

Macroprudential Policy with Firm Heterogeneity

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Motivation / What I do

- Capital controls have become an important policy tool
 - Prevent and mitigate crises by managing cross-border flows
 - But this view ignores potential effects on investment and productivity
- I combine macroprudential open economy literature and misallocation literature
- Derive sufficient statistic formula for capital controls
 - Trade-off: negative effects on productivity reduce optimal capital controls
 - Leverage along with firm-level microdata to quantify trade-off
- For baseline scenario, capital flows should be incentivized rather than restricted

Related Literature

- **Optimal Macroprudential Policy**

- **Pecuniary Externalities (Theory):** Lorenzoni (2008); Jeanne and Korinek (2010); Dávila and Korinek (2017); Basu et al. (2020)
- **Pecuniary Externalities (Quantitative):** Bianchi (2011); Benigno et al. (2013); Bianchi and Mendoza (2018, 2020); Schmitt-Grohé and Uribe (2020); Akinci and Queralto (2022)

Consider effects on investment and productivity

- **Misallocation**

- **Measurement:** Hsieh and Klenow (2009); Gopinath et al. (2017)
- **Response of Misallocation:** Capital controls (Larrain and Stumpner, 2017; Varela, 2017; Bau and Matray, 2023; Andreasen et al., 2023), macroprudential policy (Jiménez et al., 2017), government spending (Pinardon-Touati, 2024)

Demonstrate how misallocation concerns affect optimal capital controls

Model - Overview

- Small, open economy model with a representative household à la Bianchi (2011)
- Consumes non-tradable endowment and tradable good, which is produced using capital and labor
- **Pecuniary Externality + Incomplete Markets:** Households can lend or borrow from the rest of the world but face a borrowing constraint that depends on their income
- **Misallocation:** Firms differ in access to capital → misallocation → reduced productivity
- **Today:** Uncertainty and frictions are only present in $t = \tilde{t}$.

Pecuniary Externality + Incomplete Markets

- Incomplete Markets: HHs subject to borrowing constraint

$$\underbrace{d_{t+1}}_{\text{Borrowing}} \leq \kappa \left(\underbrace{y_t^T}_{\text{T Output}} + p_t \underbrace{y_t^N}_{\text{NT Output}} \right)$$

- Pecuniary externality: Relative price of non-tradable goods p_t (\approx Real Exchange Rate)
- Borrowing constraint binds $\rightarrow c_{T,t} \downarrow \rightarrow c_{N,t}$ Demand $\downarrow \rightarrow p_t \downarrow \rightarrow$ Vicious cycle
- Capital controls \rightarrow Consumption in good times $\downarrow \rightarrow$ Consumption in bad times \uparrow
 - Capital controls as insurance policy

Misallocation

- Hsieh and Klenow (2009) framework with heterogeneous firms in tradable production

$$y_t^T = \left[\int_0^1 y_t^T(i)^{\frac{\eta-1}{\eta}} di \right]^{\frac{\eta}{\eta-1}}$$

- Firm i uses capital and labor h to produce its variety

$$y_t(i) = A_t(i)k_t(i)^\alpha h_t(i)^{1-\alpha}$$

- **Firm Heterogeneity:** Firms differ in their ability to access capital

Misallocation

- Under certain conditions we can aggregate into a representative firm

$$y_t^T = \text{TFP}_t k_t^\alpha h_t^{1-\alpha},$$

where

$$\log \text{TFP}_t \equiv \log \text{TFP}_t^* - \frac{1}{2} \alpha(1 + \alpha(\eta - 1)) \text{Var} \left[\underbrace{\log R(i)}_{\text{MRPK}} \right]$$

- Reduced form specification of frictions yields

$$\gamma_t = \alpha(1 + \alpha(\eta - 1))\nu \text{Var} [\log R(i)]$$

where,

$$\gamma_t \equiv \frac{\partial \log \text{TFP}_t}{\partial \log k_t}$$

Productivity Losses

- Firms rent capital through intermediaries in segmented markets
- Must allocate $F(i)\hat{k}(i)^{1-\nu}$ to intermediation tasks
- Rents $\hat{k}(i) - F(i)\hat{k}(i)^{1-\nu}$ to firms
- If $F(i)$ is unobserved before choosing $\hat{k}(i) \rightarrow \hat{k}(i) = k$
- ν determines how intermediation frictions scale with lending. **Baseline:** $\nu \in (0, 1)$
- **Paper:** Also possible with heterogeneous borrowing constraints or access to equity

