Reverse Selection

Jiahua CHE, Wen ZHOU

CEIBS (China Europe International Business School),
HKU(The University of Hong Kong)

Motivation

The selection hypothesis

- trade reallocates resources from low productivity firms to high productivity firms by (a) crowding out less productive firms and (b) allowing more productive firms to expand from home to foreign markets

- implication: exporters must serve domestic market as well
- reality: pure exporters/export processing firms
- limit to the selection hypothesis: originally developed assuming symmetric countries

Motivation

What if countries are asymmetric?

- income disparity leading to disparity in demand: less productive, pure exporters, crowded in by trade, i.e., "reverse selection"?

What we do?

- a simple model, with shadow price of income to reflect cross-country income effect and cross-variety income effect
- endogenizing income effects by considering two kinds of exogenous asymmetries:
  - country population size and overall productivity (a country's advanced level)

Our Findings

- contrary to the selection hypothesis, in **poorer countries**, less productive firms always **specialize in export**, and may be **crowded in** by trade, resulting in "**reverse selection**" may arise in **poorer countries**;
- yet the selection hypothesis continues to hold in richer countries;
- and more ....

Model: Population Size

- Consumer preferences:

$$\sum_{y=1}^{m} \int_0^{\infty} u(q_y^x(j))dj,$$

- $u'(.) < \infty$
- firms sorted by marginal cost of labor $c(j)$
- no fixed cost, no entry cost, no trade cost, no free entry
- Consumer budget:

$$w^x l + \int_0^{\infty} \frac{\pi^x(j)}{N^x} dj = \sum_{y=1}^{m} \int_0^{\infty} p_y^x(j) q_y^x(j) dj.$$

Model: Overall Productivity

- Consumer preferences:

$$f(\sum_{y=1}^{m} \int_0^{\infty} u(q_y^x(j))dj) - l,$$

- $u'(.) < \infty$, $f'(.) < \infty$.
- firms sorted by marginal cost of labor $\beta_x c(j)$: smaller β higher overall productivity
- Consumer budget remains the same:

$$w^x l + \int_0^{\infty} \frac{\pi^x(j)}{N^x} dj = \sum_{y=1}^{m} \int_0^{\infty} p_y^x(j) q_y^x(j) dj.$$

  - non-tradable sector self-sufficient, constant returns to scale technology

Equilibrium: Population Size

$$\frac{1}{\lambda^x} r(q_y^x(j)) = w^y c_y(j), \qquad \text{intensive margin}$$

$$\frac{1}{\lambda^x} u'(0) = w^y c_y(\kappa_y^x), \qquad \text{extensive margin}$$

$$N^x l = \int_0^\infty \int_0^{\sum_{h=1}^m N^h q_x^h(j)} c_x(q,j) dq dj, \qquad \text{labor market}$$

$$\sum_{h=1}^m \frac{N^h}{\lambda^h} \int_0^\infty \int_0^{q_x^h(j)} r(q) dq dj = \sum_{h=1}^m \frac{N^x}{\lambda^x} \int_0^\infty \int_0^{q_h^x(j)} r(q) dq dj. \qquad \text{trade balance}$$

where $r(q) \equiv u'(q) + q u''(q)$

Equilibrium: Overall Productivity

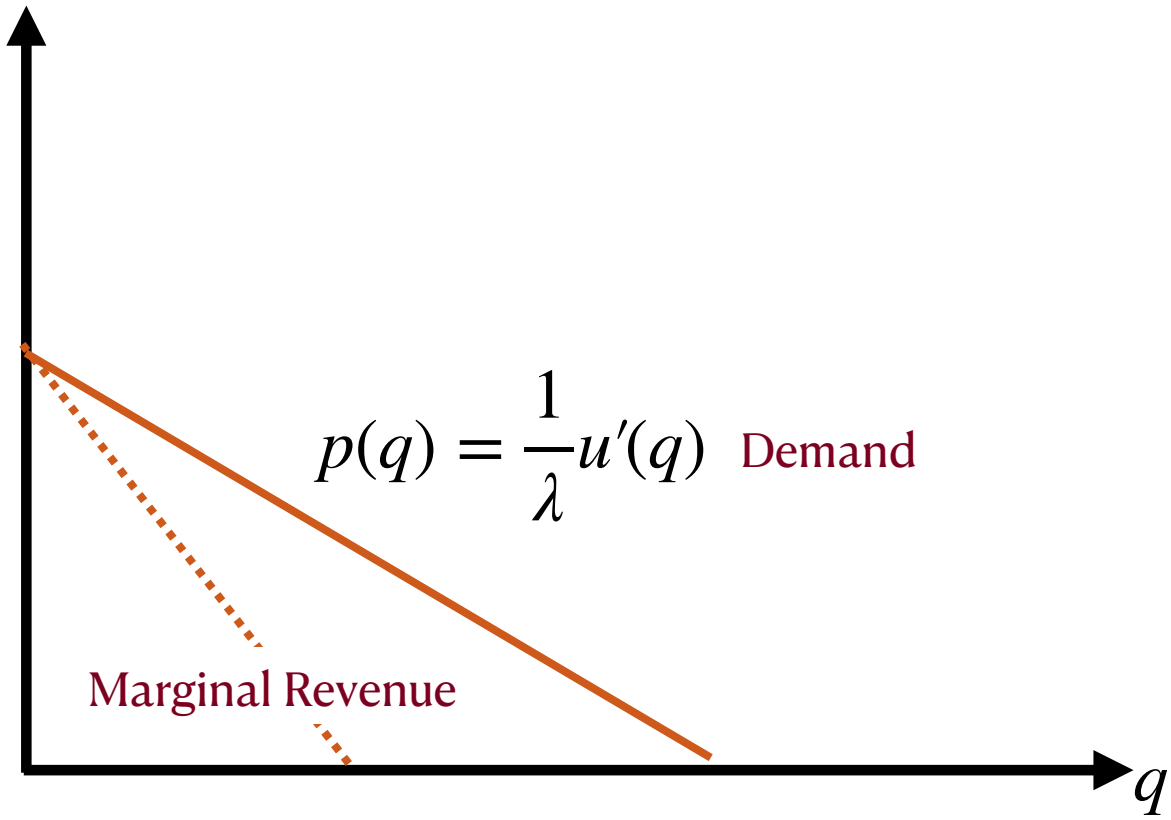
$$\frac{1}{\lambda^x} r(q_y^x(j)) = w^y c_y(j), \qquad \text{intensive margin}$$

$$\frac{1}{\lambda^x} u'(0) = w^y c_y(\kappa_y^x), \qquad \text{extensive margin}$$

$$\frac{1}{\lambda^x} \equiv w^x f'\left(\sum_{y=1}^{m} \int_0^{\infty} u(q_y^x(j))dj\right), \qquad \text{identity}$$

$$\sum_{h=1}^{m} \frac{1}{\lambda^h} \int_0^{\infty} \int_0^{q_x^h(j)} r(q)dqdj = \sum_{h=1}^{m} \frac{1}{\lambda^x} \int_0^{\infty} \int_0^{q_h^x(j)} r(q)dqdj. \qquad \text{trade balance}$$

Key Intuition



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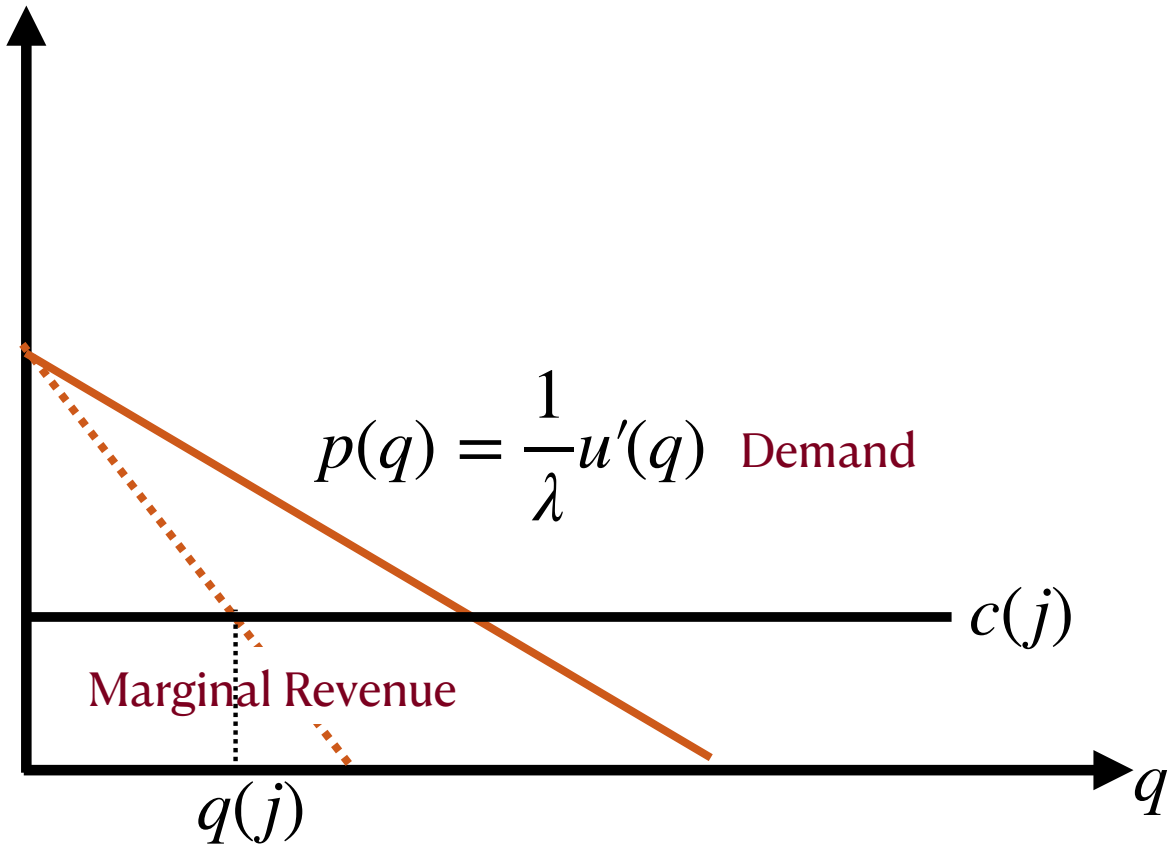

