Profit Shifting and Equilibrium Principles of International Taxation

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Summary

- All countries use source-based corporate taxes.
- But destination-based taxes are considered superior.
- Which tax system is an equilibrium (in terms of tax revenue) ?
  - Source-based taxation when corporate revenues are large
  - Destination-based taxation when corporate revenues are small

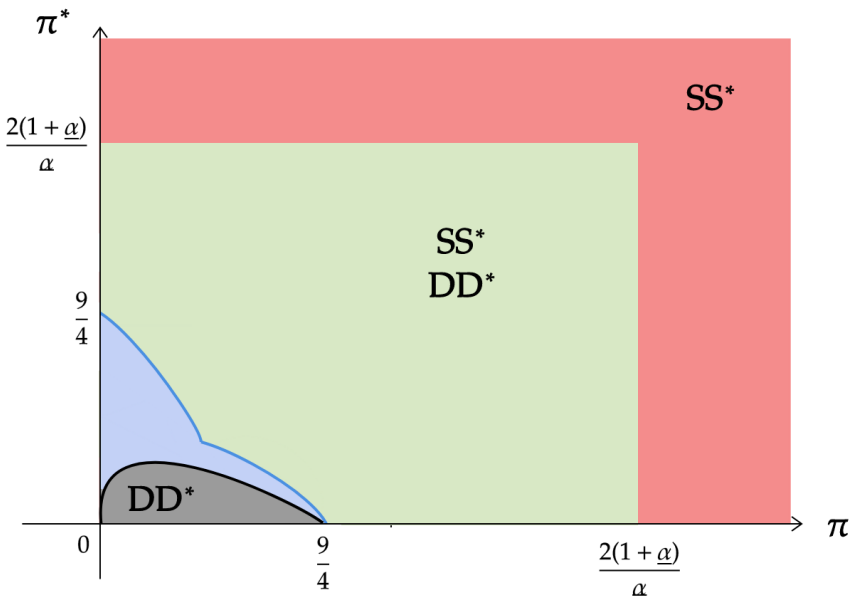


Figure: Equilibrium

Model set-up:

2 country-model with MNF.

Countries endogenously choose tax rates, tax principles and enforcement levels.

Firms choose their transfer prices.

Further details $\longrightarrow$

Introduction

- Multinational Firms (MNF) choose where to locate their profits to reduce their tax liability.
- They are subject to a tax policy composed of:

  $\Rightarrow$ A tax system:
  - Source-based: profits are taxed where goods are produced
  - Destination-based: profits are taxed where goods are sold

  $\Rightarrow$ A statutory tax rate

  $\Rightarrow$ A tax enforcement level: the degree of profit shifting monitoring

Introduction

- Destination-based (DB) taxes are considered optimal.
  Lockwood (2001), Keen-Wildasin (2004)
- However, all countries currently use source-based taxation.
- Puzzle: Why would governments choose a suboptimal tax system?

This paper endogenizes:

- the tax rate response of governments
- the tax enforcement response of governments
- the profit shifting response of firms

to investigate the conditions under which source-based taxes can be a Nash equilibrium. Literature

The model - Governments

Governments

- 2 countries, 1 MNF headquartered in each country (extension with many firms in the paper)
- Governments choose between source-based taxes and destination-based taxes
- They can also decide on their revenue-maximizing tax rate τ (τ^*) and their revenue-maximizing tax enforcement level α (α^*), with $\alpha \in [\underline{\alpha}, 1], \underline{\alpha} > 0$

Firms

- Arm's length principle: transfer price q can deviate from $c = 0$
- but the MNF has to pay a "concealment cost" αq^2

Timing

Profits

MNF headquartered in Home maximizes:

$$Max_q \ \Pi = (1-\tau)(\pi - q) - D\tau q + (1 - S^*\tau^*)\, q - \alpha q^2$$

D (resp., D^*)=1 if Home (resp., Foreign) applies the destination principle, and 0 otherwise.
$S = 1 - D$, and $S^* = 1 - D^*$

$(1-\tau)(\pi - q)$: net-of-tax profit of the Parent firm in Home
$D\tau q$: Border adjustment tax that applies if Home uses the destination principle
$(1 - S^*\tau^*)q$: profit of the affiliate q taxed in Foreign only if Foreign uses the source principle

Model

Transfer pricing

Impact of the choice of the tax principle on profit shifting:

