Quality Misallocation, Trade, and Regulations

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August 2022

Introduction

1. Trade Policy Cooperation $\rightarrow$ **Avoid Beggar-Thy-Neighbor**

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   - Legitimate reasons for domestic use: health, safety, etc...

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   - Delocation (Grossman et al 2021) & Protectionism (Baldwin et al 2000)

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   - Reallocation from low-quality to high-quality firms

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   - Reallocation from low-quality to high-quality firms
5. **New reason** for cooperation in setting regulations

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1. **Evidence**: effects of regulations on exports (Not Today)
   - Standards $\uparrow \rightarrow$ # of Exporters $\downarrow$
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   - Regulations improve welfare $\rightarrow$ Allocative Efficiency $\uparrow$
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   - Misallocation = low-quality firms over-produce
3. **Estimation of the model**
   - What are the welfare effects regulations?
   - How beneficial is cooperation?

Main Takeaways

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   - Large externality effects
   - Cooperation between two countries: stricter regulations but heterogeneous

Closely Related Literature

1. Rationale for Regulations
   - Donnenfeld et al. (1985, *JIE*); Fisher & Serra (1999, *JIE*); Baldwin and Evenett (2009, *VoxEU*); Gaigné & Larue (2016, *JAgrEc*); Parenti & Vannoorenberghe (2019); Grossman et al (2021, *ECMA*); Macedoni (2022, *RoIE*); Mei (2021); Macedoni and Weinberger (2022, *JIE*)
   - This Paper: reduction of misallocation + extension to externality
   - This Paper: role for cooperation + interaction between trade and regulations

2. Empirical studies of regulations
   - Fontagné et al. (2015, *JIE*), Ferro et al. (2015, *FoodPolicy*), Schmidt and Steingress (2018); Asprilla et al. (2019, *IER*), Fernandes et al. (2019, *WBER*); Disdier et al. (2020); Iodice (2020), Augier et al. (2021); Macedoni and Weinberger (2022, *JIE*)
   - This Paper: heterogeneous effects across countries

3. Allocative Efficiency + Trade Policy with Heterogeneous Firms
   - Edmond et al. (2015, *AER*), Dhingra and Morrow (2016, *JPE*), Campolmi et al. (2014, *JIE*; 2020) Lashkaripour and Lugovskyy (2021); Demidova (2017, *JIE*); Demidova and Rodriguez-Clare (2009, *JIE*); Felbermayr et al. (2013, *JIE*); Bagwell and Lee (2020, *JIE*); Costinot et al. (2020, *ECMA*)
   - This Paper: effects of fixed costs

Model Summary

- Building on Macedoni and Weinberger (2022, *JIE*)

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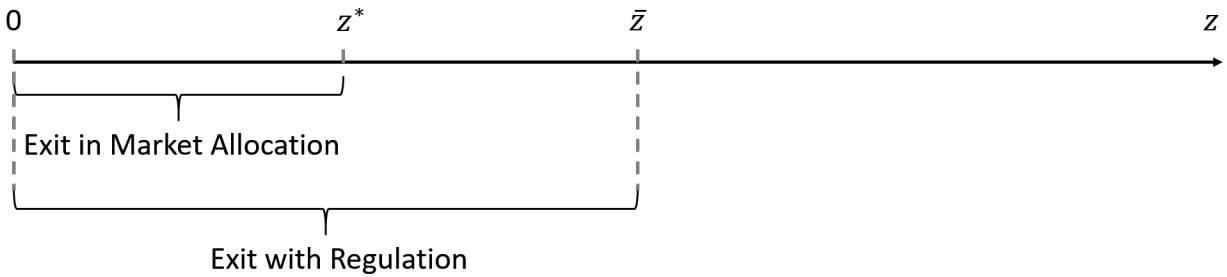
- *Government*: tariff and regulations

Regulations as a Fixed Cost

1. z_{ij}^* = Cutoff firm without regulation
2. $\bar{z}_{ij}$ = Cutoff firm with regulation



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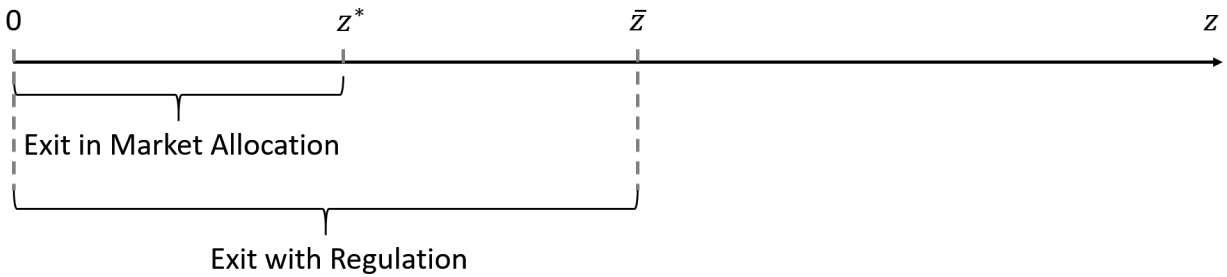
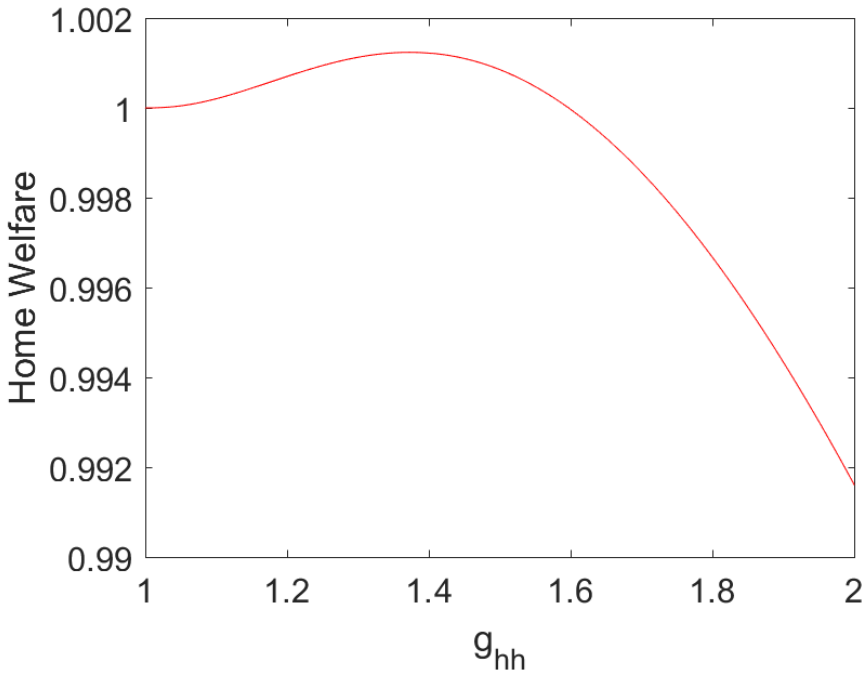