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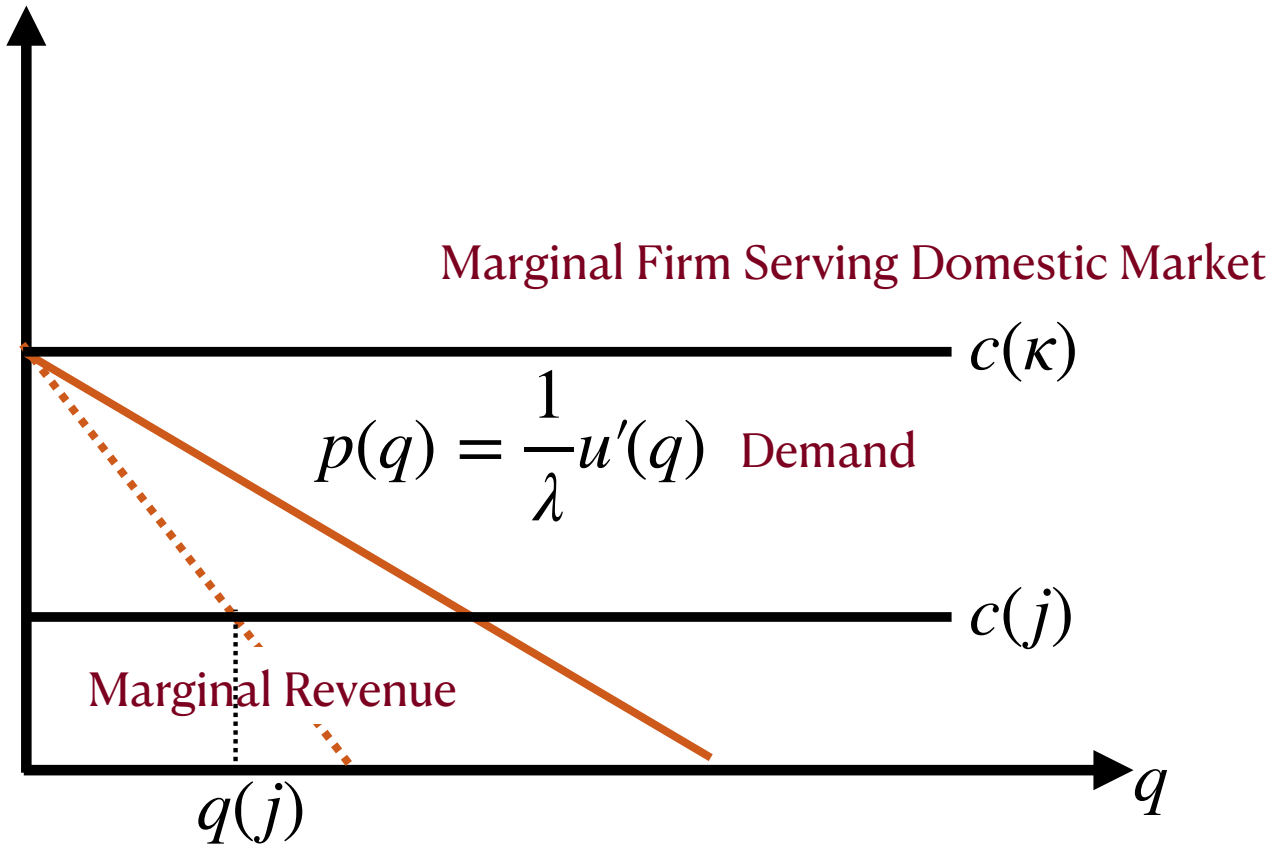

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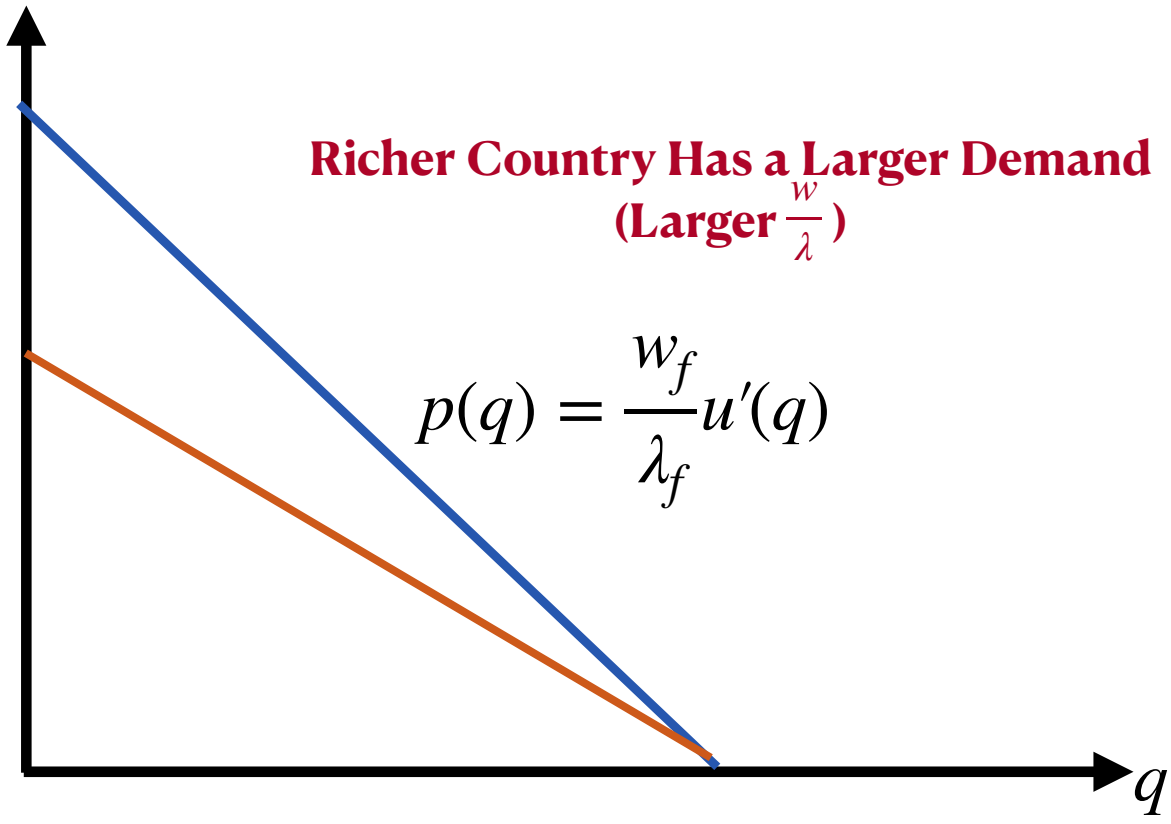

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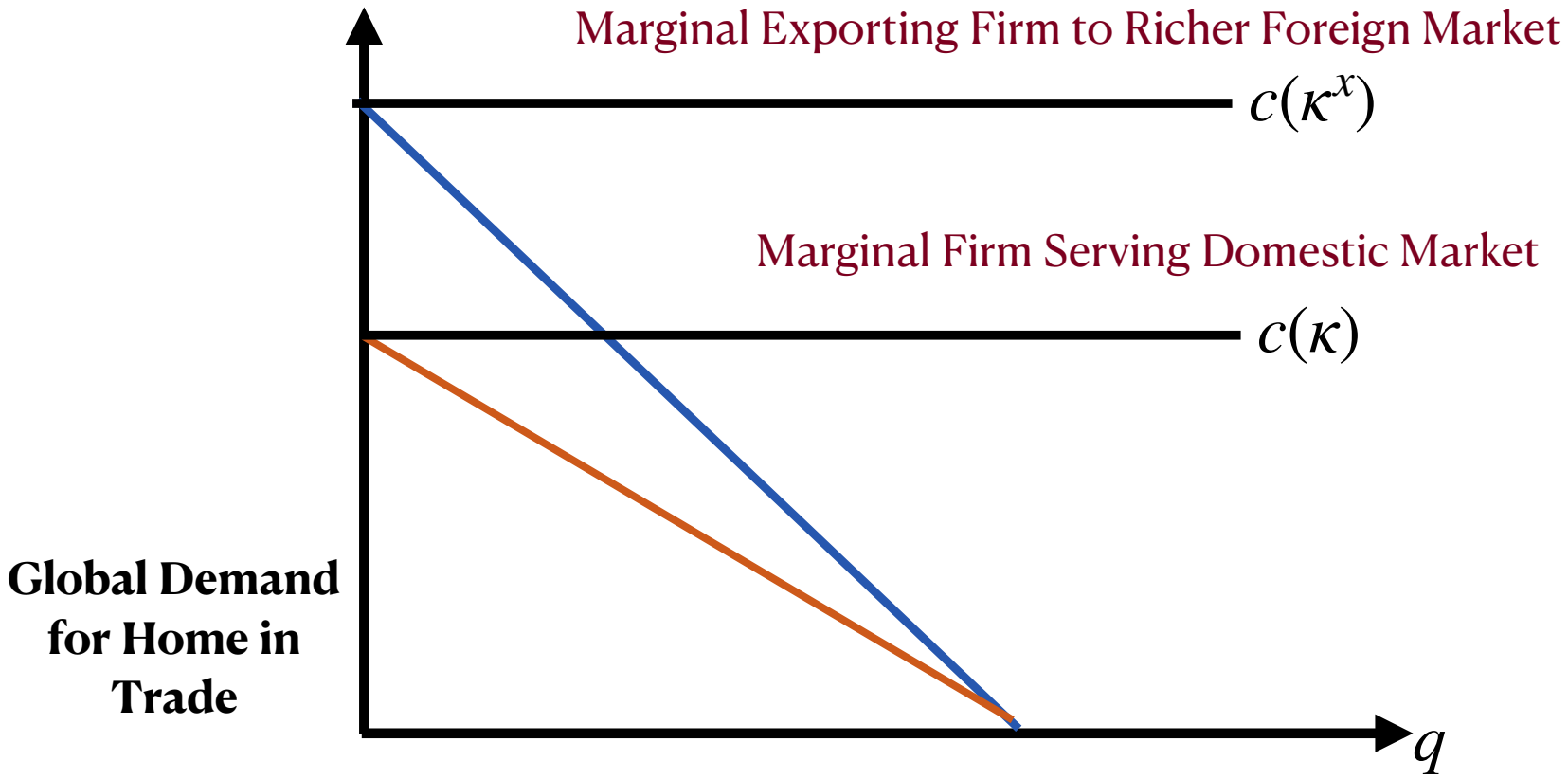

