Production Location of Multinational Firms under Transfer Pricing: The Impact of the Arm's Length Principle

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- Consider two countries with different tax rates.

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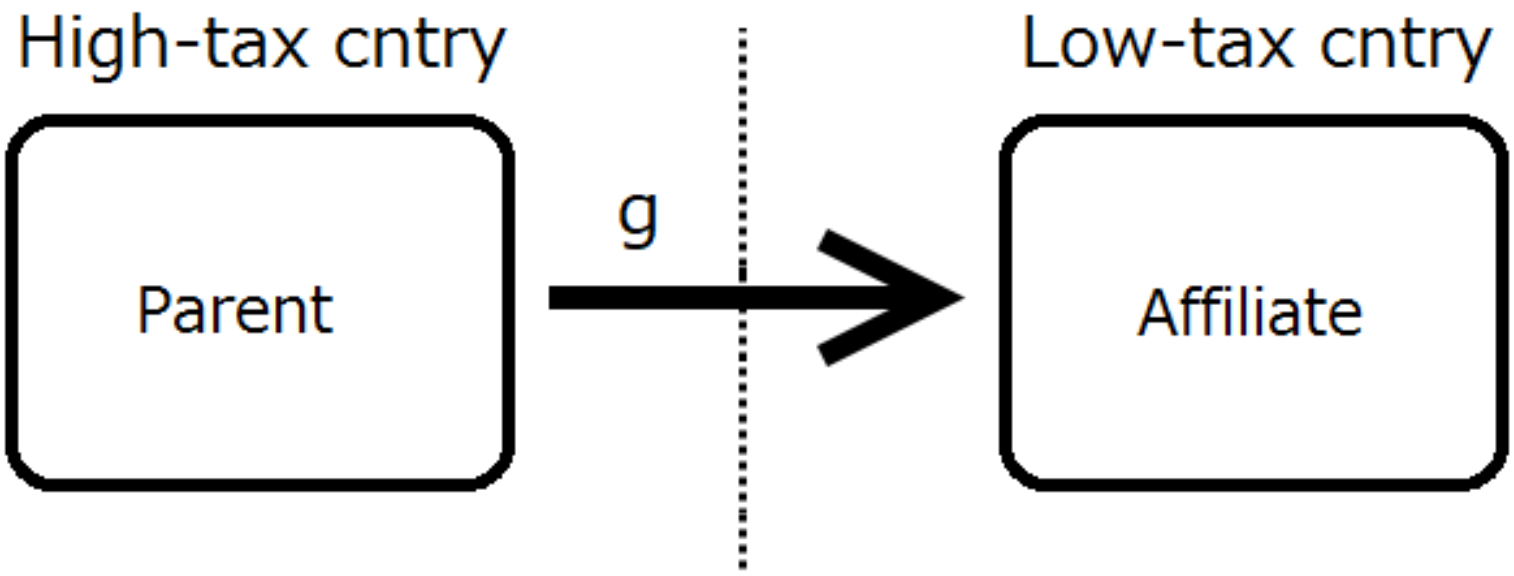
→ MNEs can internationally shift profits between affiliates by manipulating intra-firm prices (**transfer prices**).

Transfer pricing

- MNEs use transfer pricing to avoid tax payments.



Low transfer price: $g \downarrow$

$\rightarrow$ Parent's pre-tax profit $\downarrow$; Affiliate's pre-tax profit $\uparrow$

$\rightarrow$ Global **post-tax** profit $\uparrow$

Location choice under transfer pricing

- MNEs may locate some plants/affiliates in high-tax counties for tax-manipulation motives.

Q1. **In what situations do MNEs choose co-location/separate location?**

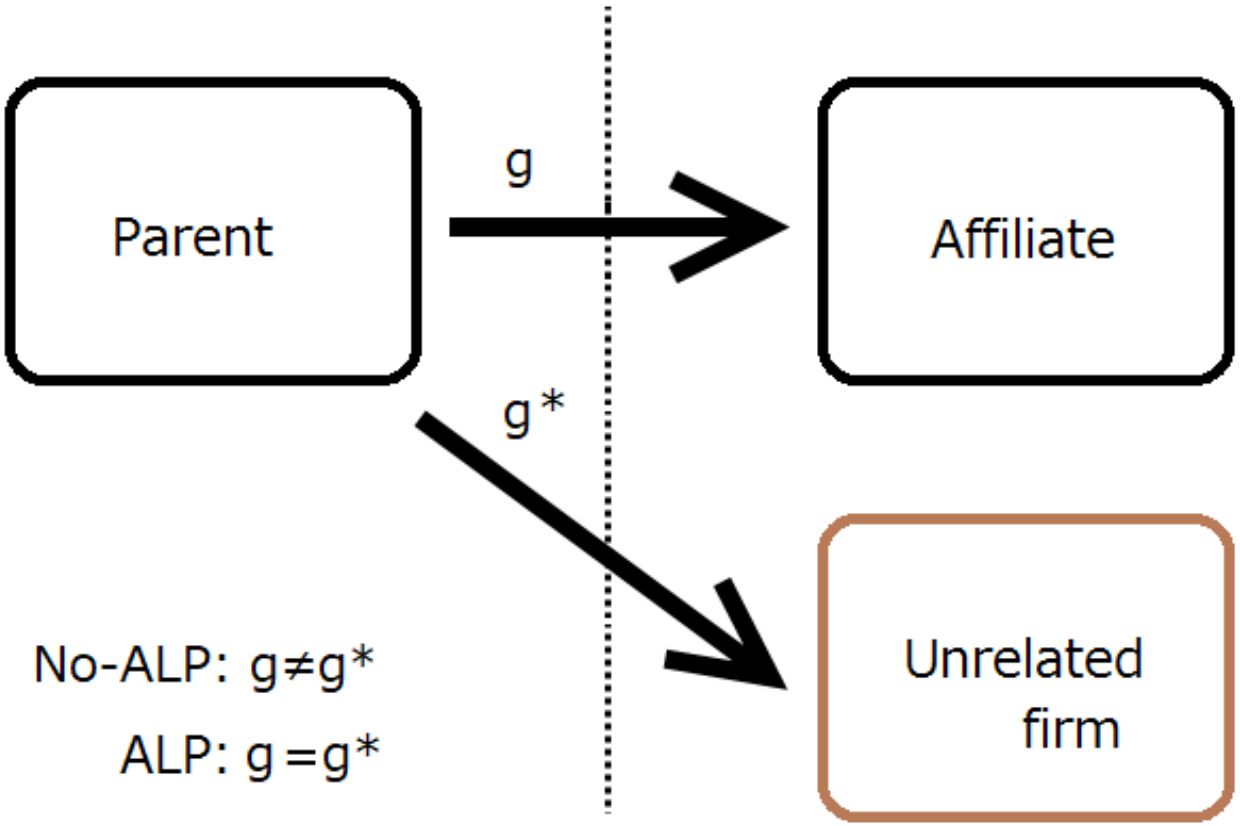
Global attention

- The OECD has launched a project to discuss international measures to prevent tax evasions of MNEs ("Base Erosion and Profit Shifting").
- Revenue losses from tax evasions of MNEs are estimated at from 4-10% of global corporate income tax revenues.

