Endogenizing governments' objectives in tax competition

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ABSTRACT

In this paper we endogenize objective functions of the regions in case the of tax competition for foreign owned mobile capital. First, considering symmetric regions and simultaneous move tax competition, we demonstrate that the competing regions can restrict 'race-to-the-bottom' in tax rates by deviating away from social welfare to net tax revenue. Moreover, it is optimal for a region to be fully revenue oriented even if that region's ultimate goal is to maximize social welfare, irrespective of whether the rival region is concerned about social welfare or net tax revenue. Next, we show that these results go through under production asymmetry and under sequential/simultaneous choice of public investment and tax rate in the case of two-dimensional competition. However, in the case of Stackelberg type competition, it is optimal for the leader region not to deviate from its ultimate goal, while the follower region always gains from being fully revenue oriented.

1. Introduction

Existing models of interregional competition for mobile capital either assume that the governments' strategies are based on the principle of social welfare maximization or the governments are assumed to be concerned only about tax revenue collected. However, the choice of governments' objective function, social welfare or tax revenue, is likely to affect the equilibrium outcomes. It is often argued that the political structure of a country plays significant role in determining its governments' objective function. Edwards and Keen (1996) and Wilson (2005), for example, argue that a leviathan government tends to maximize its net tax revenue to increase in government size so that more revenue is at the disposal of the government. Following this view, a number of authors have considered that governments maximize revenue in their models of tax competition (see, for example, Kanbur and Keen, 1993; Janeba, 2000; Dembour and Wauthy, 2009; Marceau et al., 2010, to name a few). On the other hand, Hoyt (1991), Hindriks et al. (2008), and Matsumoto (2010), among others, subscribe to the view that governments are benevolent and maximize social welfare. In both of these two sets of papers, it is assumed that the governments'

objective function, which forms the basis to determine the optimal strategies, is exogenously given.

There is another strand of literature that incorporates political competition into the models of tax competition, where the utility function of the elected policy maker (representative citizen) serves as the objective function to determine the optimal strategies to compete for mobile capital (Persson and Tabellini, 1992; Fuest and Huber, 2001; Perroni and Scharf, 2001; Ihori and Yang, 2009). However, none of these studies recognize the possible implications of strategic interaction among governments on the choice of their objective functions.

As in the case of strategic managerial delegation (Vickers, 1985; Fershtman and Judd, 1987; Sklivas, 1987), it may be optimal for the governments to deviate from their ultimate goals and determine the competition strategies based on strategically chosen objective functions. In other words, strategic interaction among governments may induce them to deviate from their ultimate goals while deciding the optimal strategies to attract mobile capital. To the best of our knowledge, the issue of strategic determination of governments' objective functions has not received much attention in the literature so far. This paper attempts to fill this gap in the literature.

Also, note that governments often set targets for revenue collection and formulate tax policies accordingly. Recent revisions of tax structures in a number of developed and developing countries to increase tax revenues testify that governments' expenditure pre-commitments coupled with the necessity to reduce budget deficit essentially leave

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no room but maximize revenue, as argued in Anant et al. (1995). A number of empirical studies also provide evidence in support of tax revenue maximization by the governments (see, for example, Caplan, 2001, Zax, 1989, Nelson, 1987).[1] Nonetheless, governments' commitment to maximize tax revenue does not appear to be the rule of the real world. There are empirical evidences, though not direct, in favor of welfare maximization by the governments as well (McGuire, 1981; Oates, 1985; Forbes and Zampelli, 1989). Overall, it implies that governments do commit to specific objectives, which may or may not coincide with ultimate goals, while designing fiscal instruments. It appears to be interesting to examine whether such commitments can be due to strategic reasons in this globalized world. If yes, what should be the optimal objective to commit on while deciding tax rates? This paper attempts to offer some insights to understand these issues.

In this paper we develop a model of interregional competition for foreign owned mobile capital, where the objective functions of the competing regions' governments are endogenously determined. We first consider that there are two regions competing for foreign owned mobile capital, where the tax rates on capital are chosen by the competing regions simultaneously and independently. It is evident that higher tax rate in a region makes it less attractive destination for mobile capital compared to its rival region. However, a region may generate higher revenue by imposing higher tax rate. We show that it is optimal for each region to be fully revenue oriented even if its ultimate goal is to maximize social welfare, irrespective of whether the rival region is concerned about social welfare or net tax revenue. In other words, it is always optimal for the competing regions to choose their respective net tax revenue maximizing tax rates. The intuition behind this result is as follows. Increase in social welfare orientation of a region makes it more aggressive in tax competition, which in turn induces it to reduce its tax rate more than proportionately than the reduction in its rival's tax rate. As a result, loss of net tax revenue of the more social welfare oriented region, due to reduction in its tax rate, is greater than its gains from returns to immobile factors, due to increased capital flow in that region. Therefore, both net tax revenue as well as social welfare of a region are decreasing in the extent of its social welfare orientation. These are new insights. This paper also demonstrates that the competing regions can restrict race-to-the-bottom in tax rates by deviating away from social welfare to net tax revenue.

