Economics 230a, Fall 2014
Lecture Note 13: Tax Competition

We have discussed the incentives for individual countries in designing tax policy, but an important issue is how the tax policies in one country affect the options in others, and how, in turn, this affects their tax policies. These responses fall under the heading of tax competition, although competition is not necessarily a good characterization of all governmental policy interdependencies. For example, even within a country, the decisions of governments at, say, the national level affect the incentives of subnational governments.

While our discussion will often refer to the interactions of different countries, similar issues come up among governments at a subnational level, as among US states, the main differences being (1) that tax rates, and differences among them, are typically much larger in the international context than in the interstate context; and (2) there is a higher-level government in the case of US states, which may help the states coordinate activities. However, there are lessons from the experience of interstate competition for tax policy choices in the international context. The *Handbook* chapter by Keen and Konrad provides a comprehensive survey of the literature.

Tax Competition: Basic Concepts and Results

Perhaps the simplest model of tax competition involves two identical (and hence, "large") countries competing for capital that is internationally mobile but, in the simplest specification, fixed worldwide. Each country produces homogeneous output with capital and labor according to the CRS production function $F(K,L)$, a representative household in each country has an endowment of capital and supplies labor to maximize a utility, and each government imposes taxes on capital (on a source basis) and labor to raise revenue for government spending, G, with the level of government spending chosen to maximize the representative household's utility, $U(C,L,G)$, where C is private consumption.

Given the nature of this set-up, we can focus our attention on possible symmetric equilibria, in which aggregates are the same in the two countries. Thinking first about global optimality, that is, maximizing the (equal) utility of the representative agents in the two countries, this would be achieved by having an equal tax rate on capital in the two countries – which is nondistortionary, since capital is in fixed overall supply – no taxes on labor, as these would involve deadweight loss, and government spending set so that the marginal utility of government spending equals the marginal utility of private consumption, $U_C = U_G$. However, this outcome will not result as a Nash equilibrium of a game in which each government chooses its own capital and labor income tax rates. This is because, from each government's perspective, capital supply is responsive to its tax rate. Thus, starting from the first-best optimum just described, a government will seek to improve national welfare by reducing the capital income tax and introducing the labor income tax, given that a small labor income tax has only second-order deadweight loss. With each government having this incentive, this process will lead to lower capital income taxes and positive labor income taxes in both countries. Also, because each country will be using distortionary taxes at the margin to raise revenue, government spending will be too low, relative to its efficient level, and the mix of government taxes will rely too much on labor and too little on capital. (In this symmetric equilibrium, production will still be efficient because tax rates are the same in the two countries.)

We thus have a "race to the bottom" in the choice of capital income tax rates and government spending. In terms of the mechanism at work, the capital income tax rate in each country has a positive fiscal externality in the other, because raising the capital income tax rate in one country drives capital to the other, thereby increasing tax revenue in the second country. As with standard externalities, the failure to internalize the externality leads each country to set its tax rate too low; and, as with standard externalities, welfare could be improved by implementing some sort of corrective measure to cause the externalities to be internalized. If we are dealing with national governments, though, what can fill the role of "government" in this case? International organizations like the OECD attempt to fill this role in developing norms for tax policy, but they lack the coercive power of governments. If we are dealing with subnational governments, such as those of US states, then there is a higher level government (e.g., the US government) that could use instruments, in this case matching subsidies for the capital income taxes of lower level governments, to overcome the fiscal externalities (see Gordon, *QJE* 1983).

In the symmetric case, one might also hope that countries could achieve a cooperative solution to the game of choosing their taxes. But cooperation becomes more challenging in an asymmetric setting, because countries with different characteristics differ not only in the policies chosen in a noncooperative equilibrium but also in the extent to which they could gain from a cooperative process, particularly if that process excludes side payments among countries.

Figure 2-3.

OECD Countries' Top Statutory Corporate Tax Rates Relative to Total Investment, 2003

