# Mergers in fiscal federalism ☆

Marie-Laure Breuillé [a],[*], Skerdilajda Zanaj [b]

[a] INRA, UMR1041 CESAER, 26 Bd du Dr Petitjean, BP 87999, 21079 Dijon Cedex, France
[b] CREA, University of Luxembourg, Campus Limpertsberg, Bâtiment Central 162a, Avenue de la Faïencerie, L-1511 Luxembourg, Luxembourg

## ARTICLE INFO

## ABSTRACT

We analyze how the merger of regions affects capital tax competition in a two-tier territorial organization where both regions and cities share the same mobile tax base. We identify three effects generated by the merger of regions that impact, either directly or indirectly, both regional and local tax choices: i) an alleviation of tax competition at the regional level, ii) a scale effect in the provision of regional public goods, and iii) a larger internalization of vertical tax externalities generated by cities. We show that the merger of regions always increases regional tax rates while decreasing local tax rates. These results are robust to a change in the timing of the game.

© 2013 Elsevier B.V. All rights reserved.

## 1. Introduction

As part of an ongoing process of regionalization in Europe, several European countries have reduced the number of their regions (Dexia Crédit Local, 2008, 2011) with the aim of improving the management of public services. Recent examples include Poland, where the number of "voïvodies" was reduced from 49 to 16 in 1999, and Denmark, where the territorial reform implemented in 2007 replaced the 13 "ämter" with 5 regions. Other countries – including France, Hungary, Italy, Romania and Sweden – are also considering merging regions.

The effect of a merger of same-tier jurisdictions on capital taxation is well-known in a one-tier territorial organization where jurisdictions compete to attract mobile capital. Hoyt (1991) demonstrated that tax rates on mobile capital, and thus public goods provision, increase as the number of jurisdictions decreases. This results from the reduction in the horizontal tax externality: when a jurisdiction increases its tax rate, the capital inflow to other jurisdictions (that become more attractive) is lower. Decreasing the number of jurisdictions reduces the capital movement; thus, increasing the

jurisdiction's tax rate is less harmful for that jurisdiction. Considering the possibility of asymmetric mergers, Bucovetsky (2009) also concluded that any merger of two same-tier jurisdictions leads to a higher average tax rate for the federation as a whole due to higher tax rates in jurisdictions that do not belong to the merger.

The effect of a merger of bottom-tier jurisdictions on capital taxation in a two-tier territorial organization with several bottom-tier jurisdictions and a unique top-tier jurisdiction, which share a common mobile tax base, has also been studied. The tax base co-occupation leads to bottom-up vertical tax externalities – in addition to horizontal tax externalities among bottom-tier jurisdictions – since bottom-tier jurisdictions ignore the overall depressive effect that an increase in their tax rate has on the tax base of the unique top-tier jurisdiction (Keen, 1998; Hoyt, 2001; Keen and Kotsogiannis, 2002). With horizontal externalities causing inefficiently low tax rates and vertical externalities causing inefficiently high tax rates, the equilibrium tax rates at the bottom-tier can be either inefficiently low or high. Keen and Kotsogiannis (2004) showed that an increase in the number of bottom-tier jurisdictions unambiguously deteriorates welfare because fiercer tax competition worsens tax externalities. However, the authors were unable to determine whether an increase in the number of bottom-tier jurisdictions would increase or decrease equilibrium tax rates.

Finally, the effect on capital taxation of a "complete merger" of bottom-tier jurisdictions with their top-tier jurisdiction (which is equivalent to removing bottom-tier jurisdictions) in a two-tier territorial organization with several bottom-tier jurisdictions and more than one top-tier jurisdiction, has also been analyzed. Wrede (1997) compared tax choices that result from i) a "competition among

federations", where $n$ top-tier jurisdictions with several bottom-tier jurisdictions inside each top-tier jurisdiction compete in a Nash game to attract mobile capital, with tax choices that result from ii) a "competition among unitary nations", where only $n$ top-tier jurisdictions compete. He demonstrated that if public goods are substitutes, tax competition among federations leads to less severe under-provision of public goods (or equally higher taxes) than tax competition among unitary nations. Grazzini and Petretto (2007) pursued the analysis in a two-country framework, where one country is federal, consisting of two regions playing as Stackelberg followers with respect to the federal tier, and the other country is unitary. In this asymmetric setting, the co-occupation of the mobile tax base generates horizontal tax externalities between the two countries, in addition to both horizontal externalities at the regional tier and vertical tax externalities in the federal country. By comparing i) the tax game played between a federal structure and a unitary structure with ii) the tax game played between two unitary structures, they showed that the standard "race to the bottom" in the horizontal tax competition literature, according to which two unitary countries competing for attracting mobile capital set inefficiently low tax rates at the equilibrium, can be altered by a change in the institutional setting.

The effect on capital taxation of a merger of top-tier jurisdictions in a two-tier territorial organization with several bottom-tier jurisdictions and several top-tier jurisdictions is, however, unknown. Should one expect an increase in the equilibrium tax rates set by top-tier jurisdictions following the merger, as it would be the case in a one-tier setting (i.e., without bottom-tier jurisdictions)? How does the merger of top-tier jurisdictions affect bottom-tier taxation? What is the consolidated impact for the taxpayer? Our paper addresses these issues.

