Tax Competition with and without Preferential Treatment of A Highly-Mobile Tax Base

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Slemrod-Wilson: Tax havens offer tax-avoidance services to firms in non-havens.

This paper: Havens set relatively low rates on capital income, thereby shifting income away from non-havens, rather than providing tax-avoidance services.

Question: Why don't all countries set low tax rates? Can we build a model that generates this asymmetry, rather than simply assuming it, and explain why--

- Effective tax rates on capital are not low, except in a few countries.

- More integration does not seem to have produced lower capital taxes.

    o Hines (2005), for example, presents evidence that corporate tax collections did not decline as a percentage of GDP between 1982 and 1999.

Previous literature: Small countries set low tax rates (Bucovetsky, Wilson), but such models don't seem to explain the very low tax rates offered by some countries, whereas corporate tax rates don't seem to have fallen much for most countries.

Our Framework

- Two types of capital

    o Mobile: locates where after-tax return is highest

    o Immobile: Cannot move to escape taxation.

- Countries differ in amounts of immobile factor.

- To start, all capital is taxed at the same rate: "non-preferential regime"

  o OECD (1998) has identified "harmful tax practices": low tax rates or preferential features that reduce the tax burden on a given base.

  o Canada/US have tax treaties that would be jeopardized if one were to discriminate.

  o Hong/Smart: It is difficult to discriminate between mobile and immobile firms in practice.

Our Results

- The one or two countries with the smallest quantities of immobile capital obtain all of the mobile capital by setting the lowest tax rates.

- The other countries do not attempt to compete for mobile capital.

- Countries with low capital productivity may also obtain all of the mobile capital if they also have small endowments of immobile capital.

- The non-preferential regime is preferred to preferential treatment of mobile capital

  o Janeba and Peters (1999) obtain the result.

  o Keen (2001) argues in favor of preferential treatment, but he assumes identical jurisdictions and less than perfect mobility of the more mobile base.

  o With perfect mobility, only mixed strategies exist in Keen's and our simultaneous-move game, but our results hold regardless of the order of moves.

The Model

Countries

- J countries, with N_i local capital owners in country i.

- Identical production functions, $F(K_i) = \gamma K_i$, where K_i is total capital.

- The government in each country i maximizes tax revenue by taxing all capital at rate t_i under a non-preferential rate, or by imposing separate tax rates on mobile and immobile capital under a preferential regime.

Timing

1. Countries choose tax rates, simultaneously or sequentially, to maximize tax revenue:

2. Mobile capital owners locate their capital in the country with the lowest tax rate

3. All capital owners choose I to maximize $(\gamma - t_i)I - C(I) \rightarrow I(t_i)$

$$W^i(t_i, 1) = [N_i + M]t_iI(t_i) \quad \text{if mobile capital locates in i;}$$

$$W^i(t_i, 0) = N_it_iI(t_i) \quad \text{if capital does not locates in i.}$$

Revenue-Maximizing tax rate for the system of J countries: $\hat{t}$ maximizes revenue obtained from each capitalist, tI(t).
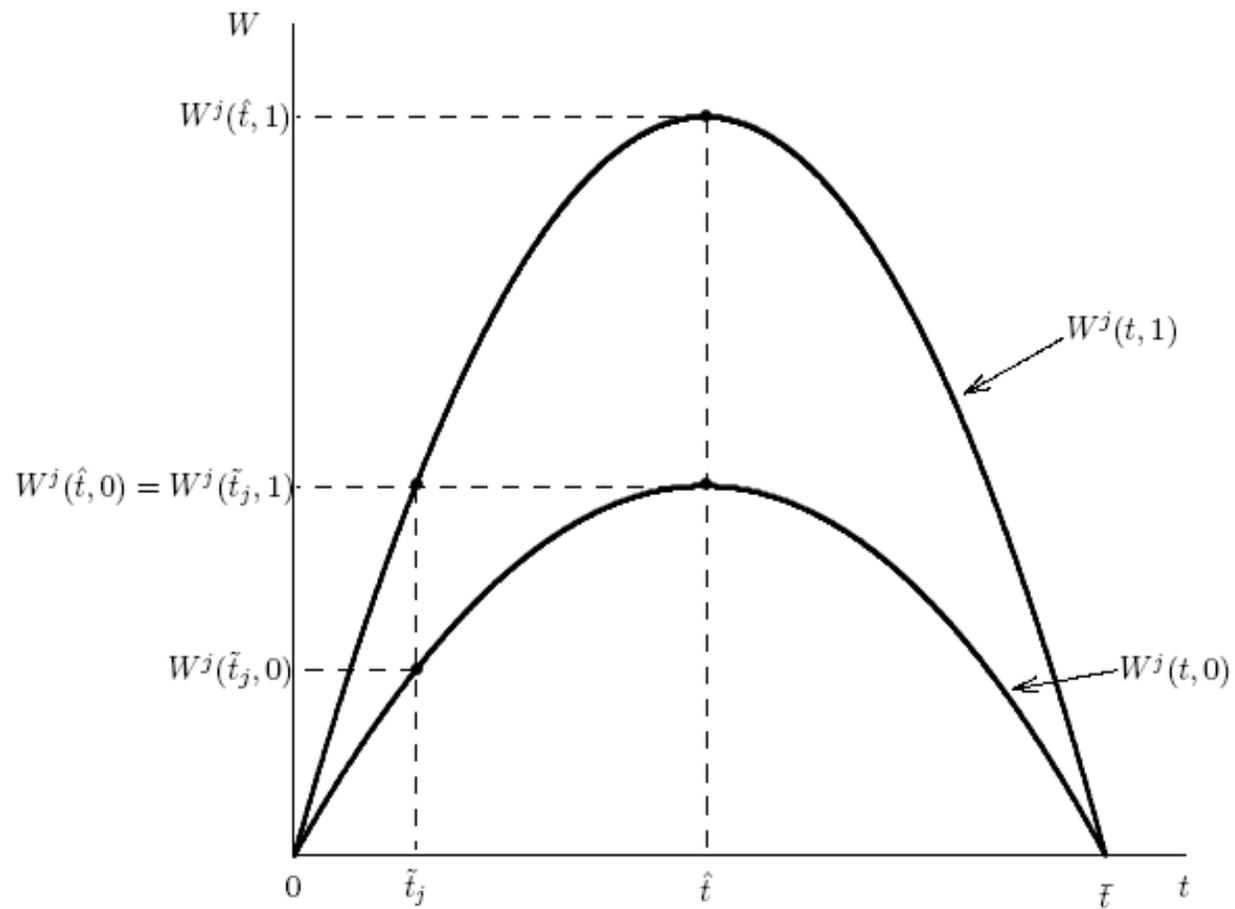
Figure 1: The Payoffs