Optimal Policy

- Constrained efficient allocation: Govt. sets capital control τ^d and Inv. subsidy τ^k
 - Two inefficiencies, two instruments \rightarrow no trade-off
 - Implicit assumption: Govt. controls level and allocation of foreign borrowing
- Consider opposite case: Govt. does not control credit allocation $\rightarrow \tau^k = 0$
- Sufficient statistic for credit allocation: Marginal propensity to invest mpi

$$\text{mpi} \equiv \frac{\partial k_t}{\partial d_t}$$

Second-best Capital Controls

Proposition (Implementing the Second-Best Allocation)

The capital control τ_{sb}^d that implements the second-best allocation is

$$\tau_{sb}^d = \tau_{ce}^d - \frac{\text{mpi}}{1+r} \times \tau_{ce}^k$$

- Can write τ_{sb}^d as function of measurable objects which capture macroprudential motive
 - Probability of crisis π
 - Strength of Pecuniary externality
 - Productivity losses γ
- Paper: Full description
- Today: Focus on effects on productivity, measured by γ .

Estimating the Investment Externality

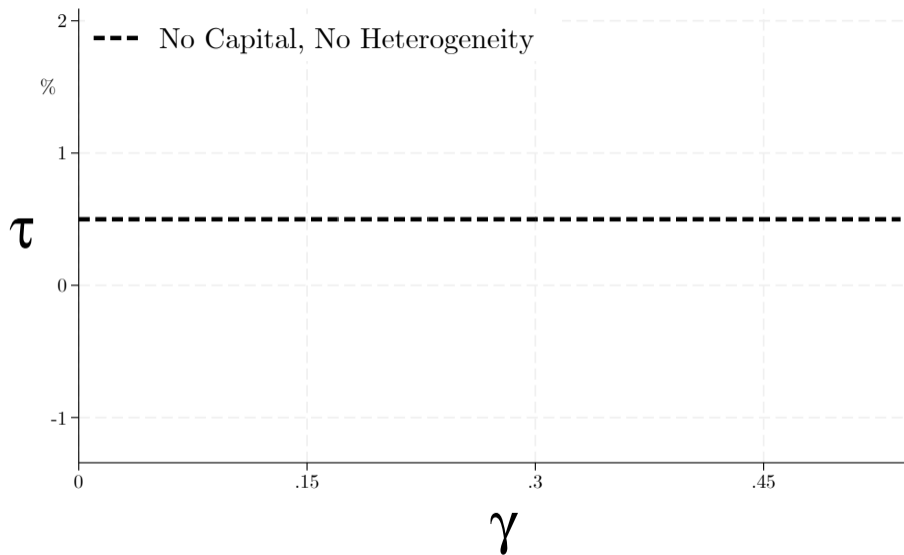
$$\gamma_t = \alpha(1 + \alpha(\eta - 1)) \times \nu \times \text{Var} [\log R(i)]$$

- To estimate $\text{Var} [\log R(i)]$, follow indirect approach from Hsieh and Klenow (2009)
- Recall:

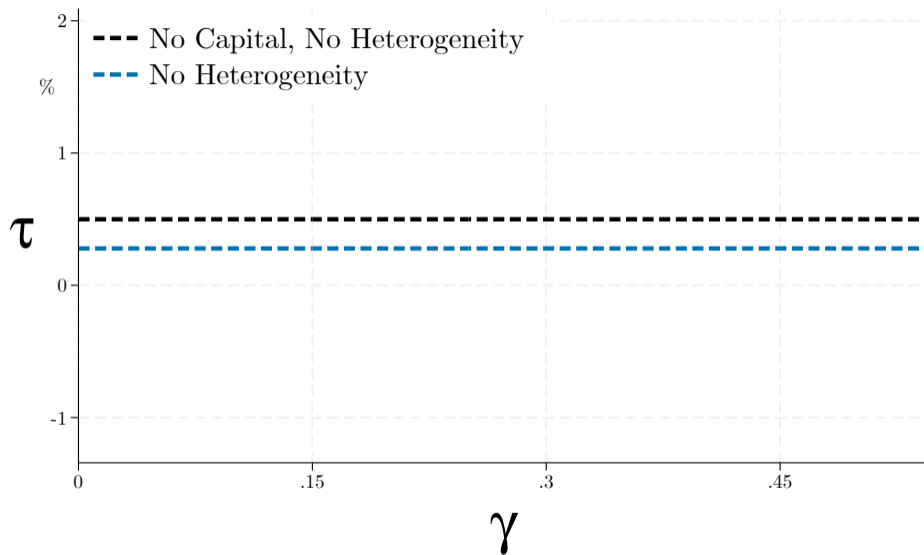
$$R(i) \propto \frac{\overbrace{p(i)y^T(i)}^{\text{revenue}}}{\underbrace{k(i)}_{\text{capital stock}}},$$