Next, we extend the analysis to examine the implications of (a) regional asymmetry in terms of productivity of capital, (b) simultaneous move two-dimensional competition (i.e., competition in terms of both public investment and tax rate), (c) sequential choice of public investments and tax rates in the case of two-dimensional competition and (d) Stackelberg type sequential move by the regions with and without public investment in the strategy set, if any. We demonstrate that the results obtained in the case of simultaneous move tax competition between two symmetric regions go through in these alternative scenarios as well, except in the case of Stackelberg type sequential move competition. In the latter case, it is optimal for the leader region not to deviate from its ultimate goal. The reason for this departure is, by moving from revenue maximization to welfare maximization the leader region can commit to a relatively low tax rate, which results in loss in tax revenue. However, the corresponding gain in returns to immobile factors outweighs the loss in tax revenue. Thus, if the leader region's ultimate goal is to maximize social welfare (net tax revenue), it is optimal for it to be fully welfare (revenue) oriented. On the other hand, the follower region can restrict wasteful race-to-the-bottom in tax rates by being fully revenue oriented. As a result, it is always optimal for the follower region to be fully revenue oriented. These results

hold true, irrespective of whether competing regions provide public investment or not.

The rest of this paper is organized as follows. The next section presents the basic setup of the model. Section 3 characterizes the equilibrium and discusses the results. Section 4 extends the model to relax some of the assumptions of basic model, as mentioned above. Section 5 concludes.

2. The model

Suppose that there are two regions, region 1 and region 2, competing for foreign owned mobile investment capital. The total amount of mobile capital is assumed to be one, which is exogenously determined. Each region decides the tax rate t_i (≥ 0) on mobile capital x_i ($0 \leq x_i \leq 1$), $i = 1,2$. For simplicity, cost of tax administration is assumed to be zero for both the regions. Therefore, the net tax revenue of region i is as follows:

$$NT_i = t_i x_i, \quad i = 1,\ 2. \tag{1}$$

Following Hindriks et al. (2008), we consider that the production function of a region i is as follows.

$$F_i(x_i) = \gamma x_i - \frac{\delta x_i^2}{2}, \quad i = 1,\ 2, \tag{2}$$

where x_i is the amount of mobile capital invested in region i, γ (>0) is the technology parameter and δ (>0) denotes the rate of decline of marginal productivity of capital.[2] We assume that $\gamma > \delta > 1$. The first part of the inequality, i.e., $\gamma > \delta$, ensures that marginal productivity of capital is always positive.[3] The second part of the inequality, i.e., $\delta > 1$, ensures existence and stability of interior solutions in all the cases considered.

We consider that the capital market is perfectly competitive, which implies that capital is paid according to its marginal productivity, and normalize the price of output to be one. Thus, the returns to immobile factors of region i is given by $IR_i = \left[F_i(.) - x_i \frac{\partial F_i(.)}{\partial x_i} \right] = \frac{\delta}{2} x_i^2$. Clearly, returns to immobile factors in a region are increasing in the amount of mobile capital invested in that region, at an increasing rate δ. Since mobile investment capital is foreign owned, social welfare (SW) of a region is given by the sum of the returns to immobile factors (IR) and net tax revenue (NT) of that region:

$$SW_i = IR_i + NT_i = \frac{\delta}{2} x_i^2 + t_i x_i, \quad i = 1,\ 2. \tag{3}$$

Note that the parameter δ can also be interpreted as the rate of increase in 'marginal social welfare' ($\frac{\partial SW_i}{\partial x_i}$) of a region due to increase in mobile capital in that region. The above formulation of social welfare function is in line with Kempf and Rota-Graziosi (2010), Hindriks et al. (2008) and Laussel and Le Breton (1998).[4]

Note that, if a region is debt constraint, its primary concern may be to generate as much net tax revenue as possible. Otherwise, the region may be concerned about the returns to immobile factors as well as net tax revenue. Other than fiscal position of a region, institutional and political factors may also play crucial roles to determine a region's ultimate goal. That is, a region may be either interested in net tax revenue (NT) only or in social welfare (SW). If a region's ultimate goal is to maximize SW (NT), we call that region as 'fully social welfare oriented region' ('fully revenue oriented region'). In this

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[1] Caplan (2001) analyzes data from U.S. states over the period 1950–1989, Zax (1989) examines county level data from U.S. states for the fiscal year 1981–1982, and Nelson (1987) analyzes data from U.S. states and local bodies for the fiscal year 1977–78.

[2] x_i can also be interpreted as the share of mobile capital invested in region i.

[3] Note that, if full amount of mobile capital is invested in any one of the two regions, marginal productivity of capital in that region is equal to $\gamma-\delta$.

[4] For further justifications of the objective functions of regions see Laussel and Le Breton (1998).