

# On the Desirability of Capital Controls

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# Why Capital Controls?

- Imposing capital controls restricts agents' budget sets
- But constraining choices will change equilibrium prices, possibly in a favorable way
  - Capital controls potentially welfare-improving
- Conventional wisdom: **international debt markets dysfunctional** due to volatile default risk premia, jittery foreign lenders, information frictions etc.
- This paper: **limits on capital flows can be desirable even with smoothly-functioning debt markets**

## What We Do

- Investigate welfare effects of capital controls in a textbook two country stochastic growth model
- Countries produce and then trade **differentiated goods**
- Compare **free trade in a bond versus financial autarky**
- **Key mechanism: asset market structure affects dynamics of relative investment and output, and thus terms of trade**
- Starting from zero NFA position, find that:
  1. Productive countries often find it optimal to restrict capital inflows: **capital controls like tariffs**
  2. Ex ante identical countries sometimes both prefer financial autarky: **capital controls as insurance**

# Related Literature

- Most closely related papers:
  - Brunnermeier and Sannikov (2014)
  - Costinot, Lorenzoni and Werning (2014)
  - De Paoli and Lipinska (2013)
  
- Other related papers:
  - Bianchi (2011)
  - Bianchi and Mendoza (2013)
  - Korinek (2010)
  - Martin and Taddei (2012)

# Model: Backus, Kehoe, and Kydland (1994)

- Two countries,  $i = 1$  and  $i = 2$
- Standard preferences and technology in each country

$$E_0 \sum_{t=0}^{\infty} \beta^t \left[ \log c_{it} - \phi n_{it}^{1+\frac{1}{\varepsilon}} \right]$$

$$y_{it} = \exp(z_{it}) k_{it}^{\theta} n_{it}^{1-\theta}$$

- Country 1 produces  $a$  (aluminum), country 2 produces  $b$  (bricks)
- Goods  $a$  and  $b$  are traded, combined to produce final consumption / investment good (houses)

$$c_{1t} + x_{1t} = \left[ \omega a_{1t}^{\frac{\sigma-1}{\sigma}} + (1-\omega) b_{1t}^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}}$$

$$c_{2t} + x_{2t} = \left[ (1-\omega) a_{2t}^{\frac{\sigma-1}{\sigma}} + \omega b_{2t}^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}}$$

$$k_{i,t+1} = (1-\delta)k_{it} + x_{it}$$

# Risk and Asset Markets

- County specific productivity shocks  $z_{it}$

$$z_{i,t+1} = \rho z_{it} + \varepsilon_{i,t+1}$$

$$\begin{pmatrix} \varepsilon_{1,t+1} \\ \varepsilon_{2,t+1} \end{pmatrix} \sim N(0, \Sigma)$$

- **Bond Economy (BE)**
  - One period bond
  - Pays 1 unit of  $c_1$  plus 1 unit of  $c_2$
  - Zero net supply
- **Financial Autarky (FA)**
  - No assets traded  $\Rightarrow$  Net exports zero
  - Still trade in goods

# Key Parameters

## 1. Persistence $\rho$

- Bond  $\approx$  Complete markets if shocks not highly persistent
- Baseline  $\rho = 0.995$  (quarterly) and  $\sigma_\varepsilon = 0.02$

## 2. Substitutability $\sigma$ between traded goods

- Determines size of terms of trade movements
- Baseline  $\sigma = 1$  (Cobb-Douglas)
- Also consider  $\sigma = 0.5, 2, 5$

## 3. Import share, linked to $\omega$

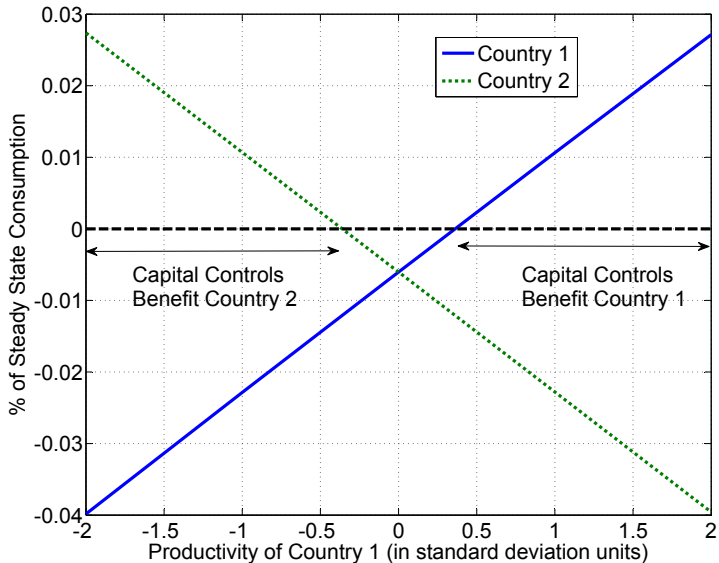
- Gains from asset trade linked to extent of goods trade
  - Baseline  $is = 25\%$
- 
- Overall, parameters generate fluctuations resembling business cycles in typical emerging markets economy