- Pin down ν using identified elasticity from Pinardon-Touati (2024)

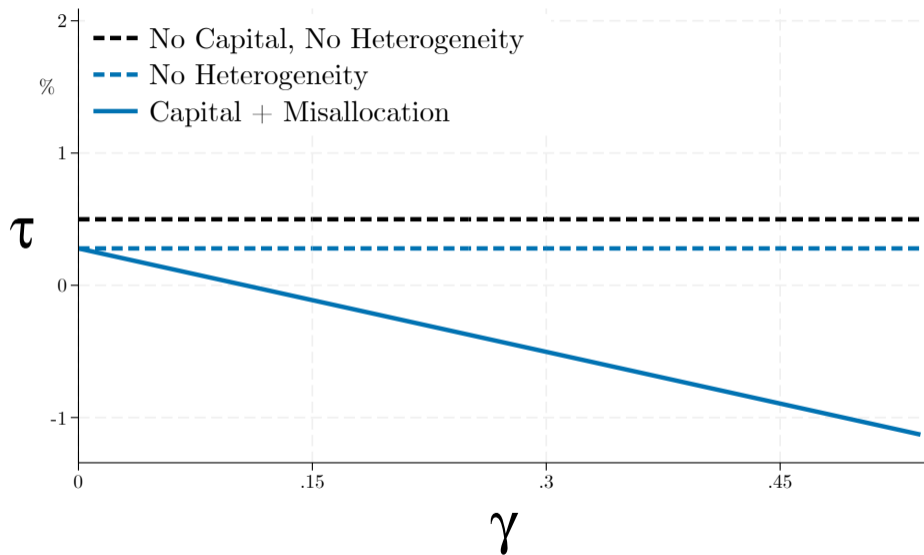
Second Best Capital Controls for $\pi = 3\%$



