International Review of Economics and Finance 46 (2016) 1–9

Contents lists available at ScienceDirect

International Review of Economics and Finance

journal homepage: www.elsevier.com/locate/iref

When ad valorem tax prevails in international tax competition

Hikaru Ogawa

Graduate School of Economics and Graduate School of Public Policy, University of Tokyo, 7-3-1 Hongo Bunkyoku, Tokyo 113-0033, Japan

ARTICLE INFO

Article history:
Received 21 January 2016
Received in revised form 11 August 2016
Accepted 11 August 2016
Available online 14 August 2016

JEL classification:
H21
H73
H77

Keywords:
Asymmetric tax competition
Unit tax
Ad valorem tax

ABSTRACT

The studies on capital tax competition have assumed that the governments compete for mobile capital in unit tax, and this assumption is partially justified by Lockwood (2004), which proves that unit tax competition is always welfare superior to ad valorem tax competition within a framework of symmetric tax competition. This paper presents the reexamination of governments' choice on tax method in the framework of asymmetric tax competition. The results show that asymmetric countries do not compete in the same tax instrument, as assumed in the literature. The capital importing countries compete in ad valorem tax, while the capital exporting countries compete in unit tax.

1. Introduction

In tax competition models, it has often been assumed that the governments compete for mobile capital in the unit tax. This assumption is justified by the equivalence property of the unit and ad valorem tax when the number of competing governments is sufficiently large. As the tax elasticity of capital is infinite when there are a sufficiently large number of countries, there exist no disparate impacts on equilibrium property between unit and ad valorem tax competition. Hence, assuming unit tax competition is a reasonable way for analytical tractability. Even in the case of tax competition among a small number of governments, a justification of unit-tax assumption has been offered by Lockwood (2004). He shows that unit tax competition is always welfare superior to ad valorem tax competition in symmetric tax competition, so that the assumption of unit tax competition is plausible. Extending this study, Akai, Ogawa, and Ogawa (2011) formally solves an endogenous choice problem of tax instruments and shows that selecting unit tax as a policy instrument is the dominant strategy of governments.

Departing from *symmetric* tax competition model, this paper reexamines the argument of Lockwood (2004) and Akai et al. (2011) and shows that ad valorem tax competition prevails in an *asymmetric* framework: if the number of countries competing for mobile capital is sufficiently small, and if the governments have some kind of regional asymmetries, such as in capital endowment and production technology, then one government competes in ad valorem tax and the other employs unit tax as a policy instrument. This result is quite a contrast to the preceding study of tax competition with regional asymmetries in which it has been assumed that different countries employ the same tax method, i.e., the unit tax (Bucovetsky, 1991, 2009 ; DePeter & Myers, 1994 ; Peralta & van Ypersele, 2005 ; Itaya et al., 2008; among others). Developing two-stage model of tax competition

E-mail address: ogawa@e.u-tokyo.ac.jp (H. Ogawa).

http://dx.doi.org/10.1016/j.iref.2016.08.002
1059-0560/

with regional asymmetries, this paper reexamines the tax method endogenously employed by asymmetric governments and clarifies the reason for the prevalence of tax competition with different tax methods. Although the results are derived under a specific functional form for analytical tractability, this result, at least, differs from known result and the conventional assumption in the literature.

The critical factor that leads us to obtain a different result from Lockwood (2004) and Akai et al. (2011) is that *asymmetric* countries have incentives to manipulate the terms of trade. They study the choice of tax instrument within a *symmetric* tax competition model, in which the terms of trade effect vanish altogether. In our model, the asymmetry among countries produces capital flow in the equilibrium. Hence, the capital importing country aims to lower the capital price so as to hold down the import cost, while the capital exporting country tries to raise the capital price to increase the income from capital exports. For an exactly contrary incentive to manipulate the capital price, the asymmetric countries employ a different tax instrument.

This paper is organized as follows. In the next section, we present a basic model. The equilibrium properties are presented to derive the main results in Section 3. Section 4 concludes the paper.

2. Model

There are two countries, and in each country i ($i = S, L$), there are homogeneous residents normalized by 1. The government in country i provides a public good that is solely financed by taxation on capital. Production of private goods in country i requires capital and labor. We assume that the production per capita in country i is conducted by the function $f(k_i) = (A - k_i)k_i$, where $A(> 0)$ is the parameter that represents the productive efficiency and k_i is the amount of capital per capita located in country i. A resident in country i has an initial endowment of capital, $\bar{k}_i$. We express the per capita capital endowments for countries S and L as $\bar{k}_S = \bar{k} - \epsilon$ and $\bar{k}_L = \bar{k} + \epsilon$, respectively, where $\epsilon \in (0, \bar{k})$ and $\bar{k} \equiv (\bar{k}_S + \bar{k}_L)/2$. Capital is perfectly mobile among countries, while residents/workers are immobile.

The resident's preference in country i is given by

$$u(c_i, g_i) = c_i + g_i \tag{1}$$

defined over the consumption of a private numeraire good c_i and a public good g_i.[1] We employ the linear utility function because it can avoid the existence of the fiscal externality. This enables us to abstract the fundamental reason which makes governments compete in different tax methods. That is, by removing fiscal externality from the model, we can observe the role of the terms of trade effect in choosing the tax instrument as it happens.

The resident in country i receives labor income $f^i(k_i) - f^i_k(k_i)k_i (= k_i^2)$, and return from capital investment $r\bar{k}_i$. Hence, the budget constraint of the resident requires

$$c_i = k_i^2 + r\bar{k}_i. \tag{2}$$

To finance the public good, the government in each country can only use capital tax, but it can choose either the unit tax or ad valorem tax system. If government i selects the ad valorem tax method, the government budget constraint in country i is given by

$$g_i = \tau_i k_i f^i_k(k_i), \tag{3}$$

where $\tau_i (< 1)$ is the ad valorem tax rate. On the other hand, if the government imposes unit tax on mobile capital, the budget constraint of country i becomes

$$g_i = T_i k_i, \tag{4}$$

where T_i is the unit tax rate.

With two countries, there are four possible combinations of tax methods selected by the governments:

Case (i) both governments compete for mobile capital in the ad valorem tax;
Case (ii) both governments compete in the unit tax;
Case (iii) government S competes in the unit tax while government L competes in the ad valorem tax;
Case (iv) governments S and L compete in the ad valorem tax and unit tax, respectively.

[1] While the linear utility function is also used in Peralta and van Ypersele (2005), Itaya et al. (2008), Ogawa (2013), and Ogawa and Wang (2016), it might be plausible to denote g_i as the lump-sum public transfer to the resident since it may take a negative value. In this case, Eq. (1) represents the available income of the representative resident.