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FISCAL SYSTEMS COMPETITION:
HYPOTHESES AND EMPIRICAL RESULTS

The aim of this article is to unravel and simplify the vast and complex literature on the subject of tax and fiscal competition. To this end, four of the most famous and useful models are presented – the Tiebout hypothesis, the Leviathan, Zodrow-Mieszkowski and Federal models. Tiebout pioneered this subject of research, concluding that tax competition provides beneficial economic effects. This result was upheld by the originators of the Leviathan hypothesis, Brennan and Buchanan, but from a viewpoint of political economy. Some years later, Zodrow and Mieszkowski contradicted the earlier findings by concluding that tax competition may lead to under provision of public goods/services and/or inefficient allocation of scarce resources. Finally, the federal string of tax competition literature, as exemplified in this article by the work of Feld, Kirchgassner and Schaltegger, returns to it's beginnings to provide support for the positive effects of such competition on economic growth.

The empirical literature on subject of competition in taxation is even more diverse. Various authors tried to test the above hypotheses with different results. Some have found that increased tax competition leads to positive results, whereas others found an inverse relation. In those studies it is important to note the sample being tested on as well as variables used, on which the results depend.

Keywords: Tax competition, tax systems competition, fiscal competition, Tiebout hypothesis, Leviathan hypothesis, Zodrow-Mieszkowski model

INTRODUCTION

European Union enlargement brought about a renewed discussion of the consequences of tax systems competition. Tax competition, or more appropriately, tax systems competition is defined as rivalry between given territories to attract mobile factors of production (labour and capital) through tax rate decreases. Fiscal competition is a more comprehensive term, including not only rivalry with tax rates, but also with institutional changes. Old EU countries generally have higher tax levels than new member countries: average corporate income tax level of 15 EU countries was around 32% decreasing to approximately 28% in a sample of 25 EU countries

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(Donaldson and Mortished, May 5, 2004). Given the free movement of factors of production within the European Union territory, the governments of 15 old EU members are concerned about their economic well being. To combat this competitive force, a resolution concerning the unification of tax bases for corporations, which conduct business in more than one EU country, was passed by the European Parliament in December 2005 (Leśniak and Słojewska, 2006). Now, the European Commission is working on a report dedicated to examining differences among corporate income calculation in 25 EU nations. The objective of this article is to present four models which describe the effects of tax systems competition on the economy and to discuss the empirical results, which have provided some support for their theoretical frameworks. The work begins with the earliest thesis – the Tiebout hypothesis – then continues chronologically with the Leviathan model, next with the Zodrow-Mieszkowski model, and finally the Federal model. The last section concludes.

1. TIEBOUT HYPOTHESIS

In his 1956 work Tiebout first voiced the opinion that intergovernmental competition benefits mobile consumers by providing them with a choice of jurisdictions with various tax/public good levels. Tiebout (1956) began with the presumption that "a satisfactory theory of public finance" should "(1) force the voter to reveal his preferences, (2) be able to satisfy them in the same sense that a private market does, and (3) tax him [voter] accordingly" (pp. 417-418). From this it follows that the local authorities, not central government, are better suited for the redistribution of economic resources. Tiebout presents his model, describing how an efficient redistributive system operates, with seven assumptions. He believed that at local government level revenues and expenditures are set and consumers move among communities in such a way as to find one which "best satisfies his set of preferences" (p. 418).

To obtain this state, Tiebout (1956) assumes that (1) consumers-voters are fully mobile and will move to a community where their set preference patterns are best satisfied, (2) consumers-voters have full knowledge of differences among revenue and expenditure patterns of communities and react to them, (3) there are a large number of communities in which the consumers-voters may choose to live, (4) restrictions due to employment opportunities are not considered, (5) the public services supplied exhibit no external economies or diseconomies between communities, (6) for every

pattern of community services there is an optimal community size, and (7) communities below the optimum size seek to attract new residents to lower average costs whereas communities above it do otherwise. To sum up the argument, the author compares purchasing services in a private market to doing so in the public one: As the consumer goes to a private market to purchase some good with a certain price, he can go to a community with a set level of taxes. Thus, the consumer must reveal his true desirable payment, either a price level or tax level, so "spatial mobility provides the local public-goods counterpart to the private market's shopping trip" (p. 422).

