Capital Controls and Free-Trade Agreements

International Fragmentation, Supply Chains, and Financial Frictions
NBER, Central Bank of Chile

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The views expressed here do not necessarily reflect the position of the Bank of England.

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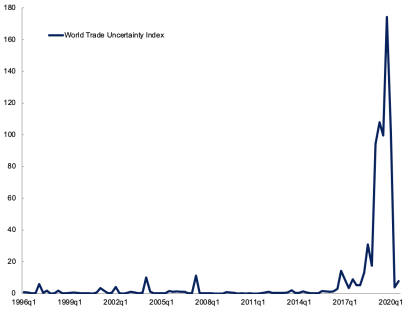
World Trade Policy Uncertainty



Source: Ahir, Bloom and Furceri (2018)

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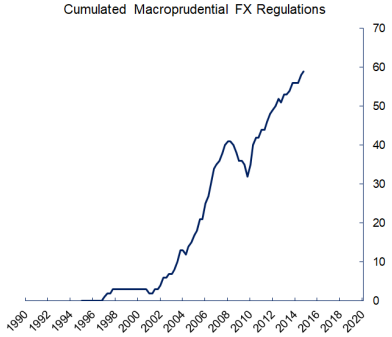

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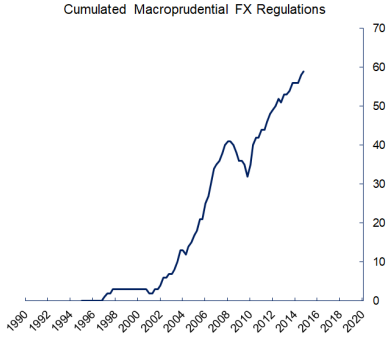

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How do optimal capital controls change in a world with less free trade?

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- Monopoly power in markets results in incentives to manipulate prices: *inter*-(world interest rate) and *intra*-temporally (relative goods prices)
- Compare unilateral (without retaliation) and strategic allocations...
  i. ...**with** FTA in place [Costinot, Lorenzoni and Werning, 2014]
  ii. ...**absent** FTA, with **optimal import tariff**

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#4. **Welfare**: Domestic gains more than offset by losses abroad from spillovers
   - ⋆ Dynamic game with retaliation: absent FTA, costly capital-control wars more likely to endogenously arise ⇒ **Novel argument for free trade**

Generality and Extensions

- **Production Economy with Nominal Rigidities**: extra incentive to bring forward consumption with demand constraints, due to aggregate-demand externalities
- **Small-Open Economy**: market power in goods only
  - *Cole-Obstfeld case*: capital controls invariant to country size; tariffs non-zero
- **Segmented Markets and FXI**: planner can use FXI instead of capital controls, which interact in same way with tariffs
- **Sanctions/Trade Disruptions**: interact with capital controls, since similar to tariffs
  - Optimal policy mix prescribes combination of capital controls and tariffs

Related Literature

Non-Exhaustive

- **Capital Controls**: Bianchi (2011); Costinot, Lorenzoni and Werning (2014); Farhi and Werning (2016); Bianchi and Lorenzoni (2021); *Fanelli and Straub (2021)*; ...
  - ⋆ Study how capital-control incentives change when departing from free trade

- **Trade Policy**: Lerner (1936); Broda, Limão and Weinstein (2008); Costinot and Werning (2019); Caliendo, Feenstra, Romalis and Taylor (2021); ...
  - ⋆ Derive dynamic path for optimal trade tariffs *with trade in assets*

- **Integrated Policy Analysis**: Ostry et al. (2010); Jeanne (2012); Basu et al. (2020); Auray, Devereux and Eyquem (2020); Corsetti and Bergin (2021); Jeanne (2021); ...
  - ⋆ Assess scope for retaliation alongside interactions between policy instruments

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⋆ **Ramsey Planner**: chooses **risk-sharing wedge** and (potentially) **tariffs**

