

The Formation and Operation of the Multinational Enterprise

Lecture 2, part II

© Marc-Andreas Muendler

University of California, San Diego

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International Integration of Production

- International Integration of Production could also be called International Disintegration of Production
 - “Slicing the value chain” (Krugman 1996)
 - “Delocalization” (Leamer 1996)
 - “Vertical specialization” (Hummels, Rapaport, Yi 1997)
 - “Intra-firm offshoring”

Vertical FDI and Theories of Firm Boundaries

- Property-rights theories of the firm and the multinational firm
Which transactions are conducted on markets, which within firms?
- Activities take place so that transaction costs are minimized
(Williamson 1985, Grossman & Hart 1986)
 - Markets are good for trade in standardized, high-volume goods
 - Organizations are good if trade requires specific investments and control. Specific investments give rise to hold-up problems

Firm Boundaries and the Hold-up Problem

- The classic Hold-up problem (Klein, Crawford, Alchian 1977)
 - Supplier S must make *specific* investment for assembler A
 - The *specific* investment has no other use (Example: Barbie legs)
 - Hold-up problem: Once the investment is made, A may renegotiate for all profits, knowing that S has no alternative use.
As a consequence, no supplier will want to invest in the first place
 - Solution: A owns *investment*. (Read: Vertically integrate A - S .)
- The converse hold-up arises if A must make a specific investment

Vertical Foreign Direct Investment

- A firm can outsource to a affiliate or buy on the world market
 - Transaction costs of using markets increase in the capital intensity of goods
 - Factor-price differences and transportation costs
 - Homogeneous versus heterogeneous goods
- Capital-intensive goods are transacted within boundaries of multinational firms, while labor-intensive goods are traded at arm's length.
Antràs (2003)
- Consider domestic monopoly, foreign suppliers with cost advantages. Hold-up costs increase less than proportionally in quantities supplied

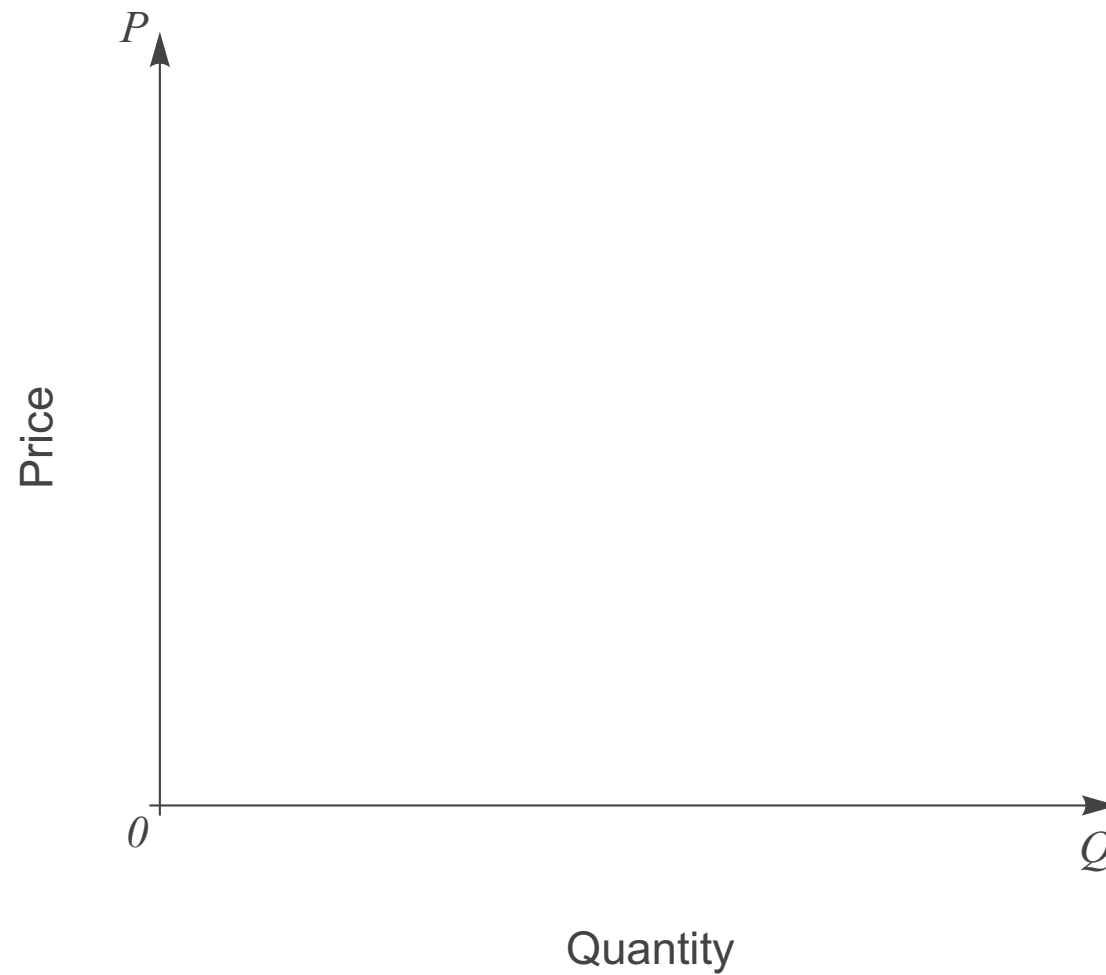
Vertical Foreign Investment Choice

- A firm can choose between three make-or-buy alternatives
 1. Produce at Home location with MC
 2. Produce at Foreign affiliate with $(1 + \tau) \cdot MC^* < MC$ (τ are shipping costs)
 3. Buy at arm's length from foreign supplier incurring
 $Hold-up\ costs + (1 + \tau) \cdot MC'^*$
Hold-up costs are more than proportionally big at small scale

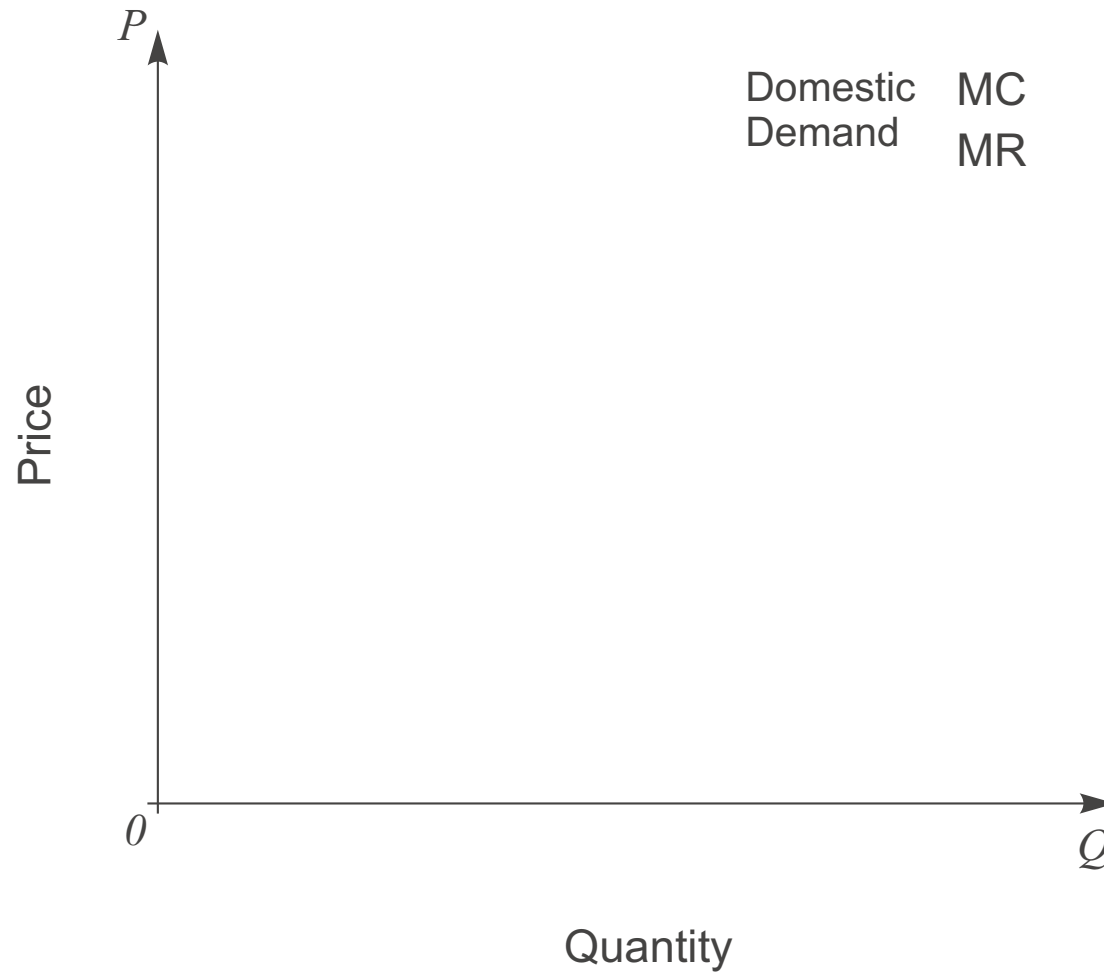
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- If costs of arm's length outsourcing exceed production costs with affiliate ($Hold-up\ costs + (1 + \tau) \cdot MC'^* > (1 + \tau) \cdot MC^*$ at Foreign affiliate's optimal quantity), there is an *Internalization Advantage*.
Then, opening a Foreign affiliate is the dominant alternative.

