International Coordination of Macro-Prudential and Monetary policies[1]

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Annual Bank Conference on Development Economics
Multilateralism: Past, Present, and Future.

June 17-18, 2019

[1] Views expressed here are not necessarily the views of the BIS.

Introduction

When is international policy coordination desirable?

- Literature starting from Obsfeld and Rogoff (1992) finds little gains to international coordination on monetary policy (MP).
  - Negligible welfare losses to domestically oriented monetary policies
- But what about macro-prudential policy (MaP) ?
  - Does a similar kind of result hold ?
  - What drives cooperation gains ?
  - How the conduct of other policies (MP) affects these gains?

An overview of the main results

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  - MP takes place ex post, after shock are realized and uncertainty has unraveled, i.e. once countries have become asymmetric
  - MaP takes place ex ante (risk sharing), under the veil of ignorance and has positive GE spill-overs.

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  - MaP takes place ex ante (risk sharing), under the veil of ignorance and has positive GE spill-overs.
- What drives gains to policy cooperation ?
  - *Frictions to cross-border capital flows*
- How do policies interact with each other ?
  - *Welfare gains to MaP cooperation larger under Nash MP.*

Introduction

Some papers in the literature.

- **Policy coordination:**
  - extensive literature on MP coordination (cross-border, cross-policy). Engel (2016) provides a nice survey.
  - Much less on MaP coordination. Jeanne (2014), Bengui (2015) and Engel (2015)

- **MP and MaP in open economy:**
  - Objectives: Benigno (2009), Corsetti et. al. (2011), Faia and Monacelli (2008), Bengui (2014), Senay and Sutherland (2018).
  - Effectiveness: Rey (dilemma vs. trilemma), Mendoza (2016) and Aizenmann et al. (2018).
  - Leakages: Aiyar (2012) for the UK, Barroso et al. (2016) for Brazil

- **Liquidity managment/provision**
  - Under-insurance and pecuniary externalities (Gromb and Vayanos 2002, Lorenzoni 2008 or Stein 2012), particularly in open economy context (Caballero and Krishnamurthy 2003 or Jeanne and Korinek 2010, Brunnermeier and Sannikov (2014)).

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Framework and technologies.

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- At date 0, banks hold unit endowment and invest in risky assets.
  - At date 1, risky asset returns 1 in one region and 0 in the other
  - Regions are symmetric and there is no aggregate uncertainty.

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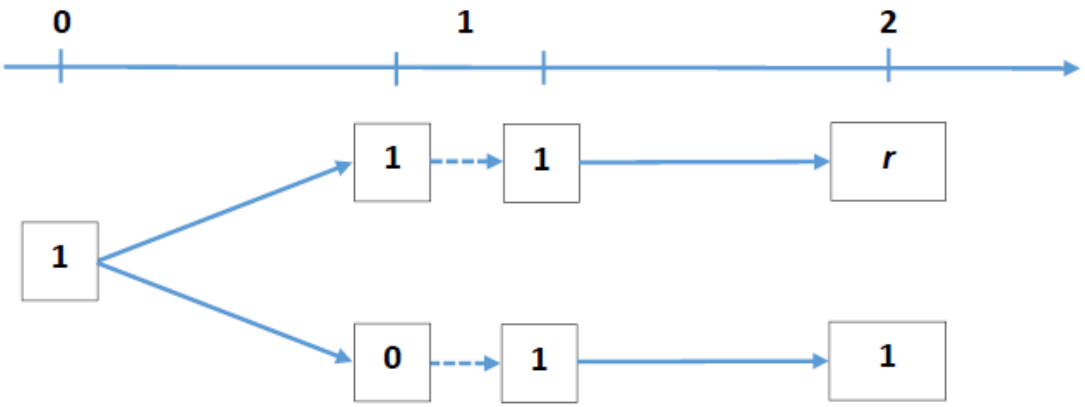
- At date 0, banks hold unit endowment and invest in risky assets.
  - At date 1, risky asset returns 1 in one region and 0 in the other
  - Regions are symmetric and there is no aggregate uncertainty.
- At date 1, once uncertainty is resolved:
  - If risky assets pay-off: banks can save for a return r (< 1)
  - If risky assets do not pay-off: banks can reinvest with unit return 1.