3. $g_{ij} = \frac{\bar{z}_{ij}}{z_{ij}^*} \in [1, \infty)$ = measure of restrictiveness of the regulation

Regulations and Welfare



- Hump-shaped rel. between regulation and welfare

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   - Entry from any country $\uparrow$

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   - Exit of low-quality, over-producing firms...
   - ... and reallocation of production towards high-quality, under-producing firms
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Welfare Effects of Trade Policies

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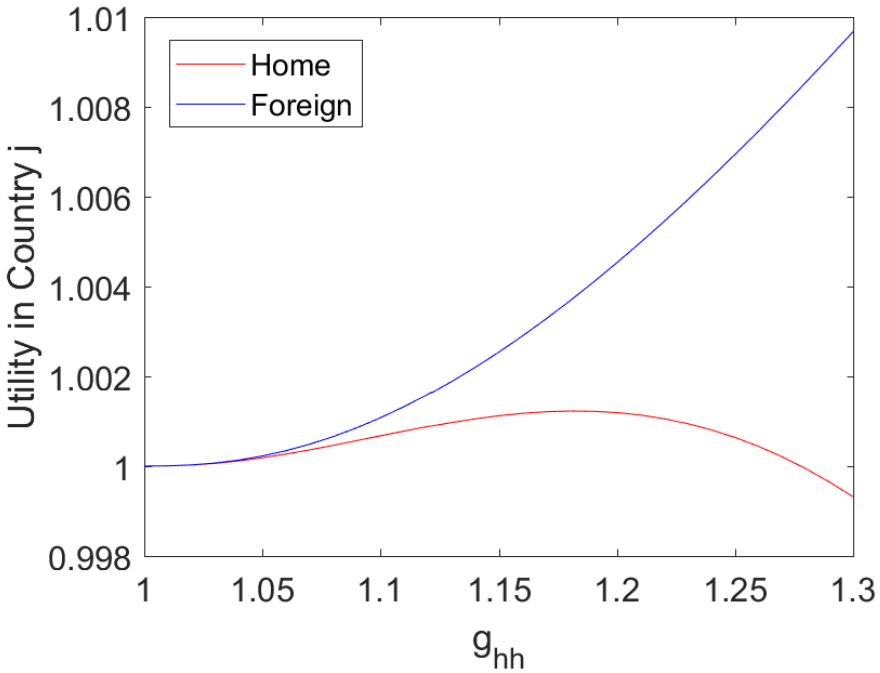

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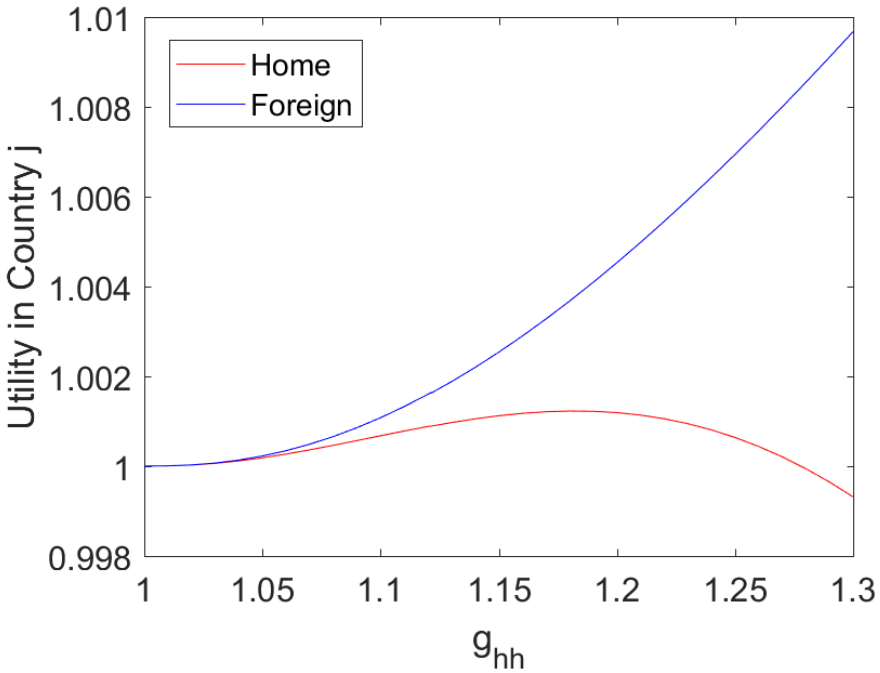
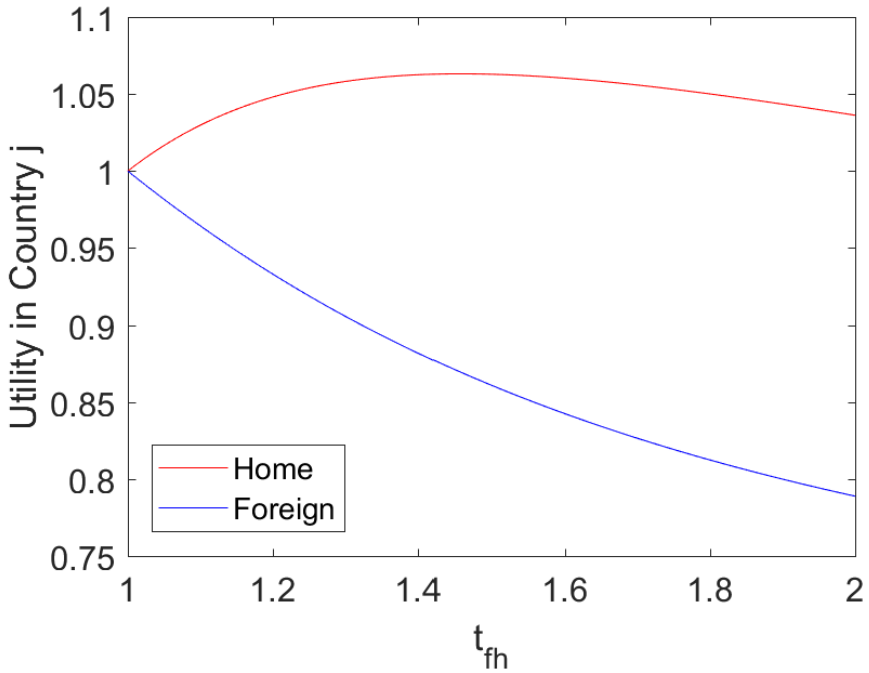