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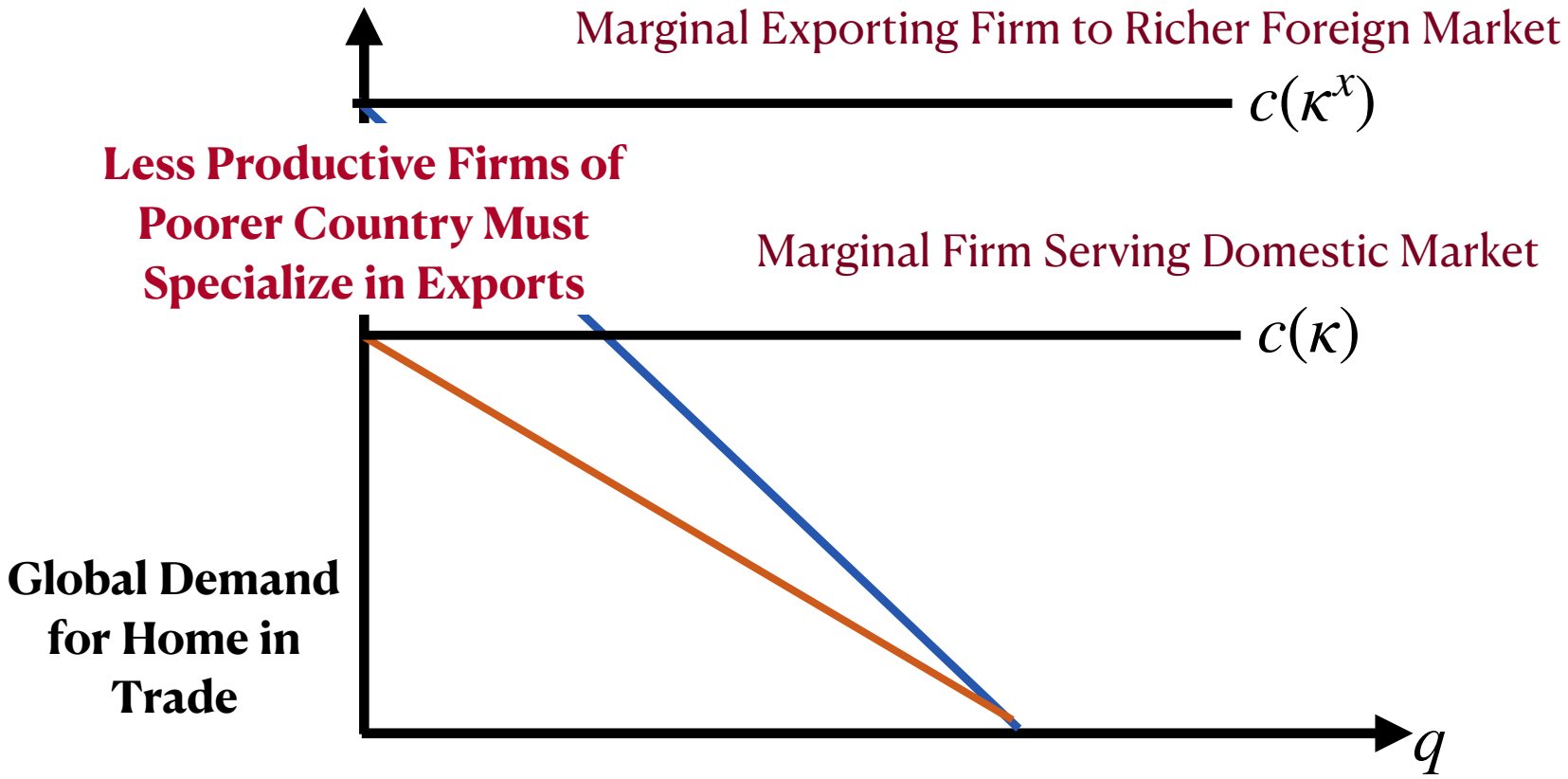

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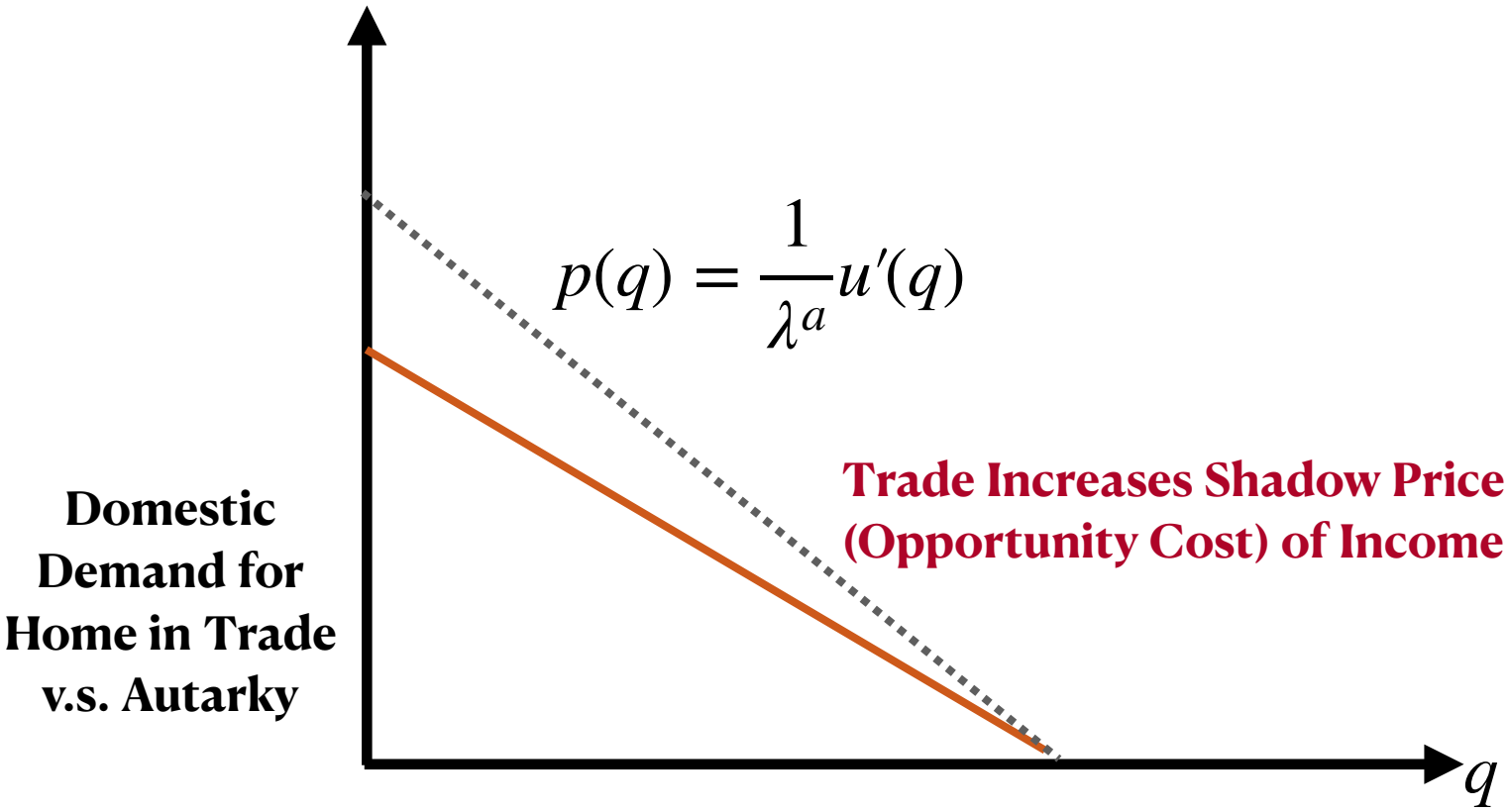

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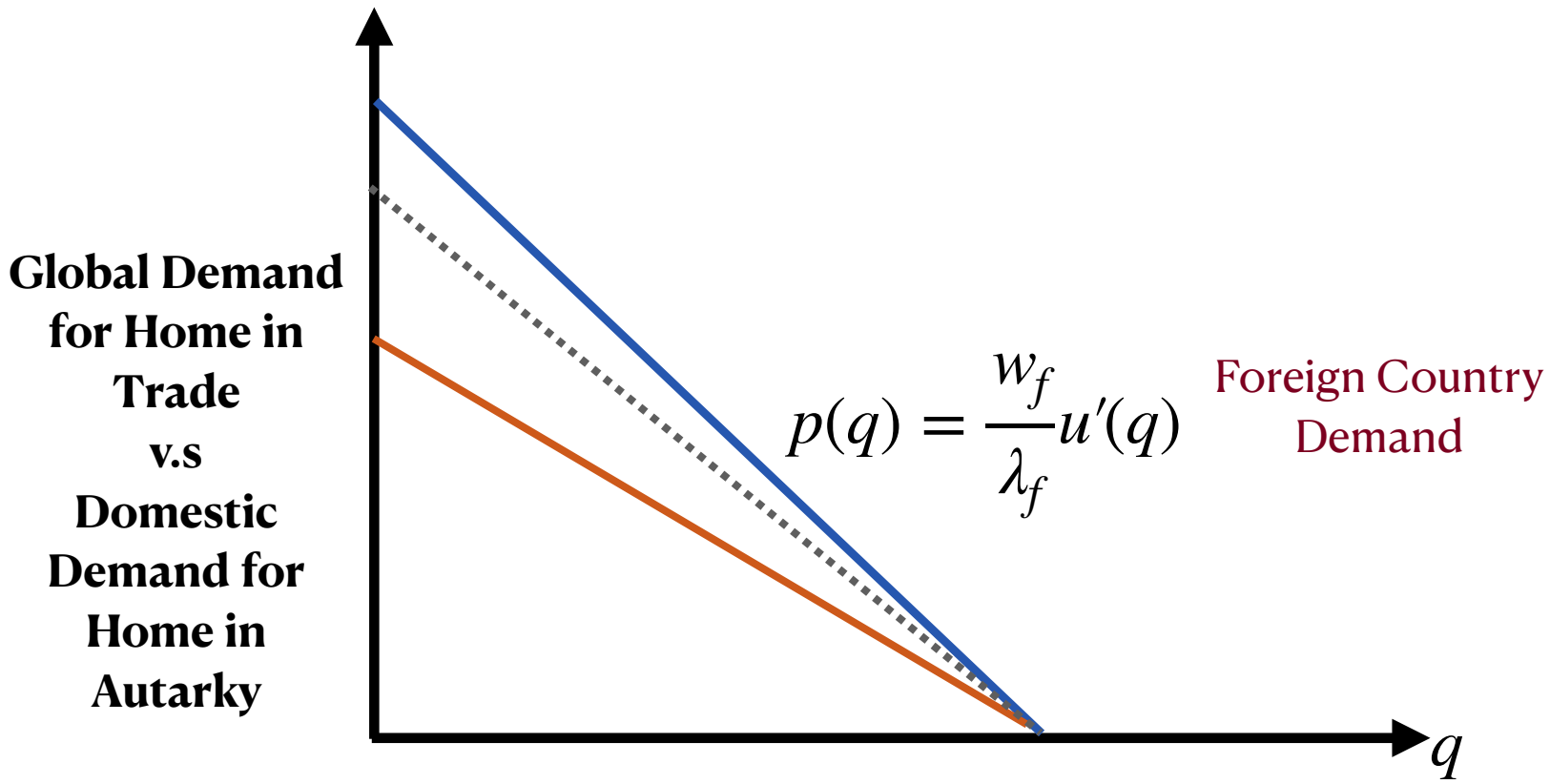