(Ranking by top statutory corporate tax rate)
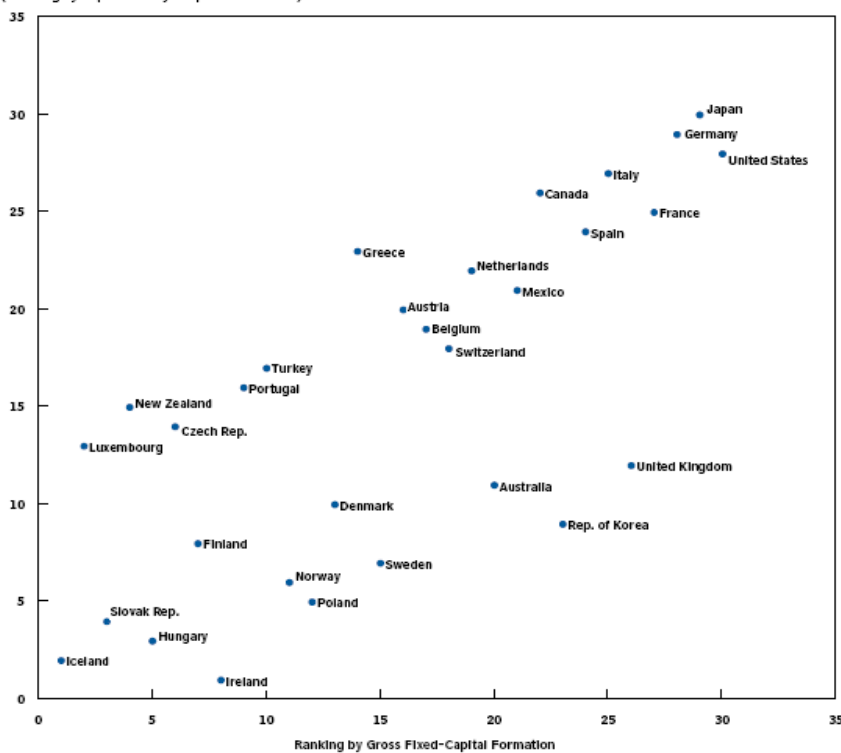
In particular, if countries differ in size and capital endowments, one might expect that smaller countries would set their capital income tax rates lower. The logic, as in Keen and Konrad (pp. 273-4) is as follows: "Intuitively, in considering a tax rate cut, countries must weigh the loss of revenue from their own capital against the benefits of attracting more inward investment; and for a small country, with a narrow domestic capital base and a lot of capital abroad that it might attract, the attractions of a rate cut will be greater."

The above figure (from CBO, *Corporate Income Tax Rates: International Comparisons*, 2005), which plots countries' rankings of corporate tax rates against their rankings in size of gross capital formation, is quite consistent with this story.

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In the extreme, countries with virtually no domestic capital or production will have strong incentives to have very low tax rates in order to attract the reported profits of multinationals. Such countries are commonly called tax havens. A recent list of such countries is provided by Dharmapala and Hines (*J. Pub. E.* 2009), who also discuss the factors determining whether countries become tax havens. While all tax havens are small, not all small economies are tax havens; a key determinant is the quality of a country's governance. The logic is that, even with low tax rates, only countries with good governance are likely to be able to attract multinational profits and the associated financial flows, as the threat of expropriation and other dangers will limit the attractiveness of countries with weak institutions. Are tax havens good or bad? On the one hand, their existence promotes the erosion of tax bases in high-tax countries like the United States. On the other hand, their existence may limit the incentives of multinationals to move real activities from the high-tax countries, as these companies can generate lower effective tax rates on such activities simply by reporting some of their profits in tax havens. Indeed, for a high-tax country like the United States, with some business activities conducted by domestic companies unlikely to move activities elsewhere, and others conducted by multinationals, the existence of tax havens and profit-shifting opportunities for the latter group amounts to the imposition of differential tax rates on companies with low vs. high sensitivity of location with respect to tax rates, which may be justified from an optimal- tax perspective.

Other evidence in the literature regarding the presence of tax competition involves (1) estimates of the dependence of tax rates on those of other countries and (2) the evolution of the *structure* of corporate taxation. In particular, to the extent that countries compete over the location of profits as well as capital (with the location of profits to some extent independent of the location of capital because of profit shifting, as discussed in the previous lecture), they may wish to rely less on tax instruments that discourage both, rather than on those that just discourage capital location.

