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# POLICY RESPONSES TO TAX COMPETITION: AN INTRODUCTION

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*ABSTRACT: This paper catalogues policies that have been deployed by jurisdictions seeking to mitigate the effects of tax competition. It takes a broad approach, recognizing that there are many instruments in the policy arsenal and that the tax base associated with a particular tax instrument may be affected by multiple policy choices, including some such as capital controls and development incentives that are outside the traditional realm of tax policy. This paper describes sixteen instruments that both federal and sub-federal governments have adopted in an effort to limit tax competition. It classifies these instruments into three groups: those that can be pursued unilaterally, those that require bilateral or multilateral agreement, and those that require action by an external actor such as an overarching government. It also discusses the set of economic responses that are relevant to the evaluation of these policies, and then summarizes new evidence on the impact of a subset of these policy instruments.*

**Keywords:** *tax competition, tax coordination, harmonization, minimum tax rates, international tax, state and local tax*

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## I. INTRODUCTION

Nations, states, and localities compete for mobile individuals, firms, and transactions when designing their tax systems. The capacity to move away from a high-tax jurisdiction is a key behavioral response for taxpayers, whether households or firms, and this response can be an important determinant of the location and scale of economic activity, as well as the fiscal capacity of governments. Rising economic integration, both within and across nations, is associated with higher mobility between jurisdictions. It places growing pressure on tax structures that were designed for a world with less economic mobility.

News accounts periodically claim that taxes are responsible for the migration of high-profile individuals and firms. For example, the band Abba's move out of Sweden in the late 1970s, when that country had top marginal income tax rates of more than 80 percent, was broadly attributed to tax issues. When Amazon was searching for a location for its second headquarters, many states and localities offered multi-billion dollar subsidy deals to lure the online retail giant. Large corporations such as Lufthansa, Deutsche Bank, and Unilever had subsidiaries in the small German town, Norderfriedrichskoog, with a population of about fifty, to benefit from its zero-rated local corporate business tax rate.<sup>1</sup> These examples that illustrate a more general point, namely that tax-driven mobility can place constraints on the tax rates that jurisdictions can set.

Cross-jurisdiction mobility of the tax base can drive a wedge between the optimal tax policy for a single jurisdiction and the optimal policy for a collection of jurisdictions taken together. Although each jurisdiction may find it individually rational to offer lower taxes, because in-migration will increase the tax base and potentially offset the revenue loss from lower rates, the relocation of economic activity from another jurisdiction reduces its tax revenues and economic activity. The net effect on the tax-cutting jurisdiction is positive, but it is possible that the net losses to the other jurisdictions will exceed this benefit and make the aggregate impact negative.

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<sup>1</sup> Further details on Abba may be found at <https://abbaarticles.blogspot.com/2012/04/1977-pop-group-abba-wants-to-leave.html>. For corporate incentives, see the 2018 *Slate* article "Here Are the Most Outrageous Incentives Cities Offered Amazon in Their HQ2 Bids;" and von Schwerin and Buettner (2016).

This possibility is illustrated by the so called “check-the-box” rules that allow U.S. multinationals to create entities that are treated differently in the United States and in foreign countries. These rules, described in Altshuler, Boller, and Suárez Serrato (2024), permit hybrid structures that reduce tax payments both in the United States and in foreign countries. Introduced in 1997, these rules allow U.S. multinationals to enjoy lower effective taxes at the expense of some non-tax haven foreign jurisdictions. Part of the initial motivation of the OECD’s Base Erosion and Profit Shifting initiative (BEPS) was to reduce the abuse of these types of hybrid entities as well as the inefficiencies created by tax competition.

Tax competition can provide a discipline on the tax rates levied by jurisdictions. It can generate benefits by facilitating sorting amongst diverse communities, taming the excessive taxation of Leviathan governments, and enhancing efficiency from better matching of firms to locations. Some individuals may be better off because of it.

Tax competition also crease two types of inefficiencies. First, when competition is responsible for tax rate disparities across jurisdictions, it results in resource misallocation across jurisdictions. The marginal product of production factors will be higher in high-tax jurisdictions. Second, when jurisdictions decide the size of their public sectors, if they equate the marginal benefit of spending to their inhabitants with the marginal own-jurisdiction cost of raising revenue, but do not consider interjurisdictional fiscal externalities, they may choose an inefficient spending level. A policy change in one jurisdiction can impact revenues and spending elsewhere, as the tax base or beneficiaries of policies move across jurisdictions. Besides tax externalities, there can be spending externalities: non-residents often consume public services outside of their home jurisdiction, but governments do not account for those expenditure spillovers when setting policy.

In federal systems of government, national governments sometimes take actions to reduce tax competition. In addition, in countries including Germany, Switzerland, and the United States, sub-federal governments have often engaged in interjurisdictional cooperation. One example is the Kansas-Missouri pact of 2019 in the US. There are also wider-ranging international initiatives such as the BEPS project at the OECD and the recent global minimum tax proposal. At the international level, the absence of an overarching tax authority has confounded cross-country tax coordination. Despite the political challenges, several recent policy initiatives---most notably the agreement by nearly 140 countries in 2021 on the G20/OECD’s inclusive framework on global

minimum taxation---have sought to limit tax competition. While there are many different policies designed to limit tax competition, there is no systematic catalogue of them, nor a comparative assessment of the extent to which they have affected jurisdictional behavior. This paper describes a comprehensive menu of policy responses to interjurisdictional tax competition, along with framework for analyzing these responses. It also summarizes the new research studies in this volume that present new evidence on some of these policies.

Policy responses to tax competition are sometimes widely accepted by jurisdictions, but sometimes they are highly contentious. States with cross-border metropolitan areas, such as New Jersey-Pennsylvania, have historically entered into reciprocity agreements that shift income taxes away from the location of work to the location of residence. Despite the long-standing agreement, New Jersey Governor Christie initially promised to abolish the NJ-PA agreement, but then reversed this decision. With respect to corporate profits, the 2017 Tax Cuts and Jobs Act (TCJA) exempted multinational foreign-sourced income from U.S. taxes. But, worried this change would result in increased profit-shifting incentives, the U.S. unilaterally passed the global intangible low-taxed income (GILTI) tax. Other policies such as state aid rules in the EU, formulary apportionment in the U.S. states and Pillar 1 of BEPS, minimum taxes as in Pillar 2 of BEPS, and exit taxes represent prominent responses to competitive forces.

The policies we consider range from complete tax harmonization to more flexible structures that involve partial harmonization among a subset of jurisdictions or that force low-tax jurisdictions to enforce a minimum rate while allowing higher-tax jurisdictions tax autonomy. Many questions arise when considering policy responses to tax competition. They include: What structures have been tried? Do they rely on an external actor like an overarching institutional authority or not? Do they require cooperation or do they allow for unilateral action? Do these institutions have staying power? What are the necessary pre-conditions to implement them? How effective are they at improving tax revenues and welfare? Beyond formal tax treaties, we also consider changes in auditing, mobility restrictions and border controls, and changes to apportionment formulas and sourcing rules. Within federal systems, we explore the tools available to state and federal governments, such as intergovernmental grants, intermunicipal cooperation, constitutional restrictions on taxing instruments, and jurisdictional amalgamation.

The distinction between unilateral and multilateral implementation of a policy response is critical because policies that can be adopted unilaterally may not internalize any interjurisdictional externalities and may instead be used as new strategic tools by their adopters. Further, the distinction between multilateral adoption without the involvement of an external actor (such as a bilateral treaty) and multilateral adoption with delegation to an external actor (such as the European Union) has important implications for the extent of the welfare improvements. If the taxed factor is locally mobile, then then bilateral efforts between nearby jurisdictions may be sufficient. In cases where the tax base is globally mobile, however, bilateral arrangements run the risk of improving the well-being of the participating jurisdictions while imposing costs on those that do not participate. In these cases, an external actor – such as an over-arching jurisdiction – may need to intervene to achieve the welfare optimum, but involving such an actor may place added constraints on the feasible policy interventions.