Arm's Length Principle (ALP)

- MNEs are supposed to follow the Arm's Length Principle (ALP).

→ Upstream affiliates should set the same price for both related and unrelated downstream firms.



Arm's Length Principle (ALP)

Q2. **How does the imposition of ALP affect MNEs' location decisions?**

Q3. **Does ALP increase tax revenues?**

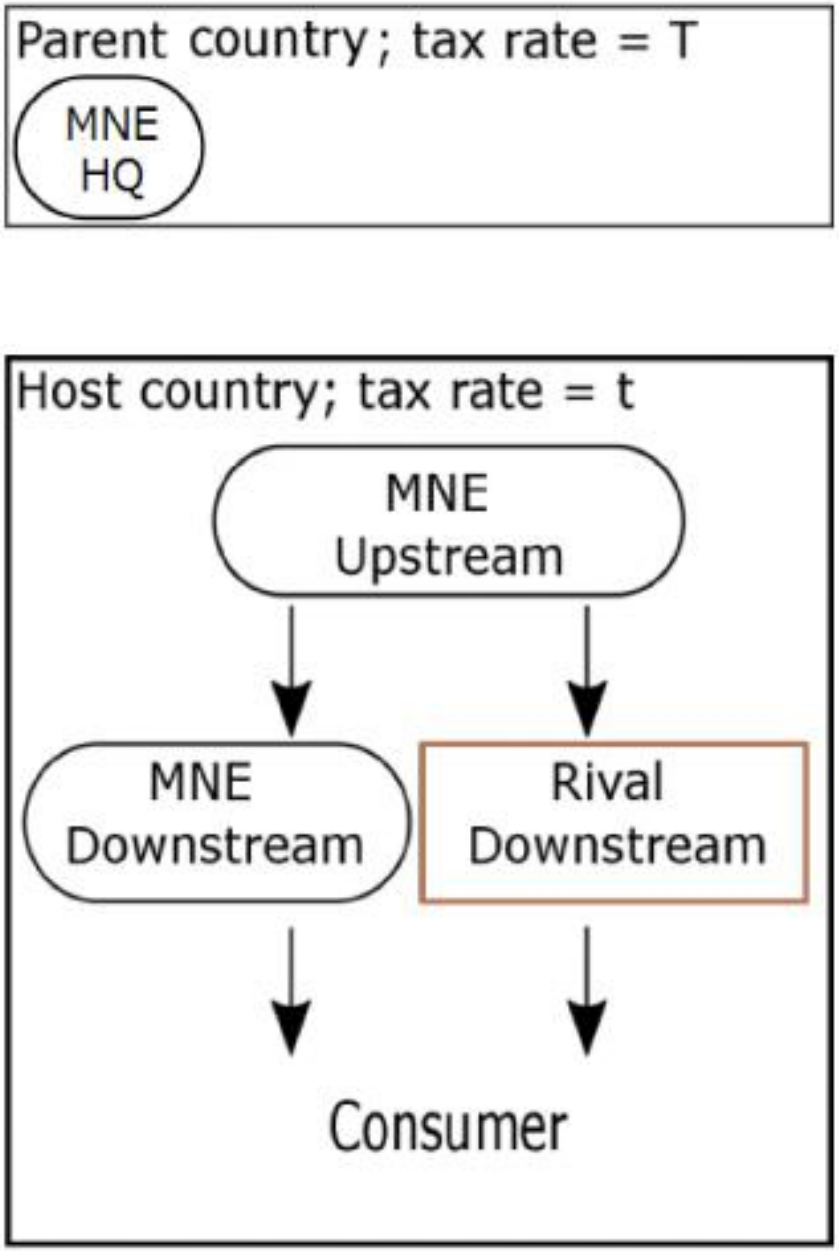
Related literature

- ▷ Empirics.
  - Swenson (2001: NTJ); Clausing (2003: JPubE); Bernard, Jensen and Schott (2006: NBER)
- ▷ Earlier studies on transfer pricing.
  - Schjelderup and Søgard (1997: ITAX); Haufler and Schjelderup (2000: OEP); Nielsen, Raimondos and Schjelderup (2003, 2008: JPET)
- ▷ Transfer pricing and ALP without location choice.
  - Bauer and Langenmayr (2013: JIE); Egger and Seidel (2013: EER); Choi, Furusawa and Ishikawa (2017)
- ▷ Location choice (tax competition) without transfer pricing/ ALP.
  - Haufler and Wooton (1999: JPubE); Ma and Raimondos (2015)