Today, it is common to interpret Tiebout's hypothesis as follows: large numbers of independent governments, controlled by landowners, wish to attract residents to the area in order to maximize the value of their land. The government raises "head taxes" and uses those funds to provide public goods to residents. Since a large number of jurisdictions is present in the model, the assumption is made that governments cannot influence the price or utility of the public goods they provide. Thus, the model leads to a conclusion that government redistribution of resources will not result in an efficient allocation in the sense that no one's position can be improved without worsening somebody else's position. As such, optimum Pareto is achieved thorough market competitive forces rather than government intervention.

Bewley (1981) presents a synthetic critique of Tiebout's argument pointing out that it is supported by the notion that, in an ideal case, there would be as many communities as voters. Free-riding will occur if this assumption is not met and, if it is dealt with, by levying additional charges on voters based on the usage of public goods/services then public goods become private ones. Another of Bewley's critiques is based on the fact that there must be free trade between jurisdictions, which must be in perfect competition with one another. If this is not so, then one government could put up trade barriers and raise taxes with would make its occupants better off then before. Finally, the author disapproves of the assumption that governments deliver pure public goods/services. He discredits this notion by showing that (1) consumers are not aware of economies of scale which impact the per capita cost of public goods, and (2) per capita cost of public goods may be lower than in direct proportion to the region's population which disallows citizens from undertaking corrective migration actions.

Further, as Sinn (1994) points out, private goods become publicly provided goods because the production of the former cannot be sustained in an open economy, since its marginal cost of production is below its average cost. If tax competition is present, countries cut rates below marginal costs to

increase tax revenues. Thus, the funds are insufficient for the production of long-term public goods such as healthcare or national security. This results either in a low level of public goods and services or higher taxes on immobile factors of production. Given this argument, Sinn (1994) proposes not only EU-wide tax harmonization but redistribution as well.

Tiebout hypothesis has been the subject of limited empirical testing. One analysis has been performed by Gramlich and Rubinfeld (1982) in which they proposed that for the hypothesis to hold (1) in the data pool citizens should possess similar expenditure tastes which implies that any variation in expenditure levels within the community should be smaller than with other jurisdictions, and (2) the community provides the desired level of public goods/services. To test this, a survey by Michigan's Institute for Social Research (ISR) of 2001 households in 1978 was used. When comparing the variances of spending demands intra- to inter-community (three counties under study – Wayne, Macomb and Oakland), "94 percent of respondents are grouped together at the 1 percent level" (p. 554). When a test of regression residuals was used, 88 percent of respondents were grouped at the 1 percent level (p. 554). Furthermore, the test showed that as the sample is expanded there was in fact less grouping, only 33% of respondents were grouped at 1 percent level. Thus, although the examination was based on Michigan data only, it failed to disprove the Tiebout hypothesis.

2. LEVIATHAN MODEL

Brennan and Buchanan in their 1980 work present a Leviathan model in which they assume that politicians, who collectively embody the government, represent their own interests rather than public interests. Self-interested politicians are influenced by rent-seeking interest groups and together they pursue revenue-maximizing actions, which lead to unnecessary increased spending and government size. The extent to which citizens are exploited by uncalled for taxation, depends on tax-payers' mobility and the number of competing jurisdictions (Forbes and Zampelli, 1989, p. 568). They called this big-budget country a Leviathan. Leviathan hypothesis predicts an indirect relation between fiscal decentralization and public sector size; that is, a greater number of jurisdictions (i.e. greater fiscal decentralization) results in smaller public sector through the mechanism of tax competition (Forbes and Zampelli, 1989, p. 568). Thus, by providing alternatives for workers and investors alike it can lead to a more appropriate

allocation of resources through decreased taxation and spending. To sum up their findings, Buchanan exclaims that "the intergovernmental competition that a genuinely federal structure offers may be constitutionally 'efficient'..." (1980). This view is also shared and described by Becker (1998, p.22) when he states that "Competition among nations tends to produce a race to the top rather than to the bottom by limiting the ability of powerful and voracious groups and politicians in each nation to impose their will at the expense of the interests of the vast majority of their populations" (Becker, 1998, p. 22).