The substantial literature on the economic effects of tax competition finds that in many settings, it is not possible to determine whether a policy action is efficiency enhancing without a careful empirical assessment. There are a few general theoretical results that have nevertheless emerged. First, as noted in Keen and Konrad (2013), “if the decentralized solution suffers from externalities between the players, it generically holds that an appropriately chosen central planner’s solution exists that yields strictly higher welfare in every country, relative to the decentralized outcome.” Although this result implies that a possible Pareto improvement exists, it may be very difficult to implement and is likely to be politically infeasible. Second, when reaction functions slope upward, so that an increase in the tax rate of one jurisdiction raises the tax rate in another, minimum tax rates are more likely to increase the tax revenues of all jurisdictions than tax harmonization to a weighted average of the uncoordinated tax rates. Third, tax harmonization to a weighted average of the tax rates that prevail under competition will not yield an efficient outcome, because those rates were likely set inefficiently low. Fourth, tax rates and welfare generally increase as the number of competing jurisdictions decreases, meaning that consolidations, mergers, and cooperation that lead to fewer taxing jurisdictions will raise revenues. Fifth, making the tax base more inelastic by changing sourcing rules or enforcements will raise tax rates. Finally, when governments have many possible taxing instruments, tax coordination on one instrument can become Pareto worsening because jurisdictions compete more aggressively on other tax instruments. Taken together, there exist policies that can be Pareto improving, but how

to design those policies to achieve those improvements requires careful empirical analysis, which we attempt to guide in this chapter.

## **II. DEFINING “TAX COMPETITION”**

There are a number of excellent surveys of prior research on tax competition, and we highlight only a few of the many insights that emerge from this body of work.<sup>2</sup> Wilson and Wildasin (2004) define tax competition as “noncooperative tax setting by independent governments, under which each government’s policy choices influence the allocation of a mobile tax base among “regions” represented by these governments.” This definition excludes a range of policy inter-dependencies between governments, including yardstick competition, expenditure spillovers, and policy learning. By requiring the tax base to be mobile among governments, this definition rules out any vertical competition that might occur between a higher level government and a lower level government that share the same tax base, discussed for example in Keen (1998). This is the situation that arises, for example, when a federal government as well as state governments apply sales taxes to the same transactions. While competition for a mobile tax base usually creates pressures that make taxes too low, vertical tax competition usually results in pressures that make taxes too high. The potential policy responses to vertical tax competition differ from the responses to horizontal tax competition between governments; we focus on the latter.

Tax competition can take many forms. Anything that changes the effective tax rate in a jurisdiction can be used as a competitive tool, such as the statutory tax rate, the definition of the tax base, the level of tax enforcement, and the availability of firm-specific or individual-specific subsidy deals as studied in Slattery and Zidar (2020). A jurisdiction may not be able to change only one policy instrument in isolation, as a feasible change in a statutory tax rate, for example, requires either a change in the tax base, in expenditures, or in debt policy. The breadth of instruments that can be used to engage in tax competition implies that policies solely aimed to address competition in tax rates are at best a partial constraint on government competition.

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<sup>2</sup> Surveys include Agrawal, Hoyt, and Wilson (2022), Brühlhart, Bucovetsky, Schmidheiny (2015), Keen and Konrad (2013), Brueckner (2003), and Wilson (1999).

The foregoing definition of tax competition allows for both strategic and non-strategic tax competition. A large empirical literature has tested for tax policy competition estimating the slope of strategic reaction functions between the tax rates or other choices of different jurisdictions. Finding that the slope of the reaction function is zero does not imply the absence of tax competition; it only implies the absence of *strategic* interactions.<sup>3</sup> Even when the reaction function has a zero slope, equilibrium tax rates are still inefficient due to interjurisdictional fiscal externalities.

Tax competition is evident at many levels of government. With respect to statutory tax rates, local governments compete for mobile capital via the property tax while states or provinces around the world have access to personal income tax rates on earnings or capital income that can be used to lure high-income individuals. States and local governments can compete for cross-border shoppers and businesses that can locate in different places by changing the retail sales tax or value-added tax rate. The sales tax case is one in which the tax base is locally mobile, so strategic interactions are expected to arise. And of course, at the international level, interjurisdictional differences in corporate tax rates have led to profit-shifting opportunities.

There are many examples of jurisdictions using specific policy levers such as bidding for firms or offering R&D tax credits. U.S. cities compete to attract corporate offices, such as Amazon HQ2 and General Electric's headquarters. States compete for manufacturing facilities such as the 2008 Volkswagen plant that was ultimately located in Tennessee or the BMW or Boeing facilities

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<sup>3</sup> To illustrate this point, consider a variant of the Zodrow and Mieszkowski (1986)-Wilson (1986) model in which infinitely many small localities levy a source-based tax on freely mobile capital and use the revenue to finance a local public good that benefits completely immobile residents. With infinitely many small governments, none can affect the world rate of return of capital. Governments are price takers: they compete with each other in a perfectly competitive market. The governments are not strategic, as they would in a world of oligopolistic competition. Although a tax change in any one jurisdiction does not change the tax rate of other jurisdictions, the equilibrium is still subject to tax competition forces and is inefficient. The perfect mobility of the tax base implies that a tax change in one jurisdiction imposes a fiscal externality on all other jurisdictions. Taxes and spending are therefore too low. In contrast, as Wildasin (2023) emphasizes, with strategic competition between a small number of jurisdictions, which might arise due to linkages from commuting from local labor markets, governments explicitly react to other jurisdiction's policies. Both the strategic and nonstrategic equilibrium are inefficient.

that were located in South Carolina. Nations like Ireland, the Netherlands, and the United Kingdom compete to attract the intellectual property income of large multinational firms. Bartik (2019) estimates that in 2015, annual state and local business tax incentives in the U.S. amounted to more than \$45 billion, an amount that is roughly comparable to state corporate tax revenues.

### **III. TAX COORDINATION AND POLICIES DESIGNED TO LIMIT COMPETITION**

Tax coordination is a response to tax competition. Policies that promote coordination limit the noncooperative tax setting authority of independent governments, reduce the mobility of the tax base among these governments, or induce each government actor to internalize externalities imposed on other governments. Wildasin (2002) observes that tax coordination can occur by delegation to external actors, by mutual explicit agreements among a set of jurisdictions, or by a single jurisdiction unilaterally altering its policy.

This definition of tax coordination includes policies that both directly limit the tax setting of governments and policies that indirectly limit the tax responsiveness of governments. For example, agreements that require the same tax rates in multiple jurisdictions, or that require minimum tax rates, place direct limits on the tax setting authority of each jurisdiction. Policies like these limit the potential competitive or strategic responses of jurisdiction to changes in the tax policies of other jurisdictions. Constitutional restrictions on local governments can also place tax rate restrictions on subnational governments.

Indirect limits to the competitive forces among governments are numerous. Policies that restrict the mobility of the tax base among governments can also allow jurisdictions to raise their tax rates. More intense auditing or changes in the sourcing rules may also implicitly reduce the mobility of the tax base, potentially reducing the incentive to cut rates. Indirect policies that induce local governments to internalize their external spillovers, for example corrective transfers as in Agrawal, Hoyt and Ly (2023), can also mitigate or even eliminate the inefficiencies from tax competition. Such “carrots” do not limit the authority of government or the mobility of the tax base, but instead incentivize the government to internalize those effects, perhaps through a system of matching grants. These policies do not place restrictions on tax rates directly, but they are part of the broad menu of policies that address tax competition.



With the foregoing definitions in mind, we now present a non-exhaustive summary of various policy responses that governments have adopted or proposed to limit tax competition. We describe sixteen policies, some available to any jurisdiction, others available only to groups, that can reduce the incentive to lower taxes to attract mobile components of the tax base. We describe how each policy works and its potential effects.