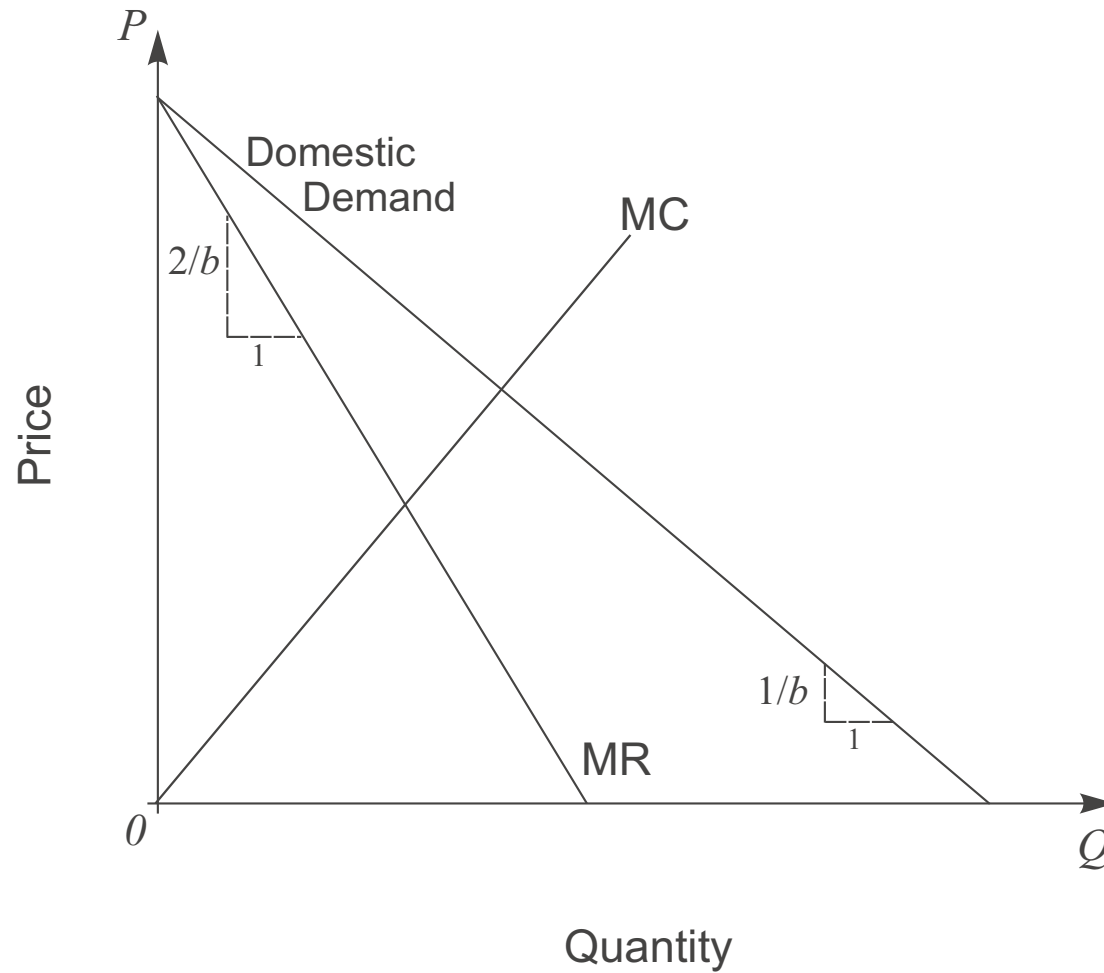
Vertical FDI with hold-up costs at foreign suppliers