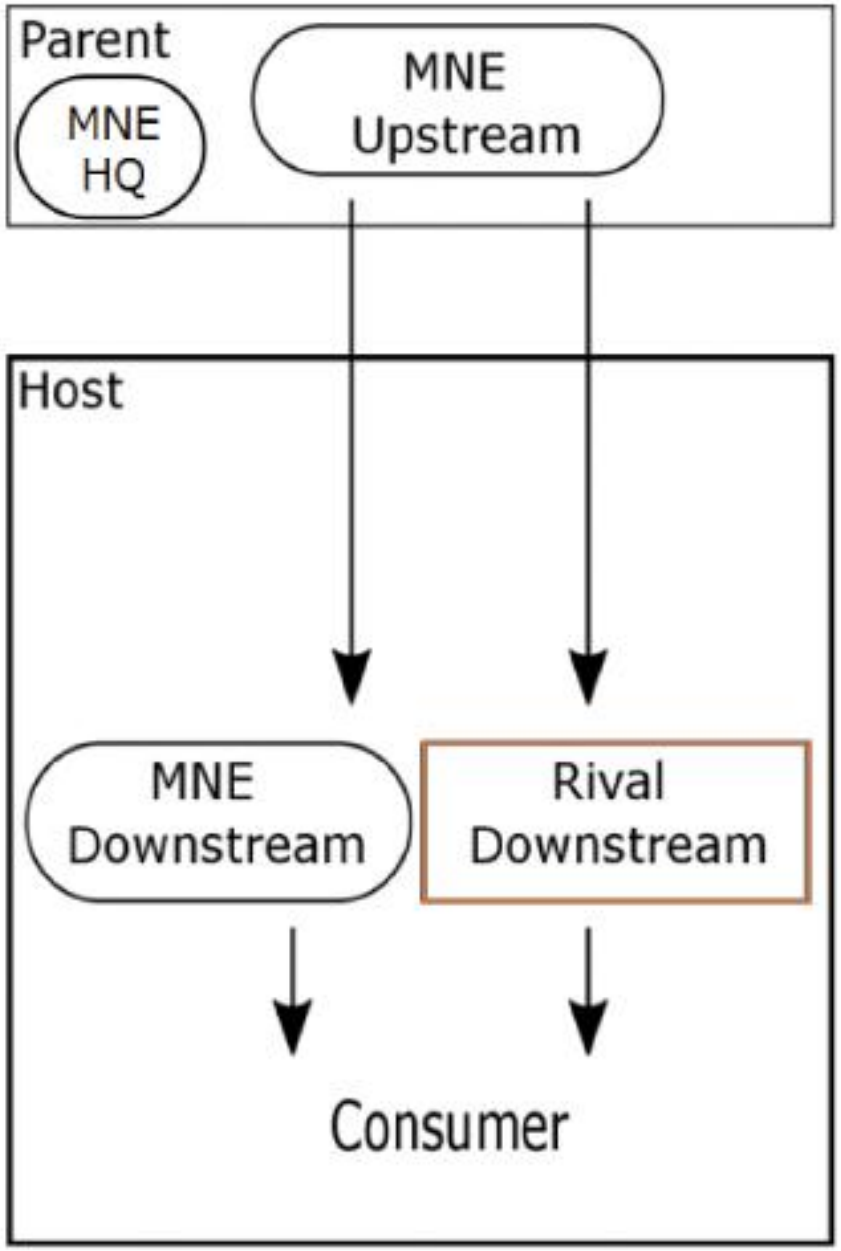
□ Our contribution: **location choice + transfer pricing + ALP.**

Setup

- Partial equilibrium model with imperfect competition.
- A downstream affiliate of a MNE is located in the host country.
- The MNE locates an upstream affiliate whether in the host (co-location) or the parent (separate location).


Parent country; tax rate = T
MNE
HQ
Host country; tax rate = t
MNE
Upstream
MNE
Downstream
Rival
Downstream
Consumer

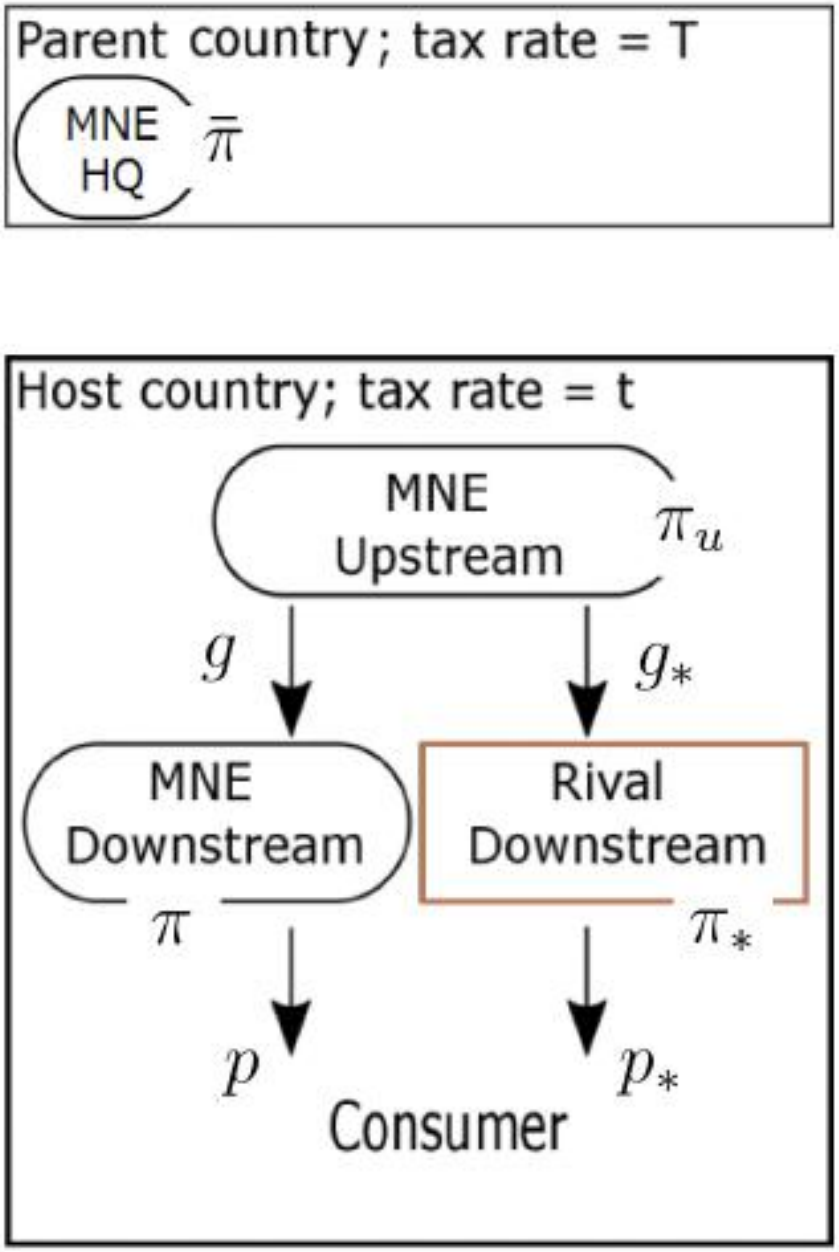
Co-location



Separate location

Benchmark case (no ALP)

(= **Different** input prices between the D affiliate and the local rival)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Host country; tax rate = t
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π_u
g
g_*
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Rival
Downstream
π
π_*
p
p_*
Consumer

Co-location

Scheme 1: Co-location

- Pre-tax profits of the D affiliate and the local rival:

$$\pi = (p - g)q,$$
$$\pi_* = (p_* - g_*)q_*.$$

- Post-tax profit of the MNE:

$$\Pi = \underbrace{(1 - T)\bar{\pi}}_{\text{Parent}} + \underbrace{(1 - t)(\pi_u + \pi)}_{\text{Host}},$$

$$\text{where} \quad \pi_u \equiv (\text{Pre-tax profit of the U affiliate})$$
$$= (g - c)q + (g_* - c)q_*.$$

- One-to-one transformation from inputs to final goods.
- $\bar{\pi}$: exogenous profit in the parent.