Second Best Capital Controls for $\pi = 3\%$

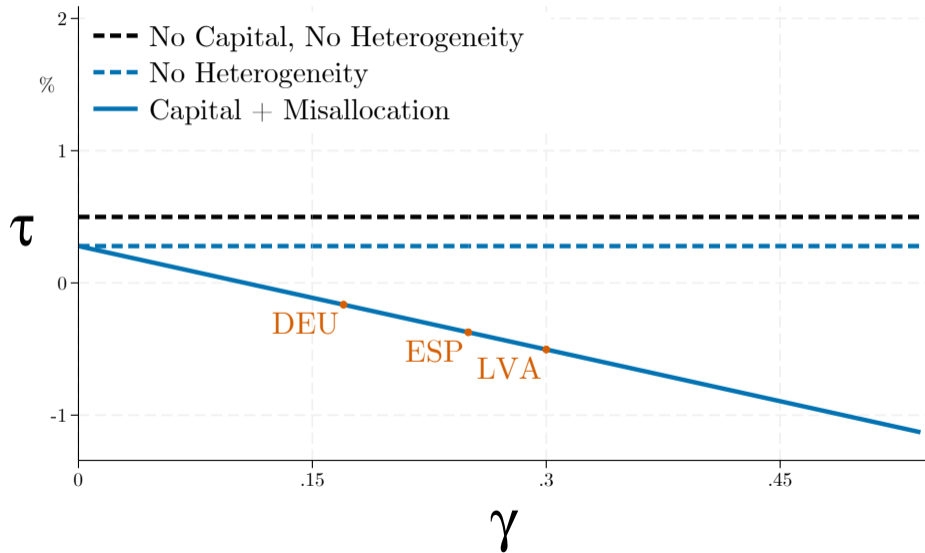


Second Best Capital Controls for $\pi = 3\%$

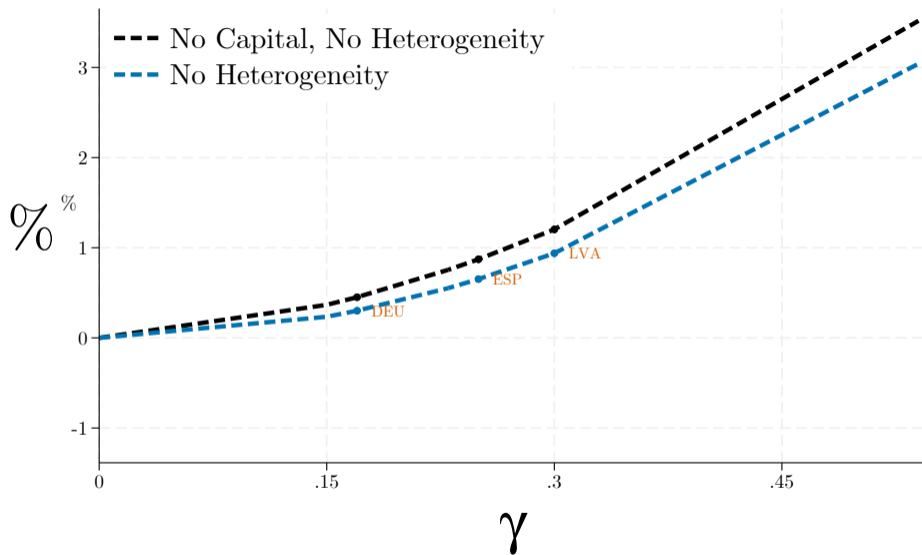


Second Best Capital Controls for $\pi = 3\%$

$\pi = 6\%$ $\pi = 25\%$



TFP Losses of Ignoring Heterogeneity



Conclusion

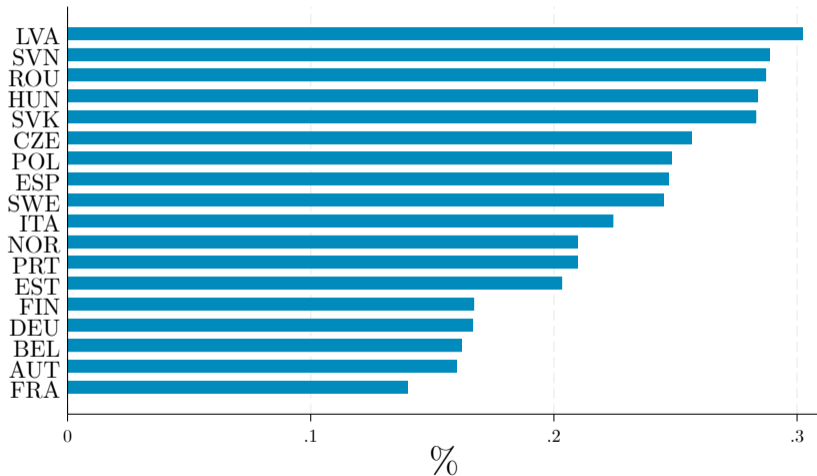
- Built model combining insights from literature on capital controls, and misallocation
- Show that negative effects on productivity can generate trade-off
- Leveraged sufficient statistic formulation together with rich micro-data to quantify trade-off
- Taking productivity losses into account \rightarrow incentivize rather than restrict capital flows

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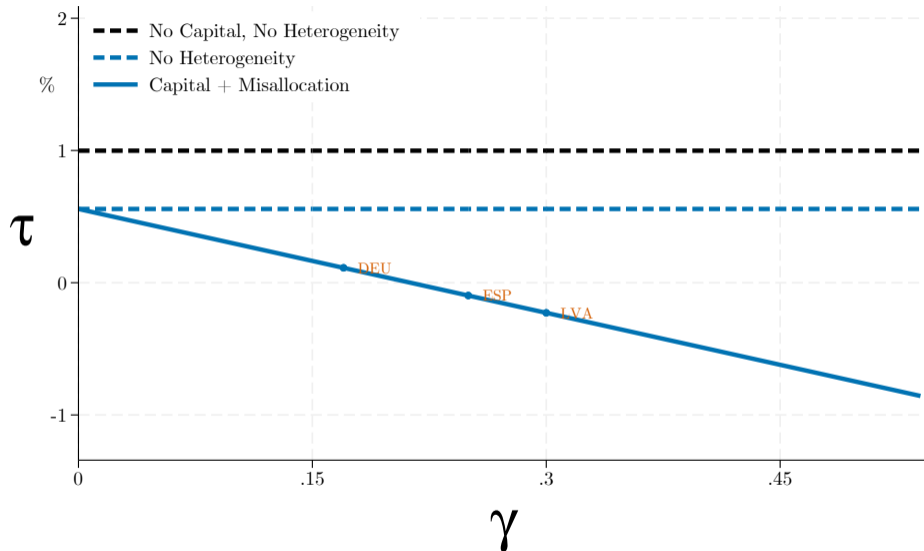
Estimates for γ_t

Back



$$\gamma_t \equiv \frac{\partial \log \text{TFP}_t}{\partial \log \text{TFP}_t}$$

$\pi = 6\%$



$\pi = 25\%$

