Capital Controls or Macroprudential Regulation?[1]

Anton Korinek Damiano Sandri

Johns Hopkins University, NBER and IMF

NBER and Central Bank of Turkey

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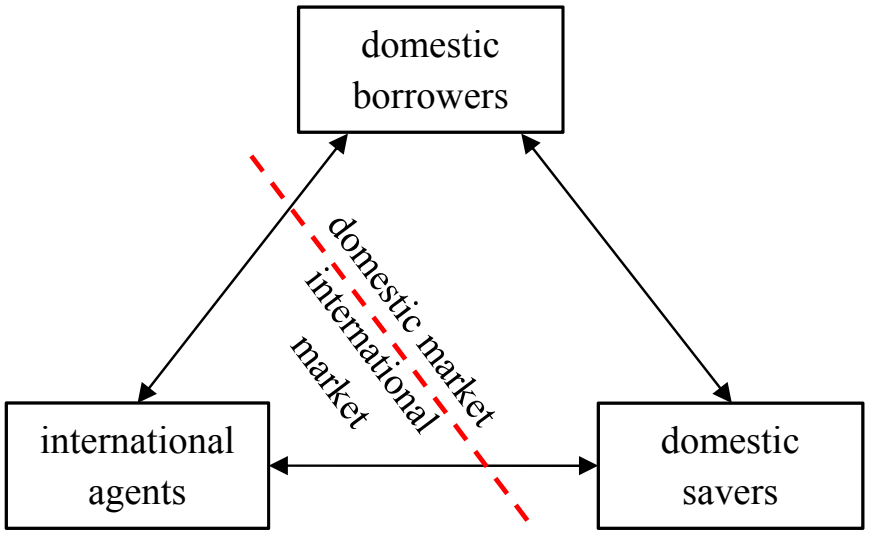
Motivation

Capital controls (CC) and macroprudential regulation (MP)

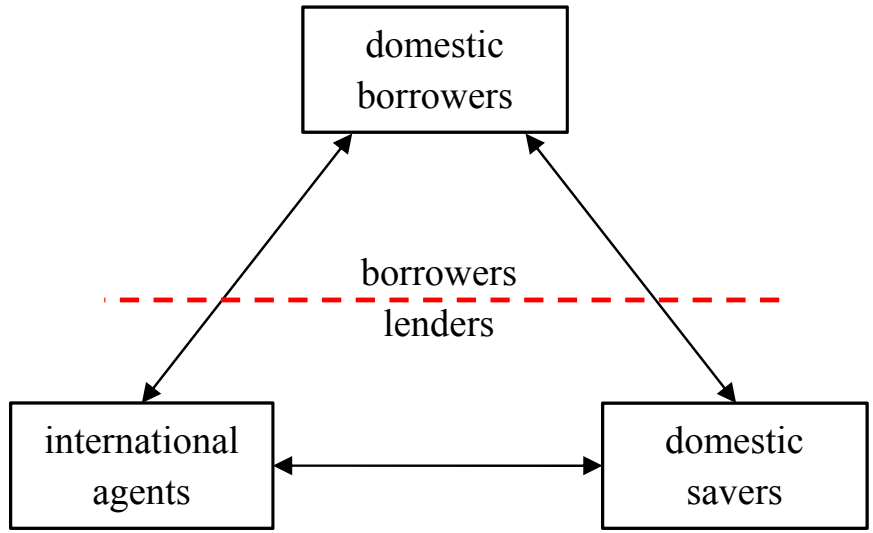
- Both curb credit booms
- But relative merits are little understood
  - Some argue CC not needed if effective MP is in place
- Main questions
  - What are the relative merits?
  - Does MP eliminate the need for CC? Or vice versa?
  - If not, what determines the optimal mix?