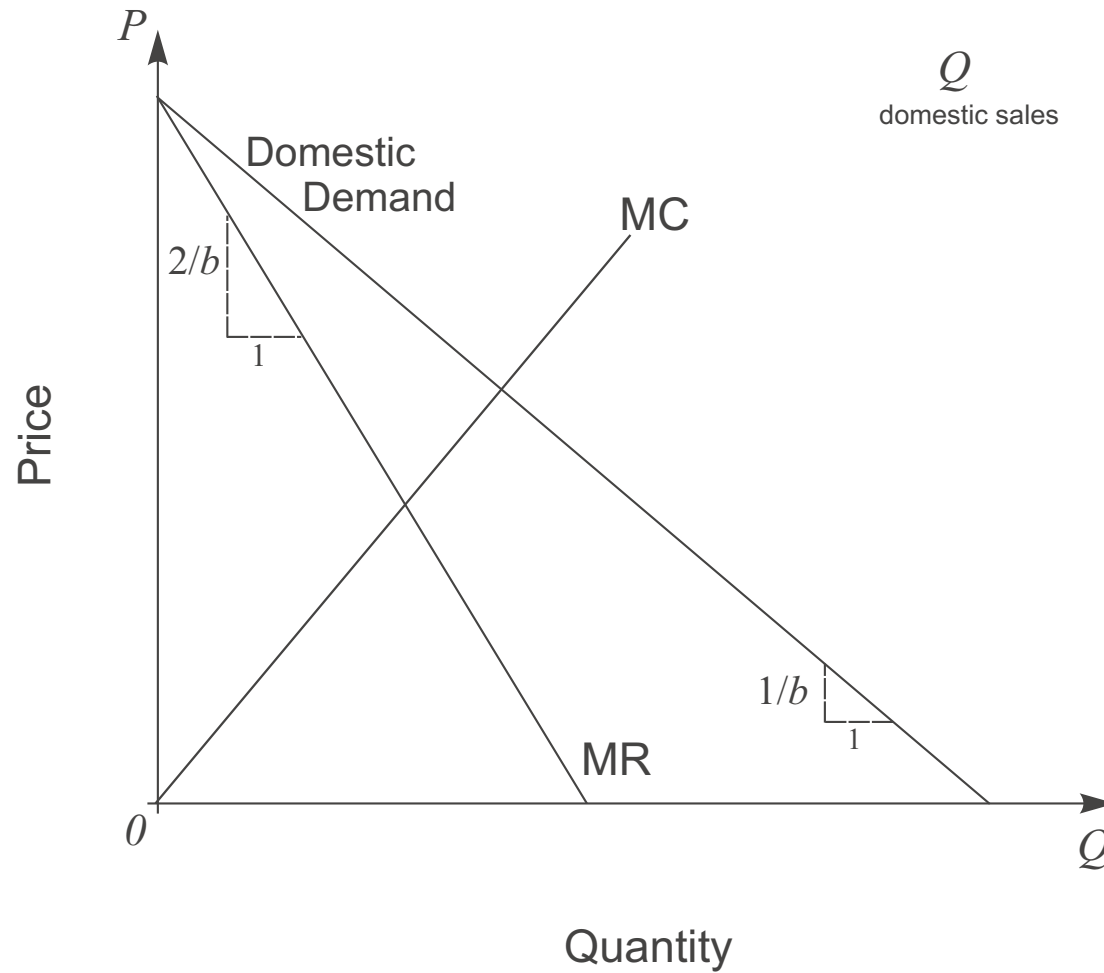
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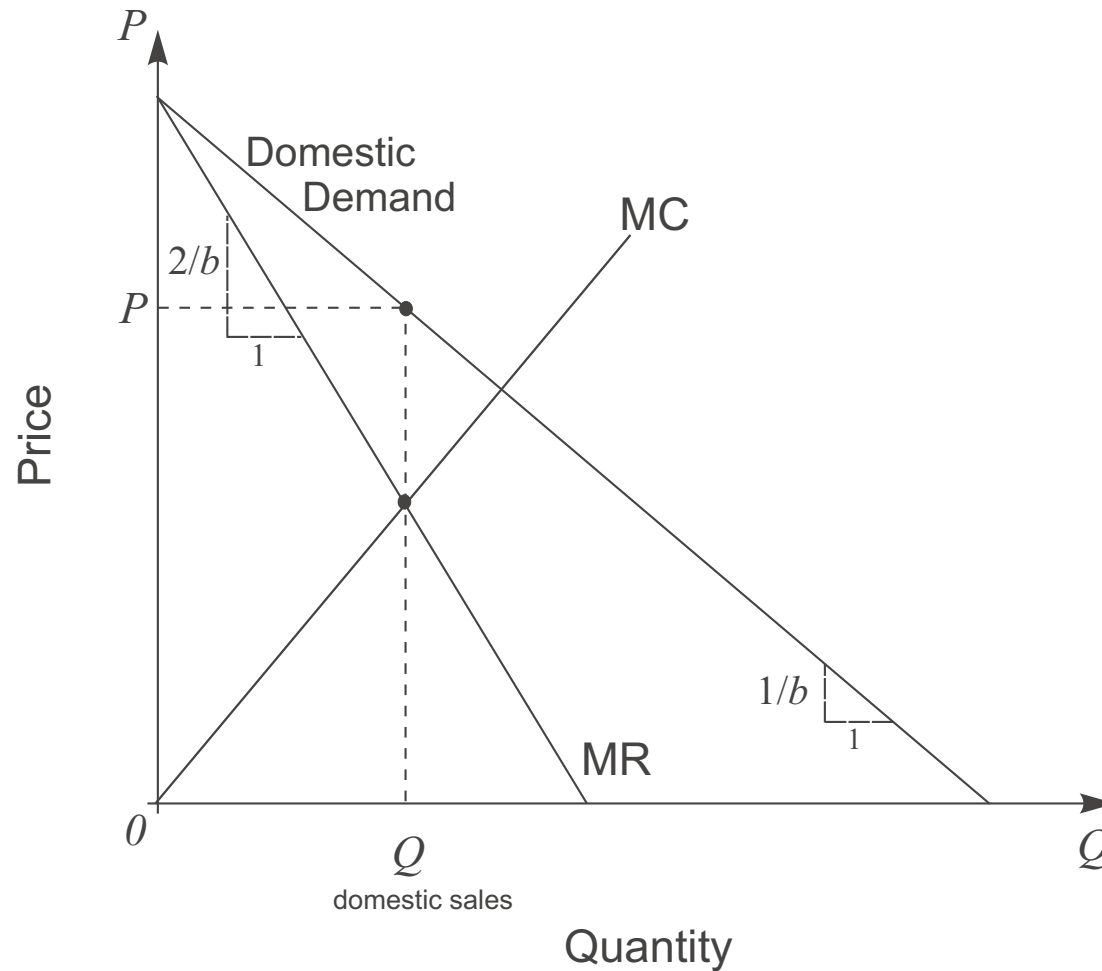
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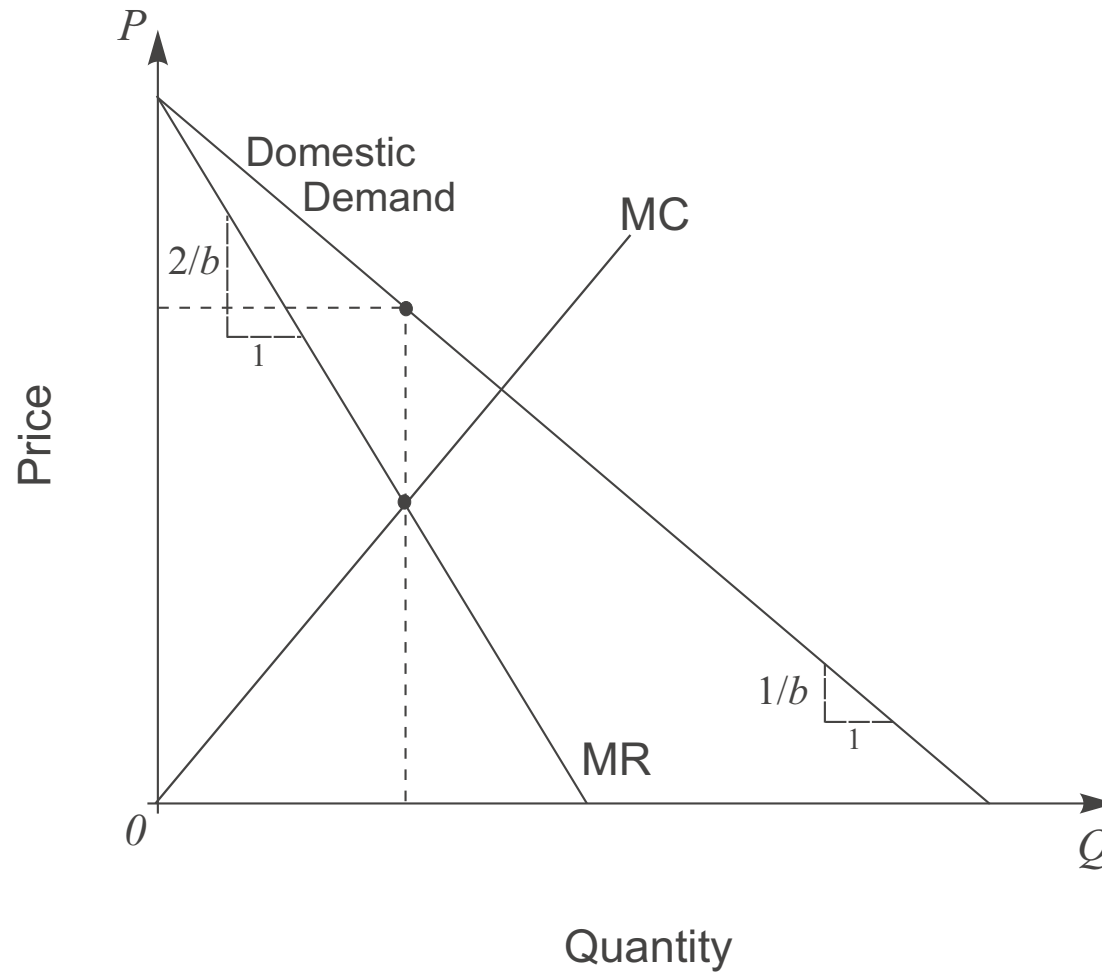
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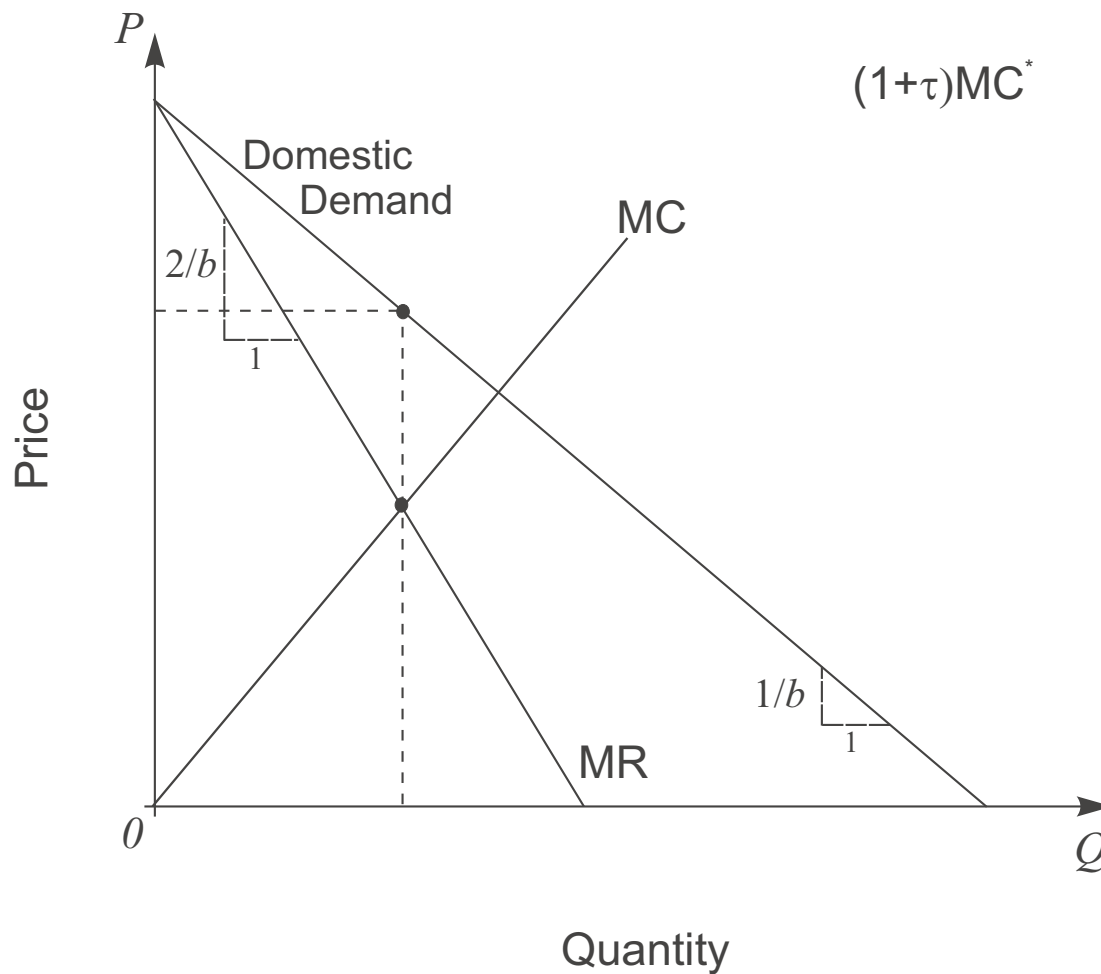