- When both countries use the source principle, profits are transferred to the low-tax country ⇒ Race to the bottom
- If Home uses the destination principle and Foreign uses the source principle, profits are shifted towards Home ⇒ Home behaves as a tax haven
- If both countries use the destination principle, there is no profit shifting ⇒ Firms comply with the arm's length principle

Transfer prices

Tax revenues

Home country maximizes its tax revenues T wrt the statutory tax rate τ

$$\begin{aligned} Max \quad & T = \tau\left[\pi - q\right] + D\tau q + S\tau q^* \\ \text{S.t.} \quad & (1-\tau)[\pi - q] - D\tau q - \alpha q^2 = 0 \\ & \tau, \tau^* \geq 0, \quad \alpha, \alpha^* \in [\underline{\alpha}, 1] \end{aligned}$$

A country first maximizes its tax revenues with respect to its tax rate τ (τ^*) and then to its enforcement level α (α^*).

Eq Tax rate

Equilibrium enforcement level

- If a country uses the source principle: strict enforcement ($\alpha = 1$)
- If a country unilaterally uses the destination principle: loose control of profit shifting ($\alpha = \underline{\alpha}$)
- When both countries use the destination principle, any $\alpha, \alpha^* \in [\underline{\alpha}, 1]$ is a Nash equilibrium

Lemma

If both countries apply the destination principle, then any $\alpha \in [\underline{\alpha}, 1]$ *and* $\alpha^* \in [\underline{\alpha}, 1]$ *is a Nash equilibrium. Otherwise, the equilibrium enforcement policy of a country using source-based taxation involves strict control of transfer pricing. The equilibrium enforcement policy of a country using destination-based taxation involves a loose control of transfer pricing.*

- There is no cost of profit shifting monitoring

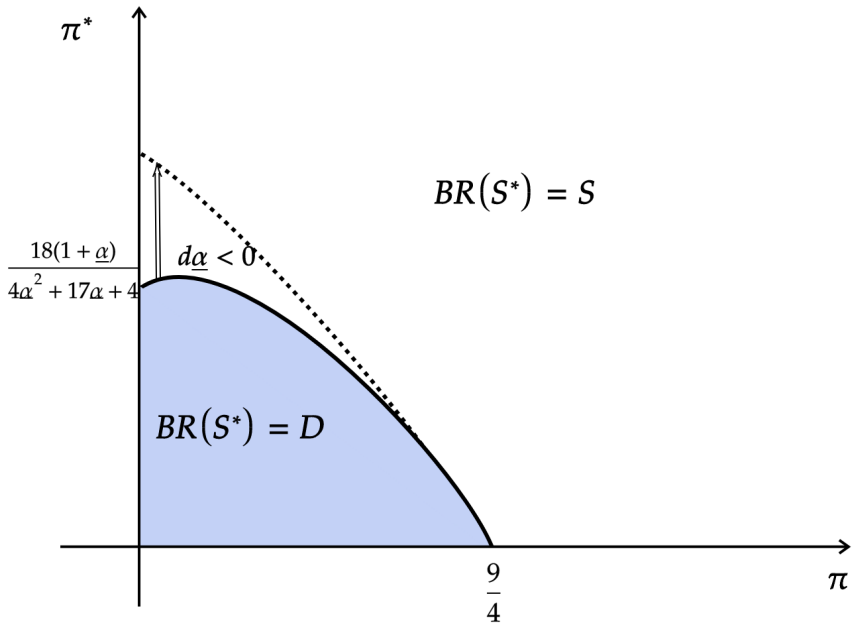
Endogenous choice of tax principle - BR to source

When the Foreign country uses source-based taxes

- The tax revenue difference writes

$$TR_H^{SS} - TR_H^{DS} = \left(\frac{2\pi + \pi^*}{3}\right)^2 - \pi - \frac{\pi^*}{2(1+\underline{\alpha})} + \frac{\pi^{*2}\underline{\alpha}}{4(1+\underline{\alpha})^2}$$

