



# Tax and the city – A theory of local tax competition<sup>☆</sup>

Eckhard Janeba<sup>a,b,c,\*</sup>, Steffen Osterloh<sup>d</sup>

<sup>a</sup> University of Mannheim, Germany

<sup>b</sup> CESifo, Germany

<sup>c</sup> ZEW, Germany

<sup>d</sup> German Council of Economic Experts, (Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung), Germany



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## ABSTRACT

In this paper we propose a novel theoretical model of tax competition at the local level. Large jurisdictions (cities) compete both locally with smaller neighbouring communities and interregionally with more distant cities, while small jurisdictions (hinterlands) compete only with other jurisdictions in their neighbourhood. The model structure is motivated by recent empirical findings as well as survey results among German mayors: the perceived intensity of competition for firms varies considerably between jurisdictions and can mainly be explained by the size and location of the jurisdiction. Our model predicts – contrary to earlier findings for competition between countries or regions – that capital taxes of large jurisdictions fall more strongly with increasing interregional competition and may eventually lead to smaller taxes than in small jurisdictions. Hinterlands are therefore less affected from globalisation than cities. We contrast our results with a standard tax competition model in which all jurisdictions compete with all other jurisdictions.

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## 1. Introduction

A common view in the theoretical literature on tax competition is that smaller jurisdictions have lower tax rates on mobile capital than larger jurisdictions (see, for example, Bucovetsky, 1991; Wilson, 1991; Baldwin and Krugman, 2004; Haufler and Wooton, 2010). In addition, tax rates on mobile factors should vanish eventually if competitive pressures rise further and further – for instance when the number of competing jurisdictions becomes very large – assuming that alternative tax instruments are available (Bucovetsky Wilson,

1991). The theoretical literature thus predicts that for the local level differences in the taxation of mobile factors should be larger than for regions or countries,<sup>1</sup> since the number of competing local jurisdictions is regularly very high. For example, there are more than 11,000 municipalities in Germany which independently choose the rates of the local business tax (*Gewerbesteuer*). Size differences are significant, ranging from less than 100 to more than 3 million inhabitants.

In this paper we argue that the above predictions do not necessarily hold in the context of local tax competition. In particular, larger jurisdictions may make less use of distortionary taxes than smaller municipalities, since they are confronted with a bigger set of competitors. The purpose of this paper is to highlight this additional channel in a novel theoretical model of interdependent tax making. Unlike most of the theoretical literature we do not assume that every jurisdiction competes with every other jurisdiction. Unlike many authors in empirical tax competition research we do not assume that for all types of municipalities the degree of fiscal competition is decreasing in distance and therefore strongest among geographic neighbours. Instead we assume that there are two levels of competition: (1) There is local competition among geographically close neighbours, and in addition (2) we assume that large/populous jurisdictions, called cities, compete with other cities of which some are geographically far.

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\* Corresponding author at: Department of Economics, University of Mannheim, L7, 3-5, 68131 Mannheim, Germany. Tel.: +49 6211811795; fax: +49 6211811794.

E-mail address: [janeba@uni-mannheim.de](mailto:janeba@uni-mannheim.de) (E. Janeba).

<sup>1</sup> Empirical support for the first statement comes from in Baldwin and Krugman (2004) as well as Haufler and Wooton (2010), among others, who report country level data.

Support for our modelling assumptions comes from recent empirical research, which will be discussed below, as well as an own survey we conducted among more than 700 mayors in the German state of Baden-Württemberg. We study the spatial structure of local tax competition by asking local politicians who they actually consider to be their main competitors for mobile capital. The size of the jurisdiction turns out to be an important determinant of the decision-maker's perception of the intensity of competition. Compared to non-urban municipalities, respondents from urban centres (up to a population of 600,000) perceive a much higher intensity of competition for firms in general, and especially with respect to competing jurisdictions which are distant or even located in other countries. By contrast, mayors from smaller municipalities (usually with populations of 1000 to 10,000 inhabitants) regularly state that they don't compete with distant jurisdictions for mobile firms. Moreover, we find evidence that jurisdictions in the direct neighbourhood are generally regarded as especially important competitors.

We are not the first to point out that fiscal interaction among governments is not only driven by competition among geographic neighbours. Case et al. (1993, 287) argue that “neighbourliness does not necessarily connote geographic proximity” and demonstrate that US states' expenditures do not only depend on their geographical neighbours' expenditures, but also depend on those of states which are economically (per capita income) or demographically (racial composition) similar. This finding suggests that spatial interactions do not have to be restricted to their geographic neighbourhood, but can occur over longer distances if jurisdictions are similar in an economic sense. Such considerations, however, have not explicitly been adopted by the theoretical literature. We push this idea in the context of the revenue side of the government budget and essentially ignore the role of expenditures. This reflects our view that at the local level tax differences between geographic neighbours are more important than at the country or regional level, because firms can more easily benefit from infrastructure and agglomeration advantages in neighbouring jurisdictions when these are geographically close.

