Does a Currency Union Need a Capital Market Union? Risk Sharing via Banks and Markets

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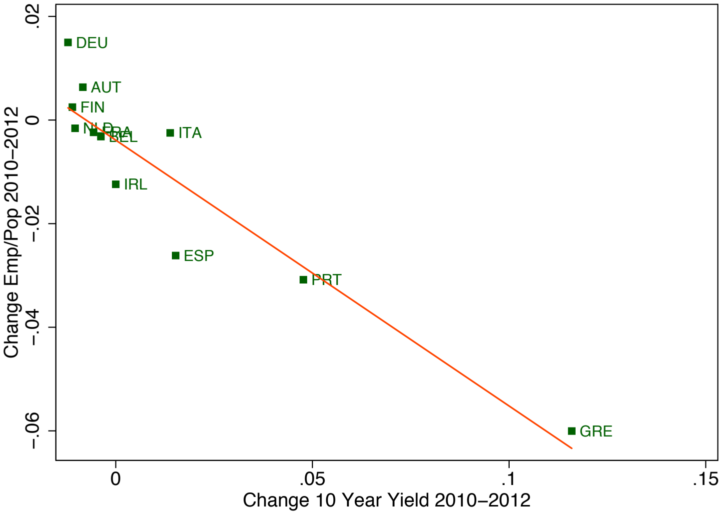
Risk Sharing and Currency Unions

- Members of a currency union forfeit the possibility of exchange rate adjustments
- Adapting to asymmetric shocks more difficult
- What institutions do we need to compensate?
- The old OCA literature recognized the importance of a risk sharing mechanism
- But these models are not microfounded
- Hard to map into current policy debates about banking and capital market union

Case Eurozone

- Little risk sharing compared to that between US states
- Demonstrated saliently during the eurozone crisis
- Largest difference is the role of capital markets (Astrubali et al. 96, Afonso & Furceri 12)
- Eurozone obtains some risk sharing through the credit market
- But market segmentation hampers this risk sharing in crisis periods (Martin & Philippon 17)
- Spread differences and sudden stops

Market Segmentation in the Eurozone Crisis



Research Question

- How much can a banking union (BU) improve risk sharing?
- What does a capital market union (CMU) add to a BU?
- How big are the welfare gains?

Banking Union: A Definition

- An ideal banking union is an arrangement that equalizes the basic funding rate (risk-free rate) in each country
- Focus on the macroeconomics of BU
- How big are the potential welfare gains?

Capital Market Union: A Definition

- An ideal capital market union is an arrangement with a (ideal) BU + optimal cross-border holdings of capital
- Again focus on the macroeconomics of CMU
- Only one type of capital (equity), abstract away from security details

This Paper

Table: Summary of Results

	Definition	Demand Shocks	Supply Shocks
Segmented	$R_{j,t} \neq \bar{R}_t$	$<$ BU	$<$ BU
BU	$R_{j,t} = \bar{R}_t$	$=$ COMP	$<$ CMU
CMU	Equity	$=$ COMP	$=$ COMP
Complete	Backus-Smith	Agg. D.	Pecuniary
Pareto	Planner	See Farhi and Werning 2017.	

Model

- Two types of households $i = b, s$, borrower and saver, $\beta_b < \beta_s$, fraction χ of borrowers

$$\mathbb{E}_t \sum_{t=0}^{\infty} \beta_i^t \left[\log C_{i,t} - \nu\left(N_{i,t}\right)\right], \text{ for } i = b, s$$

$$\log C_{i,t} = (1-\alpha) \log \left(\frac{C_{h,i,t}}{1-\alpha}\right) + \alpha \log \left(\frac{C_{f,i,t}}{\alpha}\right)$$

- Borrowers

$$\frac{B_{t+1}}{R_t} + W_t N_t - T_t^b = P_t C_{b,t} + B_t$$

and

$$B_{t+1} \leq \bar{B}_{t+1}$$

- Consider both small open economy and two country model

Model: Supply Side

- Intermediate Producers

$$\Pi_t = (AP_{h,t} - W_t) N_t = (\mu - 1) W_t N_t.$$

- Final Good Producer

$$Y_t = \left(\int_0^1 Y_{j,t}^{\frac{\epsilon-1}{\epsilon}} dj \right)^{\frac{\epsilon}{\epsilon-1}}$$

- Sticky wages

$$W_t = W_{t-1} (1 + \kappa (N_t - N_{ss}))$$

Model: Monetary and Fiscal Policy

- Taylor rule

$$\bar{R}_t = R_{ss}\left(\left(\frac{Y_t}{Y_{ss}}\right)\left(\frac{Y_t^*}{Y_{ss}^*}\right)\right)^{\phi_Y}\left(\left(\frac{\pi_t}{\pi_{ss}}\right)\left(\frac{\pi_t^*}{\pi_{ss}^*}\right)\right)^{\phi_\pi}$$