The model

- Markets
  - **Ex ante risk sharing**: At date 0, banks can issue claims on their risky assets and buy claims on the other region's risky assets.
  - **Ex post market for liquidity**: At date 1, once uncertainty is resolved, banks can exchange liquidity.

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- Policies
  - **Monetary policy** sets the return r to savings between date 1 and date 2 (*deposit facility*).
  - **Macro-prudential policy** sets the max limit on banks' borrowing at date 0 (*leverage ratio or CFM*).

The decentralized equilibrium

- The portfolio choice for banks:

$$\max_{L;L^*;D} \left[1 + L - L^* - R_1 L\right] R_2^* + \left[\beta R_1^* L^* + D - R_2 D\right]$$

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- Assuming $\max\left(r; r^*\right) \leq \left(R_2; R_2^*\right) \leq 1$, the equillibrium on market ex post funding:

$$\underbrace{1 + L^* - L}_{\text{Funding Supply}} = \underbrace{\beta R_1^* L^* + D}_{\text{Funding Demand}}$$

The decentralized equilibrium

- At the equilibrium, **borrowing and issuance constraints bind**:

$$\begin{array}{rcl} D = 1 - \lambda \\ D^* = 1 - \lambda^* \end{array} \quad \text{and} \quad \begin{array}{rcl} L = m\left(1 + L - L^*\right) \\ L^* = m^*\left(1 + L^* - L\right) \end{array}$$

Negative spill-over: Higher issuance by one region implies *lower* issuance by the other region.

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Negative spill-over: Higher issuance by one region implies *lower* issuance by the other region.

- At the equilibrium, **ex post funding is in excess supply**:

$$\left(R_2; R_2^*\right) = \max\left(r; r^*\right) \text{ and } \begin{array}{c} L \leq \lambda + \left(1 - \max\left(r; r^*\right)\right) L^* \\ L^* \leq \lambda^* + \left(1 - \max\left(r; r^*\right)\right) L \end{array}$$

Positive spill-over: Higher issuance by one region allows for *larger* issuance by the other region.

Optimal monetary policy

The non-cooperative equilibrium

- Optimal monetary policy:

$$\max_{r} \quad \pi = \left[1 + \left(1 - \frac{1}{\beta} R_2\right) L\right] R_2^* + (1 - R_2)(1 - \lambda)$$
$$\text{s.t. } R_2 = R_2^* = \max(r; r^*)$$

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- Optimal interest rates in Nash equilibrium:

$$r = r^* = r_n(L; L^*) \equiv \frac{\beta}{2}\left(1 + \max\left[\frac{\lambda}{L}; \frac{\lambda^*}{L^*}\right]\right)$$

- Equilibrium interest rate main properties:
  - optimal for one region (core), too high for the other (periphery)
  - decreases in domestic banks leverage.

Optimal macro-prudential policy

The non-cooperative equilibrium: Core vs. Periphery

- Macro-prudential policy in the **core region:**

$$\max_{m} \quad \pi = \left[\lambda + \left(1 - \tfrac{1}{\beta} r_n(L)\right) L\right] r_n(L)$$

$$\text{s.t. } L = m\left(1 + L - L^*\right) \text{ and } L \leq \lambda + \left(1 - r_n(L)\right) L^*$$

No trade-off for MaP: higher $m \Rightarrow$ higher $L \Rightarrow$ higher profits π