Co-location scheme: Equilibrium

- Input prices:

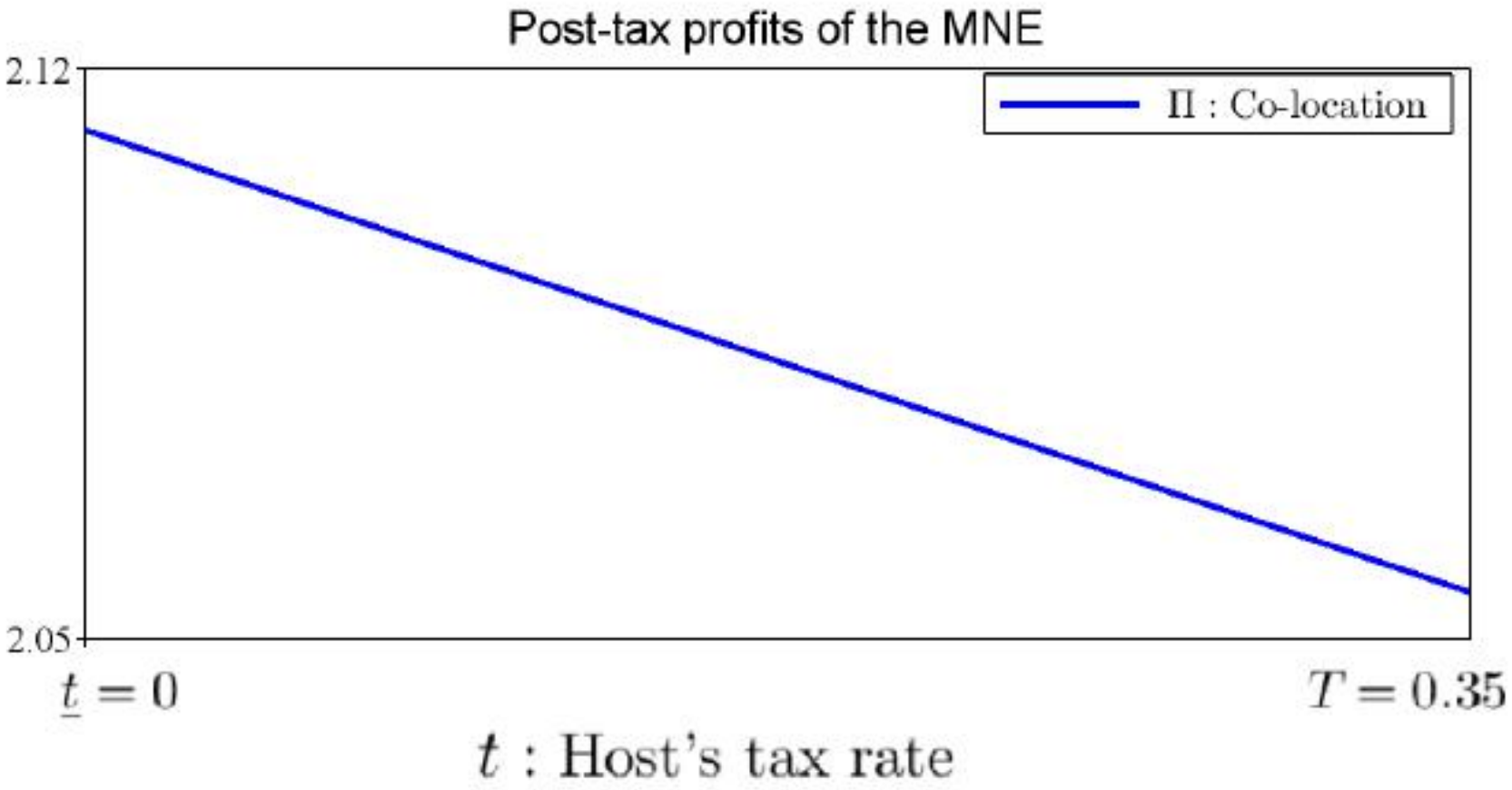
$$g = \frac{1+c}{2} \underbrace{-\frac{(2-b)(1-c)}{2(2-b^2)}}_{Strategic\ \ effect},$$

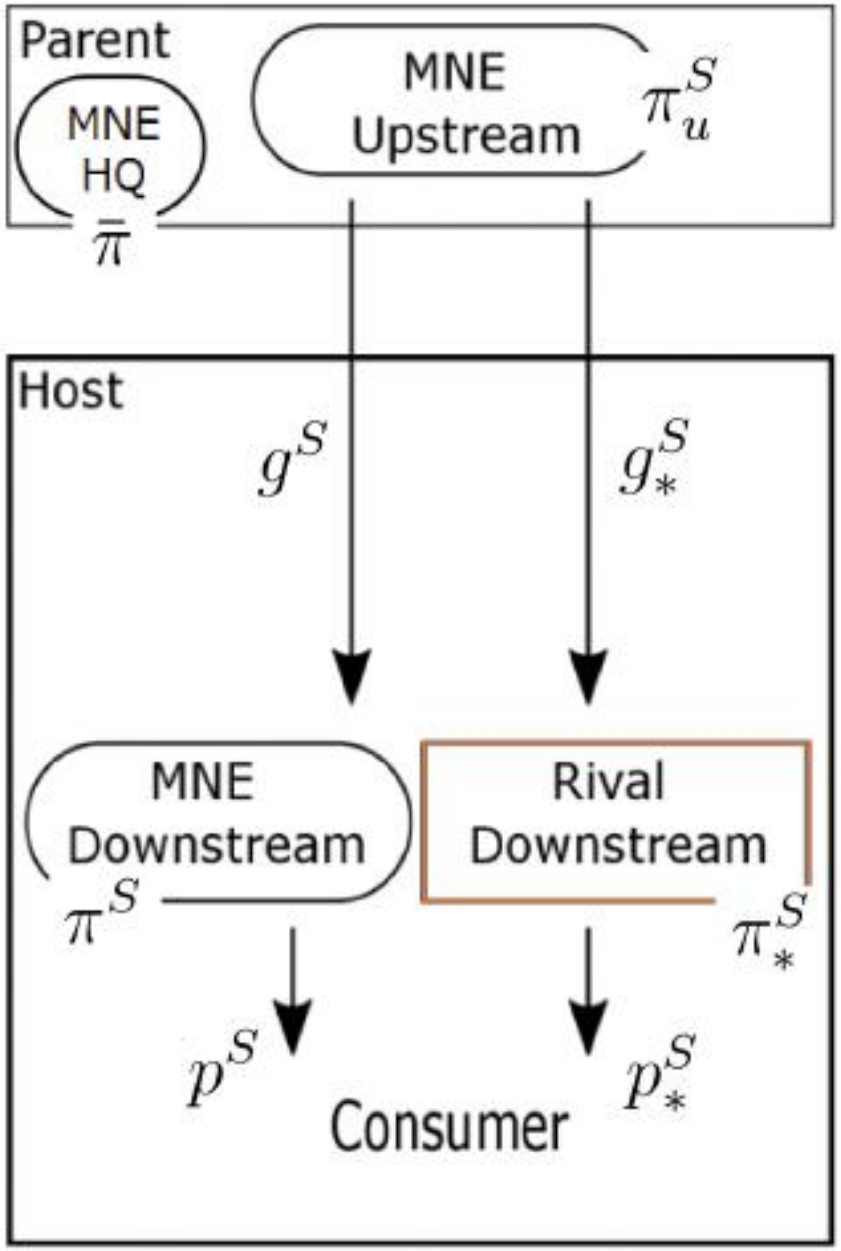
$$g_* = \frac{1+c}{2}.$$

b: (inversed) measure of product differentiation.

