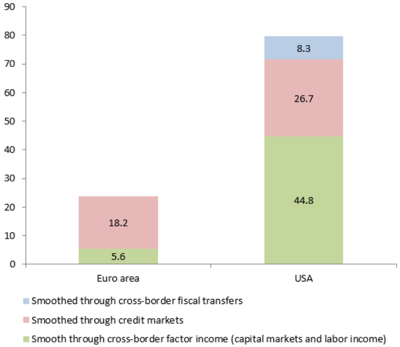


Figure: Cross-border risk sharing (as % of total asymmetric shocks to output)

Source: Nikolov et al. [2016]

Starting point

- Risk-sharing limited in the euro area
- Euro area still vulnerable to asymmetric shocks
  - no significant central budget
  - national fiscal policies constrained by fiscal rules, lack of fiscal space, and/or market distress
  - capital markets and banking unions unfinished
- Also to area-wide shocks
  - monetary policy constrained at the ZLB
  - doom loop between banks and sovereigns
  - contagion effects

⇒ calls for a stabilization capacity at European level

Starting point

- European unemployment insurance has gained increased attention (Allard et al. [2013], Dullien [2014])
  - automatic
  - quickly replaces lost income
  - high multiplier for unemployment benefits
  - extends integration to social issues, builds citizens' trust in European project
- Our paper
  - based on standard NK monetary union model with ZLB and European stabilization fund
  - calibrated to euro area data

Related literature

- Idea not new (MacDougall [1977], Five Presidents' Report (2012), Beblavỳ et al. [2017])
- Risk-sharing in federal systems (Asdrubali et al. [1996], Sørensen and Yosha [1998], Nikolov et al. [2016], Farhi and Werning [2017])
- NK model with ZLB (Galí [2008], Guerrieri and Iacoviello [2015])

We contribute by

- building a dynamic model calibrated to euro area data with ZLB
- comparing baseline against a common unemployment insurance scenario

Model overview

- A NK two-country monetary union model
  - Core and Periphery, mass ω and $1-\omega$ respectively
  - μ households have no financial access and $1-\mu$ are optimizers
  - trade in goods and bonds
  - national governments collect taxes, insure workers and issue debt
- Search and matching frictions
  - workers hired out of the unemployment pool
  - firms post vacancies at a cost
  - Nash-bargained wage
- Monetary policy
  - price adjustment costs à la Rotemberg [1982]
  - ZLB constraint on Taylor rule
- Supranational scheme
  - provides support to households when unemployment rises
  - issues debt

Households

Lifetime utility function, $i = (O, R)$:

$$E_0 \sum_{t=0}^{\infty} \left(\prod_{i=0}^{t} \beta_i \right) \frac{(c_t^i)^{1-\gamma}}{1-\gamma} \quad (1)$$

Consumption basket

$$c_t^i = \left[\Psi (c_t^{i,c})^{\sigma} + (1-\Psi)(c_t^{i,p})^{\sigma} \right]^{\frac{1}{\sigma}} \quad (2)$$

Optimizers budget constraint

$$c_t^o + \frac{H_t}{P_t} = (1 + i_{t-1}) \frac{H_{t-1}}{P_t} + w_t n_t + bu_t - \tau_t + Tr_t + \Delta_t^o \quad (3)$$

RoT consumers

$$c_t^r = w_t n_t + bu_t - \tau_t + Tr_t \quad (4)$$

Firms

Profit function:

$$\Delta_t(j) = \frac{p_t(j)}{p_t^c} y_t(j) - w_t n_t(j) - \kappa^v v_t(j) - \Phi_t^\pi(j) \tag{5}$$

Production technology

$$y_t(j) = a_t n_t(j) \tag{6}$$

Job creation condition

$$\overbrace{\frac{\kappa^v}{q_t}}^{\text{average vacancy cost}} = \underbrace{a_t mc_t - w_t}_{\text{net benefit}} + \overbrace{(1-s)E_t \beta_{t+1} \frac{\lambda_{t+1}^o}{\lambda_t^o} \frac{\kappa^v}{q_{t+1}}}^{\text{discounted future value of vacancy}} \tag{7}$$

New Keynesian Phlipps curve

$$mc_t = \frac{\epsilon - 1}{\epsilon} + \overbrace{\frac{\kappa^\pi}{\epsilon} \pi_t^c (\pi_t^c - 1)}^{\text{current inflation}} - \overbrace{\frac{\kappa^\pi}{\epsilon} E_t \beta_{t+1} \frac{\lambda_{t+1}^o}{\lambda_t^o} \pi_{t+1}^c (\pi_{t+1}^c - 1) \frac{y_{t+1}}{y_t}}^{\text{inflation and output growth expectations}} \tag{8}$$