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- Macro-prudential policy in the **periphery region:**

$$\max_{m^*} \quad \pi^* = \left[\lambda^* + \left(1 - \tfrac{1}{\beta} r_n(L)\right) L^*\right] r_n(L)$$
$$\text{s.t. } \begin{array}{c} L^* = m^*\left(1 + L^* - L\right) \\ L = m\left(1 + L - L^*\right) \end{array} \text{ and } L^* \leq \lambda^* + \left(1 - r_n(L)\right) L$$

Trade-off for MaP: higher $m^* \Rightarrow$ higher L^* but higher $r_n(L)$

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- Optimal macro-prudential policy in Nash equilibrium:

$$L = \lambda + \left(1 - r_n(L)\right) L^* \text{ and } L^* = L_n(L)$$

Optimal macro-prudential policy

The cooperative equilibrium

- **Cooperative** macro-prudential policy:

$$\max_{m;m^*} \quad \pi + \pi^* = \left[\lambda + \lambda^* + \left(1 - \tfrac{1}{\beta} r_n(L)\right)(L + L^*)\right] r_n(L)$$

$$\text{s.t.} \begin{cases} L = m\left(1 + L - L^*\right) \text{ and } L^* = m^*\left(1 + L^* - L\right) \\ L \leq \lambda + \left(1 - r_n(L)\right) L^* \text{ and } L^* \leq \lambda^* + \left(1 - r_n(L)\right) L \end{cases}$$

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- **No trade-off for core**: higher $m \Rightarrow$ larger global leverage $L + L^* \Rightarrow$ larger global profits $\pi + \pi^*$

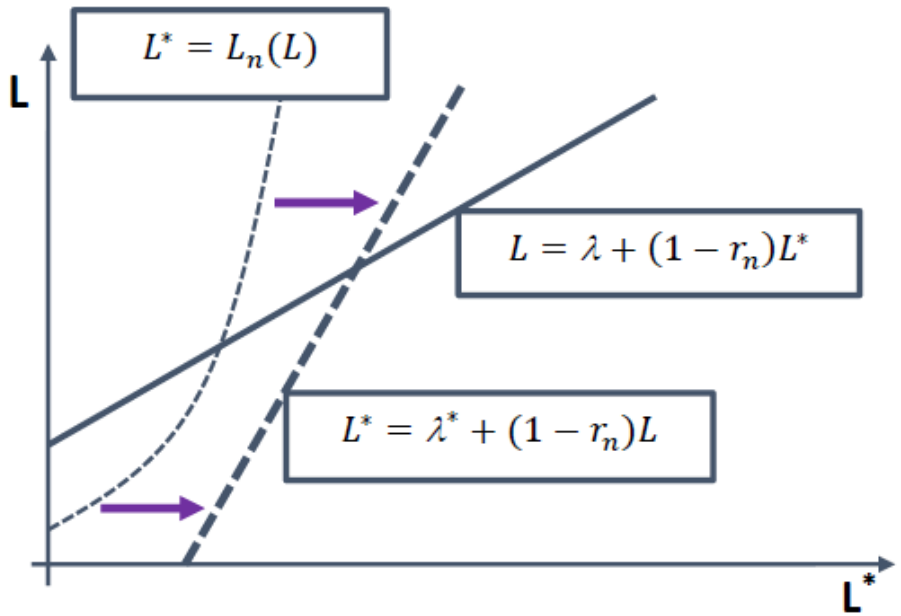
$$L = \lambda + \left(1 - r_n(L)\right) L^*$$