Our model assumes  $n$  metropolitan regions, each of which consists of one urban centre, called *city*, and  $m$  surrounding jurisdictions called *hinterlands*. There are two levels of competition for mobile capital. First, cities simultaneously compete for mobile capital by setting their tax policies, followed by capital movements between cities. This represents the level of competition between non-neighbouring communities identified in our survey. Second, after the cities' tax choices and initial capital movements, hinterlands compete simultaneously for capital *within* their metropolitan area, taking the city's tax rate and the total metropolitan capital supply as given. This approximates the neighbourhood competition effect described above and is closely linked to the empirical literature on fiscal interactions at the local level (see Brueckner, 2003; Revelli, 2005, for surveys).<sup>2</sup> One way to think about our sequential structure is to view cities as the primary competitors for large-scale investments, such as headquarters or FDI, which are often accompanied by smaller investments (for example from suppliers or subcontractors). After the large-scale investment has been located in a city, the associated suppliers and subcontractors have strong incentives to settle in a reasonable distance to their client, i.e. in the same metropolitan region.<sup>3</sup> We find this interpretation helpful

<sup>2</sup> There are two commitment assumptions built into our model: i) A city's capital tax is fixed once its hinterlands compete (but the city rationally anticipates competition from hinterlands), and ii) after the cities' tax competition game capital is mobile only within the city's metropolitan region but not beyond.

<sup>3</sup> This finding gets further empirical support from van Dijk and Pellenberg (2000), who show that the vast majority of firm relocations in the Netherlands occur in the form of short distance moves. Brueckner and Saavedra (2001) argue why capital – although theoretically completely mobile at least within a country – is supplied inelastically within a region and, thus, remains in the respective metropolitan region. For instance, investment in specialised industries is strongly tied to a region. Moreover, closeness to suppliers or selling markets as well as existing local networks are further reasons why firms may not respond elastically after they are locked in a location.

even though in our theoretical model we do not distinguish between different types of capital or firms for tractability reasons.

We then compare the outcome of the fiscal competition game from this model, called the *sequential model*, to a traditional tax competition model, called the *simultaneous model*, in which all governments decide simultaneously in an otherwise identical setup. We are particularly interested in the effects of a rise in the number of metropolitan regions  $n$ , which approximates the increase in competition through globalisation (or in Germany's context the effects from Eastern enlargement of the EU and German unification).<sup>4</sup> Our first result is a limit result and demonstrates in both types of models that for a very large number of metropolitan regions ( $n \rightarrow \infty$ ) capital tax rates in cities converge to zero, while for hinterlands the capital tax rate goes to zero in the simultaneous model, but stays bounded above zero in the sequential model. Secondly, in the sequential model an increase in  $n$  affects cities more than hinterlands in two ways: i) cities reduce capital tax rates more than hinterlands lower theirs, and ii) cities shift more from mobile capital taxation to immobile labour taxation than hinterlands. Result i) does not hold in the simultaneous model, where in cities the effect can be larger or smaller than in hinterlands and is typically close to zero when evaluated numerically. Our sequential model thus predicts that hinterlands are less affected than cities by increasing competition from entry of metropolitan regions. As empirically hinterlands are typically much smaller than urban centres, our model contrasts to research which has shown that smaller or more peripheral countries have lower corporate tax rates than large countries or regions in the core.

The rest of the paper is organised as follows. In Section 2 we present motivating evidence from our survey and discuss related theoretical and empirical work. In Section 3, we introduce a sequential model, present the results and compare them to a simultaneous model (shown in the Appendix A). Section 4 concludes.

## 2. Motivation and related literature

### 2.1. Motivating evidence

Our model structure is motivated by empirical findings from studies of local tax competition and results taken from an own survey conducted among decision-makers in (southwestern) German municipalities. The existing empirical literature on spatial interactions suggests that capital mobility is highest between neighbouring jurisdictions. Spatial tax interaction is demonstrated for the local business tax in the German state of Baden-Württemberg by Buettner (2001), for local business property taxes in the metropolitan area of Boston (Brueckner and Saavedra, 2001), and the Canadian province of British Columbia (Brett and Pinkse, 2000). Yet, evidence for spatial fiscal interaction is by itself not a sufficient proof for the existence of capital tax competition that is induced by high capital mobility between neighbouring jurisdictions. In fact, the direct evidence for tax base mobility is mixed.<sup>5</sup>

<sup>4</sup> In the literature globalisation is often modelled as a fall in the cost of international transactions (e.g. transportation costs), see for example, Haufler and Wooton (2010) in a tax competition context. Others use the change in the number of jurisdictions to model the degree of competition, see, for instance, Janeba and Schjelderup (2009), which seems the more appropriate approach in the current context.

<sup>5</sup> The observed patterns may also have other causes, such as yardstick competition (see Revelli, 2005). Brett and Pinkse (2000) as well as Brett and Tardif (2008) do not find any effect of neighbours' levels of business property tax rates on the tax base in the Canadian province of British Columbia. Positive evidence comes from Buettner (2003), who finds evidence only for relatively small municipalities in Baden-Württemberg whose tax bases are positively affected by the local business tax rates of their neighbours.

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