



# Commodity tax competition and industry location under the destination and the origin principle<sup>☆</sup>

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## ABSTRACT

We extend the model by Behrens et al. [Behrens, K., Hamilton, J.H., Ottaviano, G.I.P., Thisse, J.-F., 2007a. Commodity tax harmonization and the location of industry. *Journal of International Economics* 72, 271–291.] to the case of non-cooperative commodity taxation and investigate the impacts of tax harmonization and changes in tax principle on equilibrium tax rates, industry location, and welfare. Since our setup features internationally mobile firms, trade frictions, and asymmetric country sizes, it offers a convenient framework within which to investigate how differences in market size and deepening international integration affect equilibrium outcomes under competing tax principles. The origin principle, when compared to the destination principle, is shown to exacerbate tax competition and to erode tax revenues, yet gives rise to a more equal spatial distribution of economic activity. This suggests that federations which care about spatial inequality, like the European Union, face a non-trivial choice for their tax principle that goes beyond the standard considerations of tax revenue distribution.

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## 1. Introduction

Increases in factor mobility and economic integration have given rise in the European Union (henceforth, EU) to concerns about the possibilities of tax competition eroding governments' ability to finance public expenditure and to maintain the welfare state. Devolution of responsibility for public services to regions within the EU has arguably further increased opportunities for harmful tax competition, both within and between countries. In the USA, where state and local taxes support several important categories of public expenditure, concern about tax competition has a much longer history but remains, nevertheless, a contentious issue. In recent years, one added source of concern in both the EU and the USA has been the development of e-commerce, which has exacerbated already existing

pressures on cross-border tax systems (Goolsbee, 2001). Furthermore, in the case of the EU, increasing economic integration might be an important driver for regional inequalities, and these inequalities may be further amplified by tax competition. Since one of the social cohesion objectives of the EU, as explicitly spelled out by Article 130a of the Amsterdam Treaty of 1997, is to “aim at reducing disparities between the levels of development of the various regions and the backwardness of the least favoured regions or islands, including rural areas”, tax competition may have additional indirect costs if it were to accelerate regional divergence, thus leading to the increased use of structural funds to reverse such an undesirable evolution.<sup>1</sup>

While much of the tax competition literature focuses on capital or corporate profit taxes, there are important tax competition issues that arise for value-added taxes (henceforth, VAT) and retail sales taxes

<sup>☆</sup> This paper is dedicated to Masahisa Fujita for his 65th birthday.

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<sup>1</sup> The EU allocates roughly 35% of its budget to the European Regional Development Funds (195 million euros for the 2000–2006 period). Of these, almost 70% go to so-called ‘Objective 1 regions’, which are defined as those regions with an average income of less than 75% of the EU average.

when consumers can shop in multiple jurisdictions. It is generally thought that there are two key questions in the design of indirect taxation systems with cross-border transactions (Keen et al., 2002).<sup>2</sup> The first question asks *where taxes should be levied*. Two alternative regimes are traditionally considered. Under the ‘destination or consumption-based principle’ (henceforth, DP) tax is paid in the country where goods are consumed at the rate applied there, while under the ‘origin or production-based principle’ (henceforth, OP) tax is paid in the country where goods are produced at that country’s rate. Accordingly, local consumption is taxed and exports are exempted under DP, while local production is taxed and imports are exempted under OP. Once a tax principle has been agreed on, the second question asks whether tax rates should be set independently by national governments or rather *harmonized to some extent across countries*. While the former case allows for more flexibility in dealing with asymmetric shocks and entices governments to exert effort to collect taxes efficiently, it may make them engage in harmful tax competition.

Within the EU, the choice of a tax principle and the question of VAT harmonization are a recurrent source of debate (European Commission, 2000; Ebrill et al., 2001).<sup>3</sup> In particular, while “the concept of a definitive system of taxation in the Member State of origin [is] retained as a long-term Community objective” (European Commission, 2004b, p.1), with increasing direct cross-border sales to consumers such a system for all types of transactions (partly motivated by the relative administrative ease for collecting and remitting tax revenue) has been met with skepticism by many countries which fear losing production and tax revenue. In the USA, a closely related important issue has been whether or not to close the use tax evasion loophole that puts increasing strain on local governments’ budgets.<sup>4</sup> The Streamlined Sales Tax Project (SSTP) is an attempt at getting cooperation among states in taxation of cross-border purchases. This proposal would result in DP treatment of mail-order and online purchases, and OP treatment of purchases by consumers who travel out-of-state. As in the EU, this reform proposal has not met with broad agreement, as shown by state governments’ chronic delays in implementing the necessary regulatory requirements (Strayhorn, 2005).