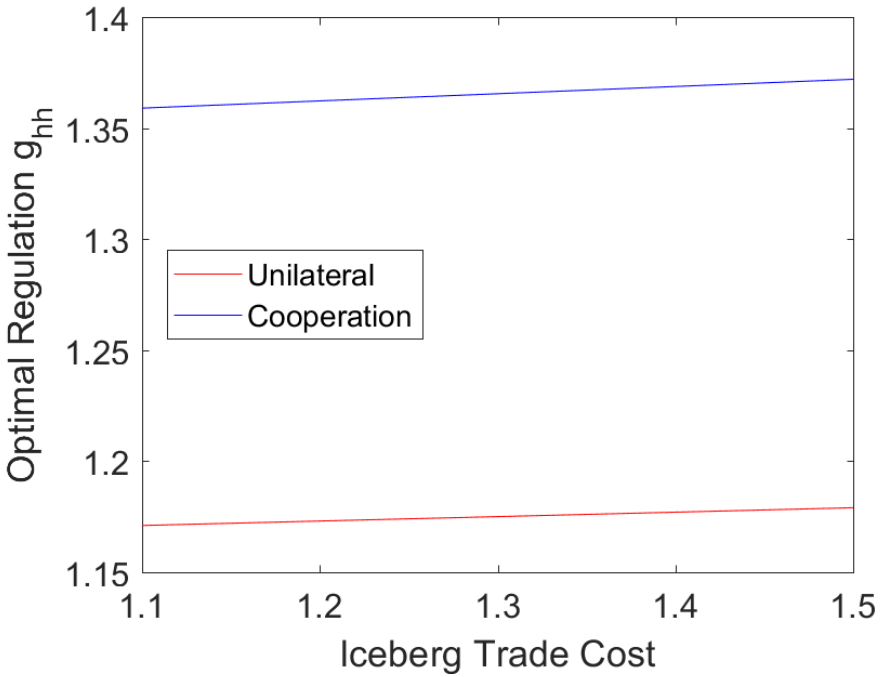
(b) Home Tariff



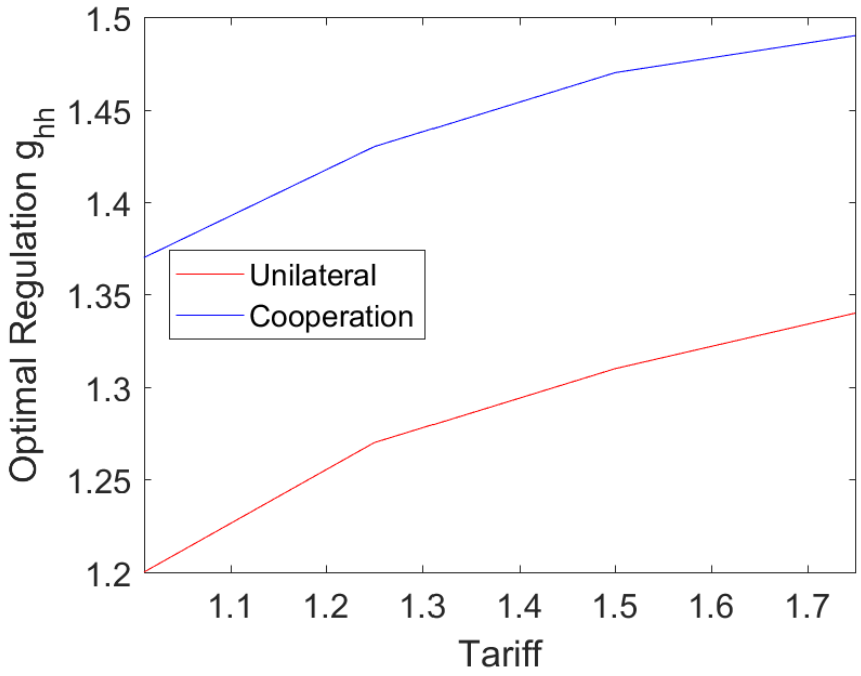
Optimal Regulation under Cooperation

Figure 2: Optimal Regulation under Cooperation

(a) Varying Trade Costs



(b) Varying Tariffs



▶ Size and Technology

Ingredients for Counterfactual

Goal: Quantify welfare effects of regulations.