**Tax harmonization (all jurisdictions).** This policy, in its strictest form, eliminates tax rate differentials by forcing jurisdictions adopt a common tax rate. In practice, however, most harmonization initiatives involve significant flexibility. For example, the European Commission previously proposed that commodity tax rates in the European Community (EC) should not deviate by more than plus or minus 2.5 percentage points from a prescribed norm. Regardless of whether the policy is complete harmonization or adoption of a common tax rate target that jurisdictions are moving toward, reduction in tax rate differentials reduces tax base mobility – there is less incentive to move – and lowers the tax externalities that any one jurisdiction imposes on other jurisdictions.

Kanbur and Keen (1993) show that in a setting with two jurisdictions that maximize tax revenues, both jurisdictions may object to full harmonization. For a small jurisdiction, harmonization is certain to lower tax revenues by preventing it from lowering its rate and thereby expanding its small tax base. For a large jurisdiction, harmonization will only raise revenue if the harmonized rate is very close to its uncoordinated rate, which was set to maximize revenue in a Nash equilibrium. Intuitively, if the harmonized rate is set exactly at the uncoordinated rate, the large jurisdiction gains revenue through the limitation of tax arbitrage. However, forcing it to set a rate that is very low means the foregone tax revenues on its originally loyal base do not outweigh the gains from the base expansion. These results, while model-based, indicate why building political consensus for harmonization may be challenging.

**Partial tax harmonization (some jurisdictions).** Partial harmonization involves a subset of countries or states within a country coordinating tax rates. Such harmonization might result, for example, from jurisdictional connections with a pre-existing trade block. Within federal systems, state governments might force local governments within their territory to cooperate and set common tax rates. Partial harmonization has the advantage, relative to full harmonization, of requiring a consensus among a smaller set of jurisdictions. This may make the determination of the harmonized tax rate easier. However, it comes at the cost of not internalizing the spillovers to

other jurisdictions that still set their tax rates non-cooperatively, and vice versa. The importance of this cost depends on the factors being taxed; Conconi, Perroni, and Riezman (2008) show that in some cases partial harmonization can welfare dominate both full harmonization and tax competition.

**Interjurisdictional cooperation and supranational institutions.** Another way to mitigate competition is through the formation of interjurisdictional cooperatives or the creation of supranational institutions such as the European Union that dictate specific tax rules for their members. In some cases, the supranational institution may completely centralize taxation authority and assign it to the cooperative body. In the subnational setting, partnerships between municipalities or other sub-federal jurisdictions can either be forced by the central government or can arise naturally from mutual inter-jurisdictional consultation. In the latter case, a jurisdiction opts into the coalition, deciding whether to cooperate and with whom. The extent of powers delegated to the cooperative can also vary. Some cooperatives only allowed to engage in “consultation” with each other while others have tax and spending authority that almost completely subsume local taxes. In other cases, they may operate in conjunction with local tax policies. France has one of the strongest forms of intermunicipal cooperation in the world, with substantial variation in how taxing powers are delegated to the cooperative.

A tax cooperative cannot internalize any externalities outside of the cooperative. But, when substantial taxing powers are delegated to the cooperative, Hoyt (1991) points out that the reduction in the number of competing jurisdictions reduces the extent of tax competition. However, with the formation of tax cooperatives, tax policy coordination typically is not the only government authority that is consolidated---cooperatives and supranational institutions are often designed to achieve economies of scale in public good provision or to catalyze the economic benefits from market integration. Empirical analyses of the effect of tax cooperatives on tax rates, such as Breuillé, Duran-Vigneron, and Samson (2018), typically identify the combined effects from limiting competition and achieving economies of scale.

**Minimum tax rates.** A minimum tax rate is a lower bound on the tax rate that a jurisdiction may set. Recent corporate tax proposals of the global minimum tax have spurred new research on the use of tax floors as a means to reduce tax competition; see for example Hebous and Keen (2023), Janeba and Schjelderup (2023) and Johannesen (2022). A combination of both a minimum

and a maximum tax rate is a weak form of harmonization that forces convergence toward a target rate. Unlike complete harmonization, minimum tax rates force low-tax jurisdiction to raise their tax rates, but do not force high-tax jurisdictions to lower theirs. With the minimum tax in place, the gap between the high- and the low-tax rate country will decline. In the presence of strategic competition, the high tax rate country may find it in its best interest to raise its rate, but it will do so by less than the increase in the tax rate of the low-tax jurisdiction. Even if jurisdictions are price-takers, they may raise their tax rates if the minimum tax policy forces a sufficiently large number of jurisdictions to raise their tax rate.

Minimum tax rates have been widely studied. Kanbur and Keen (1993) show that a minimum tax rate will increase the revenues of both small and large jurisdictions. Intuitively, because the slope of the best-response function is less than unity, taxes rise in the high-tax jurisdiction by less than the forced increase in the low-tax one. Thus, tax base leakages from the high-tax location fall, which combined with its higher rate raises revenue. The low-tax jurisdiction has a higher rate, but now has a smaller base, but the authors show that its revenues are increasing in the minimum tax rate.

**Controlled Foreign Corporation Rules like GILTI.** In 2017, the United States unilaterally introduced the Global Intangible Low-Taxed Income (GILTI) provision. It requires firms to pay U.S. taxes on low-taxed foreign income exceeding 10% of foreign tangible income when this income would otherwise be taxed at a low rate. Devereux (2023) points out that this provision is akin to a controlled foreign corporation (CFC) rule that makes profit diverted to low-tax places subject to taxation in the parent country. One benefit of this type of policy is that it can be implemented unilaterally, but a cost is that it may encourage firms to leave or invert.

**Bans on taxes and centralization.** Federal systems have some policy options that are not available at the international level. One is for higher-level governments to restrict the set of tax instruments that lower-level governments may use. For example, in some U.S. states, local governments can levy local sales taxes, while in other states they cannot. The same is true for local income taxes. While some of these differences may be a result of historical policy decisions that are hard to change, some could be a result of differences in the perceived costs of mobility of various factors across different states. Although harmonization can be facilitated by governments centralizing both expenditure and tax policies, the recent trend in many federal systems has been

toward decentralization. Gadenne and Singhal (2014) note that this may be a reaction to some positive aspects of decentralization, particularly in developing countries where it is often seen as a way to reduce corruption or political rent seeking.

**Constitutional restrictions and tax and expenditure limitations (TEs).** Constitutions may entirely ban some local taxes or they may place other restrictions on local (or even state) taxes. They may also restrict the amount by which taxes can change from one period to the next. For example, several U.S. states have supermajority requirements to pass tax increases. These restrictions can apply to the repeal of existing tax breaks and to the enactment of new tax increases. At the local level, restrictions often require special referendums or higher thresholds to raise property tax revenues beyond a certain rate of growth. Knight (2000) studies supermajority rules that restrict governments' capacity to raise taxes. These rules typically do not prohibit lowering taxes or changing spending, so they may simply tax burdens toward user fees like higher education tuition payments. Budget rules relating to deficit reduction can also be used as a tool to restrict government competition, although such rules may be irrelevant if politicians can find simple work arounds to avoid compliance with them, for example by declaring a state of emergency.<sup>4</sup> A particular type of fiscal rule---a tax and expenditure limitation (TEL)---is often used to limit the growth of government or of certain tax revenue streams, such as that from the property tax.

**Sourcing rules.** A sourcing rule determines where consumption, corporate profits, or personal income is taxed. Consumption taxes can be levied according to either the origin principle, levying the tax where things are purchased, or the destination principle, levying the tax where they are consumed. Income taxes can follow either source, where things are made, or residence, where the recipients of income live, principles. A source-based tax on mobile capital raises the required rate of return on capital in the jurisdiction levying the tax, and it results in capital flight.