- Fixed exchange rate constraints monetary policy
- Also consider a ZLB constraint
- Monetary policy rule matters only quantitatively
- Government budget constraint

$$\frac{B_{t+1}^g}{R_t} = P_{h,t}G_t - T_t + B_t^g,$$

- Consider various simple taxation rules like flat tax rate
- Obtaining risk sharing through fiscal transfers between countries possible
- Not the focus of this paper

Model: Savers' Budget Constraints

- Savers under BU

$$W_t N_t - T_t^s + S_t + \frac{\Pi_t}{1-\chi} = \frac{S_{t+1}}{R_t} + P_t C_{s,t}$$

- Savers under CMU

$$\ldots S_t + \varphi_t \left(V_t + \frac{\Pi_t}{1-\chi} \right) + (1-\varphi_t^*) \left(V_t + \frac{\Pi_t}{1-\chi} \right)$$
$$= \varphi_{t+1} V_t + (1-\varphi_{t+1}^*) V_t^* + \frac{S_{t+1}}{R_t} \ldots$$

- Savers under complete markets

$$.. + \int_{s_{t+1}} Q_t \left(s_{t+1}, s^t\right) D_{t+1} \left(s_{t+1}, s^t\right) = D_t \left(s^t\right) + ..$$

Complete Markets

- Backus-Smith condition with log preferences

$$\frac{C^*_{s,t}}{C_{s,t}} \sim \frac{P_t}{P^*_t}$$

or

$$P^*_t C^*_{s,t} \sim P_t C_{s,t}$$

- Note: complete markets only within savers

Efficiency of Banking Union

- **Proposition 1**: *For a small open economy subject to private and public leveraging and deleveraging shocks ($\bar{B}_{t+1}$, $\beta_{b,t}$, G_t, T_t), the Banking Union achieves the Complete Markets allocation.*

Why?

- **Lemma.** Spending by savers does not react to private credit shocks ($\bar{B}_{t+1}$, $\beta_{b,t}$) or to fiscal policy (neither G_t nor T_t), but only to interest rate and foreign demand shocks.
  - Proof

$$\max \mathbb{E}_t \sum_{t\geq 0} \beta^t \log\left(P_t C_{s,t}\right)$$
$$P_t C_{s,t} + \frac{S_{t+1}}{R_t} = S_t + \tilde{Y}_t^s$$

  - Inter-temporal budget constraint of the savers

$$\mathbb{E}_t \sum_{k=0}^{\infty} \frac{P_{t+k} C_{s,t+k}}{R_{t,k}} = S_t + \mathbb{E}_t \sum_{k=0}^{\infty} \frac{\tilde{Y}_{t+k}^s}{R_{t,k}}$$

  - Inter-temporal Current Account of the Country

$$\alpha \mathbb{E}_t \sum_{k=0}^{\infty} \frac{\tilde{Y}_{t+k}}{R_{t,k}} = (1-\alpha)\left((1-\chi) S_t - \chi B_t\right) - B_t^g + \mathbb{E}_t \sum_{k=0}^{\infty} \frac{F_{t+k}}{R_{t,k}}.$$

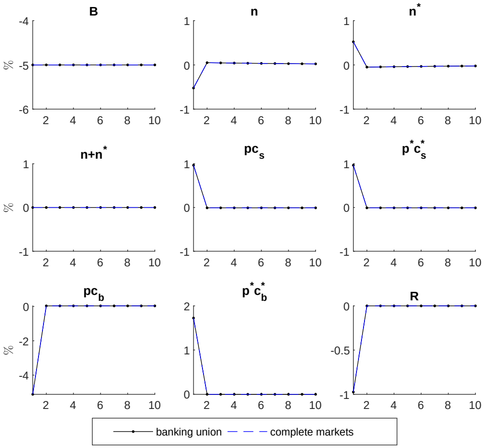
Why $P_t C_{s,t}$ is constant?

- Direct effect of deleveraging: debt repayments
- Clearly does not change PV of income
- Indirect effect: deleveraging creates a bust and initially lowers savers' income
- But lower debt level increases borrowers' future demand which then increases savers' income
- Surprising: these two forces exactly offset each other

Why $P_t C_{s,t}$ is constant?