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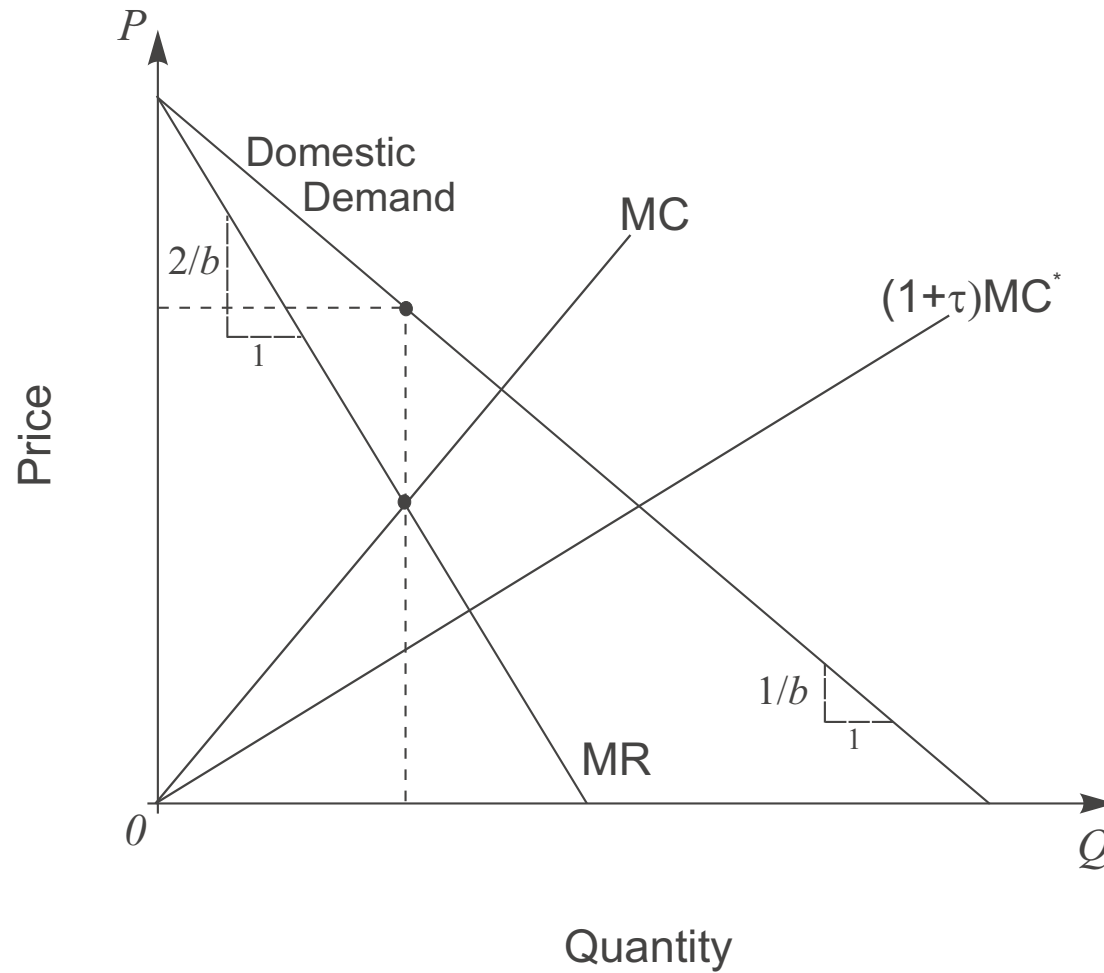
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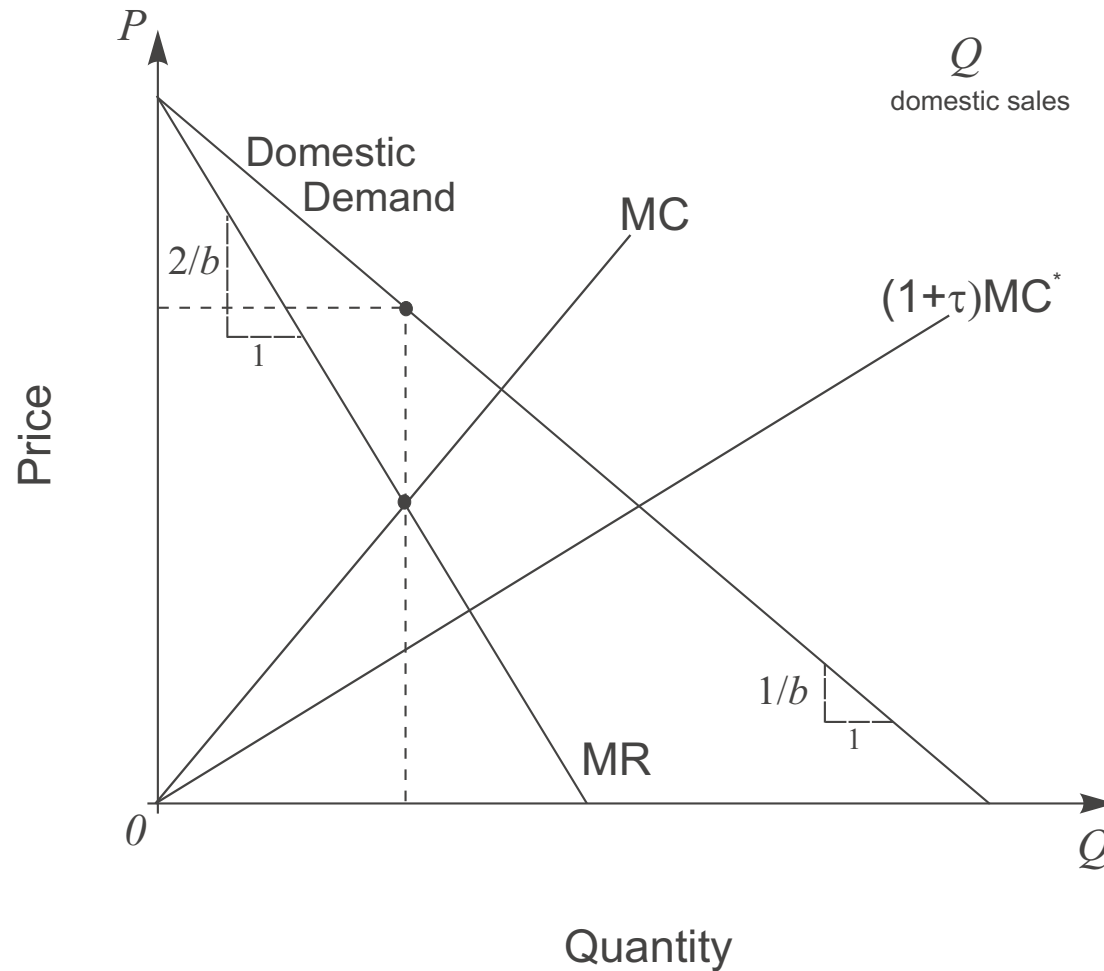
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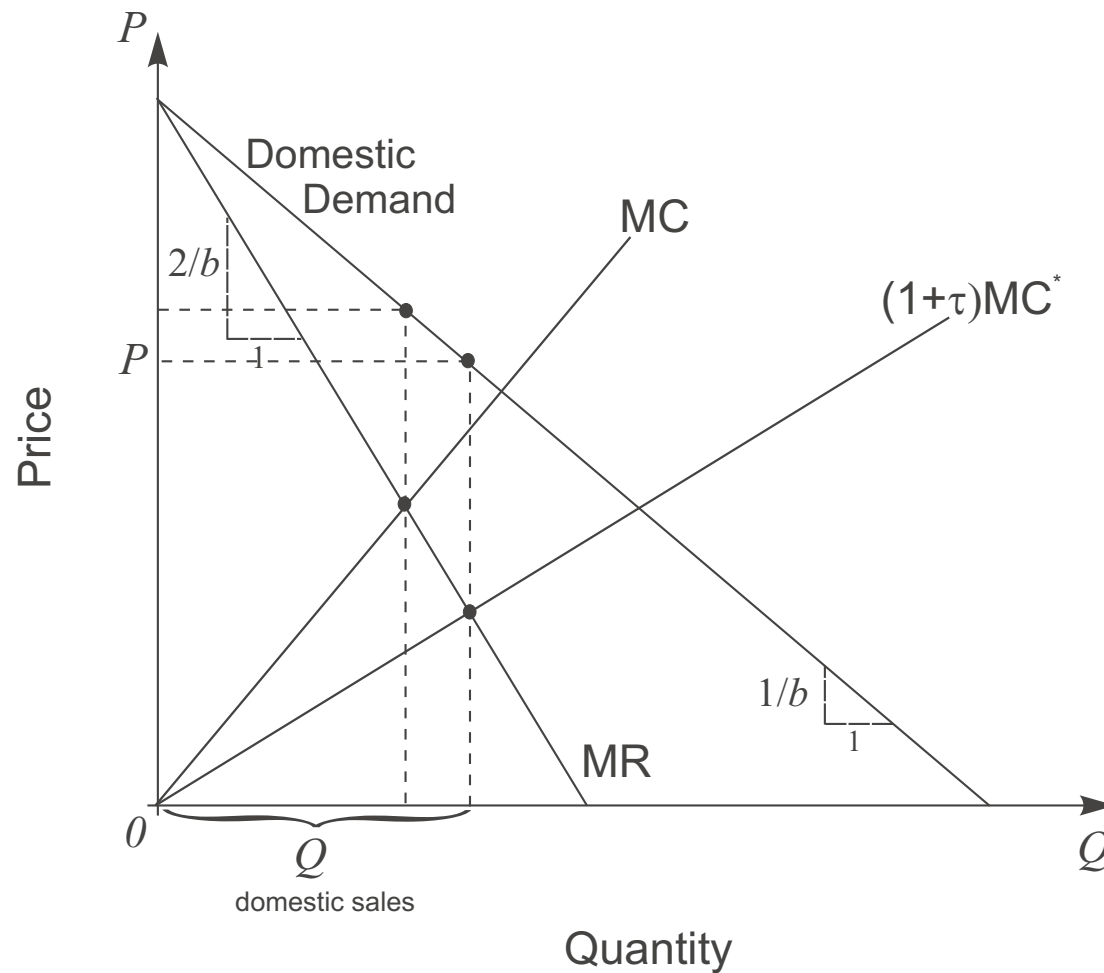