This argument was furthered developed by Edwards and Keen (1996) which formalized this public choice theory into a mathematical model, adding a condition that local governments actions are guided by self-interest as well as public welfare. By combining Leviathan and Zodrow-Mieszkowski models, they found that tax harmonization may have a negative effect on the public by the inefficient use of tax funds by government officials, but that this can be somewhat mitigated if the money raised from distortionary taxes are replaced by non-distortionary funding.

Forbes and Zampelli (1989) examined a hypothesis that tax rates should be lower in metropolitan areas with a greater number of competing jurisdictions than with lower ones. The sample included 345 U.S. counties aggregated at the municipal level of government. In the equation tested, county government size measured by its budget divided by its income was the dependent variables, whereas independent variables included population, income and intergovernmental revenue. The results where contrary to those expected based on the Leviathan hypothesis: an increase in the number of jurisdictions led to an increase in the amount of paid taxes. However, one explanation for this deviation may be the loss of economies of scale through decentralization and authorizing lower levels of government with more responsibilities than would be the case with lower number of regions (Forbes and Zampelli, 1989, p. 371-372).

Another study by Zax (1989) tests the Leviathan hypothesis, but in a quite different way than the above study, because it measures within county competitive forces, rather than relation between counties. The sample included data on 3000 U.S. counties and the dependent variable was the size of government measured by the sum budgets of all local governments within a county as a fraction of entire county income. The results lent support to the hypothesis: larger number of localities was associated with smaller public sector size and centralized counties were related to larger fiscal budgets. To reconcile both studies, it might be the case that a large number of general purpose local jurisdictions results in a smaller public sector, while a large number of single purpose local governments leads to the opposite.

A 1946 to 1985 time-series study by Michael Marlow (1988) with a dependent variable measured as a percentage of total government expenditure to gross national product (GNP) and independent variables as a percentage of state and local expenditures to total public spending, in its extended version, found that "greater fiscal decentralization is significantly associated with a smaller public sector".

In their 2003 work entitled "Leviathan and Capital Tax Competition in Federation" Keen and Kotsogiannis studied the effects in a federation on consumer welfare of an increased number of lower level jurisdictions. Leviathan theory suggests a positive relation. Using mathematical concepts, they explain that although at first sight the relation appears to be opposite, in fact it is not. This is because "increasing the number of state[s] does indeed reduce the equilibrium state tax rate" leading to "the welfare gain [which] comes…from an increase in tax revenues" (Keen and Kotsogiannis, 2003, p. 196).

Finally, Wilson and Gordon (1998) compare the effect of expenditure competition in an open and closed economy. In general, politicians are assumed to derive benefits from increased budget size. An open economy is characterized by the large number of identical regions with a fixed amount of land, mobile labour, and two types of taxes – a head tax/subsidy and linear income tax on capital and labour. In this economy, to attract new workers the government provides more public services at lower prices but in the process increasing its taxable base. An alternative to that is a closed economy in which labour is not mobile, so if provision of public goods is raised it cannot be compensated through enlargement of the jurisdiction's tax base. Rather public disappointment can only be shown by voting officials out of office, which might be an unsatisfactory mechanism. As such, tax competition provides a beneficial result because it restrains government in an open economy, as it allows people to migrate out of a jurisdiction with an unacceptable tax/public goods ratio. Moreover, in the open economy case when the residents feel that level of public goods is inadequate, they may choose to increase it.

