Optimal Macroprudential and Monetary Policy in a Currency Union

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Macroeconomic Stabilization Tools

Closed Economy

- Monetary policy (before the crisis)
- Macroprudential policy (after the crisis)

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Monetary Union

- Monetary policy cannot stabilize asymmetric shocks
- Macroprudential policy can be used to stabilize economy

Today

Key elements of the model

1. A model with nominal rigidities
2. A model with banks (Stein, 2012)
3. A model of monetary union

Main results

- Optimal regional macroprudential policy
  1. 2 AD and 3 pecuniary externalities
- Optimal global (coordinated) macroprudential policy
  2. Three international spillovers
  3. Local PM overregulates if banks issues lots of safe debt
  4. Local PM underregulates if the union is in the ZLB

Contribution to the Literature

Pecuniary externality in international models

- Jeanne-Korinek(2010), Bianchi(2011), Benigno et al.(2013)
- **This paper**: pecuniary externality in the financial sector

Macroprudential policy due to nominal rigidities and ZLB

- Farhi-Werning (2016), Korinek-Simsek (2016)
- **This paper**: macroprudential regulation of the financial sectors in a currency union

Financial regulation in monetary union

- Rubio (2014), Quint-Rabanal (2014)
- **This paper**: optimal policy

Model with Nominal Rigidities

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Households $\max_{\{c_t,n_t\},D_1^c} \; u(c_0) - v(n_0) + \beta\Big[u(c_1) - v(n_1)\Big]$

$$s.t.: \; P_0 c_0 + \frac{D_1^c}{1+i_0} \leq W_0 n_0 + \Pi_0$$

$$P_1 c_1 \leq D_1^c + W_1 n_1 + \Pi_1$$

Firms produce $y_t = A_t n_t$

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$$u'(y_1) = \frac{1}{A_1} v' \left(\frac{y_1}{A_1} \right) \quad \Rightarrow \quad y_1^* = y_1(A_1)$$

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Welfare

$$u'(y_0) \neq \frac{1}{A_0} v'\left(\frac{y_0}{A_0}\right)$$

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Welfare

$$u'(y_0) \neq \frac{1}{A_0} v'\left(\frac{y_0}{A_0}\right) \quad \Rightarrow \quad \tau_0 \equiv 1 - \frac{v'(y_0/A_0)/A_0}{u'(y_0)} \neq 0$$

Model with Banks: Preferences

$$\mathcal{U} = u(c_0) - v(n_0) + \beta \Big[u(c_1 + \underline{c}_1) - v(n_1) \Big]$$

- $c_1 + \underline{c}_1$ – total consumption in period 1

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- $\underline{c}_1$ – must be bought with safe securities D_1^c: $P_1\underline{c}_1 \leq D_1^c$

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- h_1 – consumption of durable goods
- $X_1 = \begin{cases} 1, & \text{with prob } \mu \\ \theta, & \text{with prob } 1-\mu \end{cases}$ – shock to preferences

Model with Banks: Financial Sector

Durable goods production

$$h_1 = G(k_0)$$

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Banks

$$\max_{k_0, D_1^b, B(s_1)} \; \mathbb{E}\left\{Q(s_1)\left[\Gamma_1(s_1)G(k_0) - D_1^b - B(s_1)\right]\right\}$$

$$\text{s.t. } D_1^b \leq \min_{s_1}\{\Gamma_1(s_1)\}G(k_0)$$

$$P_0 k_0 \leq \frac{D_1^b}{1+i_0} + \mathbb{E}\left[B(s_1)Q(s_1)\right]$$

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With non-pecuniary safety preferences: $\mathbb{E}Q(s_1) \neq 1/(1+i_0)$

$$\tau_A \equiv \frac{1/\mathbb{E}Q(s_1) - (1+i_0)}{1+i_0}$$

Model with Banks: Equilibrium

Equilibrium with flexible prices

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$$\tau_A = \frac{\nu u'\left(d_1^b\right)}{u'(y_1)}, \; d_1^b = \frac{\theta g'[G(k_0)]}{u'(y_1)} G(k_0)$$

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First best

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First best

- $\tau_A = 0$
- Policy: issue lots of government safe bonds
  ["Friedman rule" for safe assets]

Model with Banks: Second Best

Assumption: fiscal policy cannot achieve first best

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Available tools: regulator varies the amount of private safe debt (Pigouvian taxes on safe debt issuance)

Full Problem with RR

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Private allocation isn't 2nd best efficient: pecuniary externality

$$d_1^b = \frac{\theta g'[G(k_0)]}{u'(y_1^*)} G(k_0)$$

too much safe debt $\Leftrightarrow$ too low durable price $\Leftrightarrow$ too many durables

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Optimal macroprudential tax mitigates pecuniary externality

$$\tau_0^b = \frac{\tau_A}{1+\tau_A} \epsilon_\Gamma$$

[ϵ_Γ - elasticity of durables demand]

Model of Monetary Union: Assumptions

- Continuum of countries $i \in [0, 1]$
- Goods
  - $c^i_{NT,t}$: non-traded produced goods [sticky price in $t = 0$]
  - $c^i_{T,t}$: homogenous traded goods [endowment e^i_0, e^i_1]
  - h^i_1: non-traded durable goods
  - Cole-Obstfeld (log) utility

Preferences

- No labor mobility
- International markets
  - traded goods
  - safe debt
- Government
  - union-wide monetary authority
  - regional financial regulators who rebate locally
- Safe-assets-in-advance constraint:

$$P^i_{NT,1}\underline{c}^i_{NT,1} + P_{T,1}\underline{c}^i_{T,1} \leq D^{c,i}_1$$