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1. Standard hat-algebra applies (ACR, 2012 *AER*) ▸ Equilibrium ▸ Hat Changes
2. Trade Flows: trade shares λ_{ij} (Data)
3. Country sizes (L_i), wages (w_i), and tariffs (t_{ij}) (Data & Calibration)
4. Demand curvature γ (Estimation)
5. Shape par. of Pareto distribution of appeal κ (Estimation)
   - Follow Macedoni & Weinberger (2022, *JIE*) using Chilean domestic sales data ($\kappa = 3.96$, $\gamma = 1.88$)
6. Iceberg Trade Costs τ_{ij} (Estimation/Gravity)

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7. Restrictiveness of regulation g_{ij} (Estimation)

Estimating the Restrictiveness of Regulations

1. Simulated Method of Moments
2. Simulate export sales distribution for country pair ij
3. Moments: distribution of export sales from i to j
   - 25th, 50th, and 75th percentiles of sales normalized by average sales, and export share of top 1%, 5%, and 25% of exporters
   - Source: Exporter Dynamics Database
4. Returns g_{ij} for each country pair
5. Apply model to back out g_{jj} with estimated g_{ij}, τ_{ij}, and w_j

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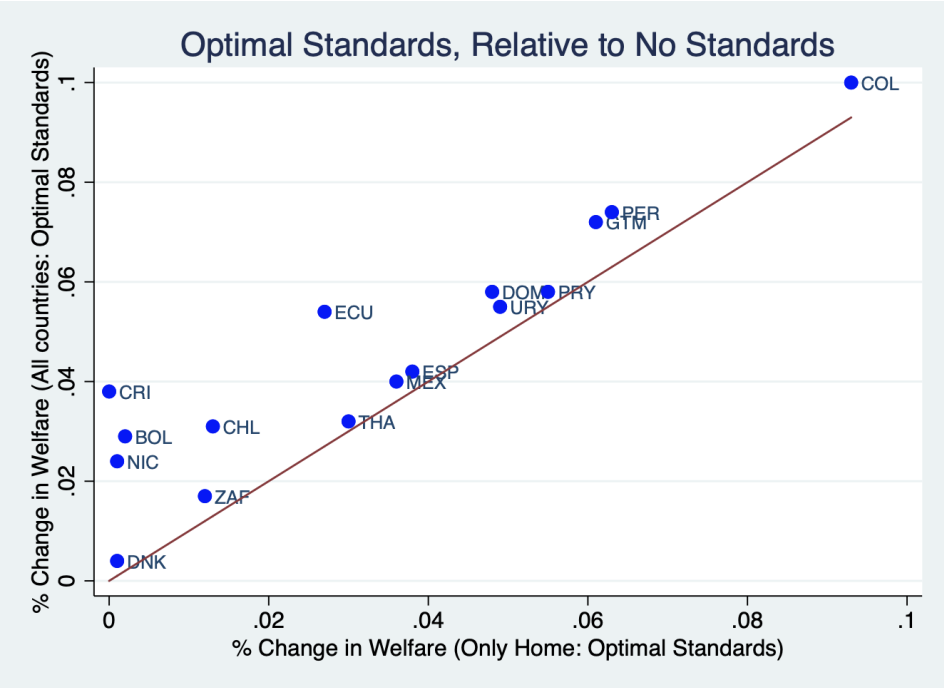
2. How large is the externality?
   - Unilateral VS All countries impose optimal regulation

Welfare Gains of Optimal Regulation: Unilateral Policies

- X-axis: Only one country at a time imposes optimal regulations.
- Y-axis: All countries impose optimal regulations.
- Gains on Y-axis 3 times larger on average



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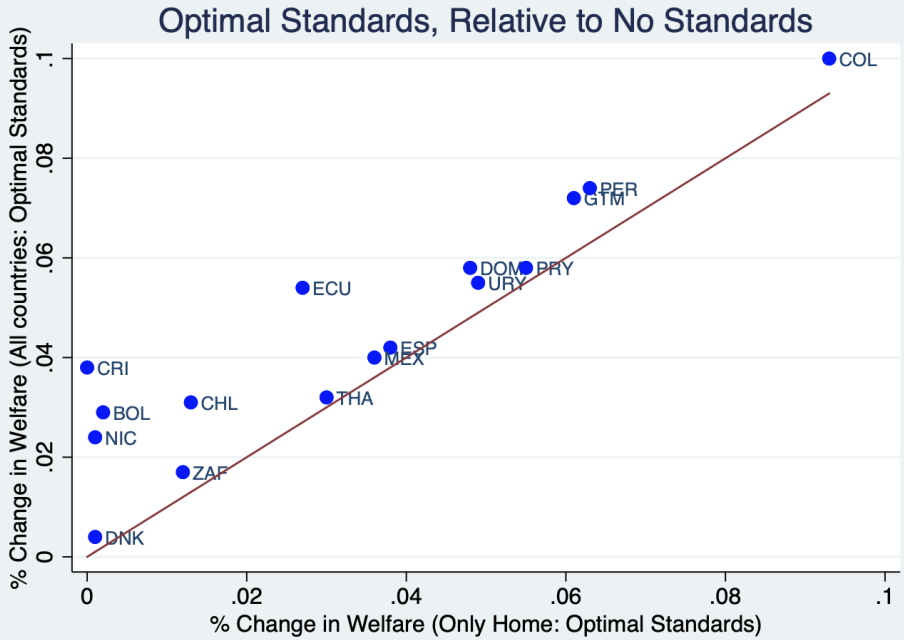
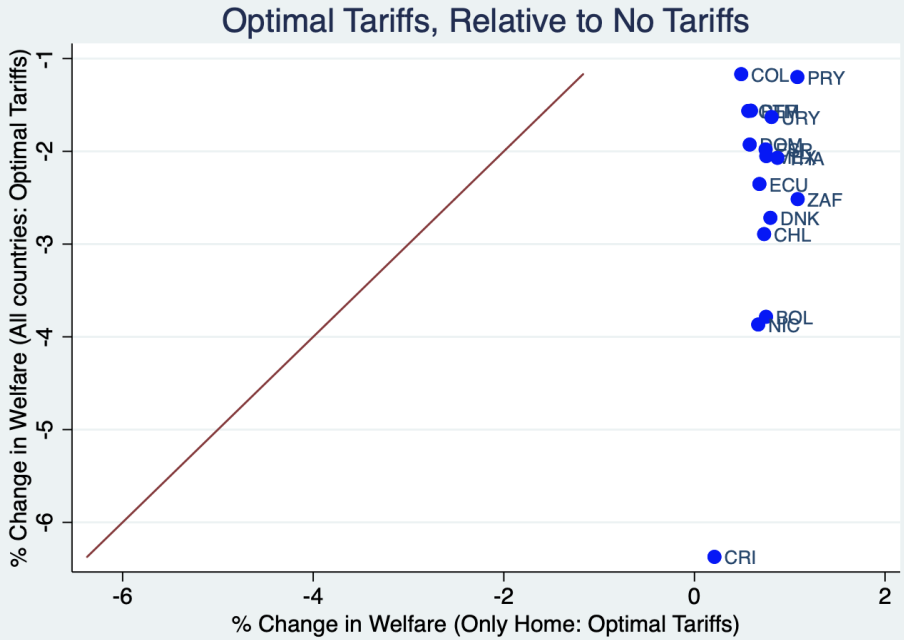