Government

National government budget constraint

$$\tau_t + \frac{D_t}{P_t} = (1 + i_{t-1})\frac{D_{t-1}}{P_t} + bu_t - (1-\mu)\Phi_t^{\pi}(j) \tag{9}$$

Fiscal rule

$$\tau_t - \bar{\tau} = \phi^y (y_t - \bar{y}) + \phi^d \left({}^{D_t}/_{P_t y_t} - {}^{\bar{D}}/_{\bar{P}\bar{y}} \right) \tag{10}$$

Transfers

$$\frac{Tr_t}{P_t y_t} = \phi^{stab}(u_t - \bar{u}) - \phi^{d^e} \left({}^{D_t^e}/_{P_t y_t} - {}^{\bar{D}^e}/_{\bar{P}\bar{y}} \right) \tag{11}$$

European budget constraint

$$D_t^e = (1 + i_{t-1}) D_{t-1}^e + \omega \, Tr_t + (1-\omega) \, Tr_t^* \tag{12}$$

Central bank

Taylor rule, constrained by ZLB

$$1 + i_t = \begin{cases} \frac{\bar{\Pi}}{\beta}\left(\frac{\Pi_t^u}{\bar{\Pi}}\right)^{\phi^{cb}}, \phi^{cb} > 1 \\ 1 \end{cases} \tag{13}$$

Union inflation

$$\Pi_t^u = \Pi_t^{\omega} \Pi_t^{*\,1-\omega} \tag{14}$$

Calibration

Variables		Core	Periphery
Economic size	ω	0.61	0.39
Output at s.s.	$\bar{y}$	1	0.85
Employment at s.s.	$\bar{n}$	0.921	0.871
Time preference	β	0.994	
Inflation target	$\bar{\Pi}$	1.005	
Bargaining power	ζ	0.9	
SE of matching	η	0.5	
Openness	ψ	0.65	0.35
Separation rate	s	0.029	0.042
Match. efficiency	κ^m	0.4614	0.4601
Benefit	b	0.61	0.58
Share of RoT HH	μ	0.33	0.33

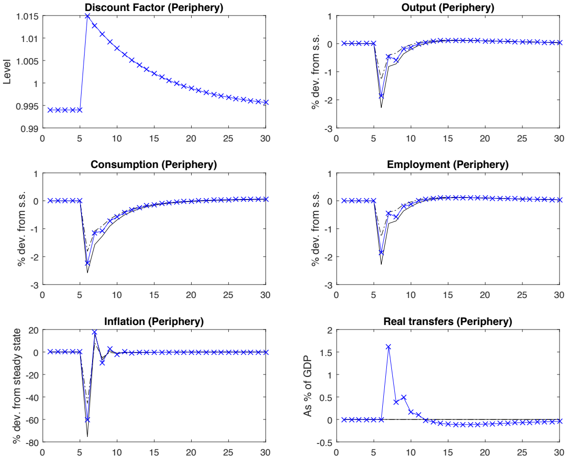
Core comprises Austria, Belgium, Finland, France, Germany, Luxembourg and the Netherlands. Periphery comprises Greece, Ireland, Italy, Portugal and Spain. Data from 1980 to 2008 extracted from OECD Employment and Labor Market Statistics and AMECO databases.

Calibration

	$\sigma(x)/\sigma(y)$		$\rho(x,y)$	
	Core	Periphery	Core	Periphery
Variable x	Model[Data]	Model[Data]	Model[Data]	Model[Data]
c	0.95[0.72]	0.9[0.90]	0.996[0.77]	0.995[0.88]
u	0.2[0.43]	0.38[0.47]	-0.66[-0.72]	-0.69[-0.73]
w	0.87[0.47]	0.84[0.85]	0.83[0.18]	0.8[0.51]

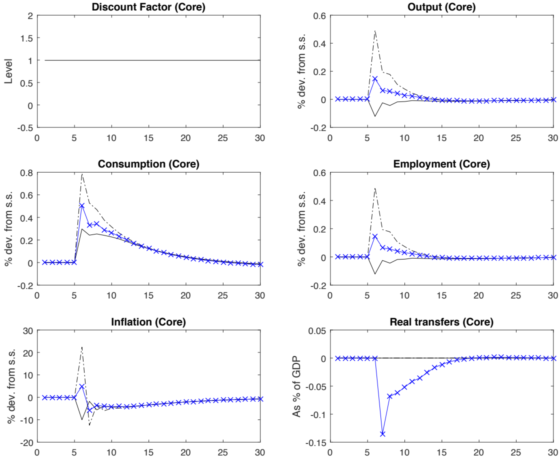
Second order moments obtained from the unconstrained version of the model without transfers, from 15000 draws including all shocks. Standard deviations calculated from HP filtered data with smoothing parameter 1600. Data from 1980 to 2008 extracted from OECD Employment and Labor Market Statistics and AMECO databases.