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- **Decentralised Allocation**: take world interest rates and goods prices as given

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Outline for Remainder of Presentation

Unilateral Planner: No Retaliation

#1 Optimal Allocations

#2 Planning Incentives

#3 Implementation: Size and Interaction of Policy Instruments

Strategic Setting with Retaliation: Trade and Capital-Control Wars

#4 Welfare Implications and Endogenous Capital-Control Wars

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$\Rightarrow$ Trade off $\frac{\partial \mathcal{L}}{\partial c_1}$ and $\frac{\partial \mathcal{L}}{\partial c_2}$

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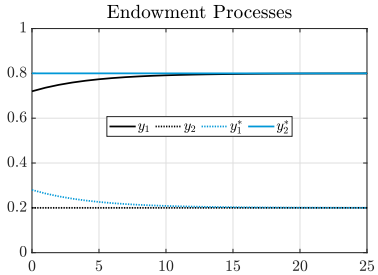

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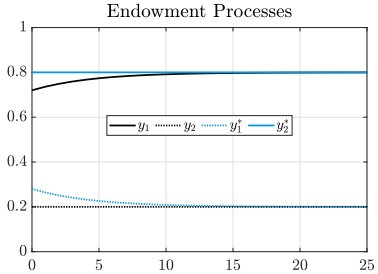

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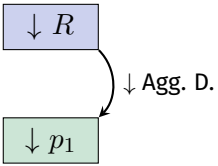

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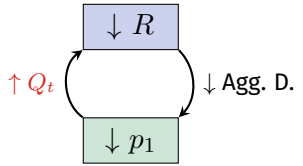

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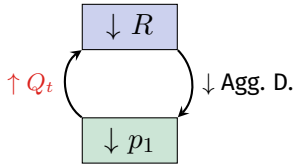

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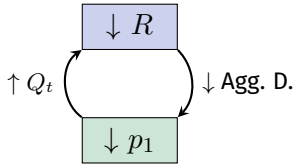

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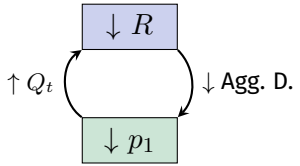

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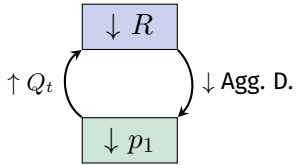

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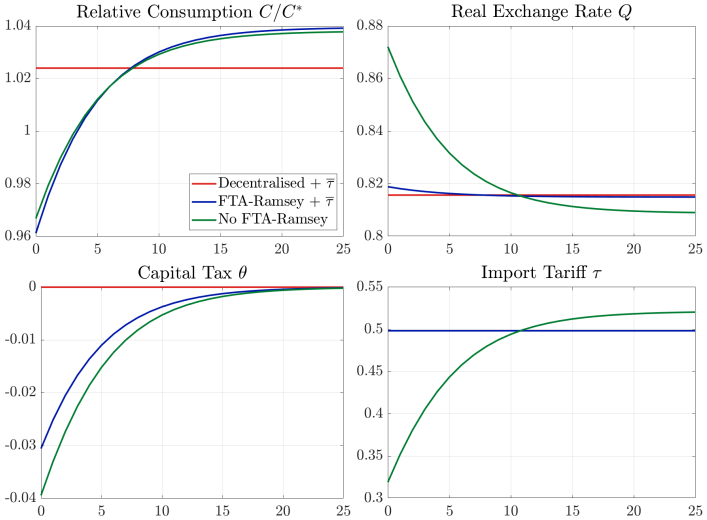

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Table: Welfare Losses and Spillovers: expressed in terms of % cons. eq.

