Heterogeneous firms, ‘profit shifting’ FDI and international tax competition

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A R T I C L E  I N F O

Article history:
Received 14 October 2009
Received in revised form 19 August 2010
Accepted 18 October 2010
Available online 27 October 2010

JEL classification:
P23
H25
H73

Keywords:
Heterogeneous firms
Tax competition
Profit shifting
Tax havens

A B S T R A C T

Larger firms are more likely to use tax haven operations to exploit international tax differences. We study tax competition between a large country and a tax haven. In the large country, heterogeneous firms operate under monopolistic competition and can choose to shift profits abroad. We show that a higher degree of firm heterogeneity (a mean-preserving spread of the cost distribution) increases the degree of tax competition, i.e. it decreases the equilibrium tax rate of the large country, leads to higher outflows of its tax base and thus decreases its equilibrium tax revenues. Similar effects hold for a higher substitutability across varieties.

1. Introduction

With globalization tax havens have become more important. The increased opportunities for multinational firms to shift profits towards these low tax jurisdictions have changed the strategic tax game for international profits and pose new challenges to policy makers. Recent empirical evidence by Desai et al. (2006) shows that larger firms use tax haven operations more intensively. This suggests that firm heterogeneity is relevant for international tax competition.1

Theory, however, has mainly focused on models with homogeneous firms.2

We introduce a tractable model of tax competition with heterogeneous firms between a large country and a tax haven. Firm heterogeneity is introduced in the way that has been found to be relevant empirically: heterogeneity in productivity and size.

The analysis reveals that economies with a higher degree of firm heterogeneity and higher substitutability across goods face stronger international tax competition. It also sheds new light on the ongoing policy debate on the desirability of tax havens.3 While Slemrod and Wilson (2009) argue that tax havens reduce welfare by leading to suboptimal levels of taxation and public good provision, Hong and Smart (2010) provide a model in which tax havens can have a positive effect on welfare. In our model, similar to Slemrod and Wilson (2009), tax competition creates a distortion towards too low tax rates and an underprovision of the public good. When firms are more heterogeneous, this adverse effect from competing with the tax haven is larger, implying a lower level of welfare. Therefore, our model suggests that the extent to which a tax haven is harmful to a country depends on its industry structure. This new dimension affecting the strength of tax competition should be taken into account when evaluating optimal tax policies.4

In the model, firms in a large country operate in a monopolistically competitive industry. They make positive profits which are taxed by the government.5 Given the tax rate, firms can decide to avoid paying taxes at home by opening an affiliate in a tax haven and shifting profits abroad. The governments of the large country and the tax haven set their tax rates non-cooperatively. Our setup allows us to derive the pure strategy Nash equilibrium of the tax game between the large country and the tax haven.

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1 Desai et al. (2006) analyze data on American multinational firms from the Bureau of Economic Analysis annual survey of U.S. Direct Investment Abroad for the years 1982 to 1999. Grouping countries with US affiliates into tax havens and non-havens allows them to find correlations between tax haven activities and firm level characteristics. In line with these findings Graham and Tucker (2006) show that larger firms are more likely to avoid taxes through corporate tax shelters.

2 Some notable exceptions will be discussed below.

3 This has been raised among others in OECD (1998) in the context of its attempts to limit ‘harmful’ tax practices.

4 Note that if taxes themselves were distortionary or if there was a Leviathan type government, welfare effects could be different.

5 While, in practice, pure profits of firms are hard to determine, in the model we assume that firm profits are observable.
In equilibrium the tax haven undercuts the large country which gives firms an incentive to do ‘profit shifting’ FDI. While the fixed cost of opening an affiliate in the tax haven is the same for all firms, the gains from profit shifting depend on the level of profits a firm is making. In line with the findings of Desai et al. (2006), in equilibrium the most productive (and thus largest and most profitable) firms shift profits while less productive firms continue to pay taxes at home. Tax competition is strongest when the distribution of profits across firms is such that the most productive firms account for a large share of aggregate profits. This is the case when firms are very heterogeneous and when monopolistic market power is low. In this case, the large country suffers a substantial outflow of its tax base. The tax haven gains as it can set a relatively high tax rate and still attracts a considerable fraction of the tax base.