# First Result: More Productive Countries Gain from Banning Capital Inflows

- Evaluate alternative market structures starting from equal capital, zero NFA
  - $k_{1,0} = k_{2,0} = k^*, B_0 = 0$
- Compute gains from moving from BE to FA as percentage of consumption, as a function of country 1 productivity (fixing  $z_{2,0} = z^* = 0$ )

# Welfare Gain from Moving to Financial Autarky



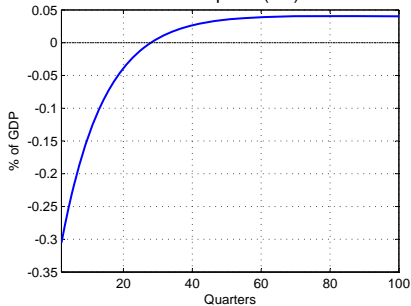
## Spain and Germany Example

- Spain can borrow freely, and has a high return tourism business
- Developers build hotels, financed by borrowing from Germany
- Supply of Spanish vacations rises  $\Rightarrow$  price of Spanish vacations falls
  - requires Spanish and German vacations imperfect substitutes
- **Pecuniary externality**: Atomistic individual developers do not internalize price effect and thus overbuild

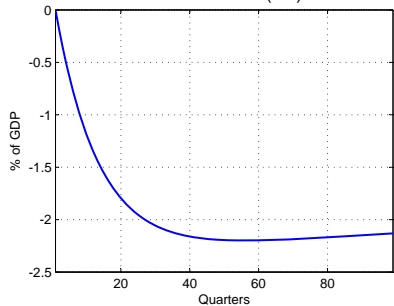
$\Rightarrow$  Capital inflows may not improve welfare

- Might shed light on why fast-growing countries often do not borrow from abroad (Gourinchas and Jeanne, 2013)

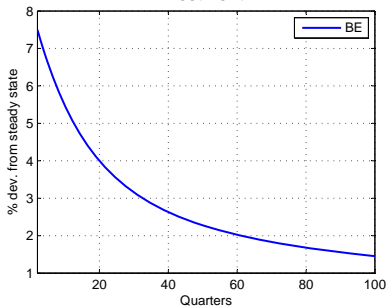
Net Exports (BE)



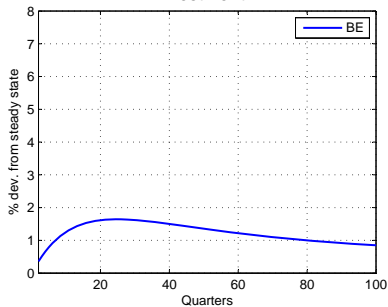
Bond Position (BE)



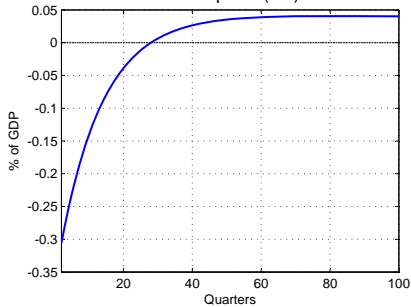
Investment 1



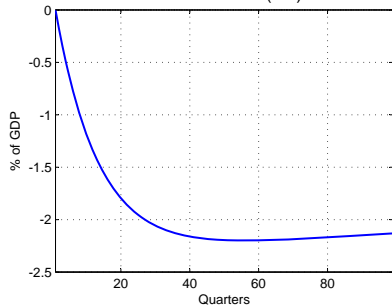
Investment 2



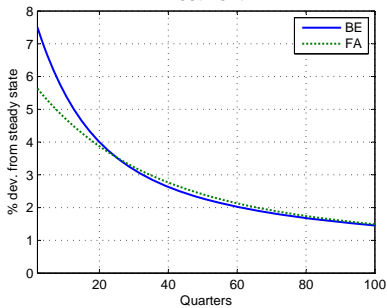
Net Exports (BE)



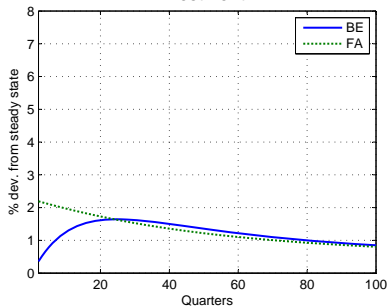
Bond Position (BE)



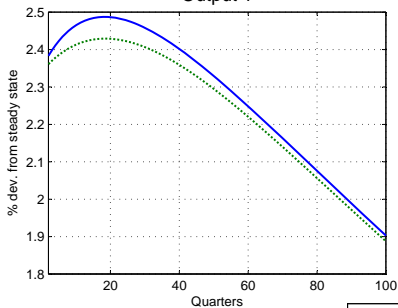
Investment 1



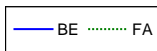
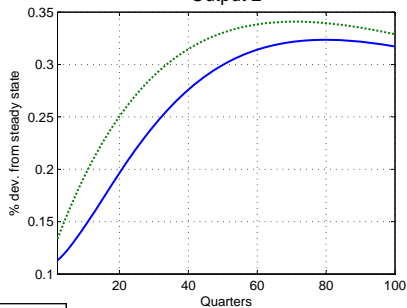
Investment 2



