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 →
Introduction

- Multinational Firms (MNF) choose where to locate their profits to reduce their tax liability.

- They are subject to a tax policy composed of:
  - A tax system:
    - Source-based: profits are taxed where goods are produced
    - Destination-based: profits are taxed where goods are sold
  - A statutory tax rate
  - 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.
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 $\tau$ ($\tau^*$) and their revenue-maximizing tax enforcement level $\alpha$ ($\alpha^*$), with $\alpha \in [\alpha, 1], \alpha > 0$

Firms

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

Home country maximizes its tax revenues $T$ wrt the statutory tax rate $\tau$

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

A country first maximizes its tax revenues with respect to its tax rate $\tau$ ($\tau^*$) and then to its enforcement level $\alpha$ ($\alpha^*$).
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 \((\alpha = \alpha)\)
- When both countries use the destination principle, any \(\alpha, \alpha^* \in [\alpha, 1]\) is a Nash equilibrium

**Lemma**

*If both countries apply the destination principle, then any \(\alpha \in [\alpha, 1]\) and \(\alpha^* \in [\alpha, 1]\) 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

\[ TR_{H}^{SS} - TR_{H}^{DS} = \left( \frac{2\pi + \pi^*}{3} \right)^2 - \pi - \frac{\pi^*}{2(1 + \alpha)} + \frac{\pi^*2 \alpha}{4(1 + \alpha)^2} \]

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:

$$TR_{H}^{SD} - TR_{H}^{DD} = 0 \iff \pi = \frac{2(1 + \alpha)}{\alpha}$$

Figure: Best-response to the destination principle
Endogenous choice of tax principle - BR to destination

**Figure:** Best-responses to the destination principle

![Graph showing 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

- **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

\[ T_{SS^*} - T_{DD^*} = \left( \frac{2\pi + \pi^*}{3} \right)^2 - \pi \]  \hfill (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)
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.
The profits under a "Source-Source" case:

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

The profits under a "Destination-Source" case:

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

The profits under a "Source-Destination" case:

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

The profits under a "Destination-Destination" case:

$$\Pi_{DD}^H = (1 - \tau)[\pi - q] - \tau q + q\alpha q^2$$
The profit of a Foreign headquartered MNF is symmetric.

The transfer prices therefore write:

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

\[ q^*(\mathcal{P}, \mathcal{P}^*) = \frac{(1 - D^*)\tau^* - S\tau}{2\alpha^*} \]
Equilibrium Tax Rate

\[
\tau = SS^* \frac{4}{3} \frac{\alpha \alpha^*}{\alpha + \alpha^*} \frac{2\pi + \pi^*}{2} \\
+ DS^* \left( 1 + \frac{\alpha^*}{\alpha + \alpha^*} \frac{\pi^*}{2\pi} \left( 1 - \frac{\alpha \alpha^*}{\alpha + \alpha^*} \frac{\pi^*}{2} \right) \right) \\
+ SD^* \frac{\alpha \alpha^*}{\alpha + \alpha^*} \pi \\
+ DD^*
\]