- **No trade-off for periphery:** higher $m^* \Rightarrow$ larger L^* **and hence** larger L (positive GE spill-over):

$$L^* = \lambda^* + \left(1 - r_n(L)\right) L$$

Optimal macro-prudential policy

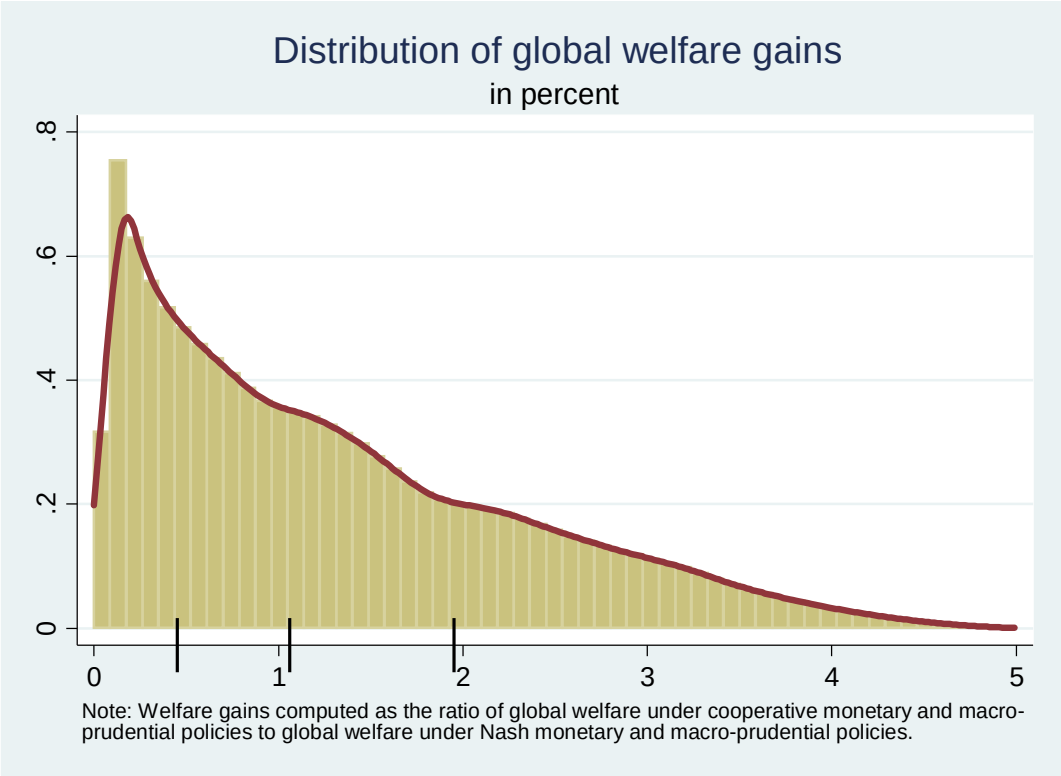
Comparing Nash and cooperation



- In Nash, periphery limits bank leverage to steer FC set in the core.
- In Coop, periphery internalizes the positive spill-over in bank leverage.
  - Gross cross border positions $(L; L^*)$ are larger
  - Global funding cost $r_n(L)$ is lower