Definitions

- CC segment domestic and foreign capital markets
- MP places a wedge between domestic borrowers and all lenders



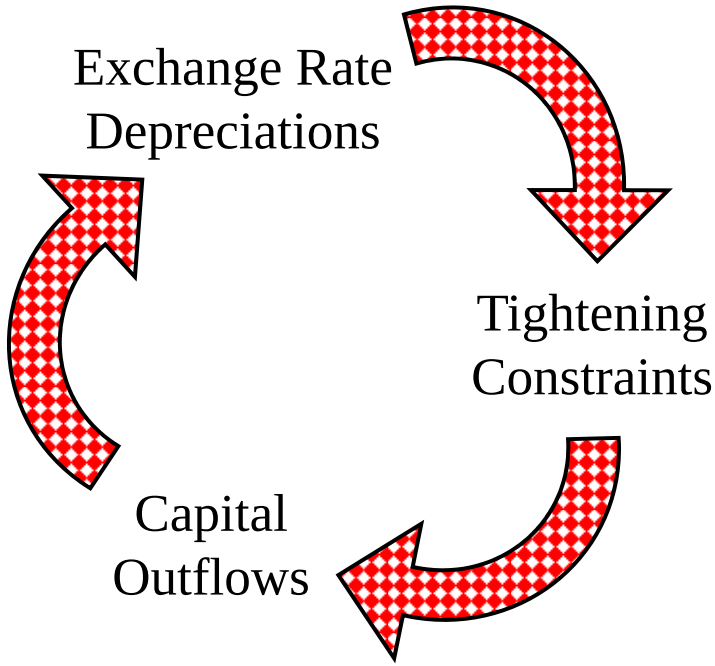
Capital Controls



Macroprudential Regulation

Basic framework

Framework: model of contractionary depreciations (Mendoza, ...)
pecuniary externalities (Korinek, Bianchi, ...)



Key Innovation: distinguish domestic and foreign borrowing

Key Findings

1. Domestic credit associated with externalities
   $\rightarrow$ rationale for macroprudential regulation

2. Foreign credit has greater externalities than domestic credit
   $\rightarrow$ desirable to impose tighter regulation on foreign borrowing

$\Rightarrow$ both capital controls and macroprudential regulation needed

Model set up - Utility

- Small open economy in three time periods $t = 0, 1, 2$:
- Agents maximize utility from consumption:
  - foreigners F with linear utility
  - domestic borrowers B
  - domestic savers S

$$U^i = u(c^i_{T,0}) + u(c^i_{T,1}, c^i_{N,1}) + u(c^i_{T,2}) \quad \text{for} \quad i = B, S$$

Model set up - Budget constraints

- Domestic agents:
  - receive endowments $y^i_{T,t}$, $y^i_{N,1}$
  - issue/buy bonds denominated in tradable goods b^i_t

- Budget constraints:

$$\begin{aligned} c^i_{T,0} + b^i_1 &= y^i_{T,0} \\ c^i_{T,1} + pc^i_{N,1} + b^i_2 &= y^i_{T,1} + py^i_{N,1} + b^i_1 \\ c^i_{T,2} &= y^i_{T,2} + b^i_2 \end{aligned}$$

- Borrowers face a financial constraint in period 1:

$$-b^B_2 \leq \phi \left(y^B_{T,1} + py^B_{N,1} \right)$$

Period 1 Equilibrium

State variables in period 1: aggregate wealth (B_1^B, B_1^S)

- Individual i solves

$$V^i(b_1^i; B_1^B, B_1^S) = \max \left\{ u(c_{T,1}^i, c_{N,1}^i) + u(c_{T,2}^i) \right\} \quad \text{s.t. BCs, CC}$$

- Real exchange rate determined by aggregate demand:

$$p(B_1^B, B_1^S) = \frac{1-\alpha}{\alpha} \cdot \frac{C_{T,1}^B + C_{T,1}^S}{Y_{N,1}^B + Y_{N,1}^S}$$

- In unconstrained equilibrium: $MPC^B = MPC^S > 0$
- In constrained equilibrium: $MPC^B > MPC^S > 0$

  $\rightarrow$ differential effects of (B_1^B, B_1^S) on exchange rate

Optimal Prudential Policy

- Prudential planner: sets B_1^i but leaves laissez-faire for $t \geq 1$ (as in Stiglitz, 1981, Geanakoplos-Polemarchakis, 1986)
- The social planner solves:

$$\max_{B_1^B, B_1^S} \sum_i \gamma^i \left[u(C_{0,T}^i) + V^i(b_1^i; B_1^B, B_1^S) \right] \text{ s.t. } RC_0$$

internalizing the effects of borrowing on future exchange rates

Social Planner's optimality conditions

- Euler equation of private agents:

$$u^i_{T,0} = u^i_{T,1}$$

- Euler equation of social planner:

$$u^i_{T,0} = u^i_{T,1} + \underbrace{\frac{\partial V^i}{\partial B^i} + \frac{\gamma^j}{\gamma^i}\frac{\partial V^j}{\partial B^i}}_{\text{social benefit of agent } i \text{ liquidity}}$$