Present Value, Depreciation Allowances, 1982-2005
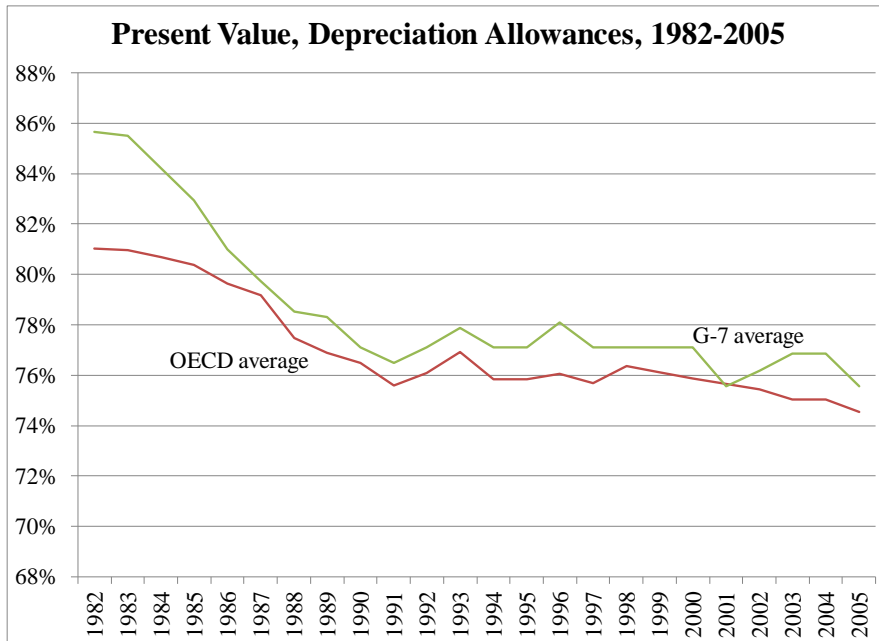
This prediction is consistent with the fact that, while corporate tax rates have come down over time, provisions to encourage capital investment specifically, but which do not affect profit-shifting (such as acceleration of depreciation deductions, which increases their present value) have actually been curtailed, as seen this figure (constructed using the Institute for Fiscal Studies corporate tax database).

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Benefits of Tax Competition?

The message of the previous discussion seems to be that tax competition is bad in the sense that it increases the distortions encountered in the provision of goods and services by governments. The literature does include some models, discussed in Keen and Konrad, in which tax competition has positive attributes, either limiting the potential attraction to governments of capital tax policies that are dynamically inconsistent (because governments have less to gain by raising capital income taxes after promising to keep them low), or by reducing the capacity of "Leviathan" governments, which seek a suboptimally large size, to extract too much from the private sector.

Alternative Tax Reforms

An alternative often proposed for existing tax systems is formula apportionment, under which a jurisdiction determines the tax base for a company operating within its jurisdiction as well as possibly several others based on the shares of that company's overall sales (S), assets (K), and/or payroll (wL) that fall within that jurisdiction. That is, if the company's worldwide profits are π, jurisdiction i imposes tax on a fraction of π equal to $\alpha_K \frac{K_i}{\sum_j K_j} + \alpha_P \frac{w_i L_i}{\sum_j w_j L_j} + \alpha_S \frac{S_i}{\sum_j S_j}$, where $\alpha_K + \alpha_P + \alpha_S = 1$. Formula apportionment is the standard approach used by US states for their own corporate income taxes.

A main attraction of formula apportionment is that it eliminates the opportunity for companies to engage in profit shifting, as the tax base in any jurisdiction does not depend on profits reported there, but only on overall profits and the apportionment factors α_K, α_P, and α_S. On the other hand, firms will have incentives to shift the factors used in the apportionment formula, as this affects their overall tax liability. Following intuition associated with a paper by McLure (1980), a tax based on apportionment factors has effects similar to a tax on the apportionment factors themselves. For example, if a company's tax liability in jurisdiction i depends on the share of its assets in that jurisdiction, then increasing the share of its assets in jurisdiction i will increase its tax liability in jurisdiction i. To see this, consider a simple example in which a firm produces in two jurisdictions, each of which taxes profits based on the share of the firm's assets in that jurisdiction. Then the firm's profits after tax are:

$$F(K_1, L_1) + F(K_2, L_2) - r(K_1 + K_2) - w(L_1 + L_2)$$
$$- \left\{ t_1 \left[\frac{K_1}{K_1 + K_2} \right] + t_2 \left[\frac{K_2}{K_1 + K_2} \right] \right\} \{F(K_1, L_1) + F(K_2, L_2) - w(L_1 + L_2)\}$$

where we assume that production functions and after-tax capital and labor costs are the same in both jurisdictions and that wages, but not capital costs, are tax deductible. The first-order condition for capital in jurisdiction 1 is:

$$F_K^1(1 - T) - \pi \frac{dT}{dK_1} = r$$

where $T = t_1 \left[\frac{K_1}{K_1 + K_2} \right] + t_2 \left[\frac{K_2}{K_1 + K_2} \right]$ and $\pi = F(K_1, L_1) + F(K_2, L_2) - w(L_1 + L_2)$ are taxable profits. Since $\frac{dT}{dK_1} = \frac{K_2}{(K_1 + K_2)^2} (t_1 - t_2)$, we have:

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$$F_K^1 \left(1 - T - \pi \frac{K_2}{(K_1 + K_2)^2}(t_1 - t_2)\right) = r$$

Thus, the tax wedge the firm faces in using capital in jurisdiction 1 equals the average tax rate in the two jurisdictions, T, plus a term that is increasing in the excess tax rate in jurisdiction 1, $(t_1 - t_2)$ and the level of taxable profits, π. The same reasoning applies to taxes apportioned based on payroll or sales, and this helps explain the evolution of formulas used by US states.

