

# Lecture Notes: Systems Competition

## II.1: “Race to the bottom” view

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# 1 Fiscal Competition and Economic Geography

The model by Haufler and Wooton (1999) analyzes the location choice of a monopolist when governments bid for the firm (in form of low taxes or high subsidies).

The main result is that the larger country attracts the FDI as it hosts the larger share of customers, thereby allowing for more savings in transportation costs - so called "home market bias".

In this lecture we will briefly discuss the model by Baldwin and Krugman. It is based on a different analytical framework than used by Haufler and Wooton.

The most important difference is that regions are symmetric. The "home bias bias" does not exist in this framework.

At first sight this may suggest that taxes may become more important for the location decision, possibly ruling out positive tax differentials as an equilibrium outcome.

## **1.1 Model by Baldwin and Krugman\***

### **1.1.1 Basic set-up**

One-period model

2 regions: South and North

Regions are symmetric

Regions have two sectors

\*R. Baldwin and P. Krugman, Agglomeration, integration and tax harmonisation, *European Economic Review*, 48 (2004) 1-23.

- Agricultural sector (producing a homogenous good; perfectly competitive)
- Manufacturing sector (producing differentiated varieties; imperfectly competitive)

Regions have two factors of production

- Mobile entrepreneurs (number of entrepreneurs (capital):  $K$ )
- Immobile workers (number of workers:  $L$ )

The representative household has utility over the agricultural product and differentiated varieties

Entrepreneurs move to the region which offers them the highest level of utility

Two potential location outcomes:

- Interior solution: entrepreneurs locate equally in both regions
- Core-periphery outcome: all entrepreneurs locate in the same region

Baldwin and Krugman focus on the core-periphery outcome. Using \* as a superscript for values pertaining to the South, this configuration emerges if

$$\frac{1-t}{1-t^*}\Omega^c \geq 1, \quad \Omega^c = \frac{\pi/P}{\pi^*/P^*}.$$

- Why? The after-tax return when locating in the North is not lower than the after-tax return offered by the South.
- $\Omega^c$  can be interpreted as an agglomeration rent: Given taxes  $(t, t^*)$ , the larger  $\Omega^c$ , the more likely will all entrepreneurs locate in the North.

### 1.1.2 Tax policy when industry is fully agglomerated

Before turning to tax policy choices it is useful to characterize  $\Omega^c$ . One important property is that  $\Omega^c$  is independent of tax policy. More formally,

$$\Omega^c = \frac{\phi^{1-a}}{1 - (1 - \phi^2)(1 + b)/2}$$

where  $a$ ,  $b$ , and  $\phi$  are parameters independent of tax rates.

The objective of the government is to maximise  $W(G, t)$ , where  $W_G > 0$ .

$t$  is the tax rate levied on wage income and profit income;  $G = tY$  and  $Y = wL + \pi K$ .

⇒ Tax policy discrimination is not feasible.

⇒ Subsidizing “capital” also involves a subsidy on immobile workers. Given by the property of  $W$ , a tax policy  $t < 0$  is not optimal.

The (endogenously) richer region prefers higher levels of  $G$  (and is thus willing to pay a higher tax price  $t$ ), i.e.  $G$  is normal in consumption.

**Sequence of decisions:** 1<sup>st</sup>: The North sets its tax rate anticipating subsequent choices.

2<sup>nd</sup>: The South sets its tax rate taking the North’s tax choice as given and anticipating the location choices.

3<sup>rd</sup>: Entrepreneurs locate, goods are produced and consumption takes place.

Why sequential tax policy formation?  $\Rightarrow$  Existence problems.

We solve the game by backward induction.

**3<sup>rd</sup> stage:** Location choice is described by the indifference condition  $(1 - t) \Omega^c = 1 - t^*$ .

**2<sup>nd</sup> stage:** The objective function is discontinuous in the tax rate  $t^*$ . Defining  $t^{*b}$  as the tax rate which induces indifference on the part of entrepreneurs, we get  $G = twL$  if  $t^* > t^{*b}$  and  $G = t(wL + \pi K)$  if  $t^* < t^{*b}$ .

Given the North's tax rate, the South compares the maximum utility attainable when the core locates in the North and the maximum utility when the South wins the location game - see fig. 4 in Baldwin and Krugman (2004).

**1<sup>st</sup> stage:** The North realizes that the higher its tax rate, the higher the threshold tax rate  $t^{*b}$ .

If the North finds it optimal to host the core, it will set a tax rate  $t$  satisfying

$$(1 - t^{*b}) = \Omega^c (1 - t),$$

i.e. the tax rate which, when pitched against  $t^{*b}$ , induces indifference on the part of entrepreneurs and indifference on the part of the South.

Question: Is it in the interest of the North to host the core? Trade-off: higher tax rate on immobile labour against a lower tax rate on immobile labour and profit income.

Answer: Since the North can charge a tax rate higher than  $t^{*b}$  (exploiting the fact that firms earn agglomeration rents), the utility when hosting the core is higher than when being the periphery - see fig. 5 in Baldwin and Krugman (2004).

Thus, the equilibrium tax rate in the North is

$$t_e = 1 - \frac{1 - t^{*b}}{\Omega^c}$$

and the South sets  $t_u^*$ , i.e. the tax rate which maximizes  $W$  when the core is the North.

**Punchline:** Mobility of “capital” induces a downward pressure on the tax rate of the country which wins the core (limit pricing).