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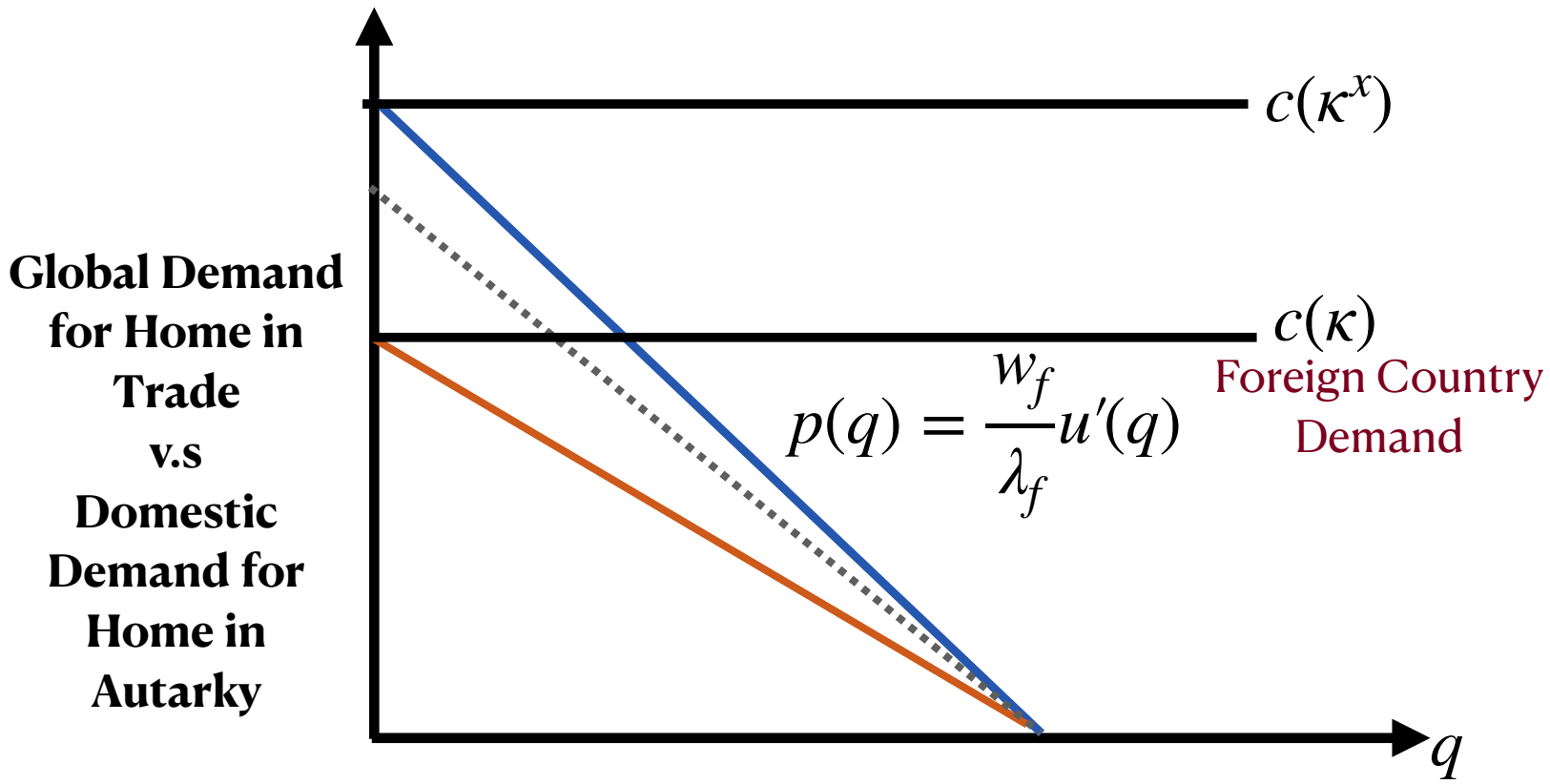

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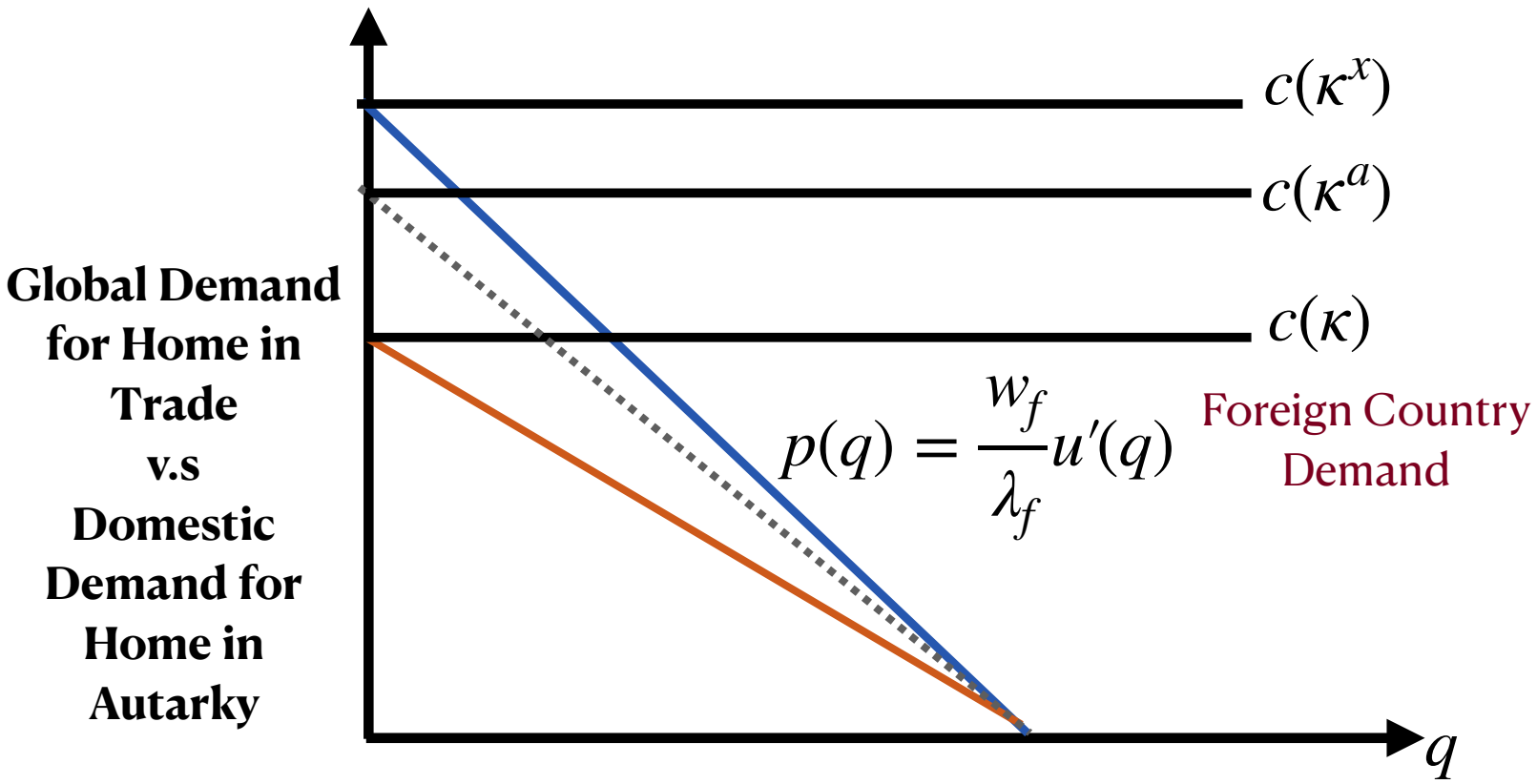
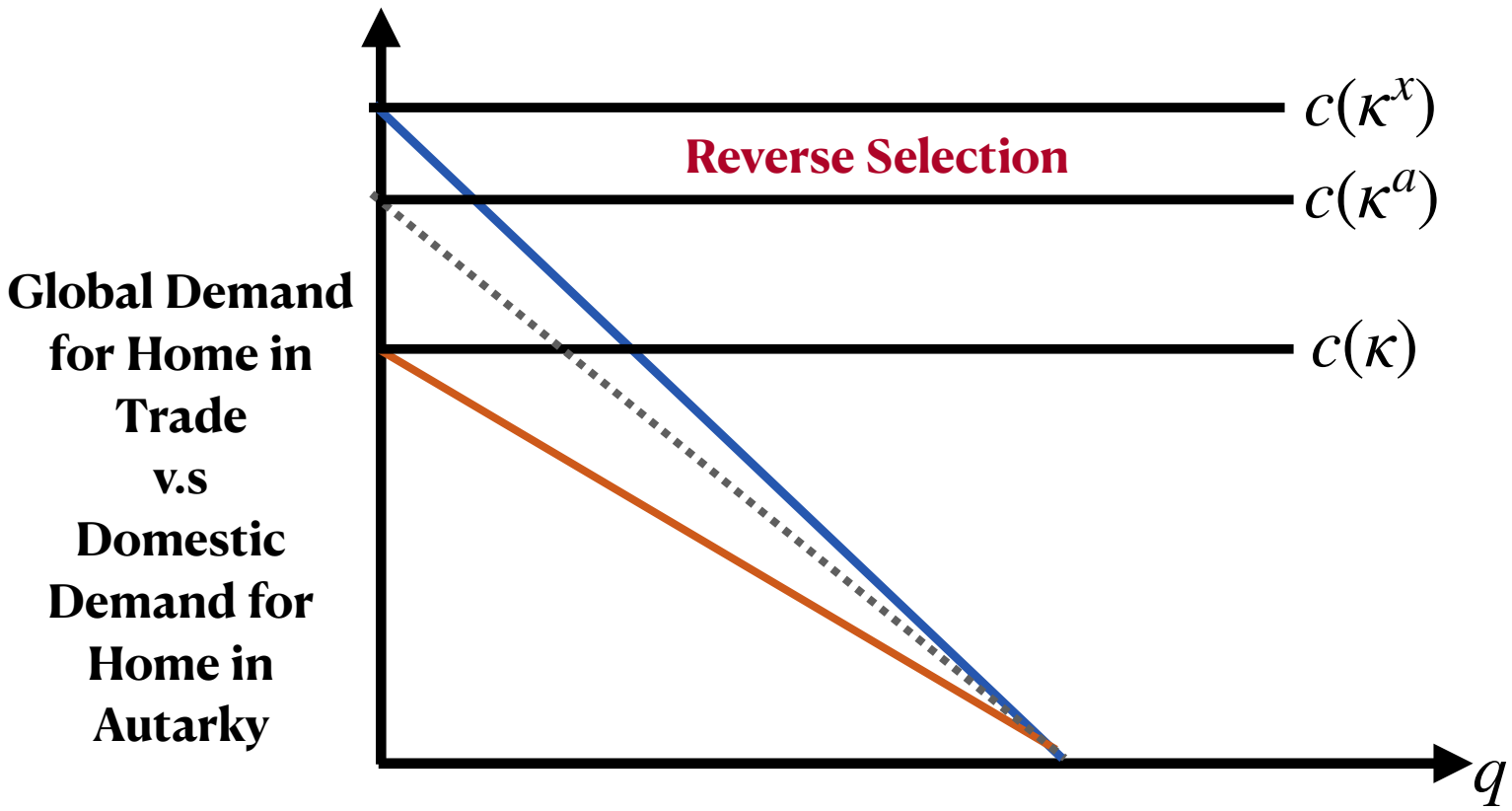