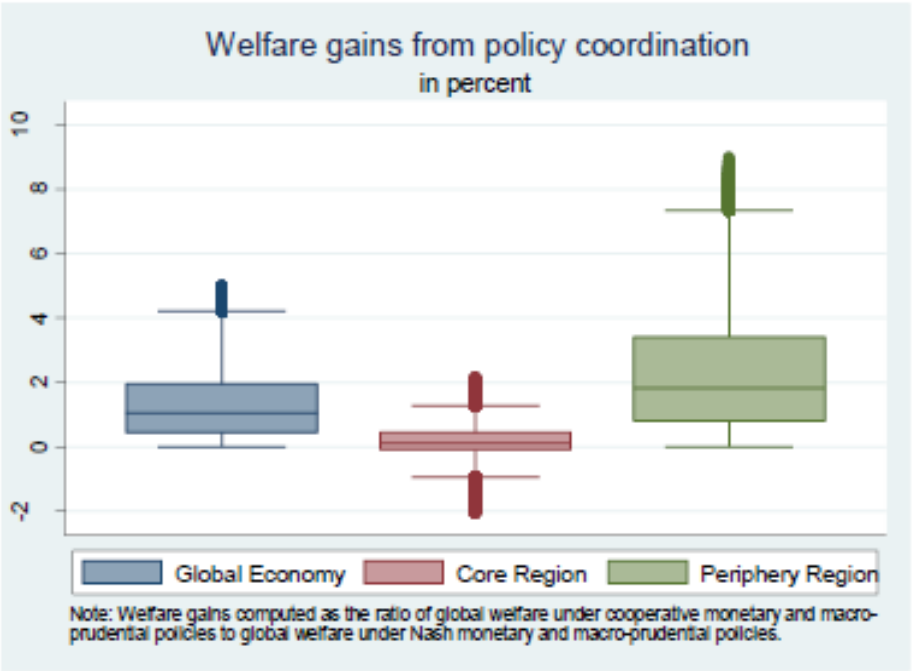
Quantifying welfare gains

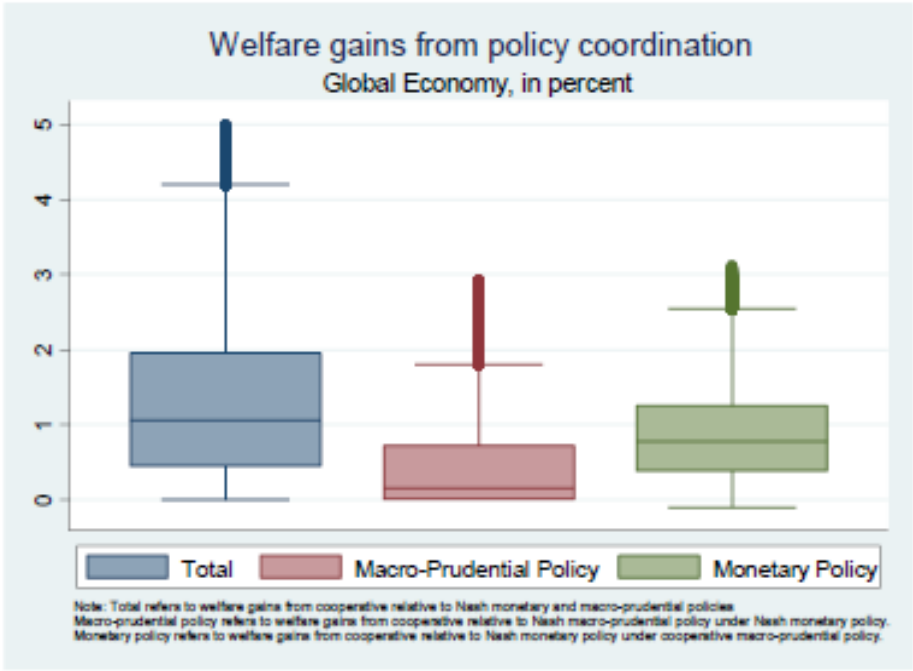
- We consider three parameters of the model
  - Cost on cross-border capital flows (β from 55% to 95%)
  - Gross foreign liabilities in Core (λ from 40% to 80%)
  - Gross foreign liabilities in Periphery (λ^* 0% to 40%)
- Global welfare gains distribution (cooperative vs. Nash MP & MaP)



