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Tax competition for foreign direct investment under information uncertainty

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ABSTRACT

The relation between taxation states and foreign direct investment (FDI) has been studied from several perspectives and with states at different levels of development. Most previous studies, however, have only considered the impact of tax level on FDI volume. This paper enhances this view by assuming that multinational enterprises (MNEs) can use transfer prices systems and have investment timing flexibility. Thus, it evaluates the impact of the use of international transfer pricing systems on state policy and on the investment timings of MNEs. In uncertain business environments (with the periodic releases of news), investment can increase if MNEs delay investment decisions. This paper shows how tax differentials can attract FDI and can influence MNE behavior. The equilibrium is set in a global environment where MNEs can shift their profits between states depending on local corporate tax rates. Assuming the use of transfer pricing schemes, this paper confirms the relationship between MNE behavior and the release of business news.

1. Introduction

The aim of this paper is to model the way countries define their taxes and how this competition, to attract investment, influences firm behavior. This equilibrium is set in a global environment where international companies can move their profits between countries and where the level of profit depends on local tax rates. Hines (1999) confirmed these profit shifts and their relation to transfer pricing schemes and Slade (2004) analyzed several models of firm profitability.

Generally, tax competition studies have assessed how non-cooperative governments set taxes. These studies have contained underlying assumptions about the role of capital as the full reversibility of the investments and the exogenous flexibility of the investment timing. However, most foreign direct investment (FDI) decisions can be characterized by irreversibility (at least partially), uncertainty (originated in the markets and government politics) and the dependency of its present value from the investment timing (implicit right to choose the best timing to commit to the FDI).

Hines and Rice (1994) studied the influence of international tax rules on FDI using data on different countries. Bughin and Vannini (1995) considered taxation aspects to analyze the impact on the labor market to the choices made by the MNE. Wu (2000) investigated the performance of foreign direct investment in China. There is evidence that determining factors for the location for FDI can change according to the country's level of development (Blonigen and Wang, 2004).

Tax rate differentials between states can be large and remain constant over time, affecting the returns from FDI. There is evidence that states with lower tax rates receive more FDI than do states with higher tax rates. It is also known that, for given states, FDI is abundant in periods when tax rates decrease (Hines, 1999).

On tax competition, some interesting studies have observed that smaller states impose lower tax rates. For unions, that includes only two states, which exclusively differ in the population factor (Wilson, 1991). Tax-lowering strategies of CEEC[1] governments seem to have an important impact on foreign firms location decisions (Bellak and Leibrecht, 2009). The evidence that smaller jurisdictions impose lower tax rates and are more tax competitive is corroborated by taxes on commodities (Kanbur and Keen, 1993). Considering the absence of side payments, differences between states can mean that synchronization between tax rates may not be easy, even if the Nash equilibrium result is ineffective.

When states base their taxation on mobile factors, such as FDI, there may exist potential benefits from tax policy harmonization. The simplest form of tax policy harmonization might be an agreement between two or more states to define a common tax rate. However, if there are other relevant differences among states, the equilibrium tax rate might be difficult to reach without side payments (Bucovetsky, 1991). An analysis of the equilibrium of a state's tax competition game (Peralta et al., 2003) and its transfer pricing mechanisms allow firms to place profits where the tax rate is lowest, and cut off the operation's location and profit link (Hines and Rice, 1994). These practices allow profit shifting to replace, partly, capital mobility (Davies and Gresik, 2001).

The structure of the paper is the following: In the next section, I assemble a model with two uncertainties for two scenarios (no-news

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[1] EU, US and 8 Central and East European host countries.

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or news). Section 3 compares the investment levels of the two scenarios. In the last section, the paper states its findings.

2. Model description and scenario comparison

To simulate the investment decisions taken by a Multinational Enterprise (MNE), the present paper considers a model with two states (S_1 and S_2) over an infinite horizon. S1 and S2 represent two symmetric sates. The MNE has its headquarters at S1. MNEs should choose the investment level that maximizes the profit shifting option. The price of the profit shifting option should be equal to the maximum of the difference between the global investment and onshore investment. This value corresponds to the opportunity cost associated with the flexibility loss of profit shifting in the other moments.

The delay in the profit shifting option results from receiving incremental information. When an MNE shifts profits at any given time, it rejects the delay option and takes the loss of the opportunity cost associated with the firm's flexibility. This investment decision results from selecting the highest present value of the global profit flow $\pi_G(\pi_{S2},\pi_{S1})$[2] that maximizes the option value. Considering this point, the company should take the right decision for each situation. If the expected present value $E[V(\pi_G)] \leq E[V(\pi_{S1})]$, the MNE should not invest offshore. In this situation, MNEs should suspend offshore investment and take the investment decision later. Otherwise, if $E[V(\pi_G)] > E[V(\pi_{S1})]$, the MNE's decision should be to shift profits immediately.

The paper considers two scenarios of uncertainty. The no-news scenario does not include the arrival of news. The news scenario includes the arrival of good and bad news with a given probability.

2.1. No-news scenario

In an uncertain environment, the offshore investment decision can be a function of news. Bad news affects negatively the investment, whereas good news is indifferent to the investment decision (Bernanke, 1983). The asymmetrical nature of uncertainty means that only unfavorable situations can substantially alter the propensity to invest. Additionally, the magnitude of the bad news translates into higher irreversibility levels. Thus, as the present value decreases, the higher required returns make the investment project less viable.