Key Intuition

Less Productive Firms Crowded in to Specialize in Export



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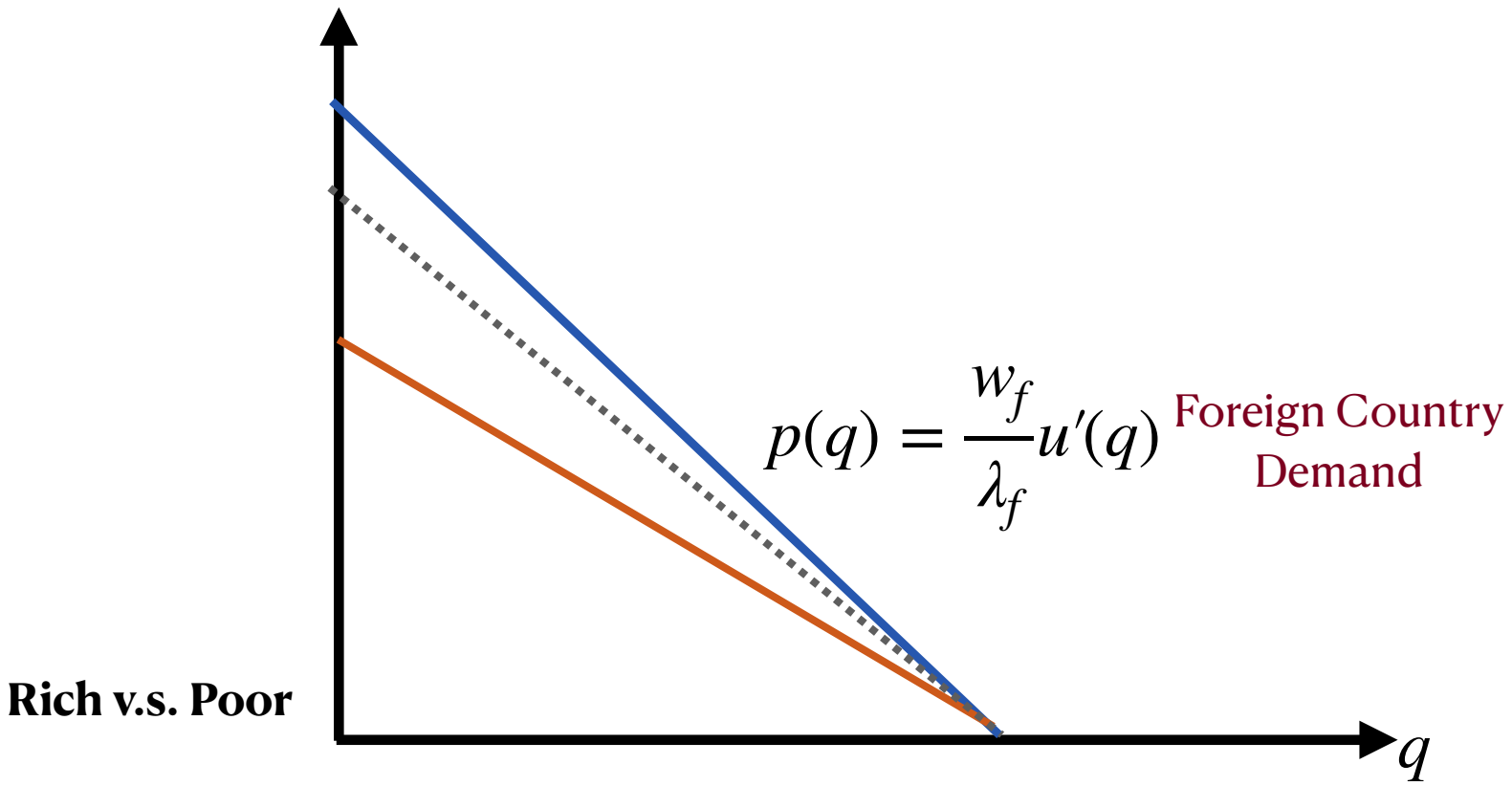

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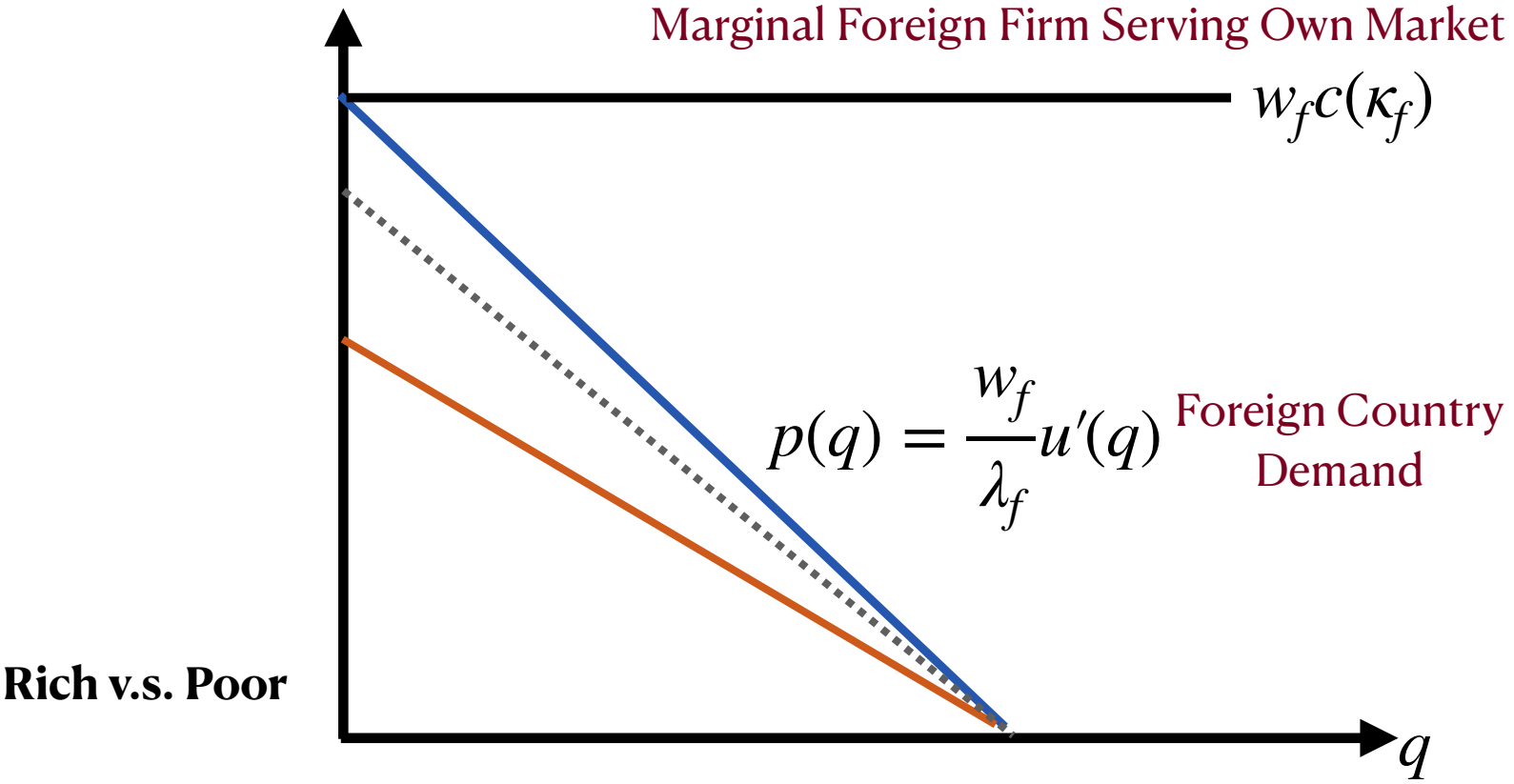

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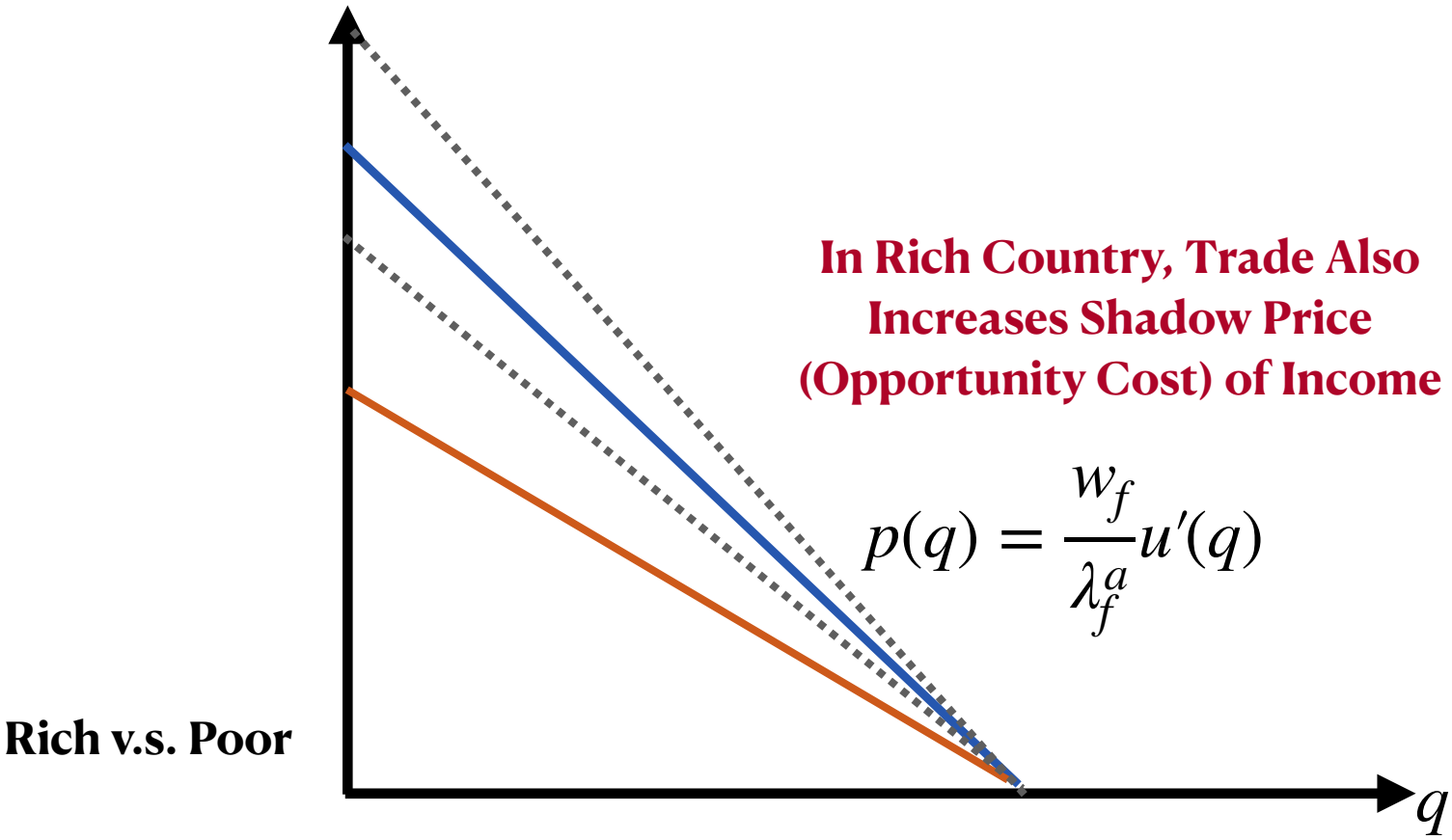