When instead there is low firm heterogeneity and high monopolistic market power, the tax base does not react strongly to tax differences and the large country is ‘protected’ from international tax competition. It can set a relatively high tax rate without losing much of its tax base. The tax haven is forced to strongly undercut the large country in order to attract some of the tax base.\(^6\)

The effect of an increase in the tax rate on tax revenues of a government is given by the own-tax elasticity of tax revenues. We show that this elasticity can be decomposed into two opposing effects, the direct effect and the tax base effect. On the one hand, holding the tax base constant, a higher tax rate directly implies an increase in tax revenues. On the other hand a higher tax rate makes it profitable for some firms to start profit shifting. This reduces the tax base and thereby tax revenues.\(^7\)

To complement our findings, we also analyze the role of the fixed costs of profit shifting. When these fixed costs are high it is more costly for firms to shift profits. This allows the large country to set a higher tax rate, which in turn makes it more profitable for firms to shift profits. In equilibrium these two effects exactly offset each other. This reduces the tax base and thereby tax revenues.\(^8\)

In our baseline model only the latter is active. In Section 5.5 we present a model where the former is also active. In our model one sector can change its location. In the baseline model the only other sector that can change its location is the sector of fixed costs. In our model the location decision of both sectors can be endogenized.

In recent work, Haufler and Stähler (2009) build on this and provide a model of tax competition with heterogeneous firms and endogenous location choice. They show that in the case of symmetric countries no equilibrium in pure strategies exists. Due to the complexity of their model an equilibrium does only exist under very particular conditions.

In recent work, Burdige et al. (2006) introduce a particular type of firm heterogeneity into a model with perfect competition, immobile labor and mobile capital. They model firm heterogeneity as an idiosyncratic, exogenous comparative advantage in one of the locations. A different strand of the literature introduces firm heterogeneity into models of tax competition in a ‘New Economic Geography’ (NEG) context. Baldwin and Okubo (2009) outline an NEG model with tax competition and firm heterogeneity in productivity. They do not derive the equilibrium of the tax game. Instead they assume an exogenous tax difference and focus their analysis on the trade-off between base-widening and rate-lowering tax reforms.

Davies and Eckel (2010) also propose an NEG-type model of tax competition with heterogeneous firms and endogenous location choice. They show that in the case of symmetric countries no equilibrium in pure strategies exists. Due to the complexity of their model an equilibrium does only exist under very particular conditions.

2. Financial autarky

We first outline the structure of the large country in financial autarky. Labor is the only input in production. There is a unit mass of workers each of which inelastically supplies one unit of labor. There are two sectors, one producing varieties of a differentiated good and one producing a homogeneous good. One unit of the homogeneous good is produced using one unit of labor. It is used as the numeraire. We only consider equilibria in which the homogeneous good is produced. This implies that wages are unity. There is a fixed and exogenous measure of firms that are owned by consumers in the large country.

2.1. Preferences

The workers are all identical and share the same quasi-linear preferences over consumption of the two goods and a good provided by the government:

\[
U = \alpha \ln Q + \beta G + q_0 \quad \text{with} \quad Q = \left( \int_D q(\omega)^{\frac{1}{\sigma}} d\omega \right)^{\frac{\rho}{\sigma}},
\]


\(^{12}\) NEG models of tax competition with homogeneous firms typically consider the location decision of firms between two asymmetric countries (e.g. Kind et al. (2000), Ludema and Wooton (2000), Baldwin and Krugman (2004), Borck and Pfluiger (2006) and Ottaviano and van Ypersele (2005)).
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