- Need
$$\mathbb{E}_t \sum_{k=0}^{\infty} \frac{\tilde{Y}^s_{t+k}}{R_{t,k}} \sim \mathbb{E}_t \sum_{k=0}^{\infty} \frac{\tilde{Y}_{t+k}}{R_{t,k}}$$
- As in e.g. Cole & Obstfeld 91, requires a unit elasticity of substitution
- Otherwise e.g. foreign expenditures would change
- Small open economy assumption required but not important quantitatively
- Some similarities with Ricardian equivalence

Private Domestic Deleveraging Shock

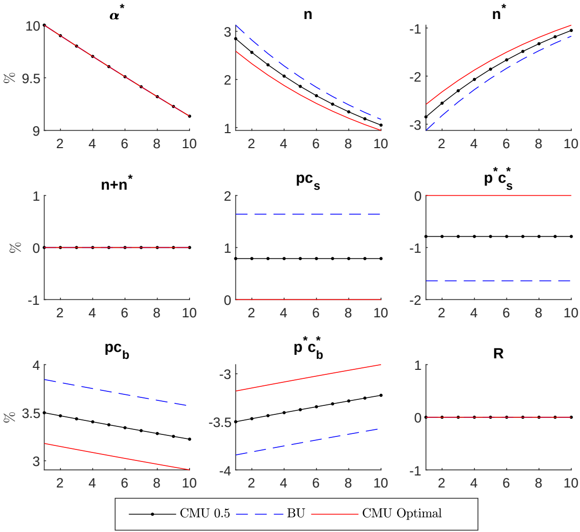


Efficiency of Capital Market Union

- **Proposition 2**: *Using static equity positions and no-cross country borrowing, it is possible to replicate the complete market allocation in a capital market union subject to quality* (α_t, α_t^*)*, TFP* (A_t, A_t^*)*, monetary policy* $(\phi_{\pi,t}, \phi_{\pi,t}^*, \phi_{Y,t}, \phi_{Y,t}^*)$ *and various preferences shocks.*
- Optimal home stock position

$$\varphi = \frac{1}{2} - \frac{1}{2}\frac{1-\chi}{\mu - 1}$$

Quality Shock



Efficiency of Capital Market Union

- **Proposition 3**: *When each country is small, using static equity positions and dynamic cross-country borrowing it is possible to replicate the complete markets allocation in a capital market union subject to (idiosyncratic) deleveraging as well as arbitrary foreign quality, productivity, monetary policy, and various preference shocks.*

A Numerical Model

- Baseline model does not include capital
- Intermediate producers production function

$$Y_{j,t} = A_t N_{j,t}^{1-\eta} K_{j,t}^{\eta}$$

- Firms choose prices and investment level
- Their problem is

$$\max \mathbb{E}_t \sum_{s=0}^{\infty} m_{t,t+s} d_{j,t+s}$$

A Numerical Model

- The dividend is given by

$$d_{j,t} = P_{j,t}Y_{j,t} - W_t N_{j,t} - P_t I_{j,t} - P_t f(I_{j,t})$$

- Firm j's capital evolves according to:

$$K_{j,t+1} = (1-\delta)K_{j,t} + I_{j,t}$$

- The adjustment cost is given by

$$f(I_{j,t}) = \frac{\theta}{2}\left(\frac{I_{t,j}}{I_{t-1,j}} - 1\right)^2$$

- Solve optimal portfolios numerically

A Numerical Model

- Adding capital does not directly change the results
- But adding investment reduces $Corr(d_{t,}, I_t)$
- Firms invest in good times which lowers dividends
- Slightly reduces the benefit of a CMU relative to a model without capital

Calibration

- Most parameters take standard values
- Match spreads and deleveraging shocks to data from eurozone
- Banks not explicitly in the model
- But can write down a banking model that implies the processes used
- When spreads go up, leverage goes down
- Use Bayesian methods to estimate quality and productivity shocks

Welfare analysis

- Calculate welfare for SM $\Rightarrow$ BU and BU $\Rightarrow$ CMU
- Calculations not directly comparable
- Benefits of BU come during a crisis period

Benefits of BU

Consumption Volatility	Segmented Markets	Banking Union
Savers	7.5%	2.7%
Borrowers	6.3%	3.7%
Aggregate	7.0%	2.9%

Benefits of CMU

Consumption Volatility	Banking Union	Capital Market Union
Savers	1.5%	0.9%
Borrowers	3.5%	3.0%
Aggregate	2.0%	0.85%

Positive Externalities of CMU

	Uninternalized Volatility Reduction	Share of Total Volatility Reduction
Savers	0.06%	10%
Borrowers	0.5%	100%

Conclusion

- BU efficient at sharing demand shocks (esp. deleveraging)
- CMU efficient at sharing supply shocks
- Both can clearly lower consumption volatility
- A lot of the gains of CMU due to GE effects