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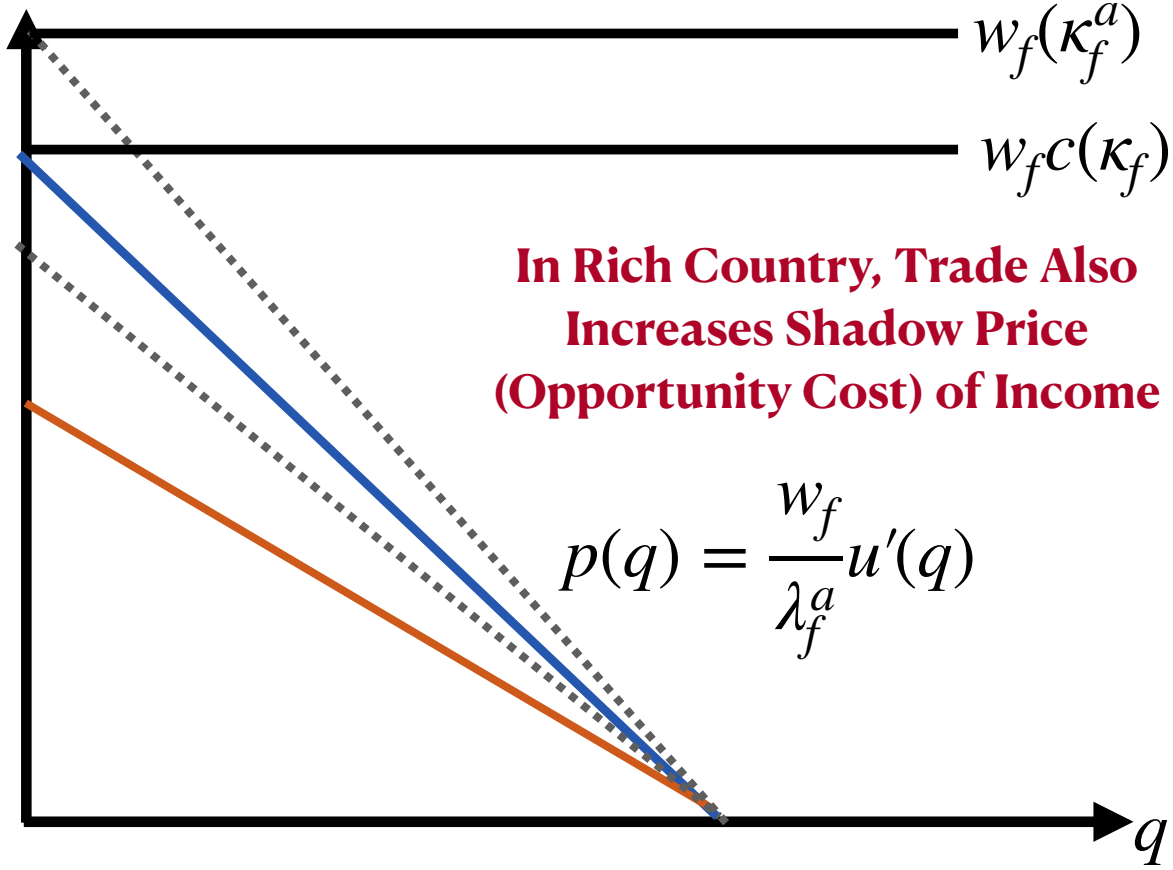

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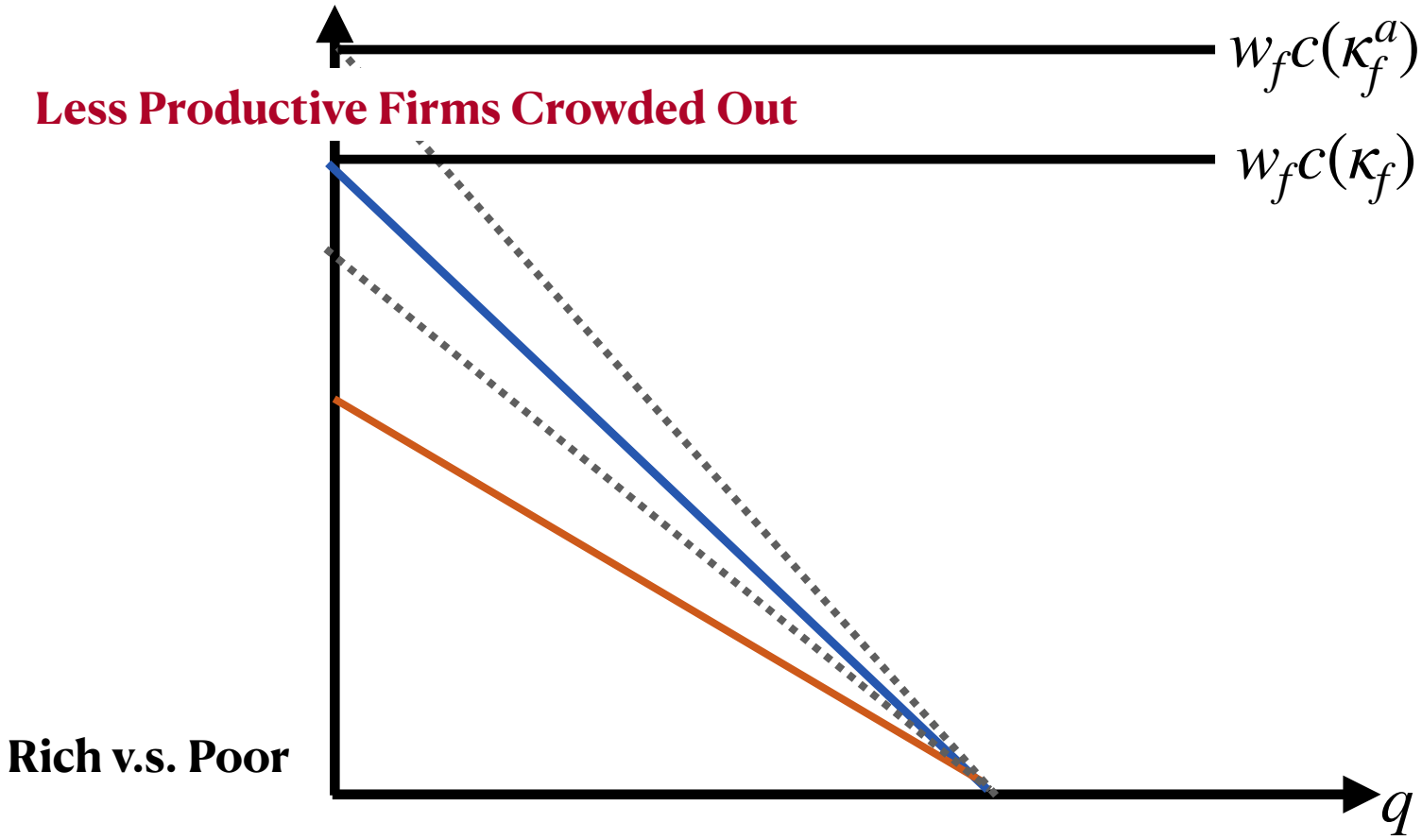
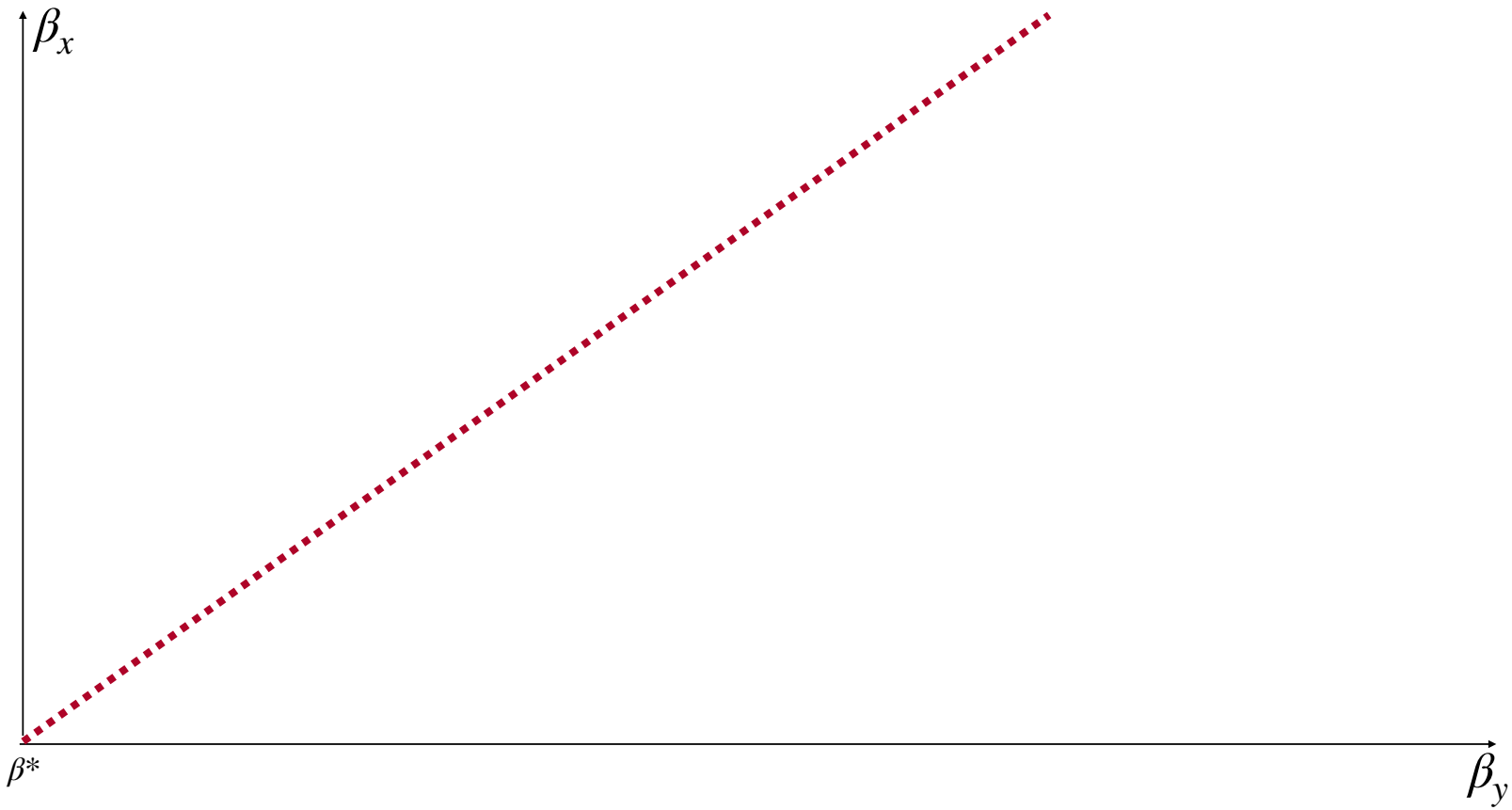