	H	F	Global $\sum_{H,F}$
with FTA (Unilateral)	-0.02	$+0.03$	$+0.01$
without FTA (Unilateral)	-1.99	$+3.44$	$+0.82$
with FTA (Nash)	$+0.01$	$+0.02$	$+0.01$
without FTA (Nash)	$+1.76$	$+1.53$	$+1.67$

#4 Strategic Interactions and Spillovers

- ⋆ Global Cooperative Optimum: No intervention
- ⋆ Unilateral: Welfare gain in H small relative to loss in F, esp. without FTA
- ⋆ Nash: Larger aggregate losses with capital control and tariff wars

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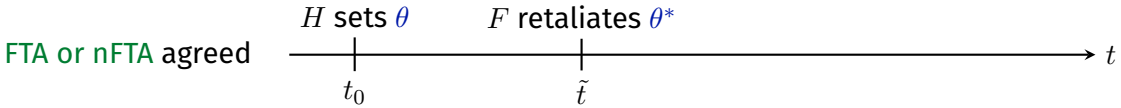
Spillovers dwarf domestic gains, especially with tariffs

#4: Endogenous Capital-Control Wars in a Policy Game



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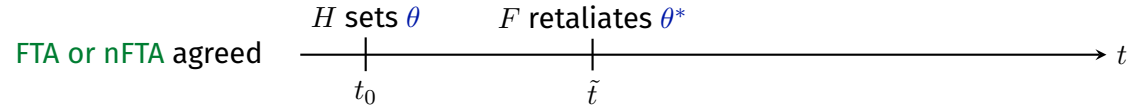

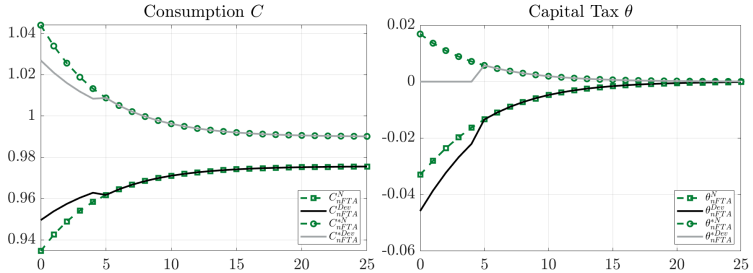

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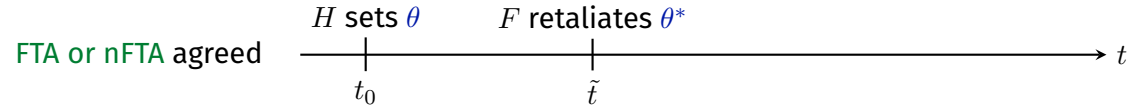

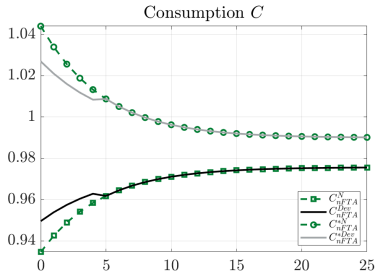

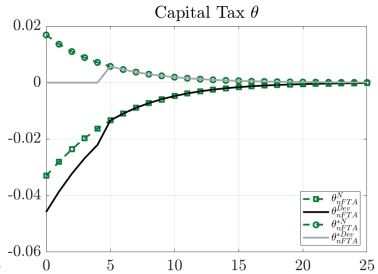

Table: Welf. Losses (% cons. eq.)

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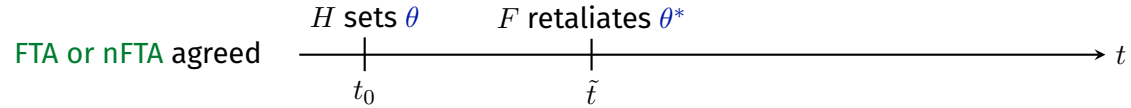
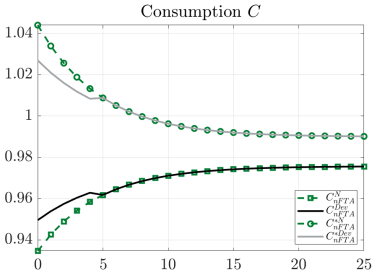
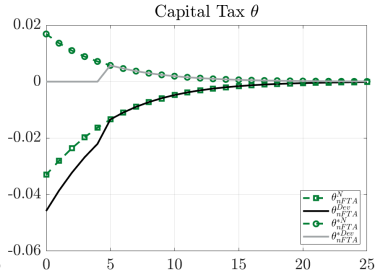
with FTA	-0.13	$+0.12$
without FTA	-0.19	$+0.19$