Figure 2: Histogram of Sales Apportionment Weights by Decade
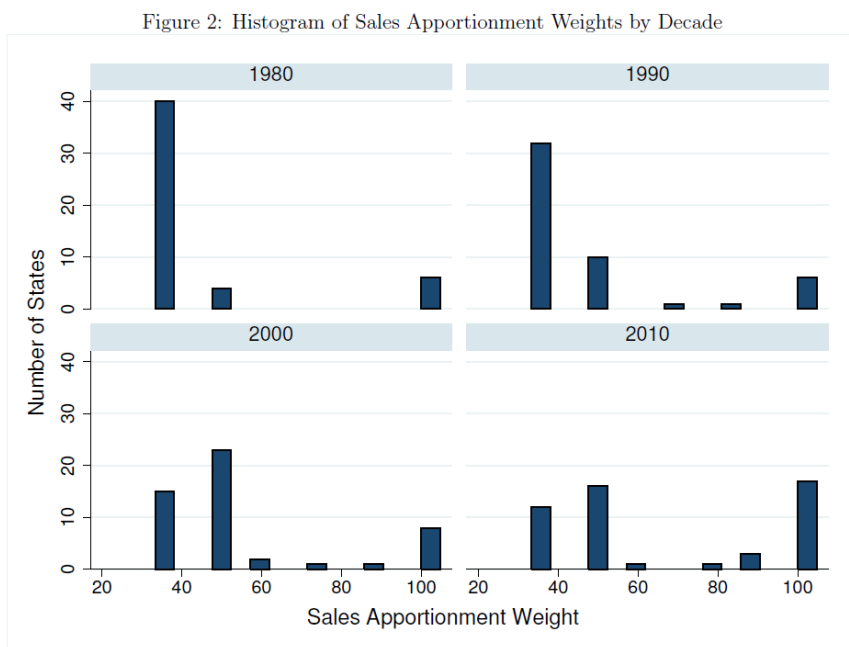
Using sales to apportion profits, rather than assets or payroll, may provide multistate companies with a stronger incentive to locate production activities within a jurisdiction. As shown in this figure, from Suárez Serrato and Zidar (2014), US states, which historically relied on an equally weighted formula based on assets, payroll, and sales, have steadily moved toward a greater reliance on sales in their apportionment formulas.

Indeed, there is some evidence (e.g., Goolsbee and Maydew, *J. Pub. E.* 2000), that switching to a greater reliance on sales increases a state's level of manufacturing activity.

Formula apportionment, though, has many drawbacks of its own. As discussed in Keen and Konrad, although formula apportionment alleviates tax competition with respect to the profit shifting, competition might even be stronger than under source-based taxation with respect to the location of productive factors. Further, particularly for the case of sales-based apportionment (for which competition for productive factors might be lessened), formula apportionment is open to tax avoidance strategies that would not be present under source-based taxation. For example, under sales-based apportionment, company A could sell its entire output to a second company, B, which is located in a tax haven, with company B then reselling the output to purchasers in high-tax countries. Because it is simply reselling company A's output, company B has minimal profits subject to tax based on sales in the high-tax countries, and company A, which may have substantial profits, pays little or no tax because its sales all occur in the tax haven.

Another alternative is destination-based taxation, as proposed in Auerbach et al. The approach is somewhat related to sales-based apportionment, in that the location of sales governs the location of taxation. But the mechanism for calculating tax liability is different, and not subject to avoidance schemes like the one just discussed. A jurisdiction wishing to impose a destination-based tax would start with source-based taxation and then impose border adjustments on exports

and imports by multinationals. That is, if the country's corporate tax rate is t, then exports would receive a tax credit at rate t and imports would be taxed at rate t. This would have the effect of eliminating the tax consequences of exports and imports (since export revenues would otherwise be taxable, and import costs otherwise deductible). Hence, profit-shifting opportunities for multinationals based on intracompany transactions would disappear.

National and Subnational Policy Coordination

One final issue is the interdependence of tax policies at different levels of government within a country. We have already discussed how a national government might use tax instruments to offset fiscal externalities among states. But there are also vertical fiscal externalities in tax policy, in that tax policy at one level of government affects the tax base at other levels. Here, though, the externalities are likely to be negative, rather than positive. For example, if the US federal government taxes corporate income and states do as well, increases in state corporate income tax rates are likely to reduce the national corporate tax base. By the usual logic of analyzing externalities, tax rates in this case will be too high, rather than too low, because governments at each level will ignore the negative effects of their taxes at other levels. With positive fiscal externalities among states and negative fiscal externalities between states and the federal government, the net impact on tax rates is ambiguous, in theory.