More Findings

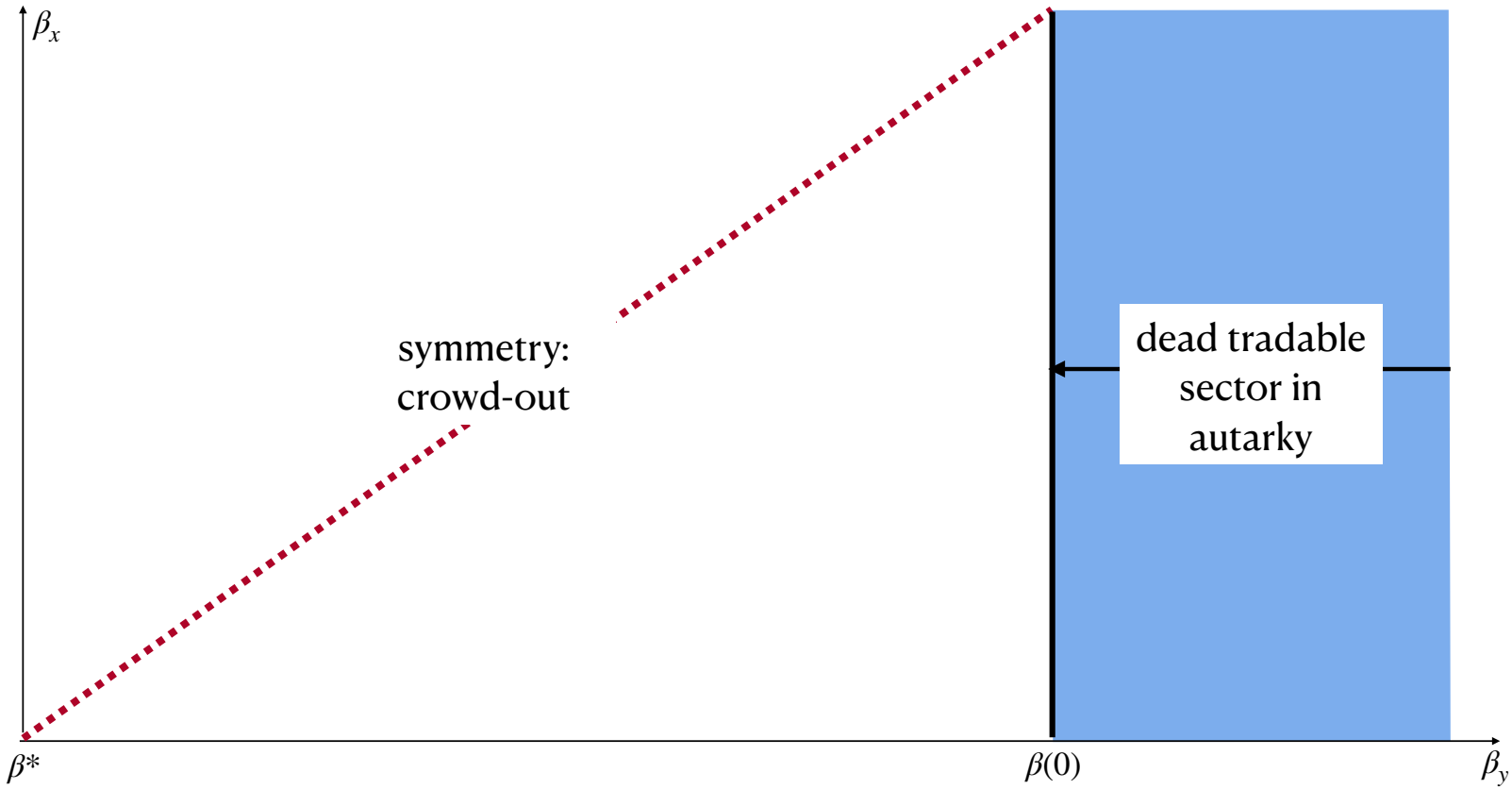
- endogenizing income disparity
  - smaller countries and more productive countries enjoy a lower shadow price of income (higher income) than their respective counterparts
- affirming the possibility of reverse selection
  - holding overall productivity constant, reverse selection happens in a country if it is sufficiently larger than its trading partners.
  - holding country size identical, reverse selection happens in a country if it lags sufficiently behind in overall productivity and its labor can flow freely between the tradable and non-tradable sectors.

More Findings

We can further trace out the evolution of trade pattern as a backward country develops in overall productivity to catch up with its more advanced counterpart



More Findings



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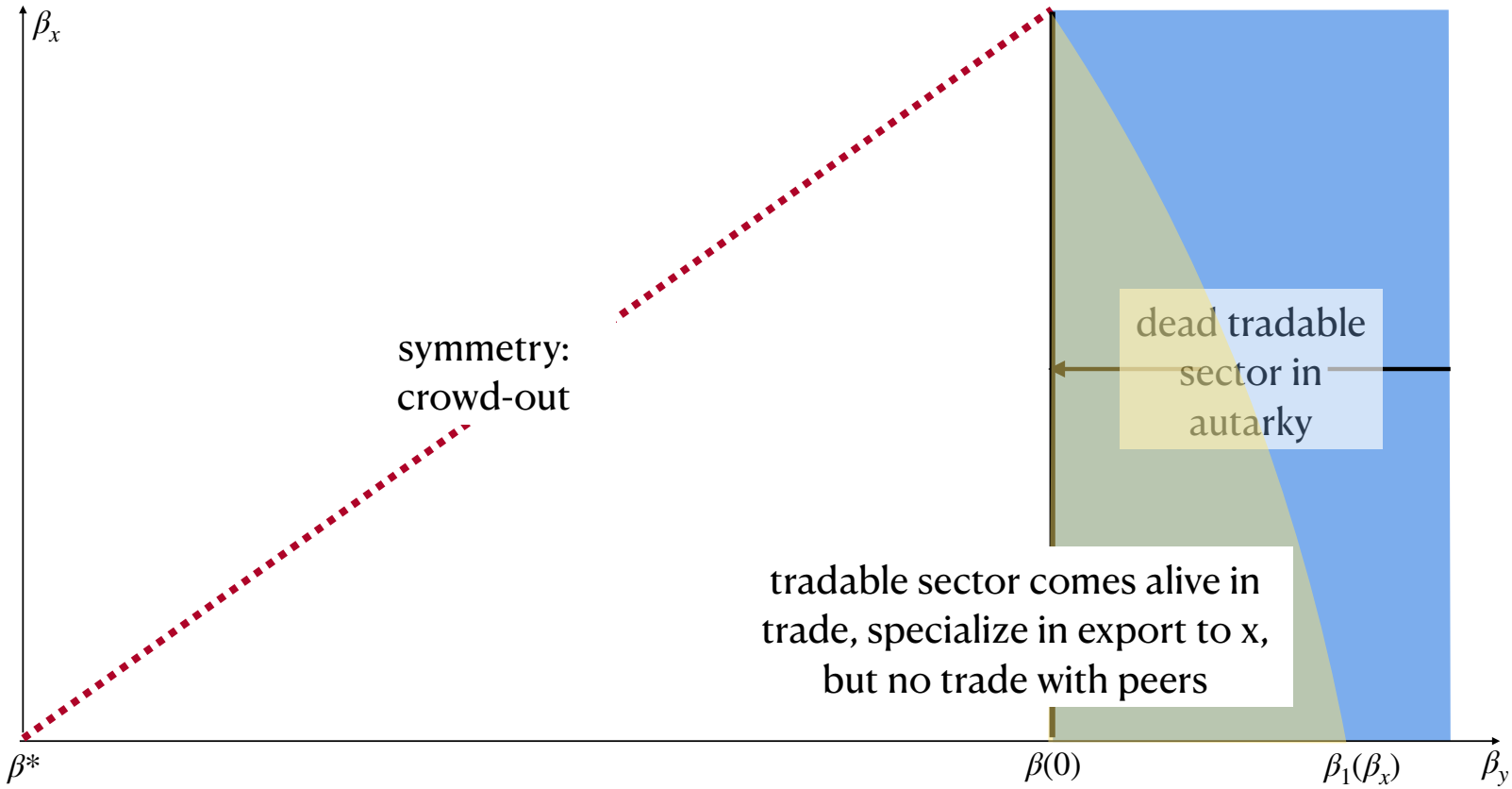