It is worth emphasizing that both the policy and the academic debate over the relative merits of OP and DP is long-standing. Early research primarily considers perfectly competitive firms (see, e.g., Lockwood et al., 1994, who present equivalence results for the two tax principles). Models in this vein all incorporate exchange rate adjustments and balanced trade, so that relative prices do not change when VAT rates are uniform across goods and when factors are immobile. Our model instead considers taxation only in the differentiated sector (i.e., there is an untaxed good), while exchange rates do not adjust as within the Euro zone or the USA.

In the wake of the commodity tax competition model of Mintz and Tulkens (1986), Kanbur and Keen (1993) show that, under OP, international tax base externalities induce revenue-maximizing governments to set inefficiently low non-cooperative tax rates. Under DP, such externalities do not exist. However, when countries can affect

their terms of trade, additional externalities appear under DP provided that countries are large enough (Lockwood, 1993). Despite this, under perfect competition, the consensus view is that DP prevents countries from pursuing self-defeating beggar-thy-neighbor policies. Furthermore, production efficiency only holds under DP when tax rates vary across countries (Lockwood, 2001). Outside the perfectly competitive setting, imperfect competition complicates matters considerably. Considering two identical countries, with one firm per country and with integrated product markets, Keen and Lahiri (1998) reach the opposite conclusion – moving from DP to OP improves welfare when taxes are set non-cooperatively. Haufler et al. (2005) extend that model by introducing trade barriers and market segmentation to study the effects of trade integration. Trade barriers are shown to play a central role as OP still outperforms DP when they are low, whereas the reverse holds true when they are high. This finding may explain some of the impetus for OP rules in the increasingly integrated EU.

Haufler and Pflüger (2004) use a model *à la* Dixit and Stiglitz (1977) with monopolistic competition in which firms face isoelastic demands and goods can be shipped subject to iceberg costs. This setup allows them to go beyond simple duopolistic structures and to deal with firms’ location choices at the cost of neglecting strategic interactions and adjustments in firms’ markups. Constant markups remove part of the ambiguity put forward by Lockwood (2001). In particular, Haufler and Pflüger (2004) show that under DP all fiscal externalities exactly offset each other so that the non-cooperative tax equilibrium is efficient. With OP taxation, instead, additional externalities on the foreign tax base and the foreign price level cause non-cooperative tax rates to exceed their efficient levels. However, the constant markup cum iceberg assumption does not capture competition effects in product markets and does not allow one to deal with market segmentation.

Our framework retains some of the analytical advantages of Haufler and Pflüger (2004) while considering both competition effects and price discrimination. Note that Haufler and Pflüger (2007) provide results for DP and OP tax competition under a wide range of different assumptions on market integration, product differentiation and the mode of competition.<sup>5</sup> Yet, unlike our analysis, they focus on a single firm in each country and there is no international factor mobility induced by tax competition. They find that the different spillover effects can lead to tax rates above or below the Pareto-efficient levels under either principle, although under OP, tax rates are below efficient levels when tax revenue must be positive.

Turning to the welfare effects of commodity tax harmonization, it has been shown in the literature that they depend on the interactions between tax principles and market structures. With perfect competition and international size asymmetries, Kanbur and Keen (1993) show that the smaller country loses from harmonization to any tax rate between those set in the non-cooperative equilibrium. In contrast, in the duopoly model with equally sized countries by Keen et al. (2002), while under DP harmonization always makes at least one country better off, and may be Pareto-improving, under OP harmonization is Pareto-worsening.

The main objective of this paper is to analyze commodity tax competition, tax harmonization, and industry location in a framework featuring internationally mobile firms, imperfect competition with variable markups, and asymmetric country sizes. To do so, we rely on the model developed by Behrens et al. (2007a), which involves two sectors, one supplying a homogeneous good under perfect competition while the other supplies a differentiated good under monopolistic competition. Our framework generates a linear demand system

<sup>2</sup> Our spatial setting differs markedly from the usual models of commodity tax competition focusing on cross-border shopping. Here, we consider a shipping model in which goods are traded between countries on segmented markets, and in which firms choose where to locate and to produce (instead of consumers choosing where to shop).

<sup>3</sup> Recent experience with extending existing agreements on reduced VAT rates in construction and hospitality has shown that agreeing on tax matters is likely to get even more difficult in the enlarged EU.

<sup>4</sup> Every state that levies a retail sales tax also levies a use tax at the same rate, which applies to goods purchased out-of-state. Enforcement is difficult since the Supreme Court has ruled that out-of-state retailers cannot be compelled to collect these taxes unless the firms ‘have nexus’, i.e., do some business within the purchaser’s state of residence.

<sup>5</sup> They consider Bertrand or Cournot competition with differentiated or homogenous products and segmented or integrated markets, with lump-sum taxes either feasible or infeasible.

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