Quantifying welfare gains

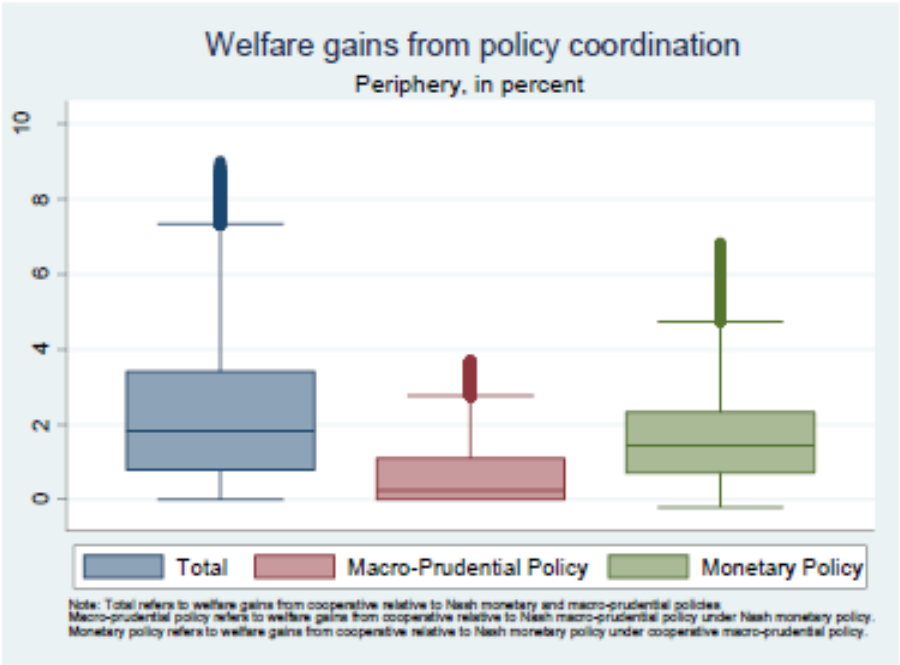
- Splitting welfare gains by region, by policy

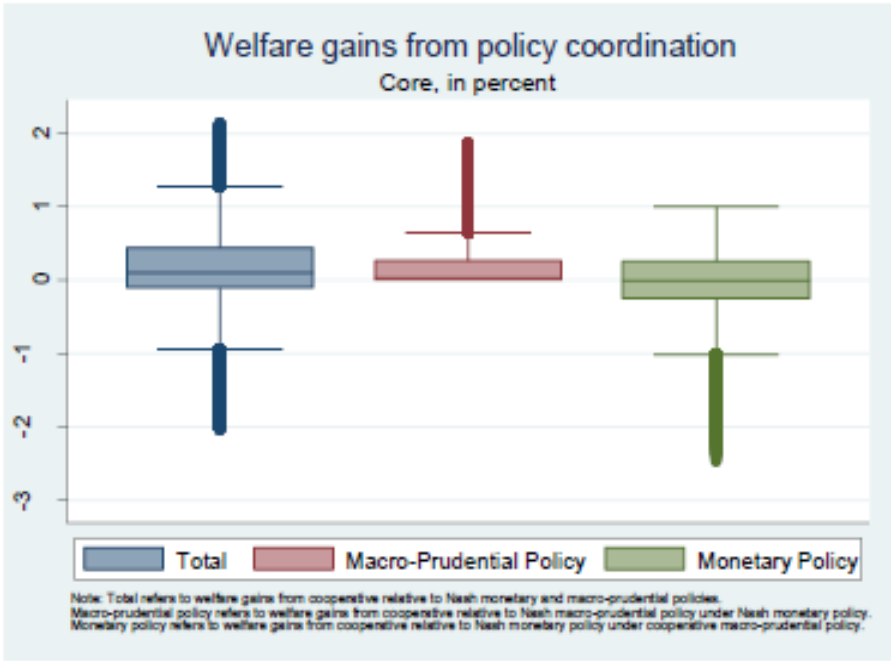




Quantifying welfare gains

- Which region benefits from coordinating what policies?





Conclusions

- We have developed a model of monetary and macro-prudential policy cross-border coordination where
  - *macro-prudential policy* determines bank ex ante leverage.
  - *monetary policy* determines the cost of ex post borrowing

- Global interest rate under Nash MP is optimal for one region and too high for the other. This creates incentives for periphery to use MaP to affect funding conditions.

- Trade-off: allowing more borrowing vs. correcting inefficient funding conditions. Main issue: misses the cross-border leverage externality.

- Numerically, coordination gains can be sizeable, particurlarly for the periphery. Asymmetry matters.