- X-axis: Only one country at a time imposes optimal tariff.
- Y-axis: All countries impose optimal tariff.
- Gains on Y-axis negative and large



▸ No Tariff or Optimal Regulation?

Counterfactuals

1. Welfare effects of optimal regulation (16 countries + ROW)
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   - Choose optimal regulation for Chile and Equador

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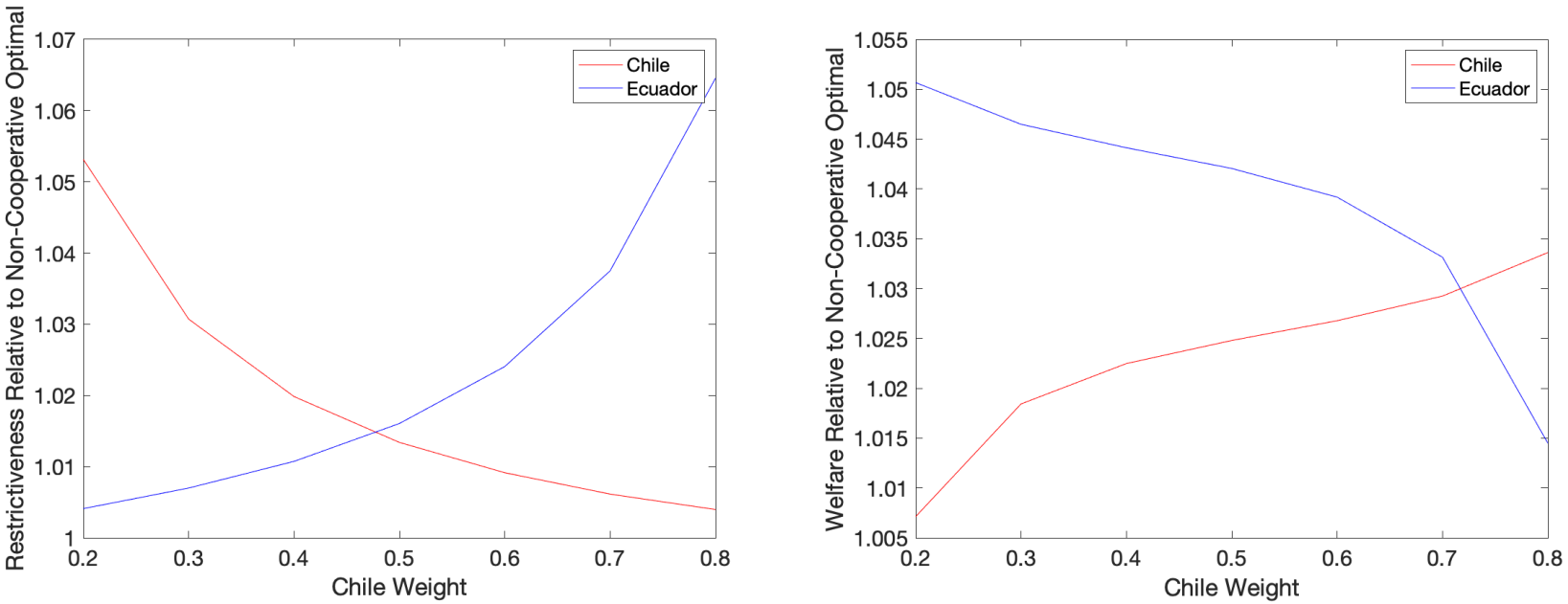
3. How large are the benefits from cooperation?
   - Choose optimal regulation for Chile and Equador
   - Tradeoff: stricter regulations VS country heterogeneity

Welfare Gains of Optimal Regulation: Cooperative Policies

Figure 3: The Role for Cooperation: Optimal Restrictiveness and Welfare relative to Non-Cooperation in 2-country Case (for varying weights on Chile).



