Policy Research Working Paper 5311

Fiscal Competition in Developing Countries

A Survey of the Theoretical and Empirical Literature

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Abstract

The last two decades have witnessed a sharp increase in foreign direct investment (FDI) flows and increased competition among developing countries to attract FDI, resulting in higher investment incentives offered by host governments and removal of restrictions on operations of foreign firms in their countries. Fiscal competition between governments can take the form of business tax rebates, productivity-enhancing public infrastructure or investment incentives such as tax holidays, accelerated depreciation allowances or loss carry-forward for income tax purposes. It can take place between governments of different countries or between local governments within the same country.

This paper surveys the recent theoretical and empirical economic literature on decentralization which attempts to answer three questions. First, does theoretical literature on fiscal competition and "bidding races" contribute to a better understanding of such phenomenon in developing countries? Second, are FDI inflows in developing countries sensitive to fiscal incentives and is there empirical evidence of strategic behavior from the part of developing countries in order to attract FDI? Third, what evidence is there about fiscal competition among local governments in developing countries?

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A Survey of the Theoretical and Empirical Literature

**Thierry Madiès and Jean-Jacques Dethier** [1]

Fiscal Competition in Developing Countries — A Survey of the Theoretical and Empirical Literature

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May 15, 2010

Introduction

The last two decades have witnessed a sharp increase in foreign direct investment (FDI) flows to developing countries in the context of globalization (see figure 1). This has been accompanied by an increase in competition among the developing countries to attract FDI, resulting in many investment incentives offered by host governments and reductions in the restrictions on foreign enterprise operations in these countries. [2]

Figure 1.
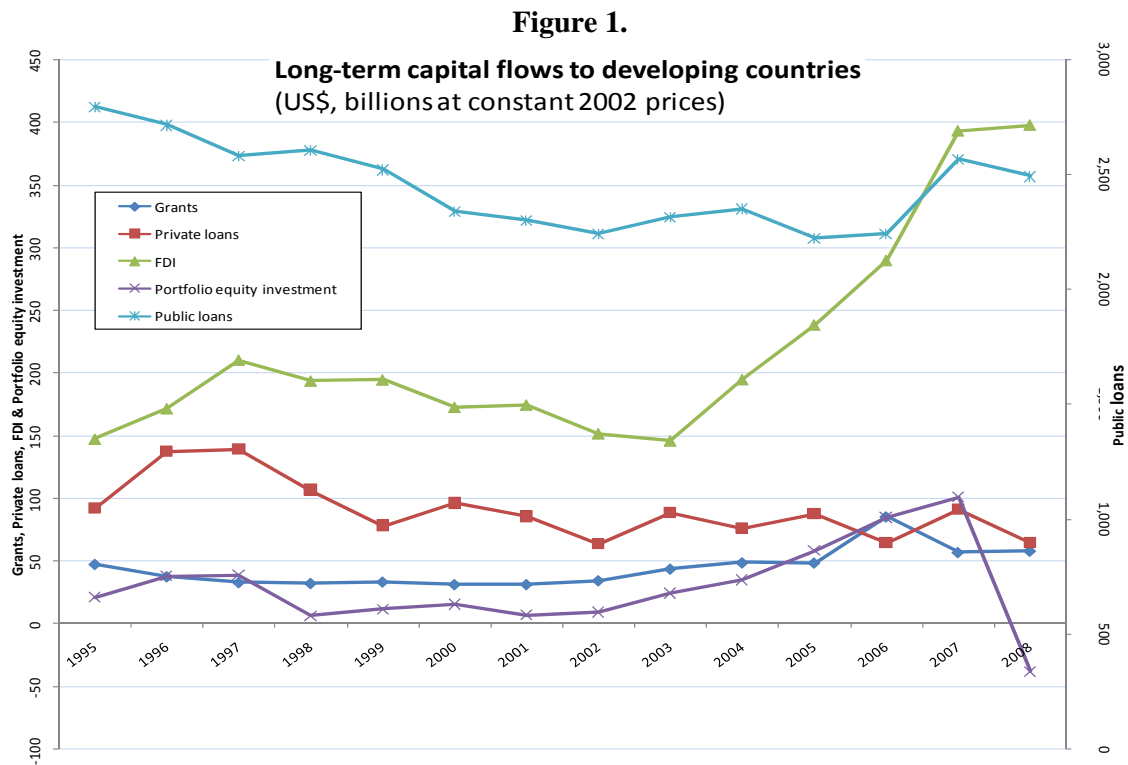
source: World Bank

For instance, the ten member countries of the Association of South-East Asian Nations seem to be engaged in a perpetual "incentive war" to attract FDI, especially since the financial crisis in 1997 that has severely affected the region. This competition becomes even fiercer as the ASEAN Free Trade Agreement (AFTA) comes into force. The AFTA would make it easier for multinational firms (MUTLINATIONAL FIRMs) from outside the region to locate