Demand shock: Periphery



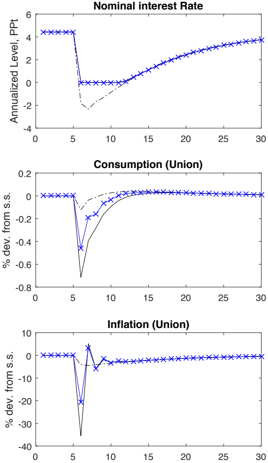
Negative demand shock in the Periphery. Dashed-dotted black lines refer to the unconstrained model without transfers (scenario 0), solid black to the constrained model without transfers (scenario 1) and crossed blue to the constrained with transfers model (scenario 2).

Demand shock: Core



Negative demand shock in the Periphery. Dashed-dotted black lines refer to the unconstrained model without transfers (scenario 0), solid black to the constrained model without transfers (scenario 1) and crossed blue to the constrained with transfers model (scenario 2).

Demand shock: Union



Negative demand shock in the Periphery. Dashed-dotted black lines refer to the unconstrained model without transfers (scenario 0), solid black to the constrained model without transfers (scenario 1) and crossed blue to the constrained with transfers model (scenario 2).

Conclusion

In a dynamic EA model with supranational scheme we find with a negative demand shock:

- ZLB constraint limits stabilization power of central bank
- EUI reduces Periphery output drop
- it can help mitigate crisis when some households are cut from financial markets

What's next?

- model trigger for reinsurance (second non-linearity)
- moral hazard issues (strategic interaction between government layers)

Thank you for attention!

Labor market

[label=labormarket] Matching function

$$m_t = \kappa^m v_t^{1-\eta} (u_{t-1})^\eta, \tag{15}$$

Employment law of motion

$$n_t = (1-s)n_{t-1} + m_t \tag{16}$$

Total labor force normalized to one

$$n_t = 1 - u_t \tag{17}$$

Labor market tightness : $\theta_t = \dfrac{v_t}{u_{t-1}}$

Job finding probability : $f_t = \dfrac{m_t}{u_{t-1}} = \kappa^m \theta_t^{1-\eta}$

Vacancy filling probability : $q_t = \dfrac{m_t}{v_t} = \kappa^m \theta_t^{-\eta}$

Nash-bargaining

Marginal value of match for worker

$$W_t^i = w_t - b + E_t \beta_{t+1} \frac{\lambda_{t+1}^i}{\lambda_t^i} (1 - s - f_{t+1}) W_{t+1}^i \qquad (18)$$

Nash-bargained wage

$$w_t = \zeta \underbrace{\left[a_t mc_t + (1-s) E_t \beta_{t+1} \frac{\lambda_{t+1}^o}{\lambda_t^o} \frac{\kappa^v}{q_{t+1}} \right]}_{\text{benefit of employed worker}} +$$

$$(1-\zeta) \underbrace{\left[b - E_t \beta_{t+1} (1 - s - f_{t+1}) \left(\mu \frac{\lambda_{t+1}^r}{\lambda_t^r} W_{t+1}^r + (1-\mu) \frac{\lambda_{t+1}^o}{\lambda_t^o} W_{t+1}^o \right) \right]}_{\text{outside option}} \qquad (19)$$

Wage rigidity

$$\tilde{w}_t = \upsilon w_t + (1-\upsilon) \bar{w} \qquad (20)$$

Market clearing

CPI

$$P_t = \left[\Psi^{\frac{1}{1-\sigma}}(p_t^c)^{-\frac{\sigma}{1-\sigma}} + (1-\Psi)^{\frac{1}{1-\sigma}}(p_t^p)^{-\frac{\sigma}{1-\sigma}}\right]^{-\frac{1-\sigma}{\sigma}} \tag{21}$$

Demand functions for Core and Periphery goods

$$c_t^{i,c} = \Psi^{\frac{1}{1-\sigma}}\left(\frac{p_t^c}{P_t}\right)^{-\frac{1}{1-\sigma}} c_t, c_t^{i,p} = (1-\Psi)^{\frac{1}{1-\sigma}}\left(\frac{p_t^p}{P_t}\right)^{-\frac{1}{1-\sigma}} c_t \tag{22}$$

Financial market equilibrium

$$\omega(1-\mu)H_t + (1-\omega)(1-\mu^*)H_t^* = \omega(1-\mu)D_t + (1-\omega)(1-\mu^*)D_t^* \tag{23}$$

Market clearing for Core and Periphery goods

$$\omega(y_t - \kappa^v v_t) = \frac{p_t^c}{P_t}\left[\omega c_t^c + (1-\omega)c_t^{c*}\right] \tag{24}$$

$$(1-\omega)(y_t^* - \kappa^{v*} v_t^*) = \frac{p_t^p}{P_t^*}\left[\omega c_t^p + (1-\omega)c_t^{p*}\right] \tag{25}$$

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