Assume an onshore profit flow in state $S_1(\pi_{S1})$ that follows the process:

$$d\pi_{S1} = \alpha_{S1}\pi_{S1}dt + \sigma_{S1}\pi_{S1}dz_{S1} \tag{1}$$

α_{S1}: Growth rate; σ_{S1}: Volatility of profit flow;

Consider an offshore profit flow π_{S2} after an MNE has expanded its activities, investing in state S_2:

$$d\pi_{S2} = \alpha_{S2}\pi_{S2}dt + \sigma_{S2}\pi_{S2}dz_{S2} \tag{2}$$

α_{S2}: Growth rate; σ_{S2}: Volatility of profit flow;

Therefore, the global profit flow π_G captures the net profit flows of states S_1 and S_2:

$$\pi_G(\pi_{S2},\pi_{S1}) = [(1-\tau_{S1}) + \theta(\varsigma)]\pi_{S1} + (1-\tau_{S2})\pi_{S2} \tag{3}$$

$\pi_G(\pi_{S2},\pi_{S1})$: Global profit flow; π_{S2}, π_{S1}: Profit flows in states S_1, S_2; τ_{S1}, τ_{S2}: Tax rates in states S_1, S_2;

with a net profit shifted function $\theta(\varsigma)$ that contains the shifted profit between states S_1 and S_2:

$$\theta(\varsigma) = (\tau_{S1}-\tau_{S2})\varsigma - \varphi(\varsigma) \tag{4}$$

ς: Profit shifted between states; $\theta(\varsigma)$: Net profit shifted; $\varphi(\varsigma)$: Cost function of profit shifting

[2] π_{S2}, π_{S1}: Profit flows in states S_1, S_2.

Offshore profits are charged at the rate τ_{S2}. After investing in state S_2, the MNE can save tax payments in the high tax state S_1 by shifting part of its profits to the low tax state S_2. Considering the absence of news, the aim is to calculate the profit level π_{S2}^* that motivates the investment abroad. Later, I will compare the difference in this profit level with the one necessary to motivate the offshore investment in a bad news environment. The expression (3) considers $(1-\tau_{S2})\pi_{S2}$ as the net offshore profit flow in state S_2 and also includes the net profit flow in state S_1, $[(1-\tau_{S1})+\theta(\varsigma)]\pi_{S1}$. The expression $\theta(\varsigma) = (\tau_{S1}-\tau_{S2})\varsigma - \varphi(\varsigma)$ represents the tax benefits from profit shifting between states. As a consequence of expanding its activity to state S_2, an MNE will try to maximize its profits and thus minimize its taxes by transferring profits from S_1 to S_2.

Some operational costs are associated with the profit shifting procedure (e.g. legal costs, tax administration costs and other service costs), as represented by the function $\varphi(\varsigma)$. If there are no profits to transfer, $\varsigma = 0$ and $\varphi(\varsigma) = \varphi'(\varsigma) = 0$. Additionally, the second derivative of the cost function $\varphi''(\varsigma)$ is bigger than zero. The cost function $\varphi(\varsigma)$ must be sufficiently convex in order to avoid a state contingent solution (Hines, 1999). These costs can be considered tax deductible or not. Haufler and Schjelderup (2000) analyzed optimal taxation of corporate profits when governments can choose both the rate and the base of the corporation tax. The authors concluded that effective costs are lower if they are tax deductible but neither assumption has impact on the qualitative results because of its magnitude. We also assume that it is expensive to transfer all profits because an MNE should not eliminate profits in the high-tax state (Panteghini and Schjelderup, 2003). Assuming a risk diversified by trading financial assets, the opportunity cost of capital μ will be exogenous. A reasonable assumption consists of not permitting an integral shift in profits from the high-tax state to the low-tax state. It is costly to shift all profits in the sense that the MNE cannot eliminate positive profits in the high-tax country. Thus, we obtain the critical level of profit shifting, differentiating expression (4) with respect to ς and equaling it to 0:

$$\varsigma^* = arg[\varphi'(\varsigma) = \tau_{S1} - \tau_{S2}]$$

$\varphi(\varsigma)$: Cost function of profit shifting; τ_{S1}, τ_{S2}: Tax rates in states S_1, S_2

From the previous expression, it can be concluded that when the tax rate of state S_1 is lower than is the tax rate of state S_2 the profit shifting level is positive $\varsigma(.) > 0$.

$$F(\pi_{S2},\pi_{S1}) = E\left\{\int_t^{\infty}\pi_G(\pi_{S2},\pi_{S1})e^{-\mu(s-t)}dx\right\} \tag{5}$$

μ: Risk − adjusted discount rate; t: Time

The firm's problem is choosing the highest option value between the onshore and offshore investments. The decision to invest offshore will be taken when the present value of the offshore investment surpasses the present value of the onshore investment. If the MNE only infinitely invests onshore, producing a profit flow π_{S1} the present value will be:

$$V(\pi_{S1}) = E\left[\int_t^{\infty}[(1-\tau_{S1}) + \theta(\varsigma)]\,\pi_{S1}e^{-\mu(s-t)}dx\right] = \frac{[(1-\tau_{S1}) + \theta(\varsigma)]\pi_{S1}}{\mu - \alpha_{S1}} = \frac{[(1-\tau_{S1}) + \theta(\varsigma)]\pi_{S1}}{\delta_{\pi_{S1}}}, \tag{6}$$

μ: Risk − adjusted discount rate; $\delta_{\pi_{S1}}$: Convenience yield

The convenience yield is the sum of all effects, which evolve from the current onshore profit to the future global profit of the MNE. It can be explained as reflecting the market's expectations concerning the future availability of onshore profit. The greater the possibility that decreases in the onshore profit will occur, the higher the convenience yield. Otherwise, an MNE infinitely invests onshore and offshore,