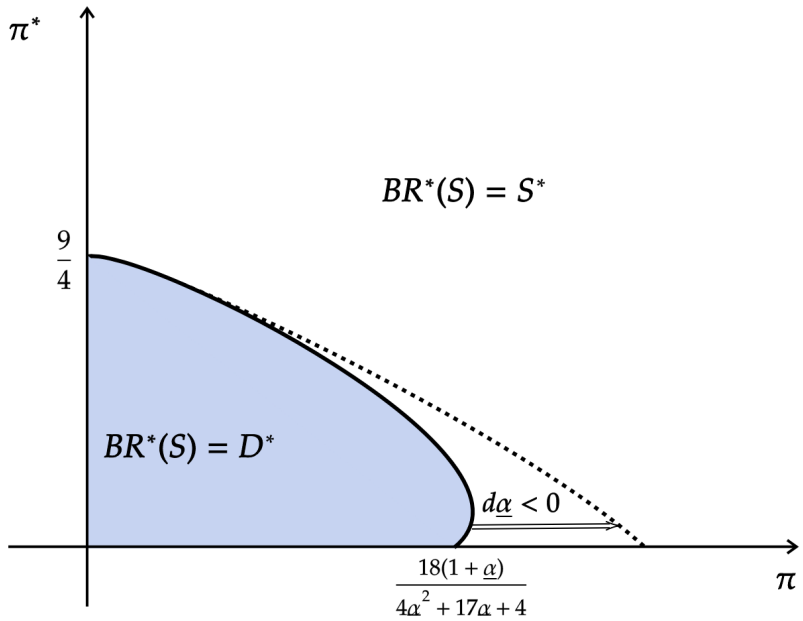
Figure: Best-response to source-based taxes



Endogenous choice of tax principle - BR to source

- Reaction function of the Foreign country is symmetric

Figure: Best-response of Foreign to source-based taxes



Proposition

The source principle is the best-response to source-based taxes if both foreign and domestic corporate revenues are large.

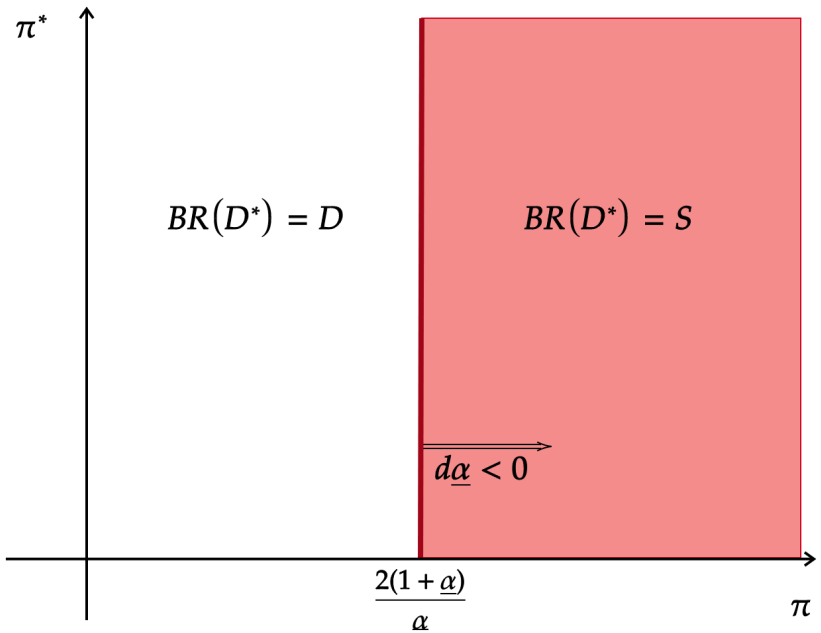
Endogenous choice of tax principle - BR to destination

When the Foreign country uses destination-based taxes

The tax revenue difference is:

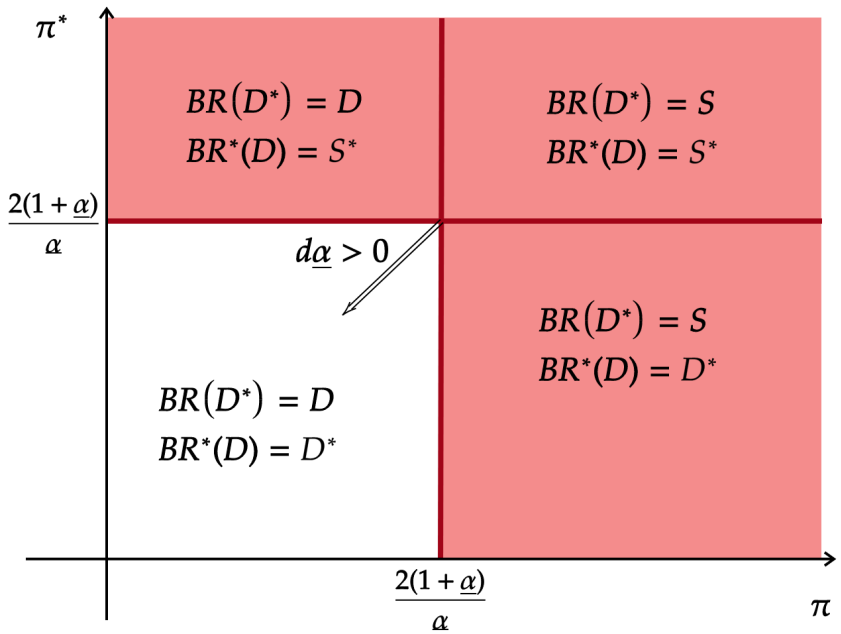
$$TR_H^{SD} - TR_H^{DD} = 0 \Leftrightarrow \pi = \frac{2(1+\underline{\alpha})}{\underline{\alpha}}$$

Figure: Best-response to the destination principle



Endogenous choice of tax principle - BR to destination

Figure: Best-responses to the destination principle

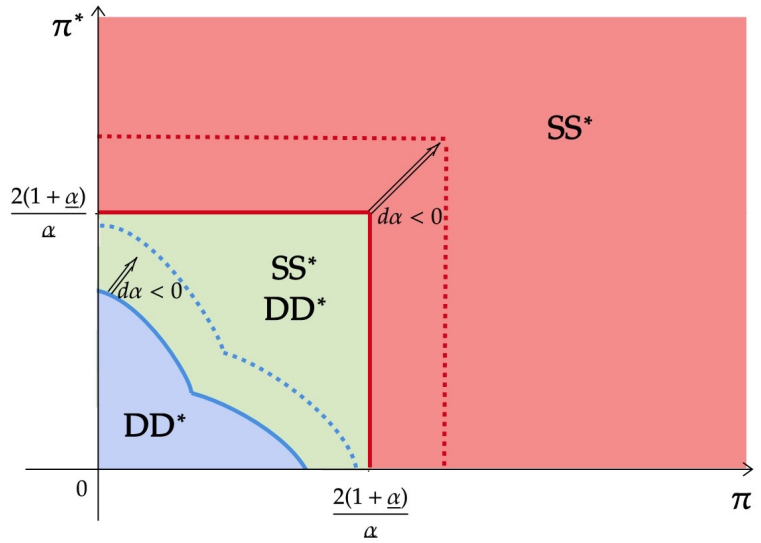


Proposition

The destination principle is the best-response to destination-based taxes if corporate revenues are small.