▸ without FTA (more) ▸ with FTA

#4: Endogenous Capital-Control Wars in a Policy Game







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▸ without FTA (more) ▸ with FTA

Incentives to levy capital controls larger without free trade

Conclusion

Cannot separate discussions around capital controls and trade protectionism

- Policy prescriptions for trade and financial openness interlinked
  - Interaction between capital controls and tariffs stems from over/under-borrowing induced by the influence of tariffs on real exchange rate over time
  1. When inter-/intra-temporal incentives aligned, capital-inflow taxes and tariffs *complementary*
  2. When inter-/intra incentives **mis-**aligned capital inflow taxes and tariffs *substitutes*
- Domestic gains from capital controls and tariffs are small, but spillovers large

Trade protection can lead to cross-border financial fragmentation

Appendix

Optimal Unilateral Policy: Setup

- Home country sets capital-flow taxes to maximise welfare of domestic representative agent
- **Primal Approach**: Home planner chooses $\{\mathbf{c}_t\}$ in order to maximise welfare of representative agent U_0, taking as given:
  1. Foreign consumer maximising U_0^* subject to intertemporal budget constraint

$$\sum_{t=0}^{\infty} \mathbf{p}_t \cdot (\mathbf{c}_t^* - \mathbf{y}_t^*) \leq 0$$

  where $\mathbf{p}_t = [p_{1,t}, p_{2,t}]$ is vector of world prices
  2. Goods market clearing

$$y_{1,t} + y_{1,t}^* = c_{1,t} + c_{1,t}^* \qquad y_{2,t} + y_{2,t}^* = c_{2,t} + c_{2,t}^*$$

Foreign Consumer Maximisation

- Representative Foreign consumer problem:

$$\max_{\{\mathbf{c}_t^*\}} \quad U_0^* = \sum_{t=0}^{\infty} \beta^t U^*(C_t^*) \qquad \text{s.t.} \qquad \sum_{t=0}^{\infty} \mathbf{p}_t \cdot (\mathbf{c}_t^* - \mathbf{y}_t^*) \leq 0$$

$\Rightarrow$ Optimality conditions:

$$\beta^t U^{*\prime}(C_t^*) \nabla g_c^*(\mathbf{c}_t^*) = \lambda^* \mathbf{p}_t$$

$$\sum_{t=0}^{\infty} \mathbf{p}_t \cdot (\mathbf{c}_t^* - \mathbf{y}_t^*) = 0$$

where $\nabla g_c^*(\mathbf{c}_t) = \left[\frac{\partial g^*(\mathbf{c}_t^*)}{\partial c_{1,t}^*}, \frac{\partial g^*(\mathbf{c}_t^*)}{\partial c_{2,t}^*} \right]$

Unilateral Home Planning Problem

With FTA [Costinot, Lorenzoni & Werning, 2014]

$$\max_{\{C_t\}} \quad \sum_{t=0}^{\infty} \beta^t u(C_t) \qquad \text{(P-FTA)}$$

$$\text{s.t.} \quad \sum_{t=0}^{\infty} \boldsymbol{\rho}(C_t) \cdot [\mathbf{c}_t - \mathbf{y}_t] = 0 \qquad \text{(IC)}$$

$$\mathbf{c}_t = \mathbf{c}_t(C_t), \quad \mathbf{c}_t^* = \mathbf{c}_t^*(C_t) \qquad \text{(FTA)}$$

where $\boldsymbol{\rho}(C_t) \equiv \beta^t u^{*\prime}(C_t^*) \nabla g_c^*(\mathbf{c}_t^*(C_t))$