- $g < g_*$ because of **strategic effect**: input prices are set so as to make the D affiliate competitive.

Co-location scheme: Post-tax profit





Separate location

Separate-location scheme: Equilibrium

- Input prices

$$g^S = \underbrace{\frac{1+c}{2} - \frac{(2-b)(1-c)}{2(2-b^2)}}_{=g} + \underbrace{\frac{(2-b)^2(2+b)(1-c)\boldsymbol{(t-T)}}{2(2-b^2)[2t-(4-b^2)T+2-b^2]}}_{Tax-manipulation\ \ effect},$$

$$g_*^S = \frac{1+c}{2}\ (> g^S).$$

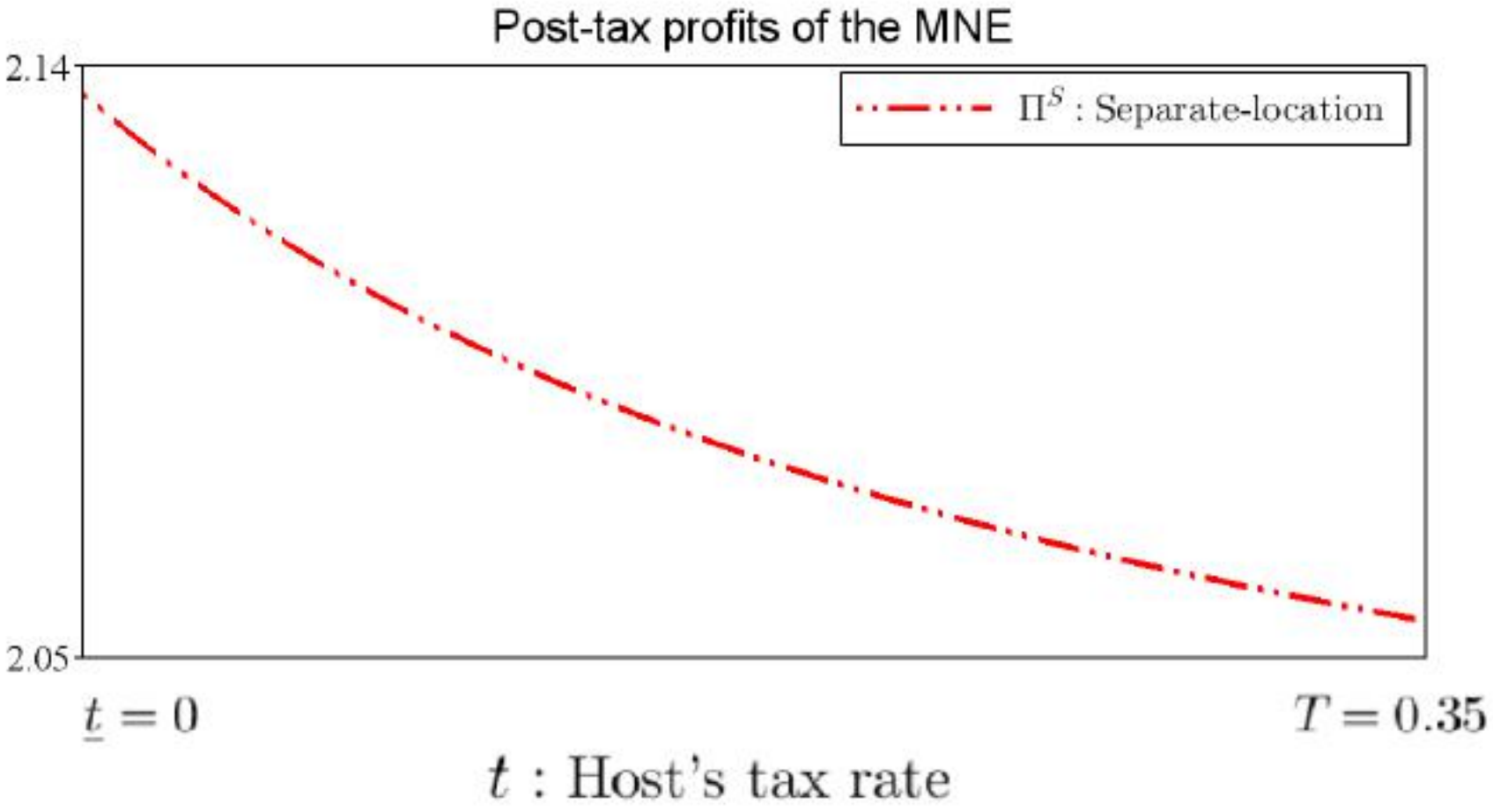
- $t < T \ \rightarrow$ **Tax-manipulation effect** is negative.

$\rightarrow$ The MNE shifts profits from the U affiliate in the parent to the D affiliate in the host.