In the case of commodity tax competition in the Kanbur and Keen (1993) model, the origin principle results in wasteful cross-border shopping and tax competition. If taxes are levied under the destination principle, however, then cross-border has no tax benefit and there is no tax competition, because households are assumed to be immobile. This illustrates that shifting the

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<sup>4</sup>Elaison and Lutz (2018), Poterba (1997), and Poterba and von Hagen (1999) explore these issues.

sourcing rule from the more mobile tax principle to the less mobile one can reduce tax competition. Rork and Wagner (2012) show that tax rates are higher when states tax personal income under the residence principle than under the source-based principle. The elasticity of residence appears to be lower than the elasticity of employment, especially in cross-border metropolitan areas.

While sourcing rules can be dictated by central governments for all states, they may also be chosen and agreed-upon by the state and local governments within fiscal unions. Differences in sourcing rules across states may result in complex tax rules or double taxation. Of course, for a sourcing rule to be effective, governments must be able to enforce it. Some corporate tax reformers, including Devereux et al. (2020), have focused on shifting to a destination-based tax due in part to the difficulties of tracking where products are produced and the challenges of tracking the location of businesses as a result of inversions and other maneuvers.

**Formula apportionment.** While best known for its use by the U.S. states' to allocate corporate tax bases, formula apportionment is also used in other contexts. Professional athletes, for example, apportion their personal income across states based on the number of games played in each state, and Pillar 1 of BEPS puts more weight on countries where goods and services are sold. Under formula apportionment, a company's profits are apportioned to a given location according to a weighted average of the share of sales, payroll, and capital there. States, for example, tax a shared tax base, which reduces the incentives for companies to engage in profit shifting. Formula apportionment creates incentives to shift sales, payroll, and capital toward low-tax states. Like the sourcing rules discussed above, an important question is whether those factors are more or less mobile than the corporate profits that are the ultimate object of taxation. Suárez Serrato and Zidar (2018) report that states have steadily increased the weight they place on sales in the apportionment formula. This may reflect a view that sales are the least mobile of the factors. It could also, however, reflect a policy choice that is being used to gain strategic advantage by some states in the tax competition game.

**Auditing and enforcement.** Tax enforcement is a potential policy response to competitive reduction of the tax base when that reduction is in part due to evasion. For example, with residence-based income taxation, a high-income taxpayer who owns two homes in different states may shift the taxable location to the lower-tax jurisdiction by falsely reporting the number of days spent in the secondary residence. In the case of U.S. state sales taxes, a consumer may not file a

use tax return in her resident state to pay taxes on out-of-state purchases. If this illegal misreporting could be easily identified and enforced via tax auditing, then tax base mobility due to evasion would be reduced, lowering tax competition. The efficacy of heightened enforcement in lowering interjurisdictional evasion is an open question. One scheme might be replaced by another in response to a new enforcement initiative, and if greater enforcement succeeds in raising the effective tax rate, it may induce more actual mobility of the tax base, rather than evasion. Stöwhase and Traxler (2005) observe that audit probabilities can be used as a strategic variable by states in a federal system.

**Mobility restrictions.** One way to limit the mobility of the tax base is for jurisdictions to impose regulatory constraints on the mobility of people and resources, such as immigration restrictions or domestic content rules for goods along with border checks at ports or international borders. Controls on the location of firms are common at the sub-federal level. Many localities use exclusionary zoning laws to keep certain types of businesses from opening in their jurisdiction. Other regulatory policies, such as occupational licensing, may also reduce the mobility of businesses and labor by creating costs to moving across state lines. While policies like these may limit factor mobility and correspondingly reduce the incentive for jurisdictions to compete with regard to taxes, they may have substantial efficiency costs for economic activity that may outweigh the potential jurisdiction gains from reduced tax competition. There are also important examples of policies that are designed to prevent mobility-reducing policies. The Bretton Woods system is a prime illustration; it limited capital controls at the national level.

One type of mobility restriction used at the international level by some countries is an exit tax on individuals. Organ (2022) notes that these taxes do not regulate or ban international mobility, but they make it costlier. If a high-income American taxpayer gives up US citizenship and moves to another country, that taxpayer must pay a 23.8% tax on the fair market value of all assets in excess of a \$767,000 exemption level. Galle, Gamage, Saez and Shanske (2021) discusses another type of tax rule that operates in a manner similar to an exit tax: “claw back” provisions that require a taxpayer who leaves a jurisdiction to pay taxes to the former tax home for several years after departure.

**Tax treaties.** Tax treaties are agreements between jurisdictions concerning the operation of their tax systems. They are often quite complex and address detailed tax issues. Many treaties

include income sourcing rules. For example, states in the U.S. can adopt tax treaties that include reciprocity agreements, whereby the employment state surrenders its taxing rights on the income of nonresident workers to the state in which the workers reside. Tax treaties are especially common with regard to foreign direct investment, where a capital exporting country may allow for either a deduction of taxes paid in the host country, or a credit up to that amount under domestic taxation, or complete exemption from taxation. These provisions are described in Janeba (1995). Tax treaties can also apply to the use of preferential tax regimes, information sharing among countries, and interjurisdictional withholding. Because these agreements are often bilateral, they are especially useful in cases where base mobility is predominantly between two jurisdictions, perhaps due to substantial cross-border economic activity.

**Limitations on bidding for firms and subsidy deals.** Many state and national tax codes have preferential provisions designed to attract or retain large firms or high-income individuals. These provisions can be viewed as a form of tax competition. Some governments have recently sought to limit preferential tax regimes for certain industries or preferential subsidy deals to win new firms. For example, there have been proposals for a national interstate compact to eliminate bidding for firms, but they have not received enough state signatories to go into effect. There are some bilateral limits on subsidy deals, such as that between Kansas and Missouri.

Whether bilateral agreements to limit subsidy deals or preferential tax regimes enhance efficiency is subject of current debate. Keen (2001) argued that preferential regimes could reduce the overall extent of tax competition by enabling jurisdictions to confine their most aggressive tax competition to a few sub-parts of the tax system. Limiting subsidy deals could intensify tax competition because jurisdictions could no longer lower tax rates only for a specific subgroup of firms or individuals, but would now need to change tax rates more broadly with effects on the entire tax base.

**Amalgamations and mergers.** Federal systems are often composed of many small subnational jurisdictions. Several countries have implemented sweeping reforms to reduce the number of municipalities by forcing or incentivizing municipalities to merge. For example, recent administrative reforms in Greece reduced the number of municipalities by about one-third. Mergers can be viewed in a similar light as intermunicipal cooperation, but without the requirement to create a new tier of governments in the federal system. Hoyt (1991) found that

reducing the number of jurisdictions could reduce tax competition and increase welfare. Just as in product markets a single firm can mark up its price above marginal cost, but many perfectly competitive firms will compete prices down to marginal cost, with government competition, decreasing the number of jurisdictions reduces competition and allows tax rates to rise.

**Public-private partnerships.** Governments may privatize the provision and financing of public services, thereby removing them from the realm of tax competition. A private firm charging user fees, however, may discover some of the same competitive pressures that would face a government, and this could affect their choice of user fee. If these fees equal the value of the services to consumers, then households should not have any reason to move. But, in practice, private firms may not price at cost or be able to provide the demanded services as a result of market failures. Privatization may simply replace tax competition among governments with price competition among firms. Sinn (1997) noted that governments are usually involved in the provision of goods and services where there are market failures, which makes it more likely that firms providing these services will also encounter them.

**Intergovernmental grants.** The inefficiency of tax competition is a result of a fiscal externality: when one jurisdiction increases its tax rate, it causes an increase in the tax base elsewhere and generates higher revenues for one or more other jurisdictions. Wildasin (1989) shows that this inefficiency can be corrected by an intergovernmental subsidy. A Pigouvian solution exists where the federal government pays the policy-enacting jurisdiction a subsidy equal to the tax revenue that flows into other jurisdictions as a result of its tax rate increase. Appropriately-designed intergovernmental grants can incentivize governments to set tax policy recognizing the externalities they impose on others. Of course, calculating the Pigouvian subsidy is empirically challenging. The general point, however, is that intergovernmental grants can be used to achieve a tax rate equilibrium that is efficient from the perspective of the entire system of jurisdictions. Similar objectives could also be pursued by allowing deductions for state or local taxes against federal taxes.