The figures display the relative restrictiveness and welfare gains when countries cooperate in a 2-way agreement, relative to each country setting its own optimal rate. We assume a 2 country world where Chile and Ecuador enter into a trade agreement that sets the level of domestic restrictiveness in each country. We calculate the non-cooperative optimal restrictiveness for each country in this 2-country scenario, then we compare that to the case where they maximize joint welfare, while varying the weights for each country. In both figures, the x-axis is a range of weights given to Chile's welfare in the agreement (with Ecuador's welfare equal to one minus Chile's). In the left figure, the y-axis is the ratio of the domestic restrictiveness in each country relative to their non-cooperative optimal. In the right figure, the y-axis is the welfare in each when they maximize joint welfare relative to when both countries impose their optimal non-cooperative standard.

Conclusions

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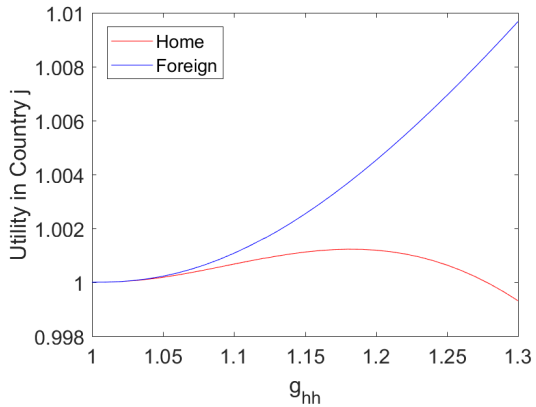

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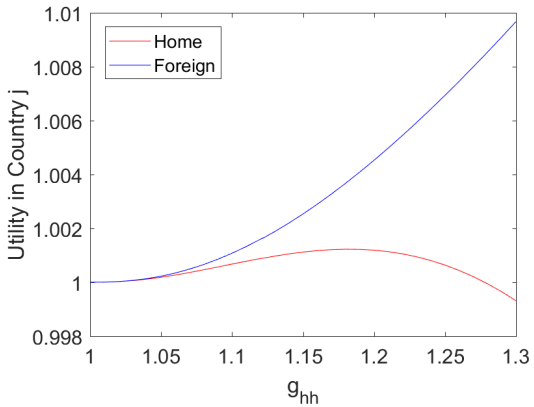
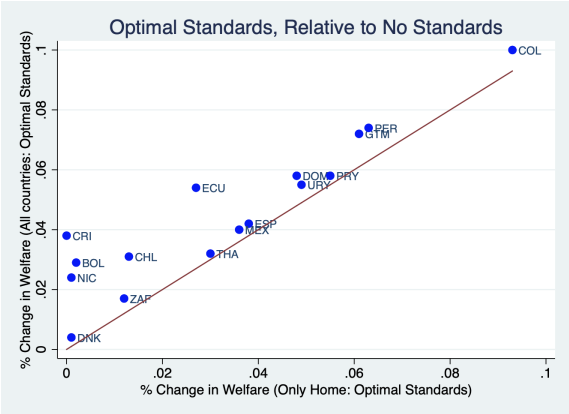


(b) Regulations have positive externality



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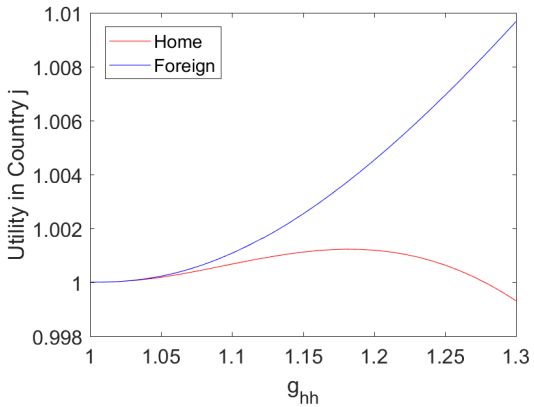

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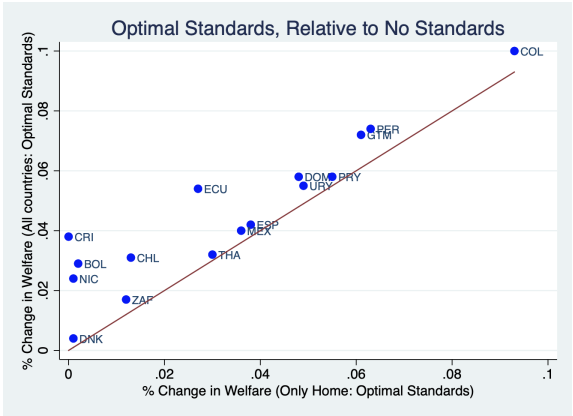
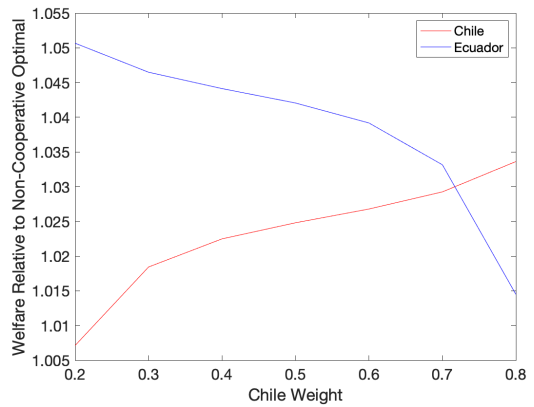


(c) Cooperation for more restrictive regulations



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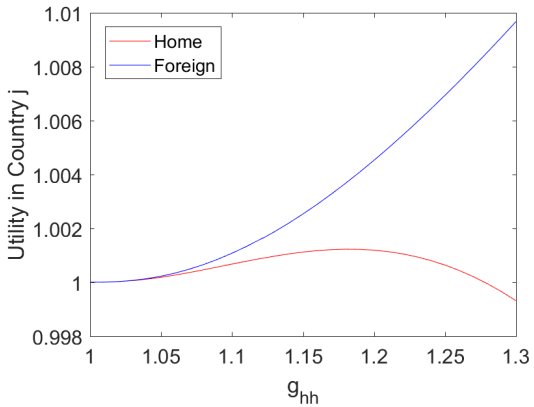