3. ZODROW-MIESZKOWSKI MODEL

The basic thesis of this model is that "government reliance on a source-based tax on capital income" can lead to "underprovision of local public services" (Zodrow, 2003). To prove the statement, a Basic Tax Competition Model is utilized and tested under various economic scenarios. The model

makes ten assumptions which are: (1) a large number of homogeneous jurisdictions, (2) perfectly competitive markets, (3) a Nash equilibrium in which each jurisdiction takes as fixed the after-tax return to capital and the tax rates set by other jurisdictions, (4) fixed population and land in each jurisdiction, (5) identical tastes and incomes for all residents of all jurisdictions, (6) a fixed national capital stock that is perfectly mobile across jurisdictions, (7) a single good that is produced by capital and the fixed factor in each jurisdiction, (8) government services that are "publicly provided private goods" benefit only residents, have no spillover effects to other jurisdictions and can be modeled as purchases of the single private good, (9) two local tax instruments – a "property tax" that applies to capital income and a head tax, (10) local governments that act to maximize the welfare of their identical residents (p. 654).

The basic reasoning presented by Zodrow and Mieszkowski (1986, 2003) states that with an increasing number of jurisdictions, facing a perfectly elastic supply of capital, each will feel unable to impact the after-tax return to capital and thus will lower its tax on mobile factors of production to finally eliminate it at all. This process of tax lowering is named "race to the bottom". It results in underprovision of public goods/services due to inadequate funding, which can only be overcome by placing a tax burden on immobile factors of production, land and, depending on the circumstances, labor (2003, p.654).

For the territory such as the European Union, the Zodrow-Mieszkowski model suggests that capital tax harmonization and simultaneous tax increase would lead to an efficient supply of public services and, given the assumptions of fixed national capital stock and identical jurisdictions, no negative consequences for the allocation of resources.

Based on the Basic Tax Competition Model numerate extensions were proposed, but in this article, let us concentrate only on those that bring us closer to true relations between EU nations. First, Wilson (1991) and Bucovetsky (1991) discuss tax competition between large and small entities that leads to a higher equilibrium rate for large jurisdictions and lower for smaller ones. Tax harmonization would thus result in a more efficient allocation of resources, but small nations may reject it, due to lower capital inflows. Second, Janeba (2000) states that if capital is not perfectly mobile, tax competition may yield important benefits. It limits governments' propensity to overburden immobile capital as it gives alternative host countries to invest in. Third, Brueckner (2000) relaxes labour mobility and indifferent tastes conditions. In this case, individuals have the possibility to

search out a best place of residence, yet still only capital is taxed. That, coupled with tax competition, leads to inefficient allocation of resources, especially in large jurisdictions, which could be eliminated with tax harmonization.

Various empirical models have been used to test Zodrow and Mieszkowski thesis. Among them, Sørensen (2001), given different variations from basic model assumptions and tax harmonization schemes such as full corporate tax harmonization or a minimum capital income tax, finds that the positive effect on GDP in EU-15 countries ranges from 0.16% to 0.35%.

Brueckner and Saavedra (2001) construct a mathematical model "to estimate the property-tax reaction function of a representative community" (p. 204), which in their case is seventy cities from the Boston metropolitan area in the U.S. state of Massachusetts. This area was chosen because of the passage of Preposition 2½ in 1981 that placed an upward limit on property tax rates in Massachusetts. As such, it bounded local governments' optional tax rates and so potentially limited the intensity of intergovernmental competitive behaviour. The study finds that while the strategic interaction was present before the law was passed, after it it was still present but among neighbouring states or pertaining to taxes associated with business activity. This outcome was likely since under new regulation local governments were not limited in tax rate per source, but rather average of sources, and thus they choose to charge residential property more than business property in order to remain competitive in the latter market.