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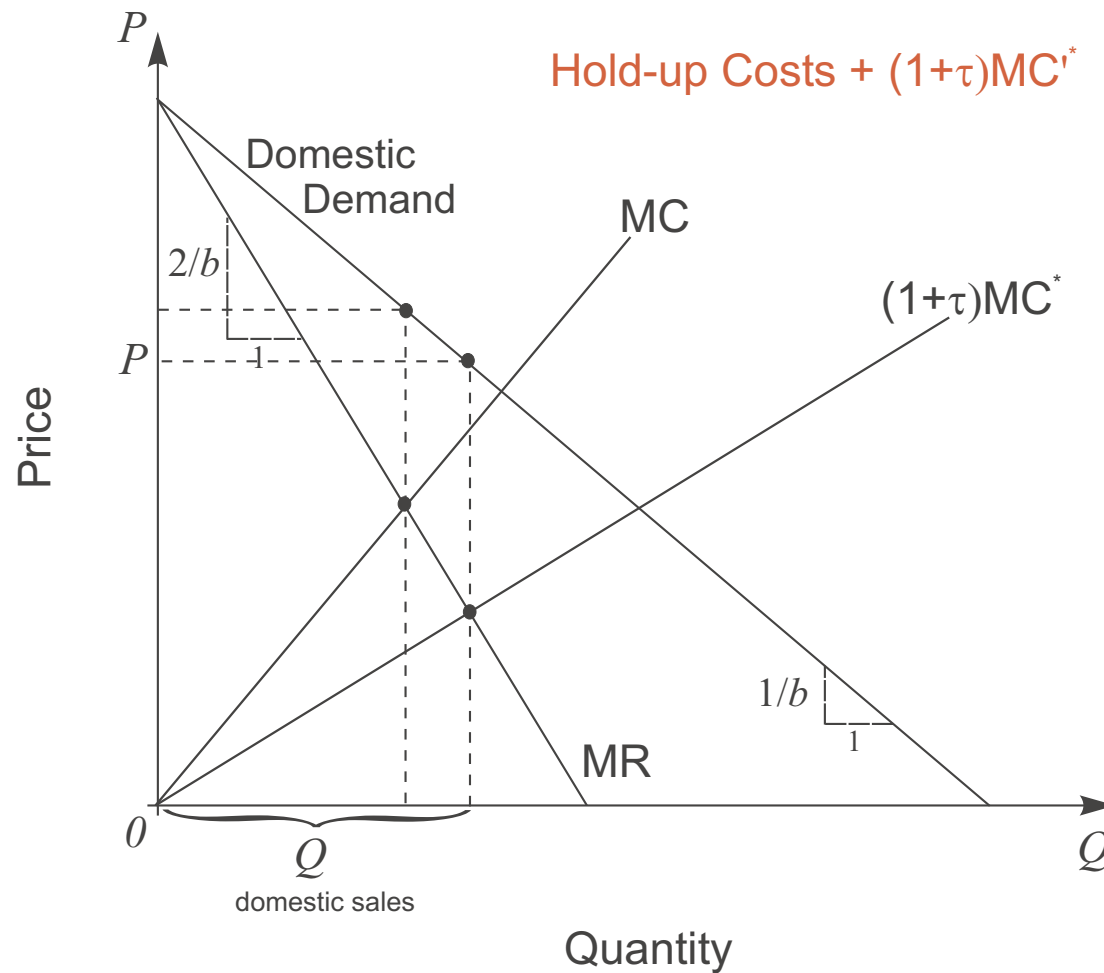
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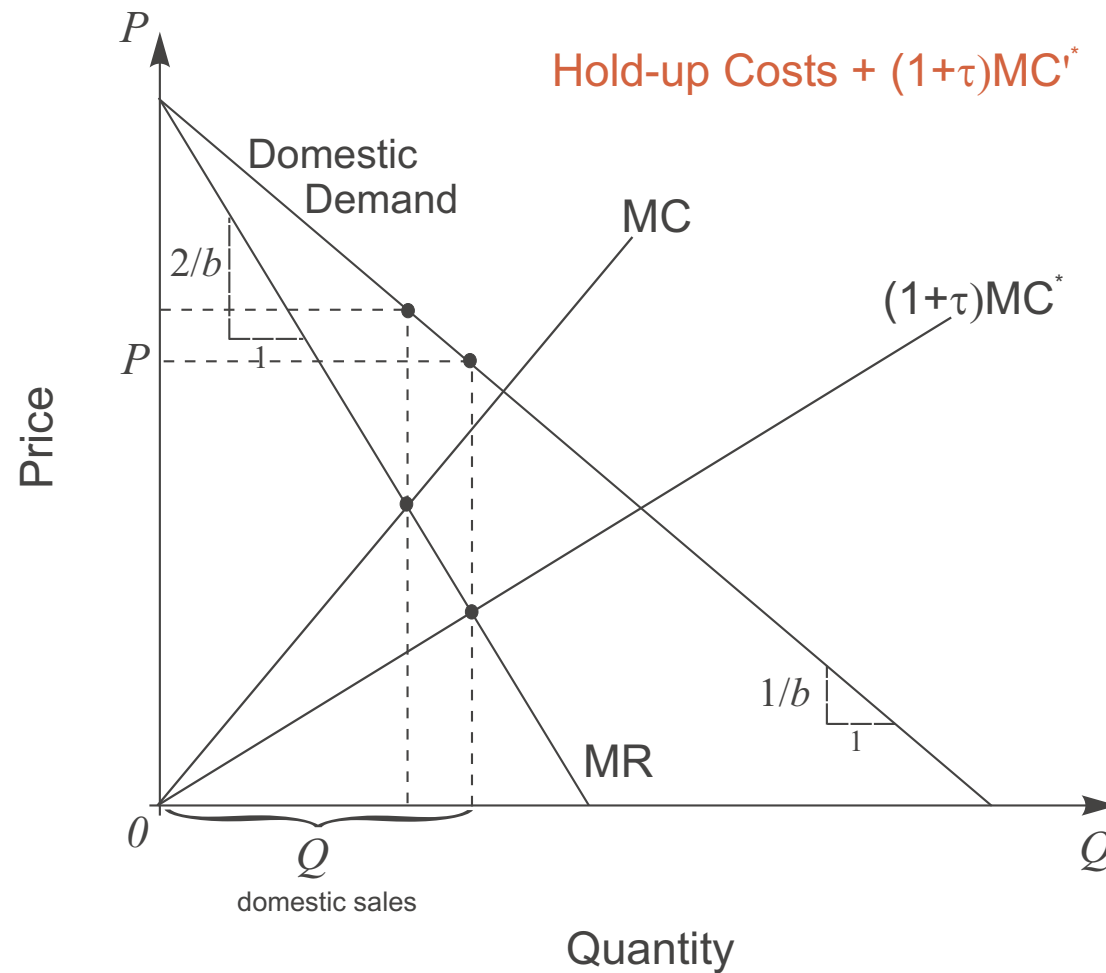
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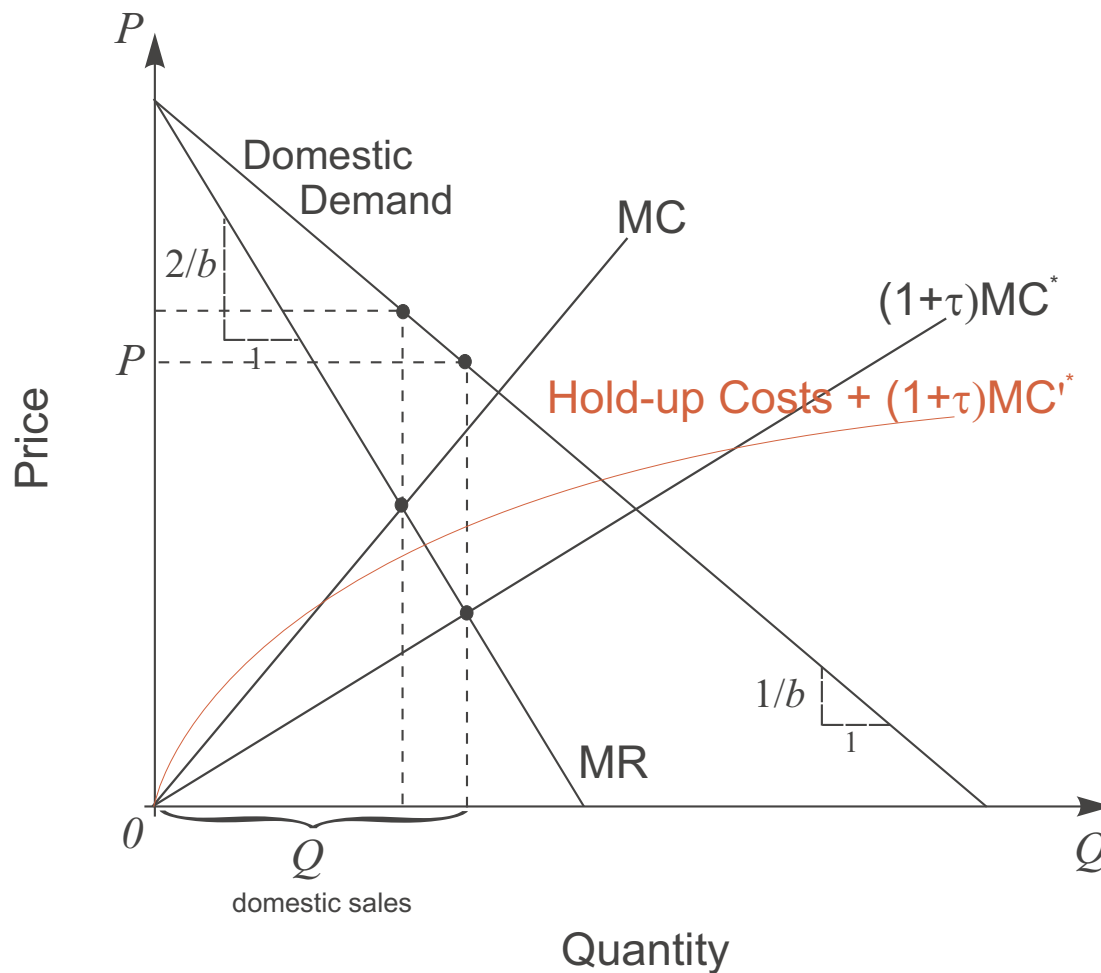