Optimal Regional Policy

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Objective: max $\mathcal{U}^i$

Constraints

- all regional equilibrium conditions
- international prices $(P_{T,0}, P_{T,1}, i_0)$ are exogenous

Macroprudential tool

- country-specific tax on safe debt issuance $\tau_0^{b,i}$

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Proposition 1.

$$\tau_0^{b,i} = \frac{1}{1-\tau_0^i}\left(\frac{\tau_A^i \epsilon_\Gamma^i}{1+\tau_A^i} - \tau_0^i Z_2^i + Z_3^i d_1^{b,i} - Z_3^i a d_1^{c,i} - \frac{a}{1-a}\tau_0^i Z_4^i\right)$$

$$Z_2^i, Z_3^i, Z_4^i > 0$$

Optimal Regional Policy

Intuition

$$\tau_0^{b,i} = \frac{1}{1-\tau_0^i}\left(\frac{\tau_A^i \epsilon_\Gamma^i}{1+\tau_A^i} - \tau_0^i Z_2^i + d_1^{b,i} Z_3^i - a d_1^{c,i} Z_3^i - \frac{a}{1-a}\tau_0^i Z_4^i\right)$$

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3-4) $d_1^{b,i} \uparrow \;\Rightarrow\; c_{T,1}^i \downarrow \;\Rightarrow\; P_{NT,1}^i / P_{T,1} \equiv p_1^i \downarrow$

- collateral constraint gets tighter: $d_1^{b,i} \leq \theta^i \frac{g'[G(k_0^i)]}{a/y_{NT,1}^{i,*}} G(k_0^i) p_1^i$

(negative pecuniary externality)

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  (negative pecuniary externality)
- SAIA constraint gets looser: $\underline{c}_{T,1}^i + \underline{c}_{NT,1}^i p_1^i \leq d_1^{c,i}$
  (positive pecuniary externality)

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  (positive pecuniary externality)

5) $d_1^{b,i} \uparrow \;\Rightarrow\; c_{T,0}^i \uparrow \;\Rightarrow\; c_{NT,0}^i \uparrow$ because $P_{NT,0}^i / P_{T,0}$ – fixed
$\Rightarrow\; y_{NT,0}^i \uparrow$ (AD externality)

Optimal Coordinated Policy

Objective: $\int \omega^i \mathcal{U}^i di$

Constraints: all local equilibrium conditions
and international market clearing

Tools: $\{\tau_0^{b,i}\}$ and i_0

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Proposition 2.

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- *Monetary policy*: $\int \omega^i \tau_0^i di = 0$
- *Macroprudential policy*

$$\tau_0^{b,i} = \frac{1}{1-\tau_0^i}\left(\frac{\tau_A^i \epsilon_\Gamma^i}{1+\tau_A^i} - \tau_0^i Z_2^i + Z_3^i d_1^{b,i} - Z_3^i a d_1^{c,i} - \frac{a}{1-a}\tau_0^i Z_4^i + Z_5^i \widetilde{\psi}_0\right), \quad Z_5^i > 0$$

International Spillovers

Intuition

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Intuition

1-2) $\boxed{\tau_0^{b,i}\uparrow} \;\Rightarrow\; d_1^{b,i}\downarrow \;\Rightarrow\; c_{T,1}^{i}\uparrow \;\Rightarrow\; c_{T,1}^{j}\downarrow \;\Rightarrow\; \boxed{p_1^{j}\downarrow}$

International Spillovers

Intuition

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- collateral constraint in country j gets tighter:

$$d_1^{b,j} \leq \theta^{j}\frac{g'[G(k_0^{j})]}{a/y_{NT,1}^{j,*}}G(k_0^{j})p_1^{j} \text{ (negative externality)}$$

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3) $\boxed{\tau_0^{b,i}\uparrow} \;\Rightarrow\; d_1^{b,i}\downarrow \;\Rightarrow\; c_{T,0}^{i}\downarrow \;\Rightarrow\; c_{T,0}^{j}\uparrow \;\Rightarrow\; c_{NT,0}^{j}\uparrow$

because $P_{NT,0}^{j}/P_{T,0}$–fixed $\;\Rightarrow\; \boxed{y_{NT,0}^{j}\uparrow}$

(AD externality)

Optimal Coordinated Policy

Symmetric Countries

Proposition 3.
If $\tau_0 = 0$ *and* $d_1^b > a d_1^c$*, then* $\widetilde{\psi}_0 < 0$ *(local regulator overregulates its financial sector).*

- Draghi wants banks to issue even more safe debt when they already issue lots of safe debt

Optimal Coordinated Policy

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If $\tau_0 = 0$ *and* $d_1^b > ad_1^c$, *then* $\widetilde{\psi}_0 < 0$ *(local regulator overregulates its financial sector).*

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Proposition 4.
If $\tau_0 > \overline{\tau}_0 > 0$, *then* $\widetilde{\psi}_0 > 0$ *(local regulators underregulate financial sectors).*

- Draghi wants to impose tighter financial regulation due to the ZLB in the Eurozone

Conclusion

1. Optimal macroprudential and monetary policy in MU

2. Macroprudential policy
   - takes into account 2 AD and 3 pecuniary externalities

3. Gains from policy coordination
   - regional regulators overregulate when banks are large
   - regional regulators underregulate in the ZLB