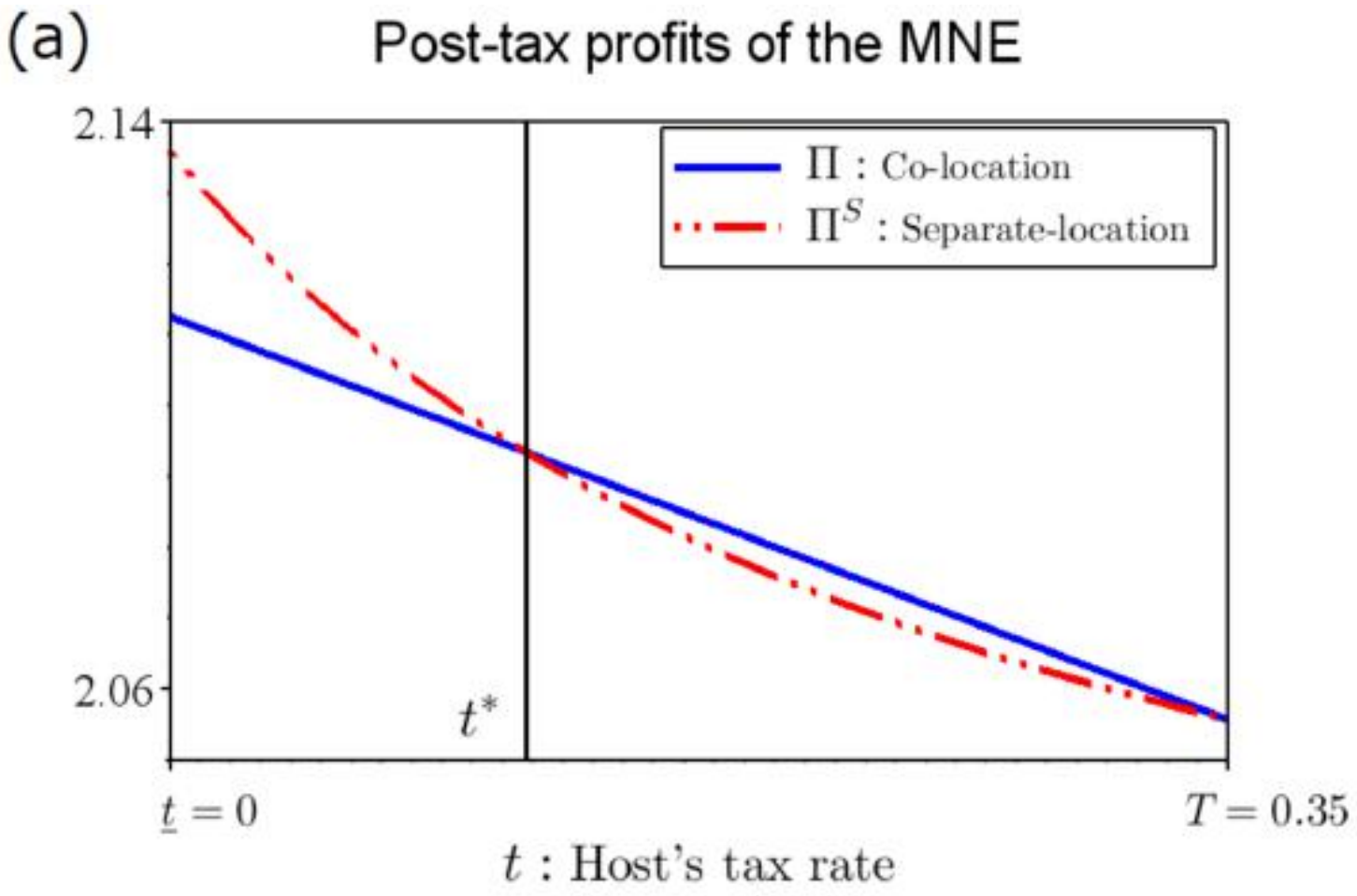
$\rightarrow$ g^S gets lower as the tax difference is larger.

Empirically supported by Clausing (2003: JPubE).

Separate-location scheme: Post-tax profit



Equilibrium location choice



- If parent's tax rate T is high enough: $T > \overline{T} \equiv \frac{b^3-2b^2+1}{b^3-2b^2-2b+4}$.
- U locates in the parent if $\Pi < \Pi^S$ while in the host otherwise.

Empirical implications

- Taxes as a determinant of bilateral FDI flow from country j to i:

$$FDI_{ij} = \beta_0 + \beta_1(Tax_i - Tax_j) + X\beta + u_{ij}.$$

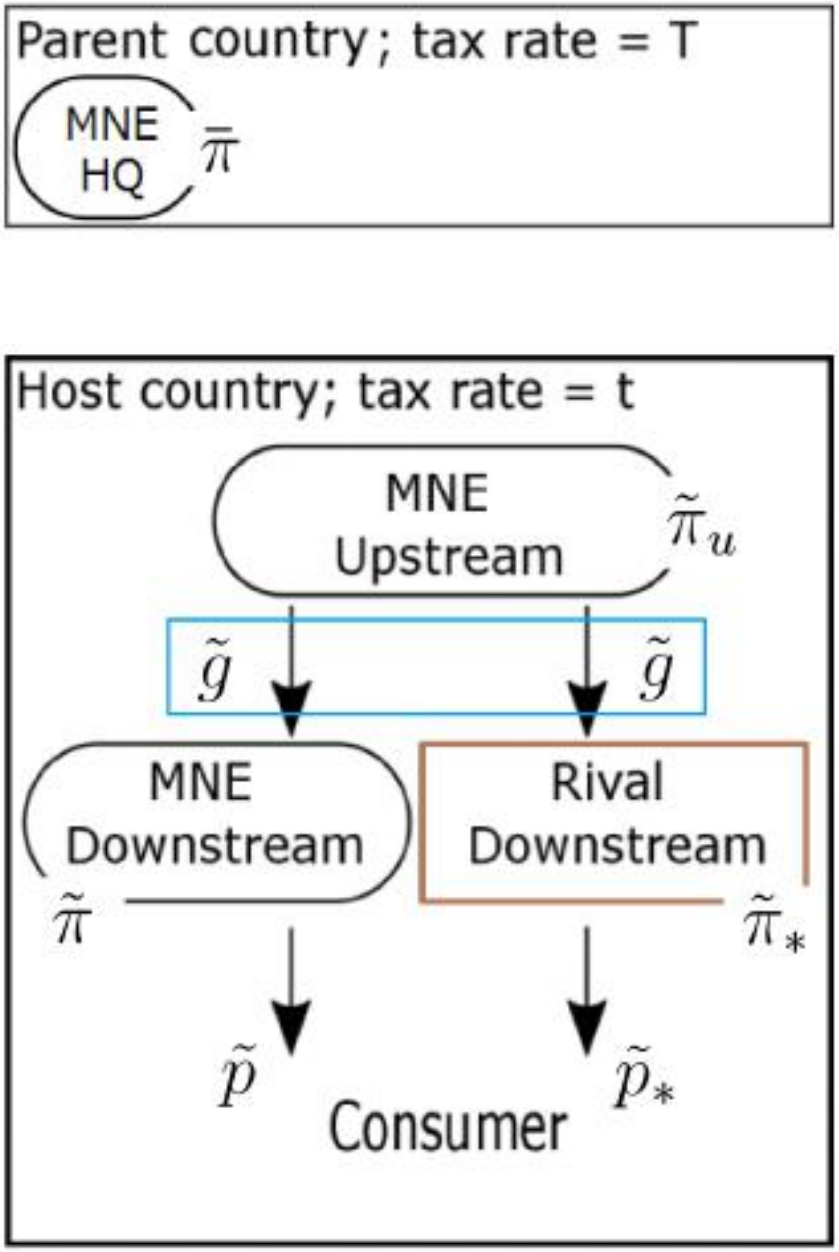
- Lower taxes are supposed to attract more FDI: $\beta_1 < 0$.