Wildasin (1989) conducts empirical studies to quantify the amount of loss of efficiency in a Basic Tax Competition Model with a large number of small jurisdictions. In other words, he sets out to quantify the difference between optimal taxation and taxation levels caused by the "race to the bottom". He concludes that the cost of inefficient allocation at the local level in the U.S. amounted to 8% of total government spending in a given year, however, when governmental transfers from federal to local level were included, the loss equated to only 0.6%.

A similar study, which considered the effects of tax base and tax harmonization, among others, on a sample of EU-15 and EU-15A (15 members of EU excluding United Kingdom, Ireland, Denmark and the Netherlands or in other words EU countries with similar accounting systems) was conducted by the Copenhagen Economics Group (2004). It found that overall harmonization slightly increases GDP and welfare (with a specific strength depending on the specific case studied) but it has a large negative impact on total tax revenues, which might lead to large budget deficits and/or inadequate funding for basic social goods. For example, under the scenario of

tax base harmonization at unweighted averages EU-15 GDP increased by almost 0.2%, while at weighted averages by almost 0.4%. Simultaneously, total tax revenues decreased by almost 0.25% and 0.3%, respectively. However, when enhanced cooperation on tax base harmonization (which means that a subset of countries will harmonize tax bases at particular levels) is taken into account (a more likely route given the unanimity rule), for EU-15 at unweighted averages total tax revenues increased by about 0.3%, while GDP declined by 0.5%. Further, the study finds that harmonization brings about large differences in the way particular countries' growth, welfare and total tax revenue are impacted, or in other words, it shows that with harmonization there would be big winners but big losers as well.

4. FEDERAL MODEL

The basic premise of the fiscal federalism literature is that competition among tax systems is as beneficial as competition among firms, or in the words of Milton Friedman: "'Competition among national governments in the public services they provide and in the taxes they impose is every bit as productive as competition among individuals or enterprises in goods and services they offer for sale and the prices at which they offer them'" (Mitchell, 2004). The logic behind it is, as explained by Davies (2004) that with monopoly power under no inter-state competition a state can set taxes too high and so create "inefficiencies in the market" by "capturing [sic!] rents for itself" (p. 501); whereas under competition taxes are lowered as states compete for firms and so learn to manage their resources more efficiently. Moreover, it presupposes that local governments have a better knowledge of "local preferences and costs" (p. 508) and so they can better serve their peoples through the provision of tailored local public goods and services, although the literature acknowledges that there are some public goods such as national security, which can only be efficiently provided by national government (Oates, 2001).

The model has been described and put in a mathematical form by, for example, Feld, Kirchgassner and Schaltegger (2005) in order to study the relationship between fiscal differentiation and economic growth. As their study pool the authors used Switzerland due to the fact it is a federate country with twenty-six cantons, which can for the most part freely define, levy, and collect taxes and between which tax systems competition exists (Baumann).

Feld, Kirchgassner and Schaltegger (2005) tested, among others, the influence of tax competition variable on economic growth by applying a neoclassical growth model developed by Mankiw, Romer and Wiel (1992). The inputs are described as follows: the real gross domestic product (GDP) denoted by Q_{it} of each EU member country i at time t is a function of their initial endowments with labor L_{it}, human capital H_{it} and physical capital K_{it}. Then, Cobb-Douglas production function is as follows:

$$Q_{it} = L_{it}^{\beta_1} H_{it}^{\beta_2} K_{it}^{\beta_3} e^{\beta_0 D_{it} + \varepsilon_{it}},$$
$$\varepsilon_{it} \sim I\,N(0,\sigma^2),$$
$$i = 1,2,3, \ldots\ldots 20,$$
$$t = 1980,\ldots\ldots 1998.$$

$e_{it} \sim I\,N(0,\sigma^2)$ denotes the technological disturbance which is independent of other terms and with normal distribution. $\beta_j = 1,2,3$ are output elasticities with respect to factors of production L_{it}, H_{it} and K_{it}. Fiscal institutions are denoted by D and so are a factor of technology.