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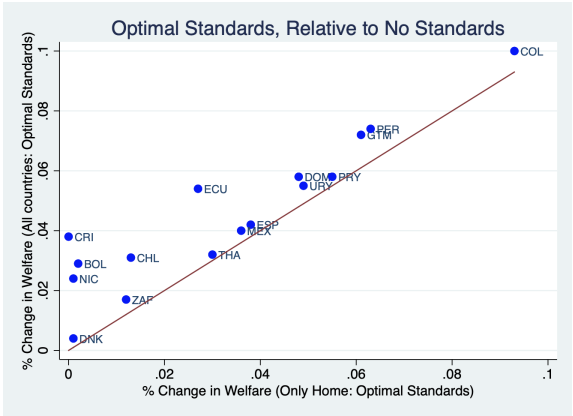

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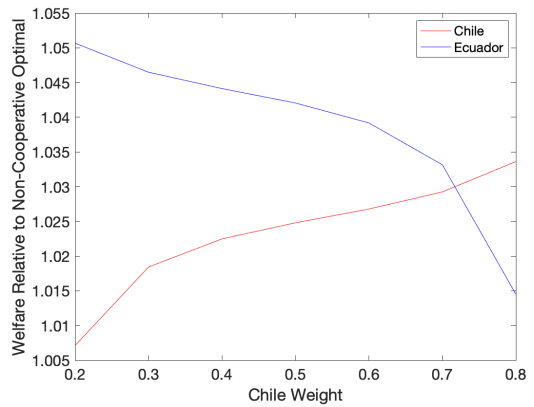
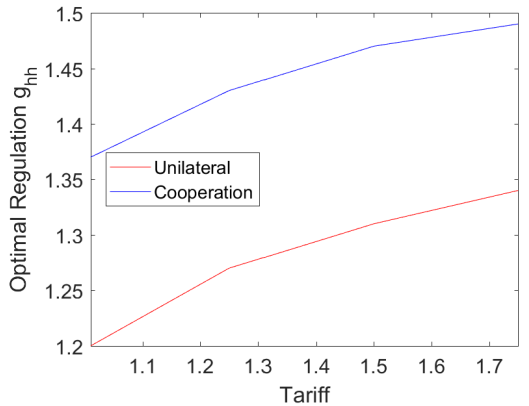


(d) Lower trade costs $\rightarrow$ less restrictive regulations



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Trade Margins and Regulations: IV Specification

Back

1. Follow Kee and Nicita (2016) and Schmidt and Steingress (2018)
2. IV for TM: TMs of related countries
   - Average number of regulations imposed in the same sectors by countries that either share a border or a common language. As a further check, we use regulations of countries with a common legal origin as instruments.

	Log Number of Exporters				Log Value per Exporter
	(Border)	(Language)	(Legal)	(OverID)	(Border)
TM Prevalence (log)	-0.157***	-0.254**	-0.953***	-0.154***	-0.145
	(0.042)	(0.103)	(0.284)	(0.044)	(0.109)
F-stat (first stage)	1210.17	195.24	41.45	346.30	1210.17
Fixed Effects	i-j,i-hs2	i-j,i-hs2	i-j,i-hs2	i-j,i-hs2	i-j,i-hs2
Controls	Tariffs	Tariffs	Tariffs	Tariffs	Tariffs
# Observations	27101	23229	28602	21901	27101

We instrument the number regulations in each destination in two ways: i) the average number of regulations in the same sector, for countries that either share a border or have a common language with the instrumented country, ii) the average number of regulations in the same sector, for countries that have a common legal system as the instrumented country. The first-stage F-statistic is reported. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Equilibrium

Back

- Gravity Equation

$$\lambda_{ij} = \frac{t_{ij} R_{ij}}{\sum_v t_{vj} R_{vj}} = \frac{(t_{ij}\tau_{ij} c_i w_i)^{-\kappa+\gamma+1} J_i b_i^{\kappa} g_{ij}^{-\kappa} G_2(g_{ij})}{\sum_v (t_{ij}\tau_{vj} c_v w_v)^{-\kappa+\gamma+1} J_v b_v^{\kappa} g_{vj}^{-\kappa} G_2(g_{vj})} \tag{1}$$

  - J_i = mass of firms that pay the fixed cost in i
  - $G_2(g_{vj})$ = function of g_{vj}

- Market clearing

$$\sum_j \lambda_{ij} y_j L_j = y_i L_i \quad \forall i = 1, ..., I \tag{2}$$

- Zero expected profits + Market clearing

$$J_i = \frac{1}{w_i f_E} \sum_j \frac{\lambda_{ij}}{t_{ij}} y_j L_j \frac{\tilde{G}_1(g_{ij})}{\tilde{G}_2(g_{ij})} \quad \forall i = 1, ..., I \tag{3}$$

- Per Capita Income

$$y_j = w_j + y_j \sum_i \left(\frac{t_{ij} - 1}{t_{ij}} \right) \lambda_{ij} \quad \forall j = 1, ..., I \tag{4}$$

Hat Changes

Back

$$\hat{\lambda}_{ij} = \frac{\hat{J}_i \hat{w}_i^{-\kappa+\gamma+1} \hat{t}_{ij}^{-\kappa+\gamma+1} \hat{\tilde{G}}_2(g_{ij})}{\sum_v \lambda_{vj} \hat{J}_v \hat{w}_v^{-\kappa+\gamma+1} \hat{t}_{vj}^{-\kappa+\gamma+1} \hat{\tilde{G}}_2(g_{vj})} \qquad \forall i,j = 1,...I \qquad (5)$$