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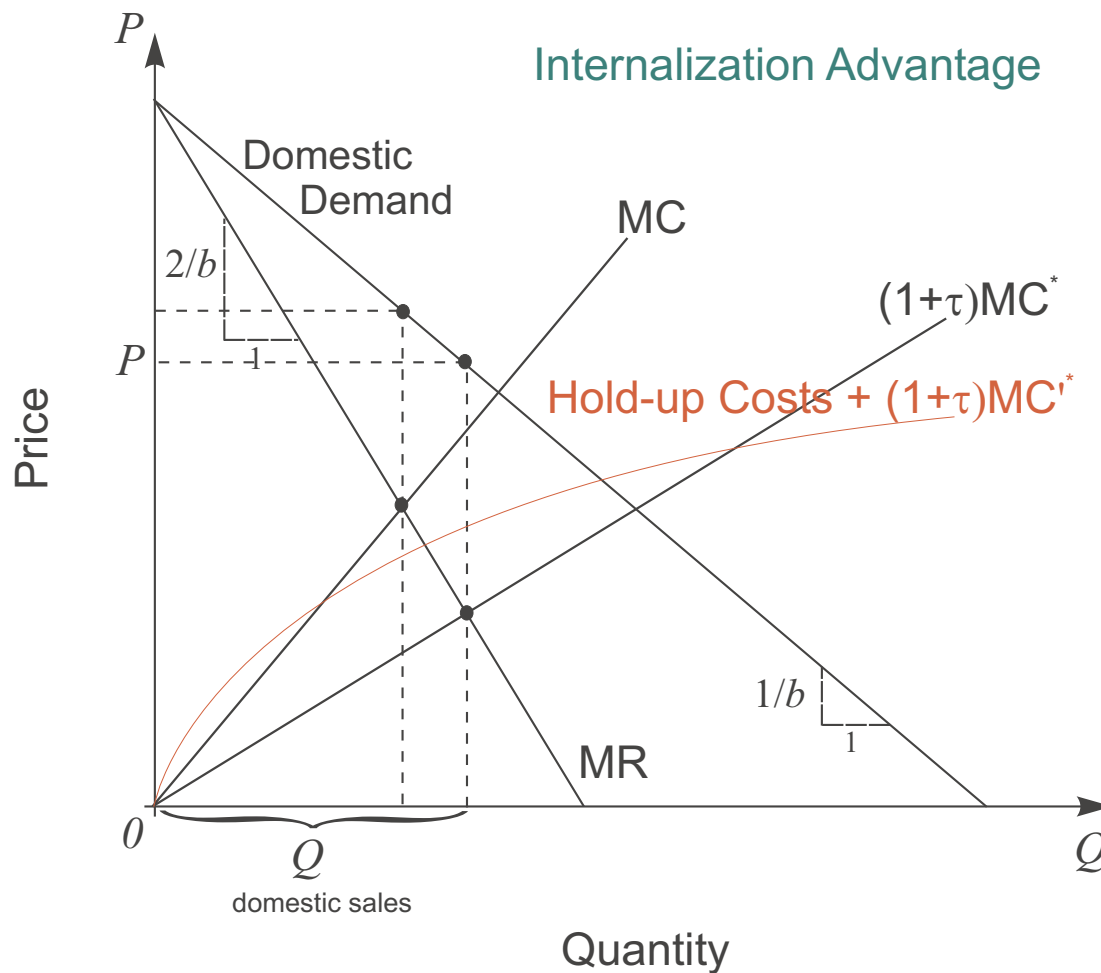
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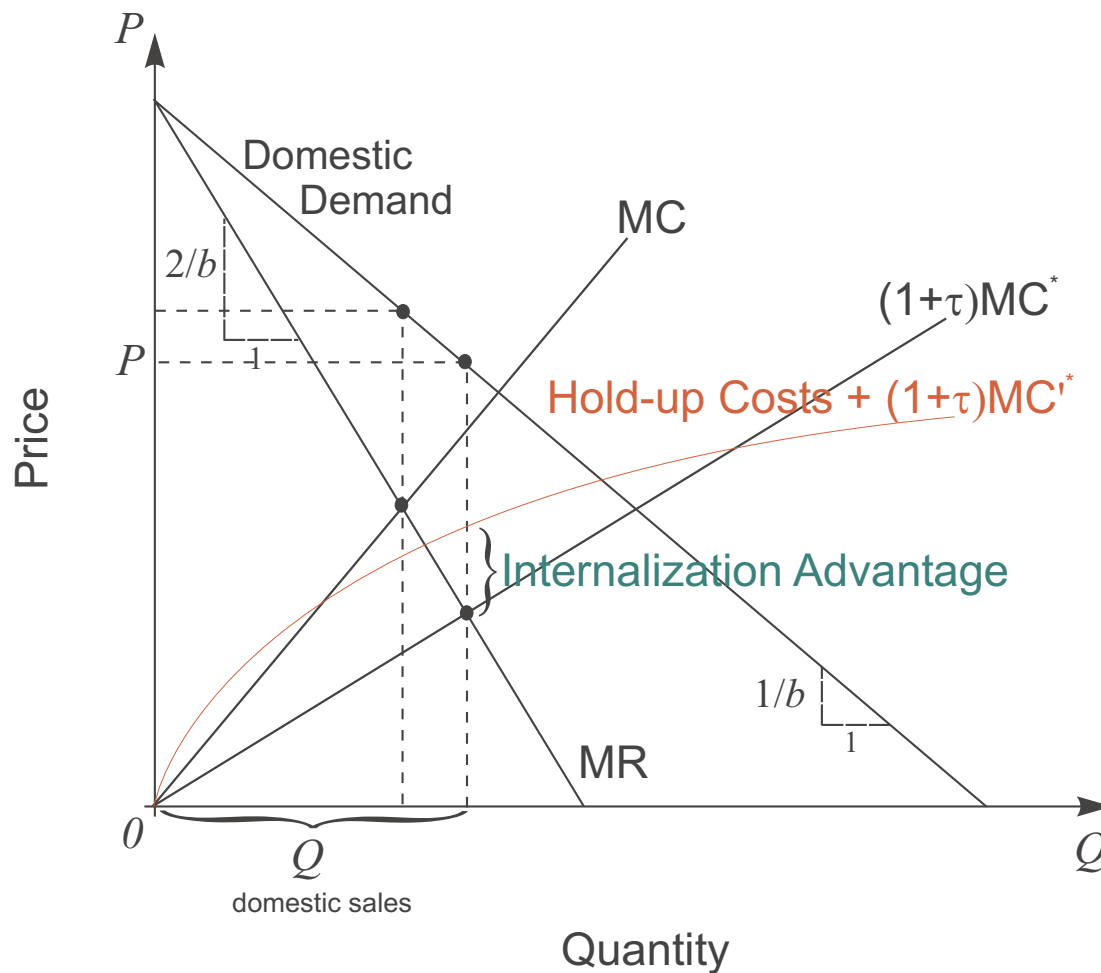
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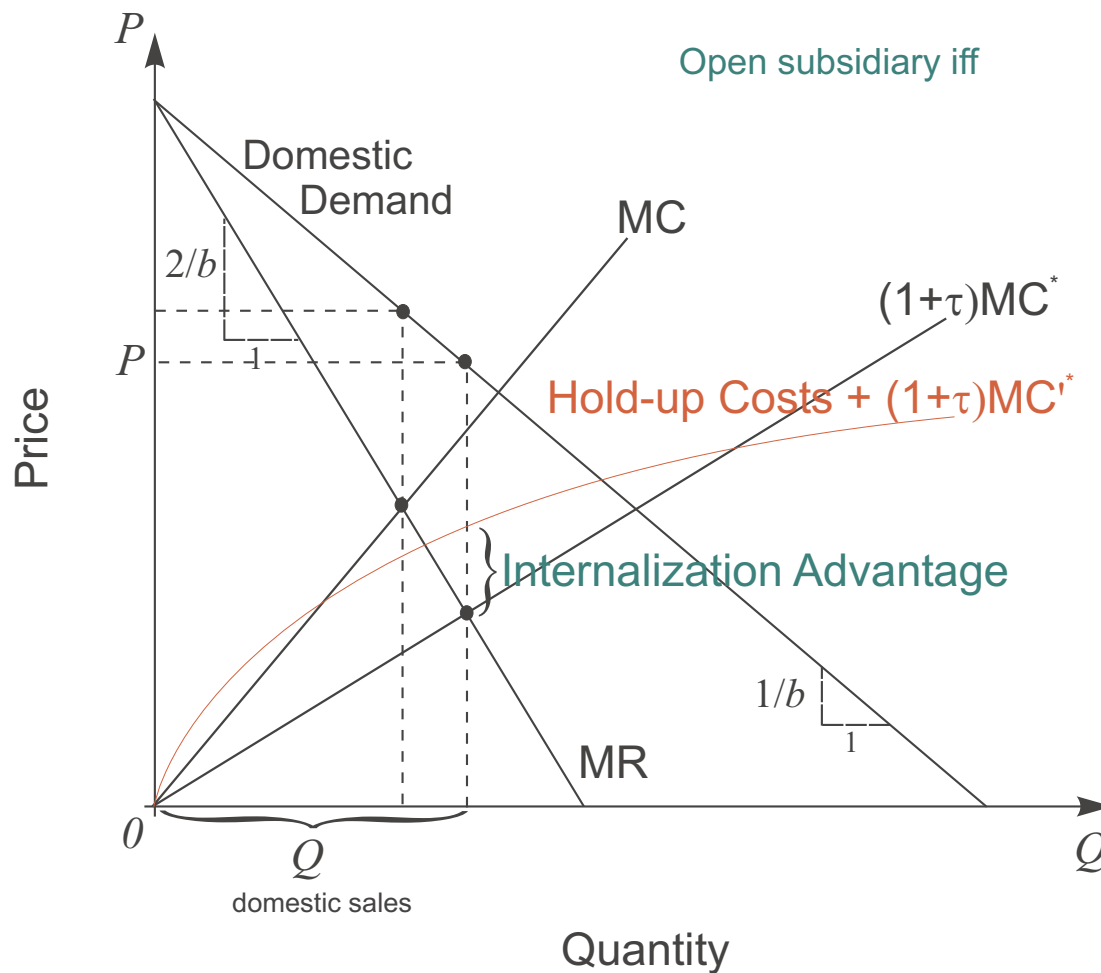
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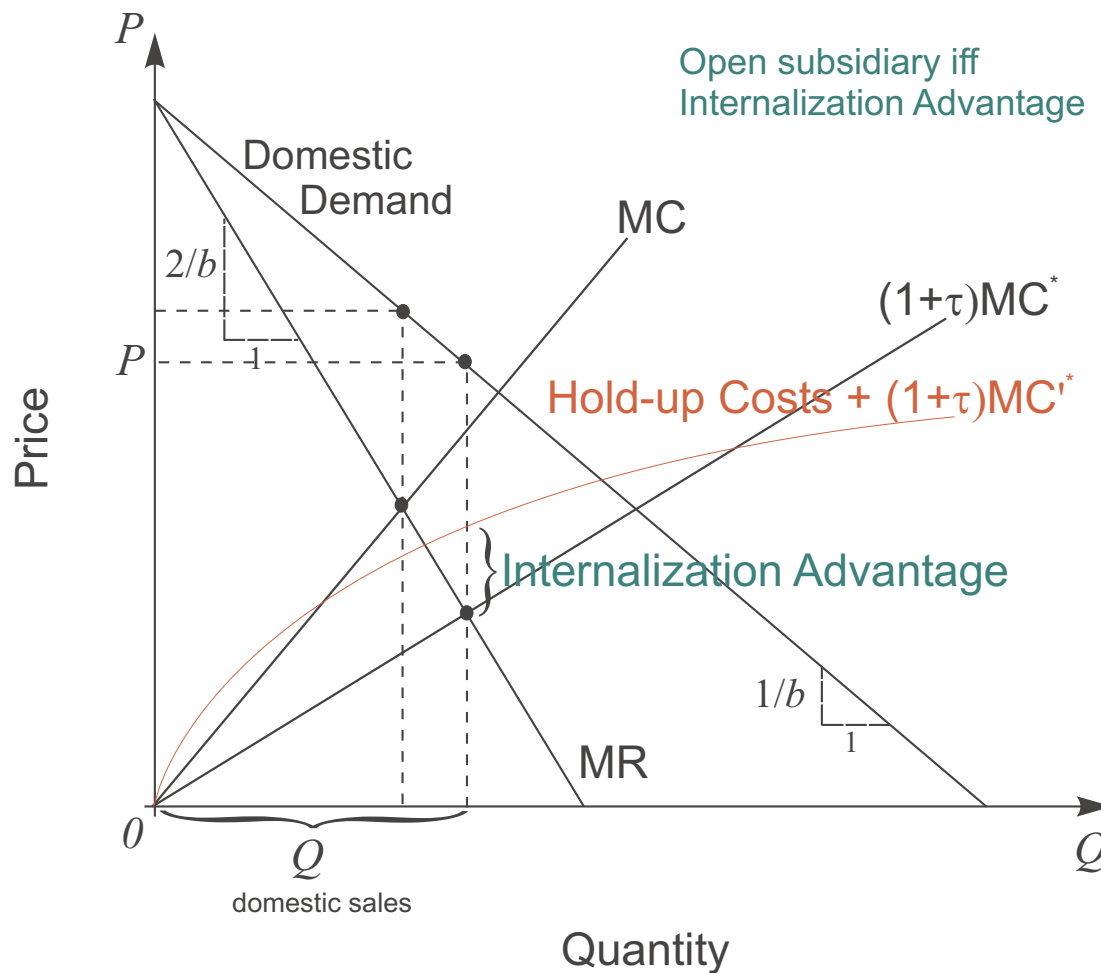