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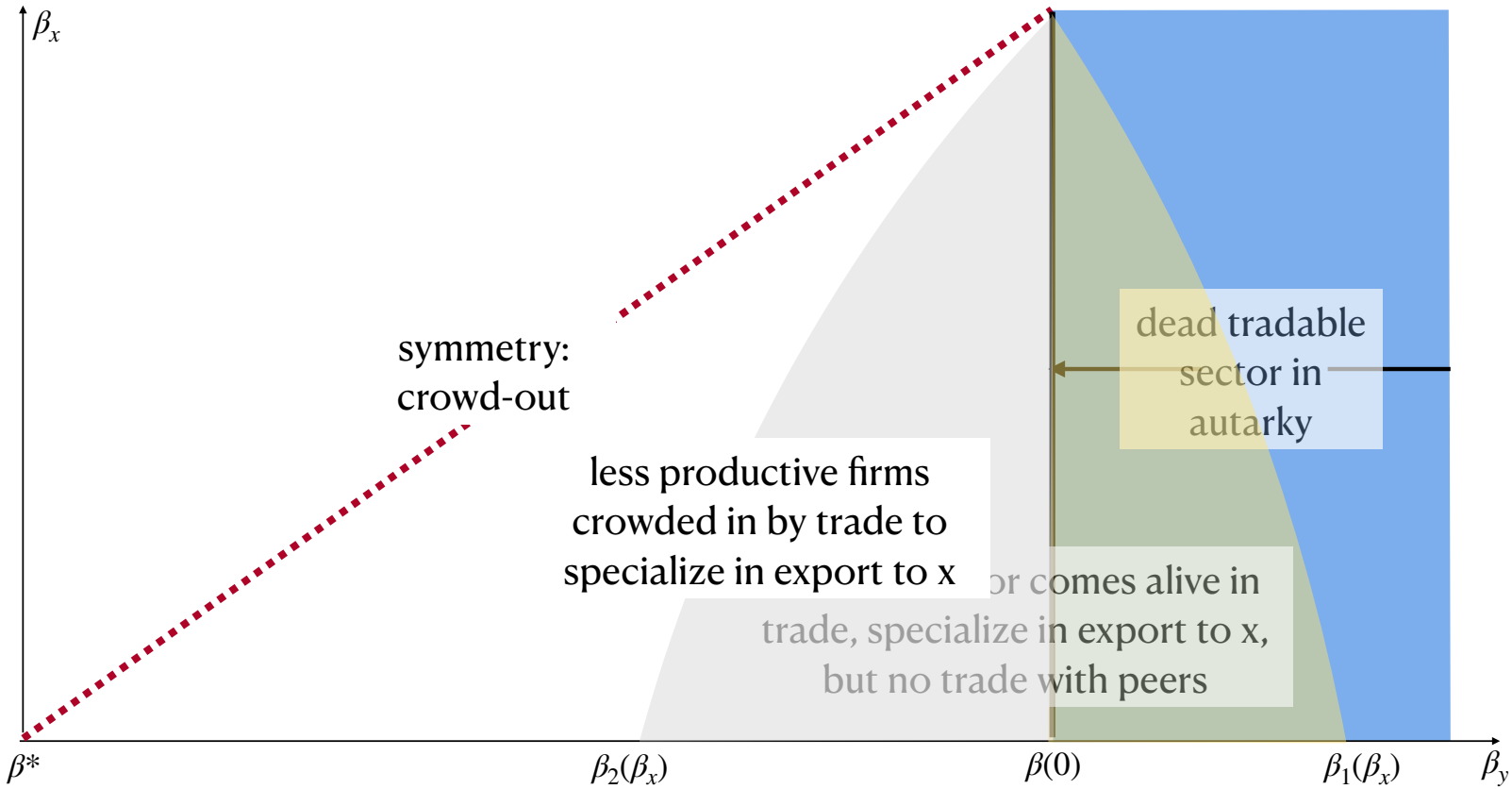

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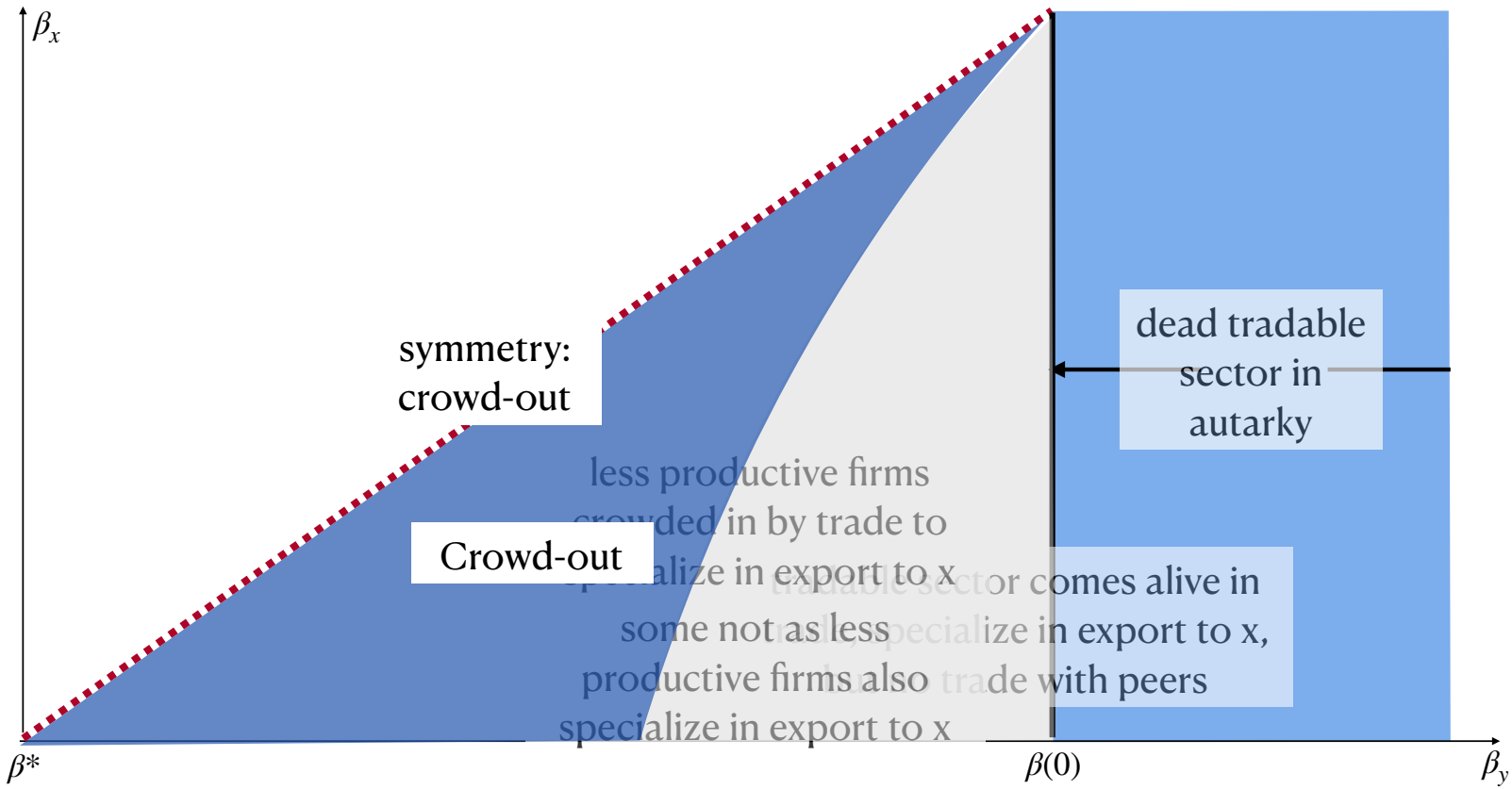
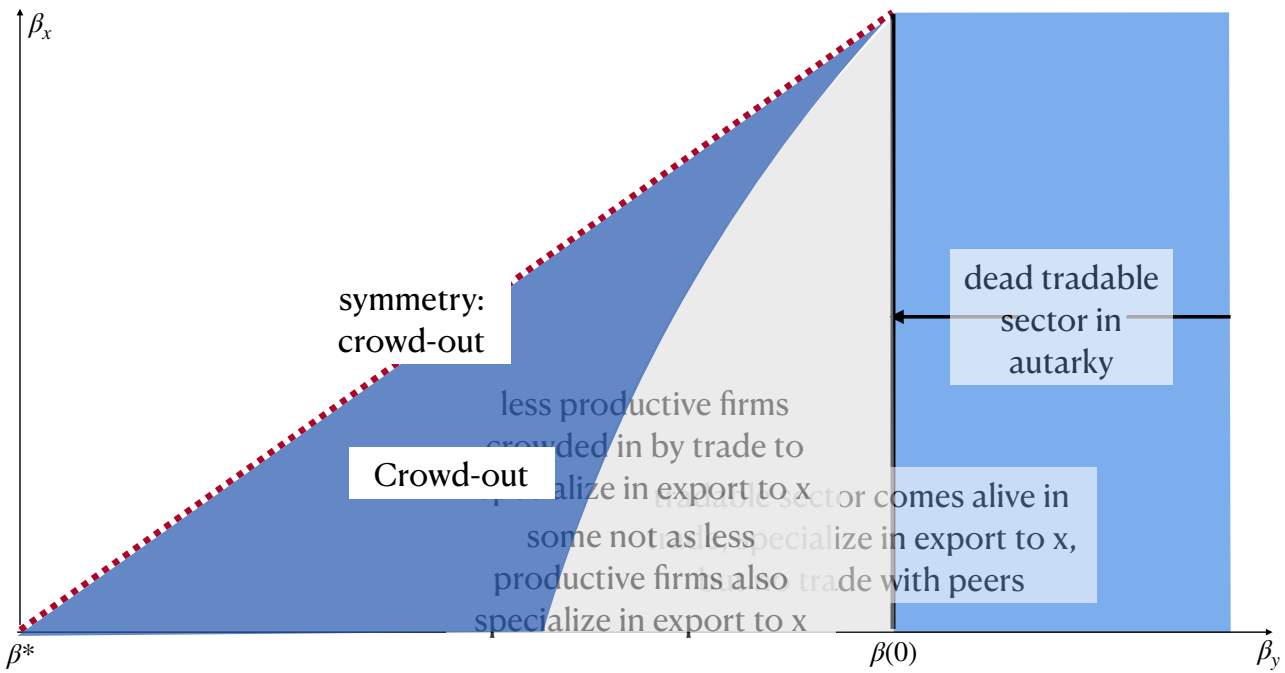


More Findings

- the critical threshold moves left with the expansion of global trade:
  - as some backward countries join the global trade and grow rich, it will become more difficult for the remaining backward countries to join the global trade.



Related Literature

- possibility of crowd-in among **symmetric countries** (not reverse selection) possible in Zhelobodko et al. (2012) and Mrazova and Neary (2017) per Non-CES preferences plus fixed cost
  - market expansion v.s. marginal revenue reduction ($\frac{1}{}$ smaller because of trade)
  - with fixed cost, market expansion can dominate marginal revenue reduction when preferences Non-CES: crowd-in possible
  - without fixed cost, marginal revenue reduction always dominates market expansion: crowd-out

Related Literature

- no free entry implies profits need to be distributed. How profits distributed affect income and hence the structure of global demand
  - Chaney (2008): profits globally distributed, country asymmetry mixed
  - ours: profits domestically distributed, country asymmetry retained
  - implication: global capital market likely impacts selection/reverse selection phenomena

Related Literature

- The following works also incorporate country asymmetry into their frameworks
  - Helpman, Melitz, and Yeaple (2004), Chaney (2008), Helpman, Melitz, Rubinstein (2008), Melitz and Ottaviano (2008), Demidova and Rodriguez-Clare (2009, 2013), Arkolakis (2010), Eaton, Kortum, and Kramarz (2011), Bertoletti and Epifani (2014), Simonovska (2015), and Bertoletti, Etro, and Simonovska (2018), Arkolakis, Demidova, Klenow, and Rodriguez-Clare (2008), Baldwin and Forslid (2010), Arkolakis, Costinot, and Rodriguez-Clare (2012), Arkolakis, Costinot, Donaldson, and Rodriguez-Clare (2019), and Dan Lv (2012)
  - with different focuses (typically on correlations of endogenous variables instead of comparative statics), without reference to the reverse selection phenomenon.