Agrawal, Hoyt, and Ly (2023) explain how to calculate the marginal corrective transfer that could achieve efficiency. This is a matching grant on each dollar of local spending that induces the local government to internalize both interjurisdictional fiscal externalities and externalities on the willingness to pay of nonresidents. This marginal corrective transfer can remedy all



inefficiencies and spillovers from tax competition, and unlike a Pigouvian subsidy, can be calculated without knowing the optimal policy. It can also be implemented at the margin, drawing on the on the marginal value of public funds framework described in Hendren (2016) and Hendren and Sprung-Keyser (2020). Using intergovernmental grants to correct for externalities allows taxes to differ across local governments, reflecting their informational advantages in revenue collection, while also achieving the federal optimum. A key disadvantage of such grants is that while they may be feasible, although difficult to operationalize, within nations, they may be almost impossible to implement in an international setting.<sup>5</sup>

#### **IV. A MENU OF POLICIES THAT SEEK TO LIMIT TAX COMPETITION**

The foregoing list of policies illustrates the rich set of options that policy-makers can consider when trying to reign in tax competition. To organize these policies, we stratify them according to whether they can be implemented unilaterally or if they require the agreement of multiple jurisdictions, possibly with external delegation to an outside authority such as a federal government. We draw on Wildasin (2002) in considering three broad ways that governments can reduce tax competition: by explicit agreement, by involving an external actor, and by taking unilateral action. In some cases, the distinctions among these three categories are not clear.

Policy responses by explicit agreement require the joint action of two or more governments. For example, a subset of jurisdictions could jointly agree to set the same tax rate, while allowing each to still administer its tax system independently. Alternatively, two jurisdictions could adopt bilateral tax treaties that specify the how income will be sourced for cross-border workers from either one. Policies that can only be adopted by explicit agreement are only likely to be observed when the cooperative outcome is in the best interest of both jurisdictions.

Policies that involve some delegation of functions to an external actor could involve a federal government, a supra national institution such as the European Union, or a new government structure such as an intermunicipal cooperative or a trade group. When policy actions are assigned

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<sup>5</sup> Wilson (2015) and Clemens and Veuger (2023) survey the existing literature on the design of intergovernmental grants, touching on issues that relate to the type of grants considered here.

to an external actor, that higher level authority may also administer taxes and collect revenues and then return revenue to the local jurisdictions via grants. The centralized authority may also keep some or all of the revenue. Alternatively, tax rate harmonization could be imposed by the federal government, but jurisdictions could still administer their tax systems and determine how to deploy the resulting revenue. Because central authorities may face political challenges coordinating across many jurisdictions, supra-jurisdictional institutions may be less likely to be adopted than bilateral agreements between two jurisdictions. It is important to recognize that an overarching federal government could act in the joint interest of all member states, while bilateral solutions are likely to improve the well-being of treaty signatories at a cost to other jurisdictions.

The third category of policy response includes policies that can be adopted by jurisdictions unilaterally. Such policies could include a rule that one state is going to index its income tax rate or sales tax rate to that of a neighboring jurisdiction, or a policy that if an adjoining state's sales tax rate falls below a certain level, the enacting state would declare a tax-free zone for all businesses within some distance of the state border. Many sourcing rules and weights in allocation formulae for tax base apportionment can be set unilaterally. Policies that could be adopted unilaterally could also be adopted multilaterally. Some might view unilateral actions, such as a commitment to index state tax rates to other states' rates, as just another form of tax competition. A unilateral shift in the apportionment rule might be viewed as a way to obtain an advantage in the tax competition game.

Our three-part typology is helpful in determining the extent to which each policy option internalizes spillovers. Unilateral policies are the least likely to internalize spillovers, and may amplify them. The distinction between multilateral adoption without the involvement of an external actor, for example a bilateral treaty, and multilateral adoption with delegation to an external actor, such as the European Union, can determine whether the benefits are localized or more global, but it may also predict the difficulty of achieving agreement among all of the relevant jurisdictions. Agreement is likely to be more difficult to obtain when the policy involves ceding some power to an external actor.

Because the externalities associated with different taxes are different, issues of competition with distinct tax bases may be resolved by different policies in different settings. For example, tax base shifting under commodity taxation was historically likely to take the form of cross-border

shopping with neighboring jurisdictions; bilateral treaties among neighboring jurisdictions could be an approach to internalizing the spillovers. However, in the case of globally mobile capital, an external actor may be necessary to coordinate across thousands of local governments. At the same time, unilateral actions by a single government might be more appropriate when loopholes in high-tax countries allow for tax base leakage.

Table 1 categorizes the policies we have described in this three-part typology. Some policy options are difficult to fit into just one category. Some policies that we indicate could be carried out without delegation, for example, could also be carried out with delegation.

<b>Table 1: Policy Responses to Tax Competition</b>			
<b>Policy Response</b>	<b>Delegation to External Actor</b>	<b>No Delegation, but Multilateral</b>	<b>Unilateral</b>
Tax harmonization	X	X	
Partial harmonization	X	X	
Intermunicipal cooperation and supranational institutions	X		
Minimum tax rates	X		
Controlled Foreign Corporation Rules (e.g., GILTI)			X
Bans on taxes and centralization	X		
Constitutional restrictions and TELs	X	X	X
Sourcing rules		X	X
Formula apportionment		X	x
Auditing and enforcement		X	X
Mobility restrictions		X	X
Tax treaties		X	
Limitations on bidding for firms and subsidy deals	X	X	
Amalgamations and mergers		X	
Public/private partnerships	X		
Intergovernmental grants	X		

## V. ECONOMIC ANALYSIS OF THE POLICIES

Evaluating each of the sixteen policies described in the previous section is a complex task that requires not only careful theoretical modeling but also empirical analysis, as in many cases both efficiency and distributional impacts are situation-dependent. This section describes several key economic inputs to such policy evaluation.

**Elasticity of the tax base.** The elasticity of the relevant tax base is critical to determining not only the revenue consequences of different policies, but also their efficiency implications. Absent other distortions, tax coordination is likely to matter the most for taxes on factors, people, or firms that have large mobility elasticities. One stylized pattern is that mobility elasticities are decreasing in jurisdiction size: localities generally have larger elasticities than countries. Elasticities also differ across factors, and they are likely to be specific to consumption, capital, individuals, and firms. The extent of tax base mobility is a key determinant of the intensity of tax competition, and also of the impact of policies that are designed to respond to it.

Some policies that are designed to affect the competitive landscape for one tax base may also affect other tax bases. Cutting wealth taxes may influence the location choices of wealthy individuals, and shift the geographic pattern of wealth holdings. It may also affect the location of some workers, and consequently alter the labor income tax base. When tax bases are interrelated, recognizing cross-tax base elasticities can be key, particularly when one of the non-targeted tax bases is a large source of revenue or when reducing competition for one tax base triggers additional competition for another.

In some cases, the elasticity of the tax base exhibits an important geographic component. A tax base could be locally mobile among a small number of neighboring jurisdictions, or it could be globally mobile. In the case of limited local mobility, bilateral measures may be sufficient to internalize interjurisdictional externalities. For example, in the Kansas-Missouri context, the policies of both states were influencing the location decisions of firms within the cross-state Kansas City metropolitan area. When tax bases are globally mobile, addressing the inefficiencies that result from tax competition may be difficult without multilateral agreements or external actors. While historically, capital was presumed to be more globally mobile than goods, the rise of digital

commerce and the presence of capital mobility restrictions in some countries may call this presumption into question. Ultimately, the degree of tax base mobility is an empirical issue.