- Empirical studies report mixed estimates of β_1 (a survey by Blonigen 2005).

- Our story suggests that if the tax difference is huge, one may get $\beta_1 > 0$.

Arm's Length Principle (ALP) case

(= **Same** input prices between the D affiliate and the local rival)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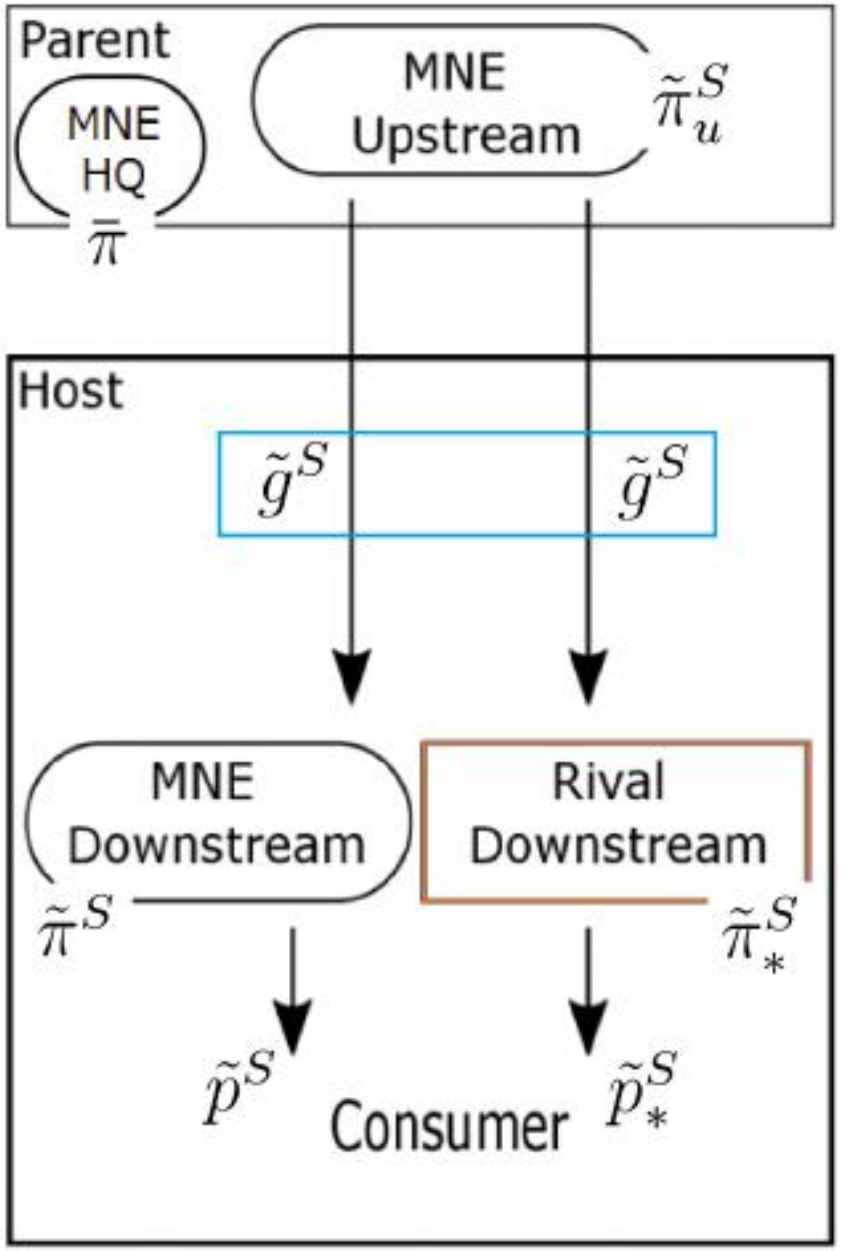


Separate location

Equilibrium quantity and price under ALP

- Co-location scheme:

$$\tilde{g} = \frac{1+c}{2} - \frac{1-c}{2(3+2b)}$$

- Separate-location scheme:

$$\tilde{g}^S = \underbrace{\frac{1+c}{2} - \frac{1-c}{2(3+2b)}}_{=\tilde{g}} + \frac{(1-c)(2+b)\boldsymbol{(t-T)}}{(3+2b)[t-2(2+b)T+3+2b]}$$