We consider a two-tier territorial organization with several identical bottom-tier jurisdictions, such as cities, and several identical top-tier jurisdictions, such as regions. Cities and regions tax the same mobile base, that is the amount of capital invested in their territory. Benevolent local and regional governments use their tax revenues in order to finance pure public goods that benefit exclusively their immobile inhabitants. The mobility of the tax base and its co-occupation by both cities and regions generate a two-tier common-pool problem with three types of tax externalities: i) horizontal tax externalities among cities that compete to attract mobile capital, ii) horizontal tax externalities among regions that compete to attract mobile capital and iii) bilateral vertical tax externalities, that is top-down and bottom-up externalities, that arise because tax decisions taken at any tier affect the shared tax base. We thus extend the standard model of capital tax competition among same-tier jurisdictions developed by Zodrow and Mieszkowski (1986) by superimposing an upper tier composed of several top-tier jurisdictions, in contrast to Keen and Kotsogiannis (2002, 2004) who consider a unique top-tier jurisdiction. Wrede (1997) built a similar two-tier tax competition model, with the important difference that his bottom-tier jurisdictions do not take into account the impact of their tax policy on the budget constraint of their top-tier jurisdiction and vice-versa, which rules out major vertical tax externalities.[1]

In view of this elaborate fiscal federalism structure that complicates the capital tax competition model, we must make specific assumptions about citizens' preferences and the production technology to derive a closed form solution. We assume the linearity of the utility function with respect to private, local and regional public goods consumptions, which implies constant marginal rates of substitution between these three types of goods. The decentralized setting allows

the coexistence of both local and regional public goods, and the distortionary effect of capital taxation limits the ability to raise tax revenues and therefore ensures the coexistence of both private and public goods. We also assume that the production function is quadratic, so that the demand for capital is a linear function of the interest rate. Relaxing either one or the other of these two assumptions[2] would lead to the emergence of additional effects linked to the merger – in addition to the three effects described below – and complicate the combination of all effects to such an extent that we would no longer be able to sign the impact of the merger.

The impact of an exogenous merger of regions on tax rates is first derived when all jurisdictions, cities and regions, play simultaneously. We identify three effects generated by the merger of regions. The first effect results from the *alleviation of tax competition at the regional level*, which reduces horizontal tax externalities among regions, as shown in the literature (Hoyt, 1991), as well as top-down vertical tax externalities. The merger decreases the number of competing regions, making tax competition at the regional level less fierce, because of a lower capital movement among regions. Regional taxation is less distorsive for regions and – due to tax base-sharing – for their cities, which reduces the incentive to set inefficiently low regional tax rates. The second effect is a *scale effect in the provision of regional public goods*. After the merger, regions (fewer in number) have a larger tax base at the symmetric equilibrium. Therefore, they can provide more pure public good for the same tax rate, which increases the marginal utility from the regional public good provision. Each of these two effects exerts both an upward pressure on regional tax rates and a downward pressure on local tax rates.

The third effect is the *larger internalization of vertical bottom-up tax externalities*. Since cities and regions share the same mobile tax base, a tax increase by a city generates ceteris paribus a capital outflow from the region the city belongs to, because the capital loss in the given city is higher than the sum of capital gain in other cities that belong to the same region. Each city accounts for the impact of a change in its tax rate on the regional tax base, which drives down local tax rates. After the merger, these vertical bottom-up externalities are internalized for a larger regional tax base. Although the capital loss in the city which increases its tax rate is still higher than the sum of capital gain in other cities that belong to the same region, the merger reduces the capital outflow for the region because additional cities with a capital gain join the region. This last effect exerts an upward pressure on local tax rates and a downward pressure on regional tax rates.

The weighted sum of these three effects determines regional and local tax changes following a reduction in the number of regions. We show that the merger of regions always increases regional tax rates while decreasing local tax rates, and that the consolidated tax rate levied on capital (i.e., the sum of regional and local tax rates) is pushed upwards.

The robustness of these results derived in a Nash game is then challenged by altering the timing of the game. Instead of a simultaneous play of regions and cities, we consider two alternative setups: one with regional leadership and the other with local leadership. When regions are Stackelberg leaders, that is, when they anticipate the impact of their own tax decision on the choice of taxation by cities, the merger of regions still exerts an upward pressure on regional tax rates and a downward pressure on local tax rates. However, the consolidated effect is not clear-cut. On the contrary, when cities are Stackelberg leaders, that is, when they anticipate the impact of their own tax decision on the choice of taxation by regions, the outcome of the game is the same as for the simultaneous move Nash game: the strategic advantage of cities is neutralized by the expectation of the action chosen by their region.

---

[1] Our problem also clearly differs from Wrede (1997), in particular regarding i) the tier concerned by the merger and ii) the nature of the merger. Indeed, we analyze the effect on tax competition of a merger of top-tier jurisdictions instead of a merger of bottom-tier jurisdictions, and our merger does not amount to removing the tier concerned, i.e., there are still some top-tier jurisdictions in our model after the merger whereas the bottom tier disappears in Wrede (1997).

[2] In the tax competition literature, linear preferences are notably assumed by Bucovetsky (2009) and the quadratic function assumption is used by several papers, including Grazzini and van Ypersele (2003), Devereux et al. (2008), Bucovetsky (2009).