**Distributional effects.** While policies that respond to tax competition are largely designed to achieve economic efficiency, they also have distributional consequences. Two equity issues may arise: within jurisdictional (how the policy affects different residents of the jurisdiction) and interjurisdictional (how it affects individuals, and even governments, in other jurisdictions). Jurisdictions differ in their productivity, amenities, trade costs, as well as location, size, productivity of the public sector and preferences for public services. These fundamental factors shape the level and distribution of economic activity in the absence of tax competition, as well as the distributional effects of policies that are designed to address competition.

Within a jurisdiction, policies may affect residents differently. For example, harmonizing tax rates at a low rate could benefit high-income residents more than low-income residents. Complex issues can arise when considering multijurisdictional policies. Tax rate harmonization, for example, forces some jurisdictions to raise rates but others to lower them. Depending on the income distribution across and within jurisdictions, such a policy could have important equity effects. Consider mobility restrictions that are designed to reduce tax competition. If the European Union enacted such restrictions, incumbent residents might benefit while immigrants trying to enter the community would be less well off. Muñoz (2023) explores issues related to this policy. As a general rule, policies that are implemented tend to benefit the residents of coalitions, often at the expense of non-residents.

While some of the policies we describe may raise worldwide tax revenues, the revenue effects are unlikely to be equal across jurisdictions and some jurisdictions may see a revenue decline. Haufler (1996) uses a stylized model to explore the welfare effects of such revenue changes, pointing out that they depend on differences in the preferences for public goods and incomes across jurisdictions. A central message is that when assessing a potential policy intervention, it is important to determine whether it will benefit all jurisdictions or only a subset of jurisdictions, whether it will yield welfare gains for all households or only for some, and whether intergovernmental transfers are required to generate Pareto improvements.

**Political economy and capacity to reach a consensus.** In the absence of delegation to an external actor, implementing bilateral or multilateral agreements requires an agreement among multiple jurisdictions. The capacity to reach such agreements may depend on political as well as economic characteristics of the jurisdictions. It is more likely the U.S. and Canada could reach an agreement than the U.S. and Russia, and more generally, agreements are more likely between relatively similar jurisdictions. Although a small theoretical literature exists on coalition formation to mitigate tax competition – see Konrad and Schjelderup (1999) and Burbidge et al (1997) –there is limited empirical evidence on how cooperative agreements emerge and the nature of potential benefits. Rich data on voluntary intermunicipal organizations could inform this issue more broadly; Tricaud (2023) is an example of such analysis, focusing on which jurisdictions are holdouts to intermunicipal cooperation.

Location fundamentals may also influence the ability to reach a political consensus. In the case of subsidy competition, the jurisdictions most likely to advocate for the abolition of tax deals are those with the most attractive location fundamentals. Intuitively, jurisdictions with high productivity and high amenities are less on subsidy deals to attract firms.

**Strength of federal versus sub-federal institutions and fiscal autonomy.** Like the capacity to reach a multilateral consensus, the ability to reach a consensus with external delegation may depend on the relative strength of federal and sub-federal institutions. In the U.S., municipal governments are “creatures of the state,” meaning that state governments can grant municipalities powers, or withdraw them. States differ in how strongly they constrain the actions of local governments and in the degree of fiscal autonomy that they grant them. In more decentralized states, the state government may struggle to implement coordinated responses to tax competition.

**Strategic reaction functions.** Jurisdictions are likely to respond in different ways to tax coordination initiatives and other policy interventions. The slopes of strategic reaction functions describe one type of response, but there are others. In the case of a minimum tax, this slope is critical for determining whether and by how much high-tax jurisdictions will react to low-tax jurisdictions being forced to raise their tax rates. The reaction function slope determines how large a tax differential remains after a policy initiative, but not the welfare consequences of lessening tax competition. Jurisdictions may react to policy changes in many ways, which expands the set of potential reaction functions. If one jurisdiction unilaterally changes its sourcing rules or

enforcement, its competitors could respond by altering their sourcing rules, or by changing tax rates, or by altering their enforcement activities, or by shifting other policy levers. In the case of unilateral changes in policy, the reactions of other jurisdictions are key determinants of welfare effects and in particular of whether limiting competition in one domain results in greater competition along another margin.

## **VI. NEW EVIDENCE: CONTRIBUTIONS IN THIS VOLUME**

The research project that culminated in volume had three parts. The first involved a review of existing theoretical and empirical research on the determinants of and consequences of tax competition. Three of the five papers in this volume were prepared in this context; they summarize a strand of existing research and offer directions for future investigation. The second brought together researchers who were studying various aspects of tax competition, documenting the extent of such competition and creating metrics for understanding its welfare effects. The third, which led to seven of the chapters in this volume, focused on policies that have been adopted in an effort to reduce tax competition. Each of the research teams presented an in-depth summary of a particular institution, along with an assessment of its effect on tax competition and an assessment of its consequences for economic efficiency. Where possible, these studies also address distributional considerations. Together, these seven studies provide important new evidence on the effect of public policies that are designed to reduce tax competition. They offer empirical evidence from four different countries and consider local as well as national policies.

The first three chapters are critical summaries of existing research. In chapter one, Wildasin (2023) describes the classic theoretical framework for analyzing tax competition, noting the critical role of the degree of resource mobility, which is summarized by the elasticity of the tax base. He also highlights how political economy considerations, other institutional factors, and the available set of tax instruments affect the nature and degree of tax competition.

In the next chapter, Slattery (2023) develops an auction based framework for analyzing how jurisdictions decide whether to make reduced-tax bids to attract a mobile firms to locate within their borders. The auction framework is particularly helpful for analyzing tax competition that centers on a particular firm, or in some cases a particular individual, who is evaluating the net-of-tax return to locating a non-divisible project in a single jurisdiction.

Chapter three focuses on how various policy responses to tax competition affect the distribution of tax revenues. Agrawal (2023) points out that while a minimum tax rate at any level can raise revenues for all jurisdictions, tax harmonization can only improve revenues in all jurisdictions if the rate is sufficiently high. This is because harmonization for initially high-tax jurisdictions, harmonization has two effects. It reduces their revenue because they are required to cut their tax rates, but it can also raise their revenue as taxable activity flows in, now that previously low-tax jurisdictions that attracted mobile activity have been forced to raise their tax rates. Unless the second effect is large – which requires a highly elastic tax base – high rate jurisdiction will see revenues contract. This chapter also discusses when coalitions are likely to emerge among governments, noting that the odds are higher when potential coalition partners are of similar size than when they are of very different sizes.

The next seven chapters describe various policies that have been at least in part as an antidote to tax competition. Chapters four through seven focus on policies that have been adopted in the US, while chapters eight through ten describe policies from other nations. In chapter four, Bruce, Fox and Shute (2023) examine the effects of a U.S. Supreme Court decision that enabled states to collect sales tax on their residents' internet purchases from out-of-state sellers. This court decision eliminated an opportunity for consumers in many U.S. states to avoid sales taxation on easily-shipped goods. The authors show that there were differences across locations in the impact of this ruling, with a larger increase in the tax burden on residents of rural areas who relied more on on-line shopping. They also demonstrate that cross-border in-person shopping became more important after the tax rate on internet purchases was increased.

The next chapter develops a model that can be used to quantify the gains from limiting tax competition, and applies it to a case study of the Kansas-Missouri tax competition compact. Kim (2023) addresses not only the economic consequences of moving from competition to cooperation, but also the factors that helped build bilateral agreement. The political economy of cooperation is a theme that emerges in multiple chapters.

Gordon (2023), in chapter six, explores a potential federal response to the externalities associated with state income tax competition: allowing state and local income taxes to be deducted from the federal income tax. By making the net-of-federal-taxes rate of state income tax lower than the pre-tax rate, an income tax deduction reduces the distortions associated with interstate tax



differentials. The deduction also reduces the cost of state and local spending in a way that may increase total sub-federal expenditures. The paper also analyzes another policy -- disallowing moving expenses as an income tax deduction – which raises the cost of moving, and thereby reduces the mobility of the individual income tax base.