Unilateral Home Planning Problem

Without FTA

$$\max_{\{\mathbf{c}_t\}} \quad \sum_{t=0}^{\infty} \beta^t u(C_t) \qquad \text{(P-nFTA)}$$

$$\text{s.t.} \quad \sum_{t=0}^{\infty} \boldsymbol{\rho}(C_t) \cdot [\mathbf{c}_t - \mathbf{y}_t] = 0 \qquad \text{(IC)}$$

$$C_t = g(\mathbf{c}_t) \qquad \text{(nFTA)}$$

where $\boldsymbol{\rho}(C_t) \equiv \beta^t u^{*\prime}(C_t^*) \nabla g_c^*(\mathbf{c}_t^*(C_t))$

Back

Relaxing FTA Can Increase Home Welfare

Proposition

Suppose preferences are symmetric, $\alpha_1 = \alpha_2^*$ and $\alpha_2 = \alpha_1^*$, then in general: $C^{nFTA} \geq C^{FTA}$

(i) When $C^{nFTA} > C^{FTA}$: optimal nFTA allocation violates Pareto frontier

(ii) $C^{nFTA} = C^{FTA}$ when endowments are proportional to preferences: $y_1 \propto \alpha_1$, $y_2 \propto \alpha_2$, $y_1^* \propto \alpha_1^*$ and $y_2^* \propto \alpha_2^*$

Intuition

- Departing from FTA, planner can manipulate relative goods prices favourably (as long as endowments are not already proportional to preferences)
- With two instruments, no need to strike compromise across inter- and intra-temporal margins

Back

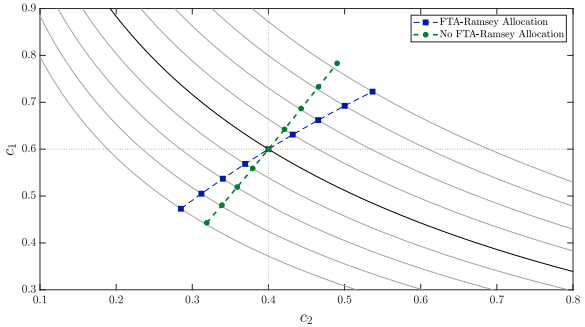
Visual Intuition: Allocations with and without FTA

Back

Feasible combinations of $\{c_1, c_2\}$ given F

FTA $\Rightarrow H$ cannot impose good-specific taxes $\Rightarrow (\mathbf{c}_t, \mathbf{c}_t^*)$ is Pareto efficient

No FTA $\Rightarrow H$ sets optimal import tariffs $\Rightarrow$ unconstrained by Pareto frontier



Note: $\phi = 1.5$, $\alpha_1 = \alpha_2^* = 0.75$, $y_1 = \alpha_1 \pm 0.25$, $y_2 = \alpha_2$, $y_i^* = 1 - y_i$ for $i = 1, 2$.

What Drives Optimal Policy? Two Deterministic Simulations

- Implement allocation with **capital-inflow tax** $\theta < 0$ and **import tariff** $\tau > 0$
- Equalise steady states (via exo. tax) to focus on welfare gains along transition
- $\sigma = 2$, $\beta = 0.96$, $\phi = 1.5$, $\rho = 0.8$, $\alpha_1 = \alpha_2^* = 0.6$ and $\overline{y}_1 = \overline{y}_2^* = 0.8$

#1: Growing Endowment of Home-Bias Good 1

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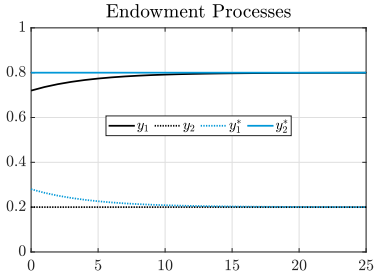