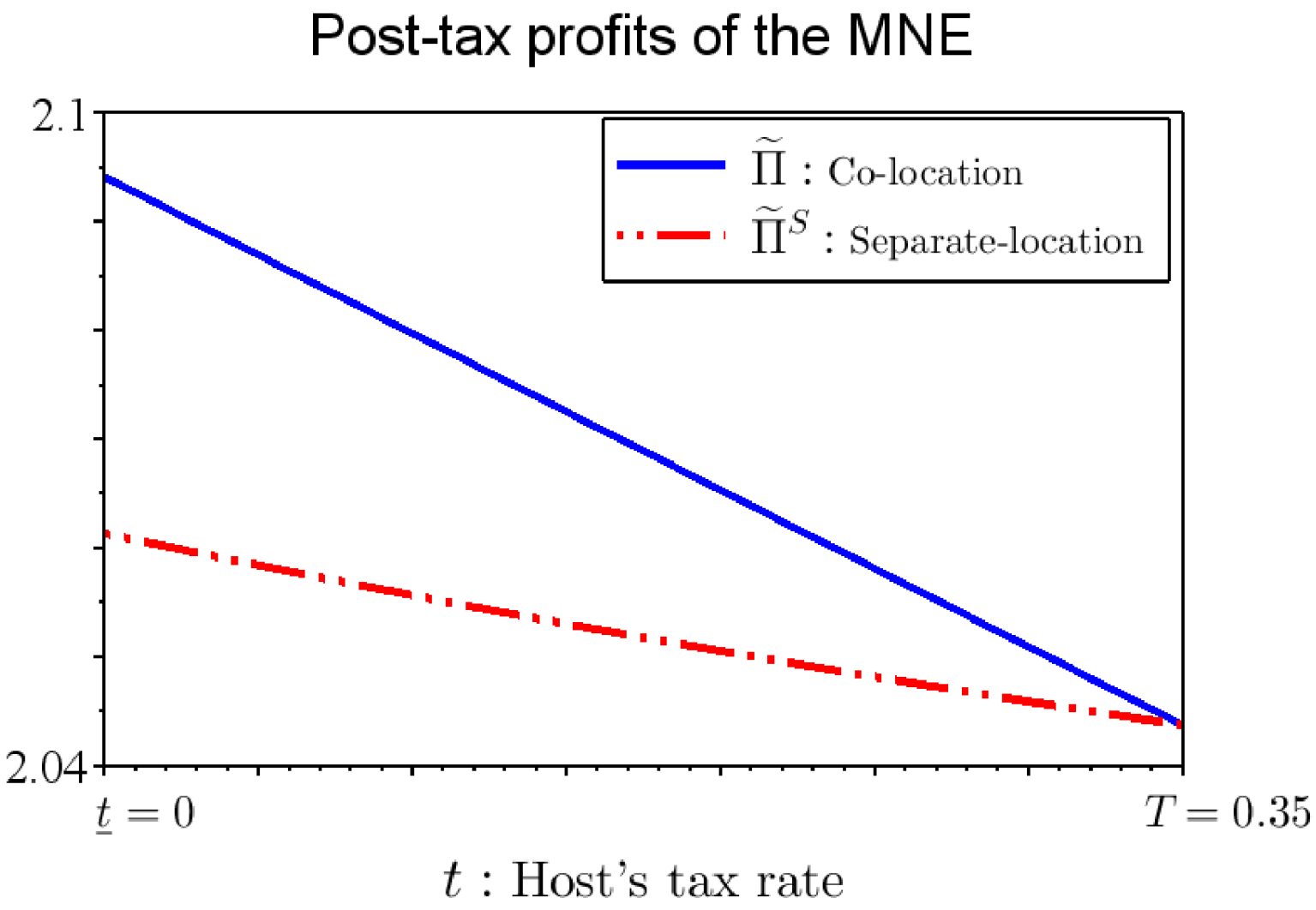
Comparison of input prices

- Benchmark case (no ALP):
- Arm's Length price for rivals $\Uparrow$ $\because$ market power.
- Internal/transfer price for D affiliates $\Downarrow$ $\because$ strategic and tax-manipulation effects.

- With ALP, these two prices must be identical.
- Given the location, it holds that

  (transfer price) $<$ (price under ALP) $<$ (Arm's length price).

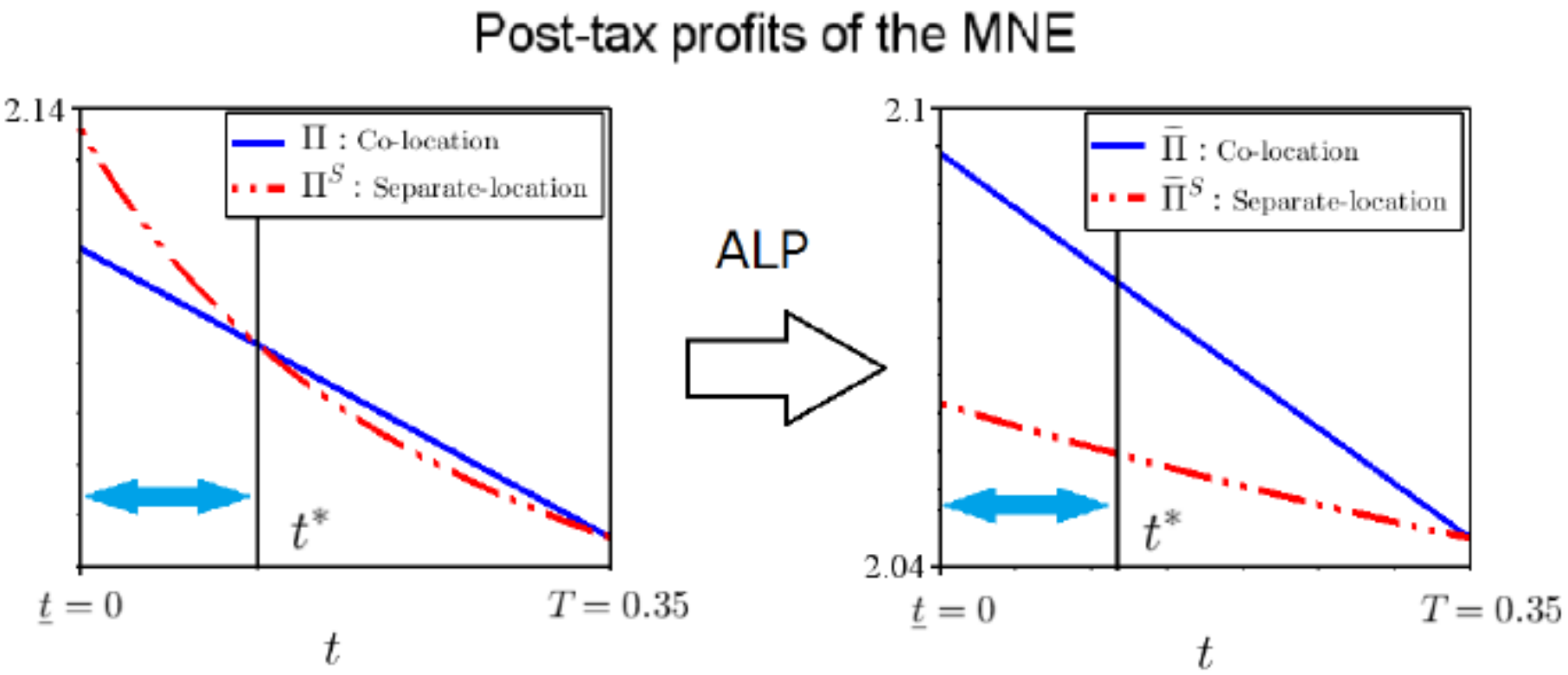
Equilibrium location under ALP



- U **always** locates in the low-tax host (co-location).

Tax revenues

- Before ALP $\rightarrow$ Separate location $=$ U affiliate in the parent.
- After ALP $\rightarrow$ Co-location $=$ U affiliate in the host.



- Does this location change lead to greater tax revenues?

Tax revenues in the host

- By imposing ALP, the host attracts the U affiliate.
- Upstream profit $\Uparrow \rightarrow$ tax revenues in the host $\Uparrow$.

- Because of no tax manipulation and strategic effects, the transfer price becomes higher, making the D affiliate less competitive.
- Downstream profit $\Downarrow \rightarrow$ tax revenues in the host $\Downarrow$.

- As the negative effect dominates, ALP decreases tax revenues in the host.

Tax revenues in the world

- Global tax revenues = Tax revenues in the host and the parent.
- Without ALP, the U affiliate sets a too low transfer price to obtain positive profits.

  Negative profits are covered by profits from other business.
- With ALP, the U affiliate gets positive profits.
- ALP in general increases global tax revenues.

Conclusion

Q1. Location choice.

A. If the international tax difference is **large**, the separate location is chosen.

Q2. The impact of ALP.

A. The introduction of ALP may **change** location patterns.

Q3. Tax revenues.

A. Location change induced by ALP **decreases** revenues in the host, but **increases** in the world.

Thank you for your attention !