The next chapter, Clemens and Veuger (2023), analyzes the role of intergovernmental grants in affecting incentives for tax competition. A key finding is that the way grants programs are designed, in particular the conditions that federal grants in the US impose on the states that receive them, can affect incentives for tax competition. The study does not find any evidence that intergovernmental transfers during the COVID-19 pandemic, which boosted state reserve funds, encouraged states to cut their corporate income tax rates. Implicit or explicit requirements associated with federal grants may explain this finding.

In chapter eight, Breuillé and Duran-Vigneron (2023) analyze how tax base elasticities and tax structure can affect intermunicipal cooperation. Their study focuses on French municipalities. There are more than 44,000 of them, and there are also a wide range of intermunicipal cooperative agreements that range from shared service provision compacts to nearly complete mergers that share taxing authority as well as spending decisions. They find that whether or not powers to tax different bases are shared between municipalities and cooperatives affects the degree of tax competition. A long institutional history of cooperation across jurisdictions played a key part in overcoming political economy concerns related to shared governance and municipal cooperation.

In the next chapter, Lyytikäinen (2023) analyzes minimum taxes, using a property tax reform in Finland that raised the minimum and maximum tax rates as a case study. He highlights the interaction between minimum tax rates and federal fiscal equalization rules, and illustrates the key role of strategic response functions in determining how jurisdictions respond to the federal requirement for a minimum property tax rate.

The closing chapter, by Brühlhart et al (2023), describes corporate taxation within Switzerland and the challenges associated with allocating tax rights, coordinating amongst sub-national governments, and implementing equalization payments in a high-trust setting. The analysis illustrates the importance of easy coordination across jurisdictions when fashioning

multilateral responses to tax competition. In the Swiss setting, federal grants serve a dual purpose, improving efficiency while also redistributing across jurisdictions.

## VII. CONCLUSIONS AND DIRECTIONS FOR FUTURE WORK

The decline of mobility costs for households, firms, and factors, coupled with a long-term trend toward increased economic integration within and across nations, creates challenges for governments seeking to raise revenues from mobile factors. Although competition among governments can have both positive and negative consequences, nations and sub-national governments have increasingly sought to limit competitive pressures. This volume draws on existing research on tax competition to offer some insights on the consequences of tax and on the effect of policies designed to mitigate it.

Although the literature on tax competition is vast, there are relatively few clear conclusions about when government intervention to limit tax competition promotes efficiency, and even fewer analyses that consider distributional consequences. This lack of clarity may be due to models and analyses that often focus on a single tax rate and a single policy response. Tax systems and the policy responses to tax competition are complex, as are the reactions of jurisdictions to those policies. A major goal of this volume is to point out the *collection* of potential policy responses across multiple tax bases, setting the stage for comparisons of the efficacy of the policy responses and of how potential interventions might interact with each other.

We classify policy responses based on whether they can be adopted unilaterally, can be launched by bilateral or multilateral agreement, or require the presence of an external actor such as a federal government. This classification is important because although unilateral policy changes could improve economic efficiency, they might also be viewed as a new form of competition. The need for an external actor can be an advantage as it allows for a level of government or an institution to evaluate what is best for the totality of its sub-members, but it is also likely to create added constraints on the set of policies that can be implemented relative to bilateral or multilateral responses.

A key lesson from our review of policies is that their effects depend on a number of key economic parameters, such as the elasticity of the tax base with respect to the jurisdictional tax rate, and the cross-effects of changing one tax rate on other tax bases. We also note that both

efficiency and distributional effects are important, in part because the distributional effects may be critical determinants of whether particular policies can secure political support and be adopted.

There are many ongoing policy discussions, at many levels of government, concerning the best ways to respond to tax competition. This makes it likely that the next several years will provide researchers with new policy experiments embodying different approaches to limiting tax competition. Two suggestions for future work emerge from the research presented in this volume. First, much of the prior literature has focused on a *single* tax instrument and a *single* policy response to limit competition. This level of detail often abstracts from the much broader complexity of the tax system as a whole and the large set of policy responses often used in combination with each other to address tax competition. The presence of multiple tax bases may necessitate nuanced policy responses, and multiple policy responses can interact, such that the totality of the intervention may have larger effects than the sum of the individual parts.

Second, it is important to move beyond static and partial equilibrium models to consider a wider set of potential responses to policies that may be directed at reducing tax competition. Bruce, Fox and Shute (2023), for example, suggest there may be unintended multi-market effects of tax harmonization initiatives on sourcing rules. Shifts of tax bases in response to changes in tax rates are not instantaneous. Although studying effects over multiple years following a policy change raises the risk of confounding effects from other policy changes, it also provides an important means to document the longer-term impacts of these interventions.

## REFERENCES

- Agrawal, David R. 2023. "Limits to Competition: Strategies for Promoting Interjurisdictional Competition." In *Policy Responses to Tax Competition*, edited by David R. Agrawal, James M. Poterba, and Owen M. Zidar, Chicago, IL: University of Chicago Press.
- Agrawal, David R., William H. Hoyt and John D. Wilson. 2022. "Local Policy Choice: Theory and Empirics." *Journal of Economic Literature*, 60(4): 1378-1455.
- Agrawal, David R., William H. Hoyt, and Tidiane Ly. 2023. "A New Approach for Evaluating the Welfare Effects of Decentralized Policies." Working paper.
- Altshuler, Rosanne, Boller, Lysle, and Suárez Serrato, Juan Carlos. 2024. "Tax Planning and Multinational Behavior." Working Paper.
- Bartik, Timothy J. 2019. "Should Place-Based Jobs Policies be Used to Help Distressed Communities?" W.E. Upjohn Institute working paper 19-308, Upjohn Institute, Kalamazoo, MI.
- Breuillé, Marie-Laure and Pascale Duran-Vigneron. 2023. "Intermunicipal Cooperation in France and Related Tax Issues." In *Policy Responses to Tax Competition*, edited by David R. Agrawal, James M. Poterba, and Owen M. Zidar, Chicago, IL: University of Chicago Press.
- Breuillé, Marie-Laure, Pascale Duran-Vigneron and Anne-Laure Samson. 2018. "Inter-municipal Cooperation and Location Taxation." *Journal of Urban Economics*, 107: 47-64.
- Bruce, Donald, William F. Fox and Alannah M. Shute. 2023. "Wayfair: A Step Toward the Destination, but Sales Tax Competition Remains." In *Policy Responses to Tax Competition*, edited by David R. Agrawal, James M. Poterba, and Owen M. Zidar, Chicago, IL: University of Chicago Press.
- Brueckner, Jan K. 2003. "Strategic Interaction among Governments: An Overview of Empirical Studies." *International Regional Science Review*, 26(2): 175-188.
- Brülhart, Marius, Sam Bucovetsky, and Kurt Schmidheiny. 2015. "Taxes in Cities." *Handbook of Regional and Urban Economics*, 5: 1123–96.
- Brülhart, Marius, Marko Koethenbueger, Matthias Krapf, Raphaël Parchet, Kurt Schmidheiny, and David Staubli. 2023. "Competition, Harmonization and Redistribution: Corporate Taxes in Switzerland." In *Policy Responses to Tax Competition*, edited by David R. Agrawal, James M. Poterba, and Owen M. Zidar, Chicago, IL: University of Chicago Press.
- Burbidge, John B., James A. DePater, Gordon M. Myers, and Abhijit Sengupta. 1997. "A Coalition-Formation Approach to Equilibrium Federations and Trading Blocs." *American Economic Review*, 87(5): 940–956.

Clemens, Jeffrey and Stan Veuger. 2023. “Intergovernmental Grants and Policy Competition: Concepts, Institutions, and Evidence.” In *Policy Responses to Tax Competition*, edited by David R. Agrawal, James M. Poterba, and Owen M. Zidar, Chicago, IL: University of Chicago Press.

Conconi, Paola, Carlo Perroni and Raymond Riezman. 2008. “Is Partial Harmonization Desirable?” *Journal of Public Economics*, 92: 254-267.