Equilibrium

Figure: Equilibrium tax principle



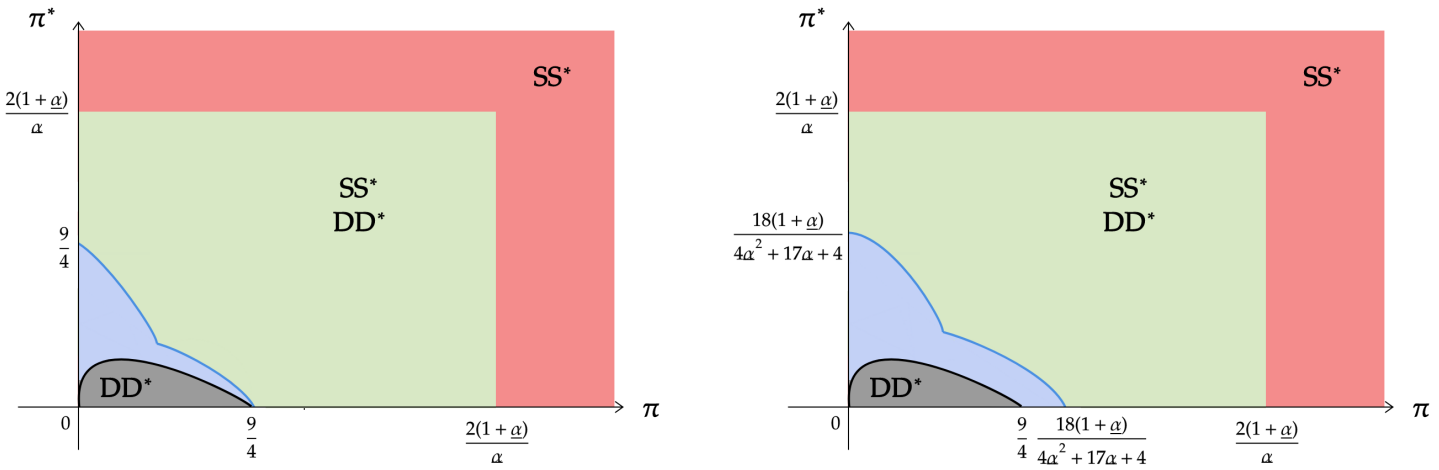
Proposition

- *SS* is an equilibrium when revenues are large*
- *DD* is an equilibrium when revenues are small*
- *Multiple equilibria when revenues are average*
- *No unilateral equilibrium DS* (SD*)*

Tax ranking of equilibria

$$T_{SS^*} - T_{DD^*} = \left(\frac{2\pi + \pi^*}{3}\right)^2 - \pi \tag{2}$$

Figure: Tax-ranking of equilibria



Proposition

The source principle always dominates the destination principle.

Conclusion

- This paper investigates the equilibrium choice of tax regimes in terms of tax revenues,
- with endogenous choices of tax rates and enforcement levels.
- Source-Source is a NE when corporate revenues are large.
- This is conditional on a strict monitoring of profit shifting.
- Destination-Destination is a Nash Equilibrium when corporate revenues are small.
- Multiple equilibria with average revenues: Source-Source and Dest-Dest.
- No Unilateral equilibrium.
- **Policy implications:** we need stricter monitoring of profit shifting to use a source-based corporate tax + current system = equilibrium.

- **Tax Competition:** Devereux et al. (2008), Zodrow and Miezkowski (1986), Wilson (1986), Johannesen (2010), Haufler and Schjelderup (2000)
- **Transfer pricing:** Gresik and Osmundsen (2008), Johannesen (2010), Bauer and Langenmayr (2013)
- **Destination-based cash-flow tax:** Bond and Devereux (2002), Auerbach and Devereux (2018), Bond and Gresik (2020), Becker and English (2019), Rusina and Schjeldrup (2019), Bond and Gresik (2021)

Back

Timing

- Governments choose in a non-cooperative way the tax principle,
- Then they choose their enforcement policies,
- And finally their statutory tax rates.
- Given the tax policies $\mathcal{P} = \{D, \alpha, \tau\}$ chosen by Home and $\mathcal{P}^* = \{D^*, \alpha^*, \tau^*\}$ choose by Foreign, firms set their transfer prices.

The model is solved backwards.

Back

- The profits under a "Source-Source" case:

$$\Pi_H^{SS} = (1-\tau)[\pi - q] + (1-\tau^*)q - \alpha q^2$$

- The profits under a "Destination-Source" case:

$$\Pi_H^{DS} = (1-\tau)[\pi - q] + (1-\tau^*)q - \tau q - \alpha q^2$$

- The profits under a "Source-Destination" case:

$$\Pi_H^{SD} = (1-\tau)[\pi - q] + q - \alpha q^2$$

- The profits under a "Destination-Destination" case:

$$\Pi_H^{DD} = (1-\tau)[\pi - q] - \tau q + q\alpha q^2$$

Back

Profits

- The profit of a Foreign headquartered MNF is symmetric.
- The transfer prices therefore write:

$$q(\mathcal{P}, \mathcal{P}^*) = \frac{(1 - D)\tau - S^*\tau^*}{2\alpha}$$
$$q^*(\mathcal{P}, \mathcal{P}^*) = \frac{(1 - D^*)\tau^* - S\tau}{2\alpha^*}$$

Back

Equilibrium Tax Rate

$$\tau = SS^* \frac{4}{3} \frac{\alpha\alpha^*}{\alpha+\alpha^*} \frac{2\pi+\pi^*}{2} \tag{3}$$

$$+DS^* \left(1 + \frac{\alpha^*}{\alpha+\alpha^*} \frac{\pi^*}{2\pi} \left(1 - \frac{\alpha\alpha^*}{\alpha+\alpha^*} \frac{\pi^*}{2}\right)\right) \tag{4}$$

$$+SD^* \frac{\alpha\alpha^*}{\alpha+\alpha^*} \pi \tag{5}$$

$$+DD^* \tag{6}$$

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