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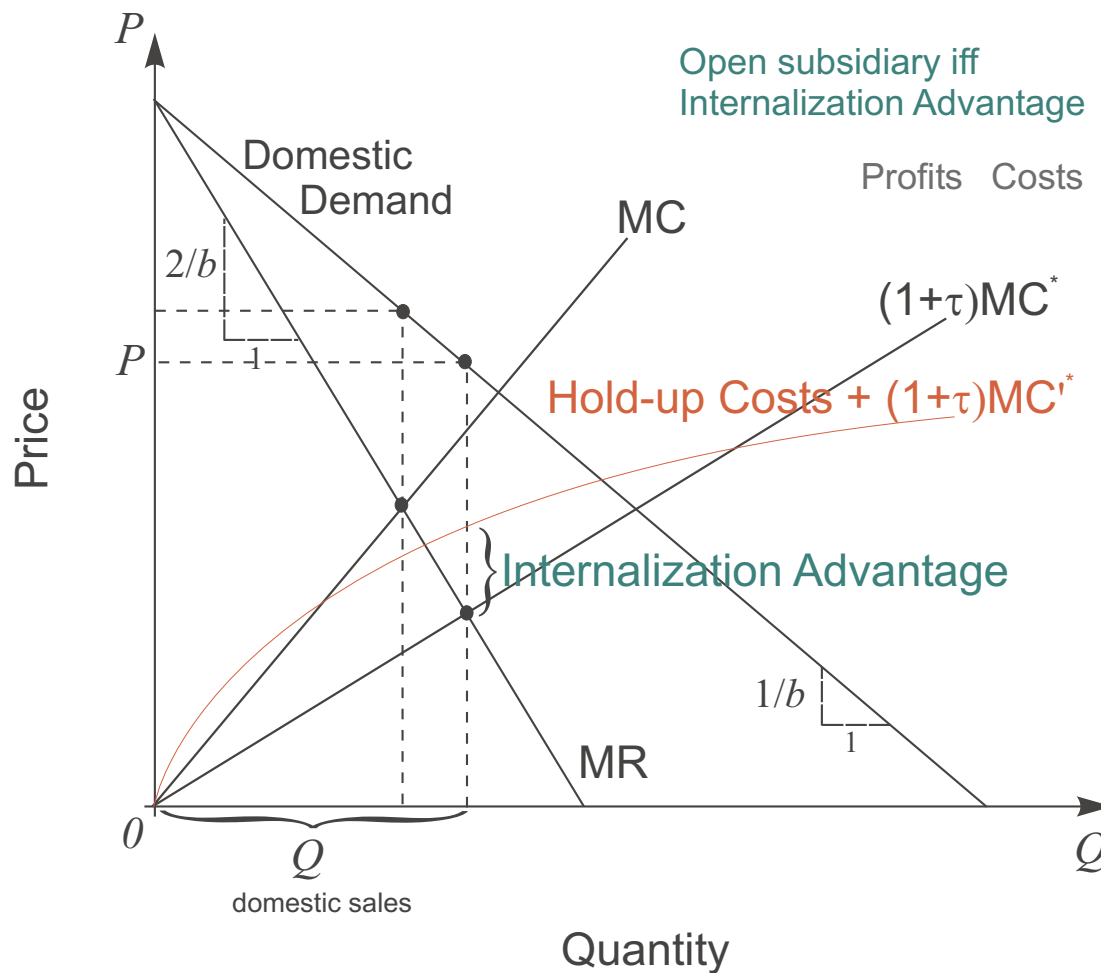
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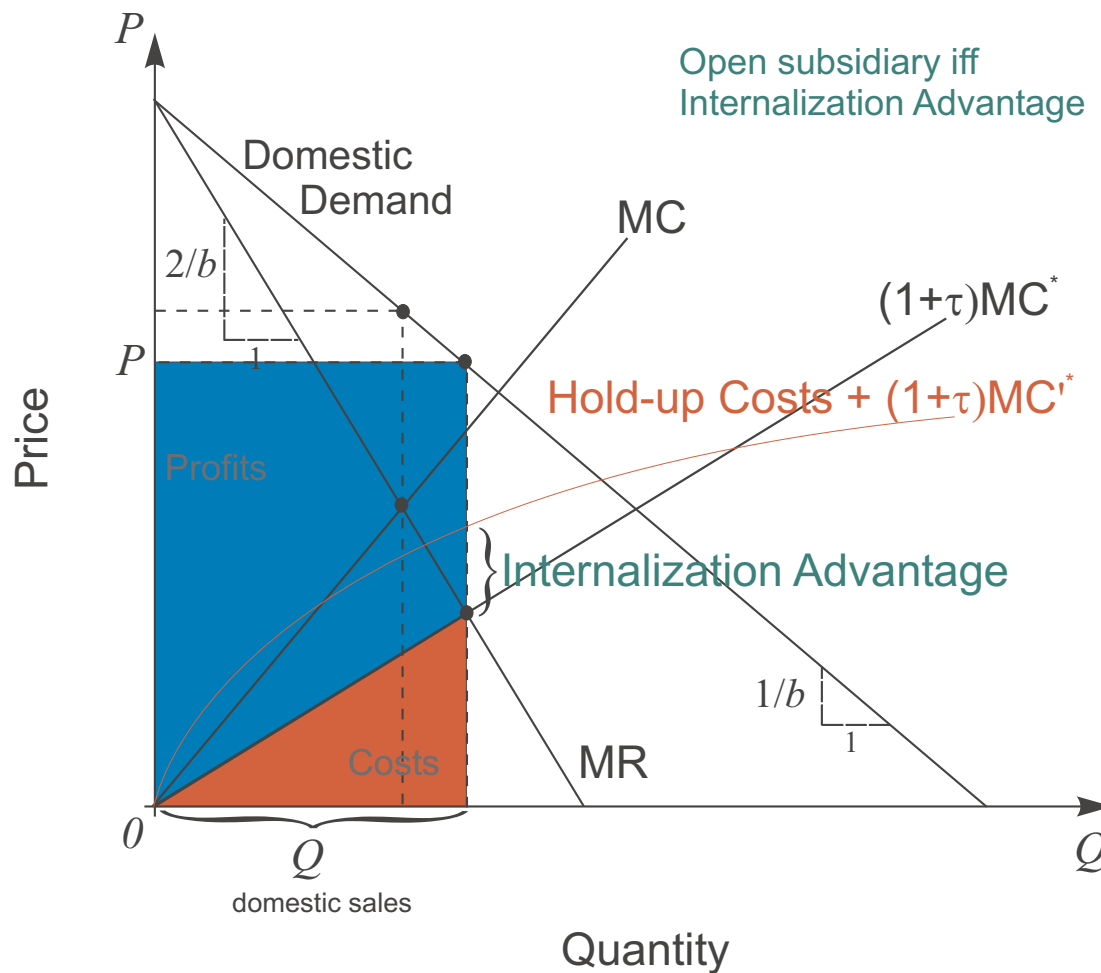
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Internalization vs. Outsourcing