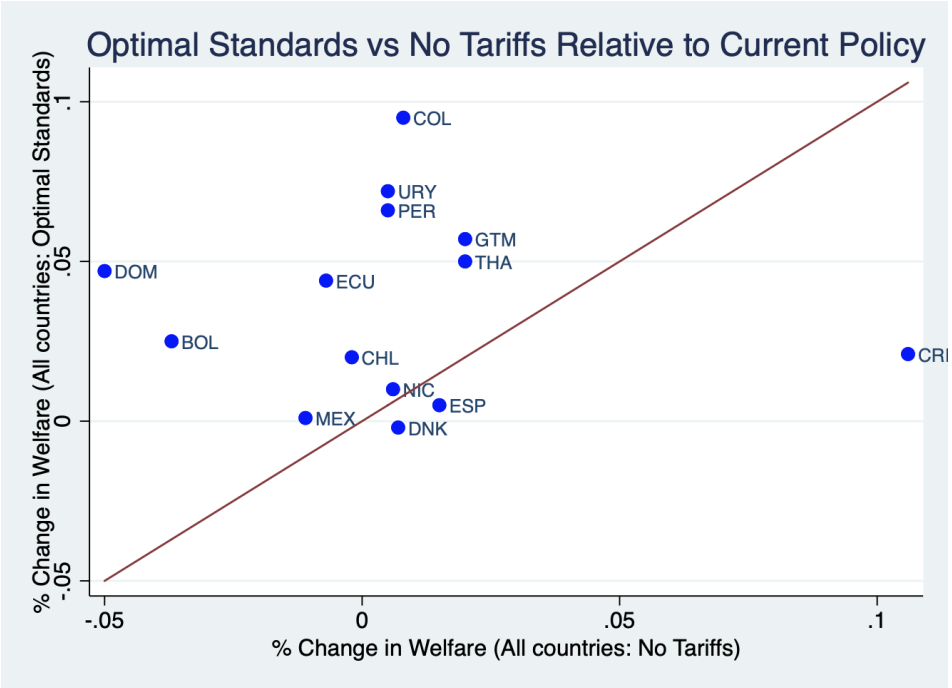
$$\hat{y}_i = \frac{\sum_j \lambda_{ij} y_j L_j \hat{\lambda}_{ij} \hat{y}_j}{\sum_j \lambda_{ij} y_j L_j} \qquad \forall i = 1,...,I \qquad (6)$$

$$\hat{J}_i = \frac{1}{\hat{w}_i} \frac{\sum_j \frac{\lambda_{ij}}{t_{ij}} y_j L_j \frac{\tilde{G}_1(g_{ij})}{\tilde{G}_2(g_{ij})} \frac{\hat{\lambda}_{ij}}{\hat{t}_{ij}} \hat{y}_j \widehat{\left(\frac{\tilde{G}_1(g_{ij})}{\tilde{G}_2(g_{ij})}\right)}}{\sum_j \frac{\lambda_{ij}}{t_{ij}} y_j L_j \frac{\tilde{G}_1(g_{ij})}{\tilde{G}_2(g_{ij})}} \qquad \forall i = 1,...,I \qquad (7)$$

$$\hat{y}_j = \frac{w_j}{y_j} \hat{w}_j + \sum_i \widehat{\left(\frac{t_{ij}-1}{t_{ij}}\right)} \hat{\lambda}_{ij} \hat{y}_j \left(\frac{t_{ij}-1}{t_{ij}}\right) \lambda_{ij} \qquad \forall j = 1,...,I \qquad (8)$$

No Tariff or Optimal Regulations? Back

Optimal Standards and No Tariffs relative to Current Policy: All Countries set Policy vs One at a Time



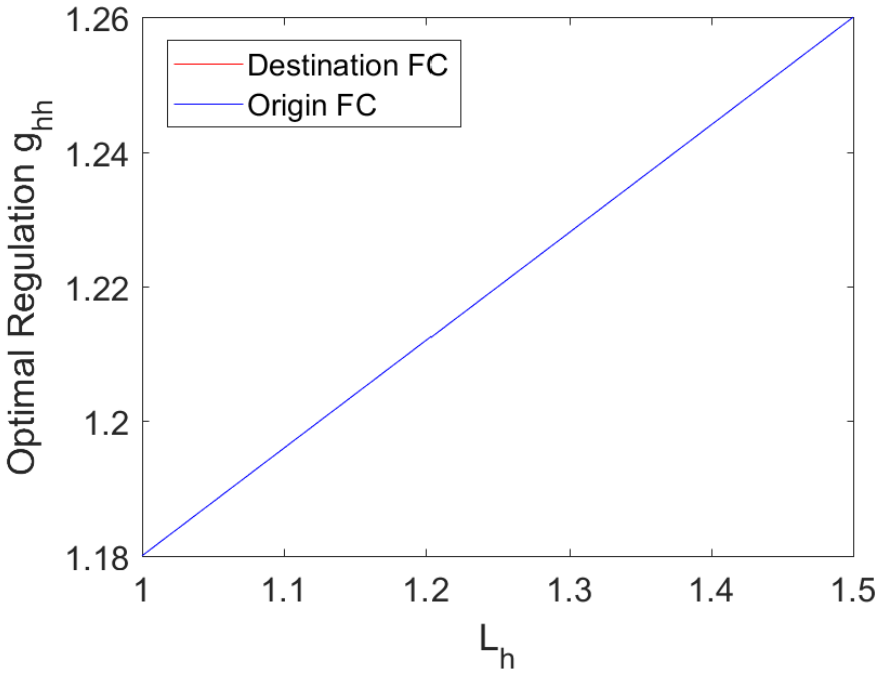
We compare the welfare gain of moving from the *current policy* (currently estimated standards/measured tariffs) to either optimal standards (y-axis) or no tariffs (x-axis). Notice that the new standard policy can reduce welfare in this case as a country's trade partners now might reduce their standards to their own optimal level.

Optimal Regulation in Rich and Bigger Countries

Back

Figure 5: Optimal Regulation, Size, and Costs

(a) Home Size



(b) Home Unit Costs