Inter-temporal incentives:

H endowment low today $\Rightarrow$ Incentive to borrow

$\Rightarrow$ Planner seeks to tax inflows $\theta < 0$ to $\downarrow R$

$\Rightarrow$ Reduced borrowing will also $\downarrow p_1$

Intra-temporal incentives:

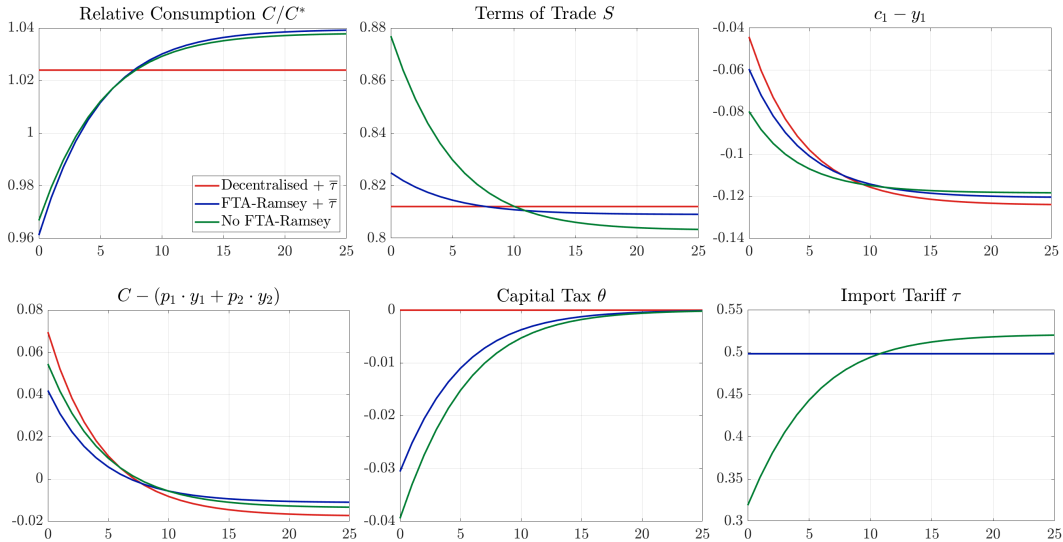
Good 1 endowment low today $\Rightarrow$ Sell less to Foreign

$\Rightarrow$ Incentive to subsidise imports of good 2 to $\downarrow p_1$

$\Rightarrow$ Will also dis-incentivise borrowing $\downarrow R$

Growing Endowment of Home-Bias Good

Detail



What Drives Optimal Policy? Two Deterministic Simulations

#2: Growing Endowment of 'Foreign' Good 2

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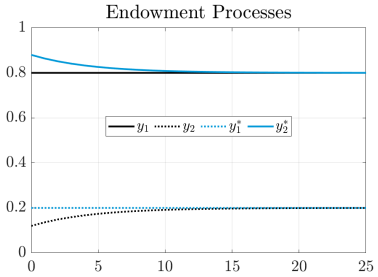


Inter-temporal incentives:

H endowment low today $\Rightarrow$ Incentive to borrow

$\Rightarrow$ Planner seeks to tax inflows $\theta < 0$ to $\downarrow R$

$\Rightarrow$ Reduced borrowing will $\downarrow p_1$

Intra-temporal incentives:

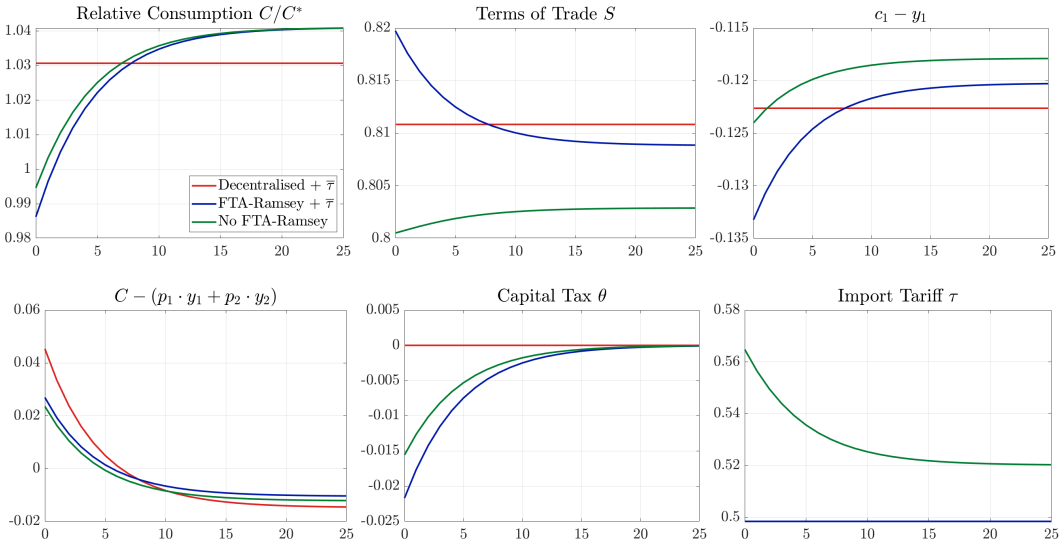
Good 1 endowment relatively high today

$\Rightarrow$ Sell more to Foreign

$\Rightarrow$ Incentive to tax imports of good 1 to $\uparrow p_1$

$\Rightarrow$ But this will incentivise borrowing $\uparrow R$

Growing Endowment of 'Foreign' Good



Small-Open Economy: Setup

Following Costinot et al. (2014), define:

$$C_t = c_{1,t}^{\frac{1}{2}} c_{2,t}^{\frac{1}{2}} \quad \text{and} \quad C_t^* = \frac{1}{N-1} {c_{1,t}^*}^{\frac{1}{N}} {c_{2,t}^*}^{1-\frac{1}{N}}$$

with market clearing

$$c_{1,t} + c_{1,t}^* = y_{1,t} \quad \text{and} \quad c_{2,t} + c_{2,t}^* = y_{2,t} + (N-1) y_{2,t}^*$$

such that SOE limit when $N \to \infty$ and (implicitly) $\sigma = \phi = 1$ à la Cole and Obstfeld (1991)

Small-Open Economy: Mechanisms

As $N \to \infty$:

- **Inter-temporal** motive goes away, as no longer large in world capital markets
- **Intra-temporal** motive remains, as still large in this goods market

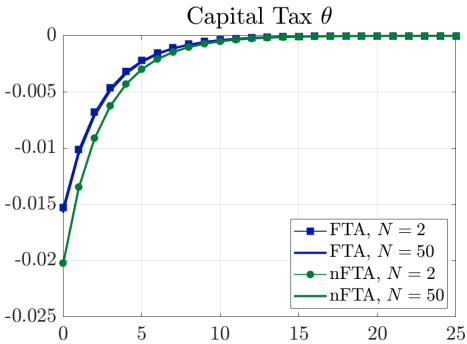
For specific case in which H learns today that endowment of 'home-bias' good 1 will grow, at the Cole-Obstfeld knife-edge, we find:

- With FTA: size of capital controls unchanged as N increases ($\downarrow$ Inter, but $\uparrow$ Intra)
- Without FTA: capital controls continue to be same size with respect to N, and tariffs non-zero due to size in goods market
- Interaction survives: capital controls larger in no-FTA case (vs. FTA), owing to effects of tariff on Q and over-/under-borrowing