- Two stylized facts: The share of U.S. intra-firm imports is significantly higher, the higher the capital-intensity of the export good.
The share of intra-firm imports is significantly higher, the higher the relative capital endowment of the export country.
- Antràs (QJE, 2003): Plug a Grossman-Hart-Moore model of the firm into a monopolistic-competition model of international trade.
- Insights: Capital intensive goods are transacted within firms, labor-intensive goods are traded at arm's length.
Capital-abundant countries specialize in capital-intensive goods.

The Hold-Up Problem Revisited

- But Grossman & Hart (JPE, 1986): Suppose final-good assemblers need specialized inputs from suppliers who face noncontractible, relationship-specific investments in capital and labor.
- Then: Ownership of suppliers gives residual rights of control to assemblers, improving assemblers' bargaining position but worsening suppliers' incentive to invest.
- Yet, if suppliers incur all investments, efficiency dictates that assemblers give up entire control. Trade should be arm's length in heavy-investment industries.

The Hold-Up Problem Once Again

- Antràs's (2003) premise: Capital expenditures $rK_x(i)$ are transferrable from the assembler to the supplier S at no charge; but labor expenditures $wL_x(i)$ are necessarily provided by the supplier S .
(Once A and S enter relationship, $K_x(i)$ and $L_x(i)$ useless elsewhere.)
- A is now subject to opportunistic behavior of S , with exposure increasing in $K_x(i)$ (capital intensive sector). *Ex ante* efficiency requires residual rights of control to A : Vertical integration.
- Transfer of capital $rK_x(i)$ *always* optimal for A if bargaining power of S low ($1 - \phi < 1/2$) so that S would never choose first best.

The Economy

- Two types of final goods in utility: $1/(1 - \alpha) > 1$

$$U = \left(\int_0^{N_Y} y(i)^\alpha di \right)^{\mu/\alpha} \left(\int_0^{N_Z} z(i)^\alpha di \right)^{(1-\mu)/\alpha}$$

- If S provides high-quality input then $y(i) = x_Y(i)$, else $y(i) = 0$.

- Intermediate-goods production: with $B \equiv \beta_Y^{-\beta_Y} (1 - \beta_Y)^{-(1-\beta_Y)}$

$$x_Y(i) = B \cdot \left(K_{x,Y}(i) \right)^{\beta_Y} \left(L_{x,Y}(i) \right)^{1-\beta_Y},$$

where $\beta_Y > \beta_Z$ (Y more capital intensive).

Some More Assumptions

- Generalized Nash Bargaining with fraction ϕ of quasi rents to A
- Bargaining also occurs after integration (Grossman & Hart (1986), Hart & Moore (1990)) but A can fire S 's manager and keep what has been produced so far.

If A could appropriate $x_Y(i)$ under integration, S always chooses no quality. So, A can only appropriate $\delta x_Y(i)$ with $\delta < 1$.

- S incurs a fixed cost $F = f r^{\beta_Y} w^{1-\beta_Y}$ and partly shares it with A .
- Upon entry, S makes lump-sum transfer $T_Y(i)$ to A

Solution for Integrated A - S Pair

- If bargaining fails, A can only sell $\delta y(i)$, resulting in a fraction δ^α of (agreement) revenues. Quasi rents $(1 - \delta^\alpha)p_Y(i)y(i)$ go to A (share ϕ) and S (share $1 - \phi$).

- A maximizes (with respect to $K_{x,Y}(i)$)

$$[\delta^\alpha + \phi(1 - \delta^\alpha)] p_Y(i)y(i) - rK_{x,Y}(i),$$

and S simultaneously chooses $L_{x,Y}$.

- In equilibrium, $\bar{p}_Y = \bar{m} \cdot r^{\beta_Y} w^{1-\beta_Y}$ with markup \bar{m} , and profits $\bar{\pi}_Y$

Solution for Nonintegrated A - S Pair

- A provides $rK_{x,Y}(i)$ for $\phi > 1/2$.
- If bargaining fails, neither A nor S have revenues. So, revenues $p_Y(i)y(i)$ are quasi rents going to A (share ϕ) and S (share $1 - \phi$).
- A maximizes (with respect to $K_{x,Y}(i)$)
$$\phi \cdot p_Y(i)y(i) - rK_{x,Y}(i),$$
and S simultaneously chooses $L_{x,Y}$.
- In equilibrium, $p_Y = m \cdot r^{\beta_Y} w^{1-\beta_Y}$ with markup m , and profits π_Y

Factor Intensity and Ownership Structure

- A chooses the ownership structure to maximize profits.

The profit ratio $\bar{\pi}_k/\pi_k$ is a strictly increasing function of β_k ($k = Y, Z$)

- **Proposition.** There is a unique threshold capital intensity $\hat{\beta}$ such that all firms with $\beta_k < \hat{\beta}$ ($k = Y, Z$) outsource and all firms with $\beta_k > \hat{\beta}$ vertically integrate.
- **Intuition.** Grossman & Hart (1986) idea. If x production is capital intensive, investment of A relatively large and optimal assignment of residual rights is to A in order to alleviate underinvestment in K .

Closing the Model

- Industry equilibrium: Determine number of A - S pairs N_k under the two scenarios, outsourcing and integration
- General equilibrium in closed economy: Expenditure is income $E = rK + wL$, all factors employed
- World-trade equilibrium: Factor price equalization, final goods not tradeable. Factor endowments determine trade pattern.
- *Proposition.* Intra-firm imports increase in the size of trading countries and in the capital-labor ratio of the exporting country.

Summary Remarks

- The choice of opening foreign affiliates depends on factor endowments and contractual conditions
- The rapid expansion of MNEs may be an explanatory factor for increasing trade volumes because MNEs resolve transaction problems
- Intra-firm trade may explain the more than proportional increase in trade relative to world income
- FDI is a costly but resilient form of international capital

Outlook: The Consequences of MNE Formation

- The formation and operation of MNEs has consequences for the domestic economy, especially labor markets
- **Questions.** How sensitive is labor demand across locations to varying local conditions, especially wage differentials? Do MNEs save or cut jobs in their home markets?
- **Methods.** How to model the formation and operation of MNEs empirically? How to compare MNEs and non-MNEs?
- **Results.** MNEs matter, but answers depend on the questions.