Simultaneous Tax Game for the Non-Preferential Regime

- Each country sets its tax rate at or below $\hat{t}$, since any higher rates would lower its revenue.

- Each country sets its tax rate at or above the level, $\tilde{t} < \hat{t}$, at which it is indifferent about attracting the mobile base: $W^i(\tilde{t},1) = W^i(\hat{t},0)$

- No pure strategy Nash equilibrium.

Preferential Regime: Countries compete the tax on mobile capital to zero and maximize revenue from the immobile base, yielding revenue $W^i(\hat{t},0)$

Mixed-Strategy Equilibrium in the case where $N_1 > N_2 > \dots N_J$.

- Countries $j = 1, 2, \dots, J - 2$ play $\hat{t}$ with probability $q_j = 1$, and never attract mobile capital.

- Country $J - 1$ plays $\hat{t}$ with probability $q_{J-1} < 1$, but plays a continuous probability distribution, $H_{J-1}(t)$, over the interval, $[\,\tilde{t}_{J-1}, \hat{t}\,)$, with probability, $1 - q_{J-1}$.

- Country J plays a continuous probability distribution, $H_J(t)$, over the interval, $[\,\tilde{t}_{J-1}, \hat{t}\,)$, with probability 1.

- Mobile capital always locates in J or J-1.

- But only J obtains a higher expected revenue than in the preferential regime: $W^i(\tilde{t}_{J-1}, 1) > W^i(\tilde{t}_J, 1) = W^i(\hat{t}_J, 0)$, because $\tilde{t}_{J-1} > \tilde{t}_J$ since the smallest country has less to lose from lowering its tax rate.

Conclusions:

- Total revenue, summed over all countries, is higher in the non-preferential regime than in the preferential regime.

- All mobile capital always locates in the two smallest countries.

Sequential-Move Game for the Non-Preferential Regime

- Countries play sequentially, one after the other.

- Tie-breaking rule: If multiple countries choose the lowest tax rate, mobile capital locates in the smallest country (it is willing to undercut the lowest tax rates that the other countries are willing to choose).

- Regardless of the order, the smallest country always "wins": it attracts the mobile base.

- All other countries play the revenue-maximizing rate, $\hat{t}$

- Total revenue depends on the order of moves but the smallest country obtains at least the revenue that it would obtain in the simultaneous move game.

- This worst-case order of moves occurs when the smallest country moves first.

- The best-case scenario occurs when the smallest country moves last and sets its tax rate at the revenue-maximizing level, $\hat{t}$.

- Assuming that all orders of moves have a positive probability, total expected revenue is higher in the sequential-move case than in the simultaneous-move case, and therefore higher than under the preferential regime.

An Extension: Varying Productivities

- Again let $\widetilde{t}_k$ denote the tax rate at which k is indifferent between attracting the mobile base and instead raising its tax to $\hat{t}_k$: smaller countries have smaller $\widetilde{t}_k$, since they sacrifice less revenue by lowering their tax to attract the mobile base.

- Sequential equilibrium for the non-preferential regime: Mobile capital locates in the country with the largest $\gamma_k - \widetilde{t}_k$, which need not be highest-productivity country if smaller countries have lower productivities.

- The preferential regime may be preferable, because mobile capital is not taxed and, therefore, it locates where its productivity is highest.

Conclusions

- A non-preferential regime is better at reducing the under-taxation inefficiency (Janeba-Peters result).

  - Since the simultaneous-move game has only a mixed-strategy equilibrium, arguments that countries would not play mixed strategies suggest that they would move to a sequential-move game, but in both cases, the non-preferential regime yields more revenue.

- A preferential regime is better at reducing the locational inefficiency.