Social benefit of carrying more wealth into period 1:

- higher wealth leads to higher consumption
- higher consumption pushes up exchange rate
  $\rightarrow$ relaxes constraint

Implementation

Proposition (*Implementation*)

A planner finds it optimal to impose a tax on bond purchases of

$$\tau^i = \lambda^B \cdot \Psi^B \cdot MPC^i \quad \text{for both} \quad i = B, S$$

This requires both capital controls and macroprudential regulation.

- $MPC^B > MPC^S > 0 \Rightarrow$ macropru to curb domestic borrowing (keeping wealth with borrowers supports the exchange rate)
- $MPC^S > MPC^F = 0 \Rightarrow$ capital controls to curb foreign borrowing further (keeping wealth domestic supports exchange rate)

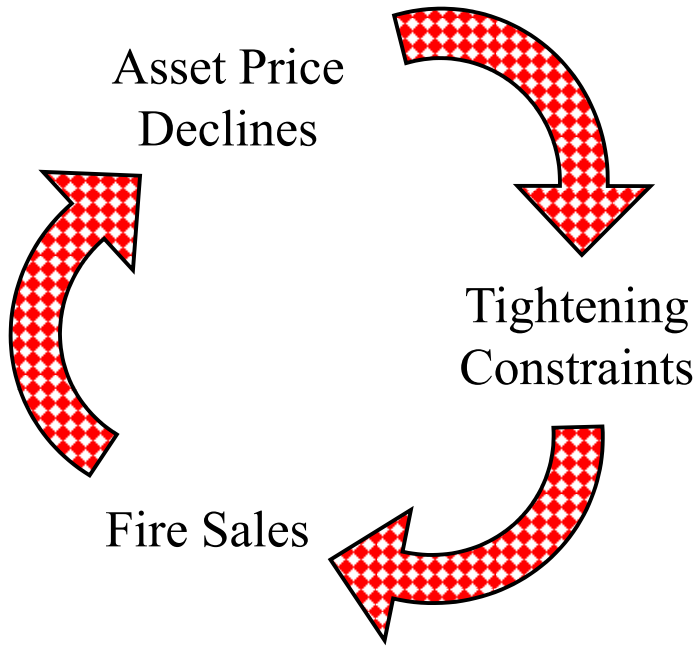
$$\text{mapping:} \quad (\tau^B, \tau^S) \iff (\tau^{MP}, \tau^{CC})$$

Uncertainty and Risk Markets

1. Complete risk markets: full set of Arrow securities
   - Domestic agents do not buy sufficient insurance
   - Planner imposes risk-sensitive capital controls and macroprudential regulation
2. Incomplete risk markets: only uncontingent bonds
   - Private agents take on excessive leverage
   - Planner uses capital controls and macroprudential regulation on bonds

Macroprudential Regulation and Fire Sales

- Macroprudential policy often motivated by fire sales of assets, esp. in advanced economies (AEs)
- Fire sales lead to similar feedback loops as ER depreciations



→ Do fire sales of assets also justify capital controls?

Macroprudential Regulation and Fire Sales

Model setup extended to fire sales of assets:

- Borrowers B hold productive assets
- Lenders S and F are less productive using assets than borrowers
  $\rightarrow$ asset sales to savers/foreigners lead to price declines
- Since savers are unconstrained, $q = F_k^i$ independent of B_1^S

$\rightarrow$ no benefit to increasing the wealth of unconstrained savers

Proposition (*Fire Sale Externalities*)

If externalities derive from the fire sales of assets, macroprudential regulation alone is sufficient.

$\rightarrow$ Argument why capital controls are relevant for EMs not AEs.

Conclusions

- In EMs with contractionary depreciations, both capital controls and macropru are needed:
  - They mitigate crises by reducing ER depreciations
- Mechanism:
  - increase net worth of people who spend on domestic goods, i.e. both borrowers and savers (keep wealth at home)
  - But: regulate borrowers more since $MPC^B > MPC^S$

$$\tau^B > \tau^S > 0$$

- In AEs with feedback loops driven by fire sales of assets
  - Macroprudential regulation is sufficient