In this context, fiscal institutions are defined as "efficiency of public activities" (Feld, Kirchgassner and Schaltegger, p. 14). To simplify the equation, take the natural log of both sides, which gives us the following:

$$\ln Q_{it} = \beta_0 D_{it} + \beta_2 \ln L_{it} + \beta_2 \ln H_{it} + \beta_3 \ln K_{it} + \beta_4 \ln V_{it} + \varepsilon_{it}$$
- β_0 through β_4 are parameters of interest
- ε_{it} is the error term
- L_{it} is measured by number of employees in a canton
- H_{it} is measured by canton's education spending per capita
- K_{it} is canton's capital investment
- V_{it} is a vector of control variables, including canton's population.

The results obtained by the researchers indeed showed that tax competition, defined as the difference between the highest corporate income tax rate of a canton in Switzerland and the average of corporate income tax rates in neighbouring cantons (in similar or if possible in identical tax brackets), had a positive effect on GDP per capita on a 5% significance level. Moreover, they found that "the higher the neighbours' tax rates, the smaller is the difference between the canton's tax rate and that of its neighbours" (p. 15) but the lower GDP per capita. The results proved to be robust to other estimation methods such as instrumental variables as well as to the inclusion of outliers.

But there is one important difference between fiscal competition between independent countries and such competition between states, cantons, or a like within a federal union, that is of a vertical fiscal competition. This occurs because upper and lower levels of government share a similar tax base and thus may compete for it. Keen and Kotsogiannis (2003) develop a model of federal capital tax arrangements to study both phenomena assuming that governments have Leviathan properties. In the case of horizontal fiscal competition they argue (as Brennan and Buchanan do) that local governments would wish to increase capital tax, so from their perspective tax is too low, because they ignore the positive side effect of expanded tax base in other states. However, it can be argued that vertical fiscal competition leads to the opposite effect because each level of government neglects the negative consequence an increased capital tax rate has on the other levels by lowering the common tax base. The authors come to the conclusion that in federations vertical fiscal competition dominates the horizontal one and thus "absence of cooperation" (p. 195) between self-interested governments leads to over-taxation. Thus, the federal capital tax rate which forms at equilibrium is too high and its decrease would increase consumers' welfare.

The United States is also considered to be a federate country and some studies have been performed to analyze whether U.S. states engage in tax competition. Davies (2005) cites many examples when states provided large tax incentives (such as tax abatements or payroll tax credits) to foreign companies to attract them into their territory. Further, by mathematical application, he concludes that inter-state fiscal competition results in a more efficient utilization of resources and brings federal government closer to its optimal level. Therefore, under Davies' analysis tax competition proved beneficial not only to the winning state but also to the national government. Also, Figlio, Kolpin and Reid (1999) have found that U.S. states tend to decrease state benefits in tandem with their neighbours and that they respond more to benefit decreases then increases.

CONCLUSION

The literature on tax competition is very vast and complex. The goal of this article was to systematize it according to three different paths researchers took after its first formulation by Tiebout (1956). Since then, the primary question posed is: is tax competition a benefit or detriment to

economy and its participants? One strain was formulated by Zodrow and Mieszkowski (1986, 2003) using a model to analyze the negative consequences of tax competition. On the other hand, the political economy view developed by Brennan and Buchanan (1980) upholds its positive consequences through more efficient allocation of resources. The same view is held by authors with federalist convictions on tax competition such as Feld, Kirchgassner and Schaltegger, although they present different reasons from Leviathan supporters. The empirical studies are limited both in number and scope. Due to inadequate sample size they are often incomplete and should be repeated with longer time series and using more modern technological and statistical measures. Moreover, as the European Union member countries search for appropriate methods of harmonization, the region might prove to be fertile ground for conducting tax competition research.

From this review, one can not offer clear guidance to European Union policy makers. Fiscal competition seems to have its benefits, but costs as well and too often the former may flow to the wealthy countries at the risk of poorer countries bearing the latter.

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