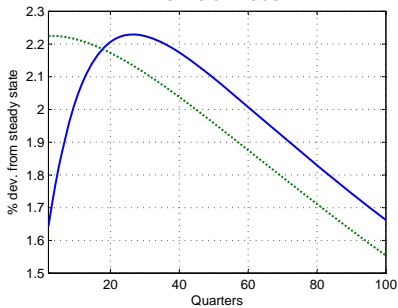
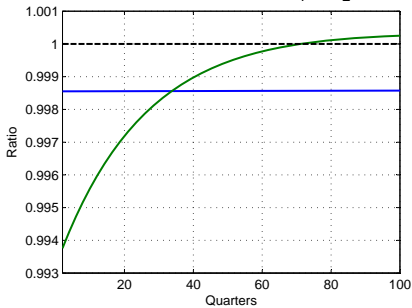
Output 1



Output 2



Terms of Trade

Relative Consumption =  $c_1 / (c_2 r x)$ 

# Capital Controls As Insurance

- Asset market structure changes ToT dynamics
- With complete markets, prices induce efficient allocations  
⇒ messing with prices cannot be Pareto-improving
- But our baseline model has a friction: absence of insurance against shocks to relative permanent income
- ToT moves inversely with relative quantities, dampens fluctuations in relative permanent income, provides automatic insurance against country-specific shocks
  - Cole and Obstfeld, 1991
- Capital controls might improve or worsen this terms of trade insurance

## Welfare Gains Moving to FA (ex ante identical countries)

Import Share	Elasticity		
	$\sigma = 0.5$	$\sigma = 1$	$\sigma = 2$
$is = 0.25$	0.059	-0.006	-0.029
$is = 0.50$	-0.045	0.000	-0.027
$is = 0.75$	-0.024	-0.005	0.002



# Interpreting Welfare Findings

- Imagine a positive productivity shock in country 1
- Capital controls restrict investment in 1, improve ToT for country 1
- Standard calibration:
  - small terms of trade response
    - ⇒ 1 already relatively better off
    - ⇒ capital controls reduce ex ante insurance
- Low elasticity case:
  - large terms of trade response
    - ⇒ 1 relatively worse off
    - ⇒ capital controls enhance ex ante insurance

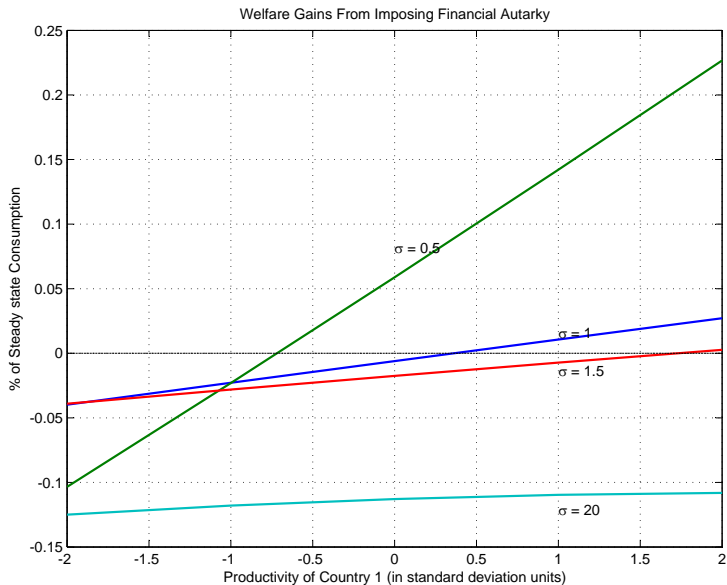
## Summary: Capital Controls in a Textbook Model

- Capital controls often welfare improving for one country at the expense of its trading partner
  - For relatively productive country, free capital inflows lead to high investment, worse future terms of trade
  - This pecuniary externality creates a case for restricting capital inflows
- Capital controls can also be welfare improving for both countries (symmetric starting point)
  - Capital controls can improve terms of trade insurance
  - Need both highly persistent shocks and low substitutability between goods

# Conclusions

- Theory potentially helps explain why fast growing countries reluctant to borrow
- Motivates additional work to quantify potential role for capital controls in specific countries
- Are there less blunt tools to address the externality?

# Alternative Elasticities



## Persistence and Risk Aversion

	Elasticity		
	$\sigma = 0.5$	$\sigma = 1$	$\sigma = 2$
Baseline Model			
$\gamma = 1$ $\rho = 0.995$	0.059	-0.006	-0.029
High Risk Aversion			
$\gamma = 2$ $\rho = 0.995$	0.146	-0.009	-0.041
Low Persistence			
$\gamma = 1$ $\rho = 0.91$	-0.012	-0.015	-0.009