Devereux, Michael P., Alan J. Auerbach, Michael Keen, Paul Oosterhuis, Wolfgang Schön, John Vella, and Wolfgang Schön. *Taxing Profit in a Global Economy*. Oxford University Press, 2020.

Devereux, Michael P., 2023. “International Tax Competition and Coordination with a Global Minimum Tax.” *National Tax Journal*, 76(1): 145-166.

Dharmapala, Dhammika. 2021. “Do Multinational Firms Use Tax Havens to the Detriment of Nonhaven Countries?” in *Global Goliaths: Multinational Corporations in the 21<sup>st</sup> Century*, edited by C. Fritz Foley, James R. Hines, Jr., and David Wessel, Washington DC: Brookings: 4370495.

Elaison, Paul and Byron Lutz. 2018. “Can Fiscal Rules Constrain the Size of Government? An Analysis of the “Crown Jewel” of Tax and Expenditure Limitations.” *Journal of Public Economics*, 166: 115-144.

Gadenne, Lucie and Monica Singhal. 2014. “Decentralization in Developing Economies.” *Annual Review of Economics*, 6: 581-604.

Galle, Brian, David Gamage, Emmanuel Saez, and Darien Shanske. 2021. “The California Tax on Extreme Wealth (ACA 8 & AB 310): Revenue, Economic, and Constitutional Analysis.” Indiana Legal Studies Research Paper No. 461.

Gordon, Roger. 2023. “Fiscal Federalism and the Role of the Income Tax.” In *Policy Responses to Tax Competition*, edited by David R. Agrawal, James M. Poterba, and Owen M. Zidar, Chicago, IL: University of Chicago Press.

Haufler, Andreas. 1996. “Tax Coordination with Different Preferences for Public Goods: Conflict or Harmony of Interest?” *International Tax and Public Finance*, 3(1): 5-28.

Hebous, Shafik and Michael Keen. 2023. “Pareto-improving Minimum Corporate Taxation.” *Journal of Public Economics*, 225: 104952.

Hendren, Nathaniel. 2016. “The Policy Elasticity.” *Tax Policy and the Economy*, 30(1): 51-89.

Hendren, Nathaniel, and Ben Sprung-Keyser. 2020. “A Unified Welfare Analysis of Government Policies.” *The Quarterly Journal of Economics*, 135(3): 1209-1318.

- Hoyt, William H. 1991. "Property Taxation, Nash Equilibrium, and Market Power." *Journal of Urban Economics*, 30: 123-131.
- Janeba, Eckhard. 1995. "Corporate Income Tax Competition, Double Taxation Treaties, and Foreign Direct Investment." *Journal of Public Economics*, 56(2): 311-325.
- Janeba, Eckhard and Guttorm Schjelderup. 2023. "The Global Minimum Tax Raises More Revenues than You Think, or Much Less." *Journal of International Economics*, 145: 103837.
- Johannesen, Niels. 2022. "The Global Minimum Tax." *Journal of Public Economics*, 212: 104709.
- Kanbur, Ravi and Michael Keen. 1993. "Jeux Sans Frontières: Tax Competition and Tax Coordination when Countries Differ in Size." *American Economic Review*, 83 (4): 877-892.
- Keen, Michael. 1998. "Vertical Tax Externalities in the Theory of Fiscal Federalism." *IMF Staff Papers*, 45(3): 454-485.
- Keen, Michael. 2001. "Preferential Regimes Can Make Tax Competition Less Harmful." *National Tax Journal*, 54(4): 757-762.
- Keen, Michael and Kai A. Konrad. 2013. "The Theory of International Tax Competition and Coordination." *Handbook of Public Economics*, 5: 257-328.
- Kim, Donghyuk. 2023. "Interjurisdictional Competition and Coordination: Evidence from Kansas City." In *Policy Responses to Tax Competition*, edited by David R. Agrawal, James M. Poterba, and Owen M. Zidar, Chicago, IL: University of Chicago Press.
- Konrad, Kai, and Guttorm Schjelderup. 1999. "Fortress Building in Global Tax Competition." *Journal of Urban Economics*, 46(1): 156–167.
- Knight, Brian G. 2000. "Supermajority Voting Requirements for Tax Increases: Evidence from the States." *Journal of Public Economics*, 76: 41-67.
- Lyytikäinen, Teemu. 2023. "Minimum Tax Rates and Tax Competition: Evidence from Property Tax Limits in Finland." In *Policy Responses to Tax Competition*, edited by David R. Agrawal, James M. Poterba, and Owen M. Zidar, Chicago, IL: University of Chicago Press.
- Muñoz, Mathile. 2023. "Trading Non-tradeables: The Implications of Europe's Job Posting Policy." *Quarterly Journal of Economics*, forthcoming.
- Organ, Paul. 2022. "Citizenship and Taxes." *International Tax and Public Finance*, forthcoming.
- Poterba, James. 1997. "Do Budget Rules Work?" In: Auerbach, A. (Ed.), *Fiscal Policy: Lessons from Economic Research*. MIT Press, Cambridge, MA.

- Poterba, James and Jürgen M. von Hagen. 1999. "Introduction." In: Poterba, J.M., von Hagen, J. (Eds.), *Fiscal Institutions and Fiscal Performance*. University of Chicago Press, Chicago, IL.
- Rork, Jonathan and Gary Wagner. 2012. "Is There a Connection Between Reciprocity and Tax Competition?" *Public Finance Review*, 40(1): 86-115.
- Sinn, Hans-Werner. 1997. "The Selection Principle and Market Failure in Systems Competition." *Journal of Public Economics*, 66(2): 247-274.
- Slattery, Cailin R. 2023. "Subsidy Competition as an Auction." In *Policy Responses to Tax Competition*, edited by David R. Agrawal, James M. Poterba, and Owen M. Zidar, Chicago, IL: University of Chicago Press.
- Slattery, Cailin and Owen Zidar. 2020. "Evaluating State and Local Business Incentives." *Journal of Economic Perspectives*, 34(2): 90-118.
- Stöwhase, Sven and Christian Traxler. 2005. "Tax Evasion and Auditing in a Federal Economy." *International Tax and Public Finance*, 12: 515-531.
- Suárez Serrato, Juan Carlos and Owen Zidar. 2018. "The Structure of State Corporate Taxation and its Impact on State Tax Revenues and Economic Activity." *Journal of Public Economics*, 167: 158-176.
- Tricaud, Clemence. 2023. "Better Alone? Evidence on the Costs of Intermunicipal Cooperation." Working Paper.
- von Schwerin, Axel and Thiess Buettner. 2016. "Constrained Tax Competition – Empirical Effects of the Minimum Tax Rate on the Tax Rate Distribution." Working Paper
- Wildasin, David E. 1989. "Interjurisdictional Capital Mobility: Fiscal Externality and a Corrective Subsidy." *Journal of Urban Economics*, 25(2): 193-212.
- Wildasin, David E. 2002. "Tax Coordination: The Importance of Institutions." *Swedish Economic Policy Review*, 9: 171-194.
- Wildasin, David E. 2023. "Open Economy Public Finance." In *Policy Responses to Tax Competition*, edited by David R. Agrawal, James M. Poterba, and Owen M. Zidar, Chicago, IL: University of Chicago Press.
- Wilson, John D. 1986. "A Theory of Interregional Tax Competition." *Journal of Urban Economics* 19: 296-315.
- Wilson, John Douglas. 1999. "Theories of Tax Competition." *National Tax Journal*, 52(2): 269-304.

Wilson, John Douglas and David E. Wildasin. 2004. "Tax Competition: Bane or Boon." *Journal of Public Economics*, 88: 1065-1091.

Wilson, John D. 2015. "Tax Competition in a Federal Setting." *Handbook of Multilevel Finance*, 264-290.

Zodrow, George R. and Peter Mieszkowski. 1986. Pigou, Tiebout, Property Taxation, and the Underprovision of Local Public Goods." *Journal of Urban Economics* 19: 356-370.