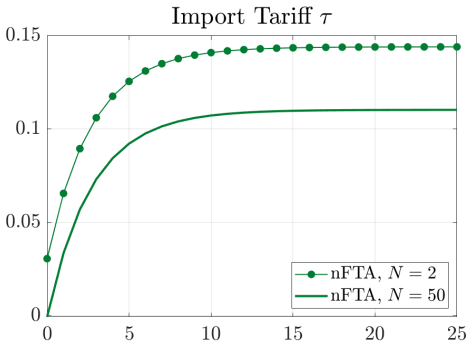
Small-Open Economy: Discussion

Back

Capital-Flow Tax



Import Tariff (no FTA)



Away from C-O, 'inverse-elasticity rule' likely to play role ('tax more when el. low'):

- $\sigma > \phi$: low intra-elasticity $\rightarrow$ more tariff, so more capital controls (via interaction)
- $\sigma < \phi$: high intra-elasticity $\rightarrow$ less tariff, so less capital controls (via interaction)

Trade Disruptions and Sanctions

Back

Suppose exogenous and temporary increase in import costs τ

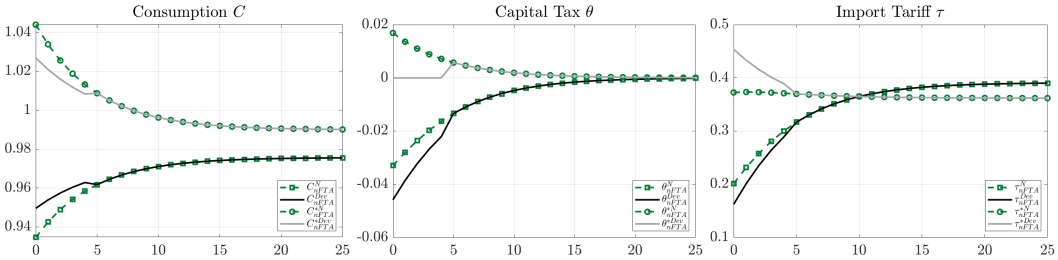
- **Inter-temporal incentives**
  - Consumption relatively expensive today, so private incentive to *over*-borrow today
  - $\Rightarrow$ Planner seeks to $\downarrow R$ to delay consumption
  - $\star$ **Tax capital inflows** $\theta < 0$
- **Intra-temporal incentives**
  - Imports relatively expensive today, so private incentive to *over*-consume good 1 today
  - $\Rightarrow$ Planner seeks to $\downarrow p_1$ and, so $\uparrow Q$
  - $\star$ **Subsidise good** 2 **imports in near term** $\tau < \overline{\tau}$, 'undoing' the trade costs/sanctions

$\star$ **Interaction**: Because subsidy affects Q, incentivising *over*-borrowing...

...optimal unilateral policy response without FTA involves **more capital controls**

#4: Endogenous Capital-Control Wars in a Policy Game

Without FTA



Back

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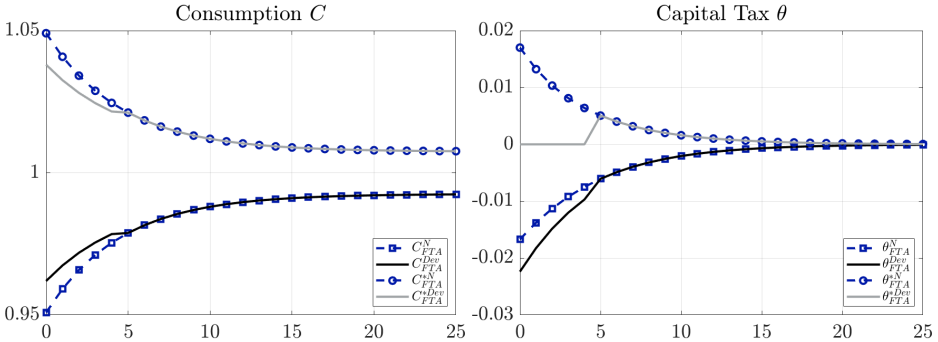

Back