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[2] The border effect literature, in line with the seminal paper by Mc Callum (1995), shows that regional integration should not be over-estimated and that national borders still matter. There is also empirical evidence that Chinese provinces' greater involvement in international trade went hand in hand with a decrease in domestic trade flow intensity between the mid 1980s and 2000.

their activities in a single country from which they could supply the entire ASEAN market. As another example, during the mid 1990s an "incentives war" within MERCOSUR between Argentine and Brazil has followed the introduction of special "auto regimes" in both countries. Is the problem so important that it require a fiscal harmonization between MERCOSUR countries? More than 70% of African countries use tax holidays as an incentive to attract FDI compared to only 20% of OECDE countries: Are economically integrated areas more likely to enter "bidding races" for business? Does this mean that tax incentives can offset handicaps such as political instability and poor governance in those countries?

Fiscal competition is likely to take place not only between countries but also among local governments within developing countries. Indeed, over the two last decades, many developing countries have implemented a decentralization process for reasons that are very different from one country to another. One can expect decentralization to empower local governments and to give them more fiscal autonomy which in turn may increase scope for fiscal competition. However, as we will see below, things are more complicated in developing countries and an appropriate analytical framework has to take this specificity into account.

Thomas (2009) reports that, in Vietnam, desperate provincials officials engaged in pitched battles for inward FDI projects, and where many offered investment incentives beyond what was allowed by law. Martinez-Vasquez and Simatupang (2009) detect some forms of fiscal competition and yardstick competition between Indonesia's districts after the Big Bang decentralization reform. Fiscal competition also takes place between Chinese provinces rising questions such as: Are lagging regions racing to the bottom by lowering taxation or to the top by levying heavy taxes on existing enterprises knowing that provinces have little tax autonomy? Does competition between provinces lead to modify the pattern of public expenditures in favour of infrastructures?

Fiscal competition can take several forms. Governments may compete over the corporate income tax (CIT) or, more generally, over business taxation. In developing countries, central governments very often keep the CIT while local governments are left with less productive business taxes. From a theoretical viewpoint, the same kind of models can be used for international tax competition and interjurisdictional tax competition. The main difference lies in the fact that the former extensively deals with the effects of the use of double taxation and tax-shifting issues (even if to some extent tax planning can also take place between local jurisdictions whenever business tax is not "territorialized"). As we will see, the impact of double taxation on FDI inflows in developing countries should not be underestimated.

However, competition between countries and among local governments exists for business taxation but also for productivity-enhancing public infrastructure which, in certain cases, may mitigate the intensity of tax competition. This point deserves to be underlined since, in most developing countries, local governments have little or no discretionary control over tax rate and tax-base definition of their own tax resources. Both are set at the national level and this raises doubts about the effectiveness of decentralization. Finally, many governments believe that they can attract FDI and, more generally, new business through investment promotion activities and more specifically by granting fiscal incentives (such as tax holidays, reduced corporate income tax rates, accelerated depreciation allowances on industrial machinery and other capital equipments, investment allowances, or loss carry-forward for income tax purposes). The theoretical public finance literature regarding fiscal incentives is different and, to some extent, less developed that the tax competition literature. Fiscal incentives, because they are *de facto* discretionary regimes, pave the way for "bidding wars" between

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governments and induce firms to adopt a strategic behavior in order to get the highest incentives before locating in a given place. Furthermore some incentives (such as industrial land subsidies) may drive governments into a race for infrastructure—which may be inefficient for those governments which did not manage to get the lusted project.

The empirical literature on tax competition has to a large extent focused on OECD countries. It is now widely acknowledged that FDI flows are highly sensitive to differentials in corporate income tax rates. This view was not the prevalent one among FDI experts fifteen years ago – see for instance Markusen 1995). Similarly, the number of papers dealing with interjurisdictional fiscal interactions between local governments was very low fifteen years ago but is now increasing at a rapid pace. They generally conclude that local governments behave strategically when setting tax rates.

The purpose of this paper is to survey the recent theoretical and empirical literature addressing three questions related to developing countries:

(i)   Does the theoretical literature on fiscal competition and bidding races contribute to a better understanding of these phenomena in developing countries?
(ii)   Are FDI inflows in developing countries sensitive to fiscal incentives and is there empirical evidence of strategic behaviour on the part of developing country governments in order to attract FDI?
(iii) What does the literature about fiscal competition among local governments in developing countries?

I.   Insights from the Literature on Fiscal Competition and Bidding Wars

We begin by discussing the existing theoretical literature on intergovernmental competition and fiscal incentives. There is a homogeneous literature dealing with this topic (see Wilson 1999 for a survey on theories of tax competition). We draw on three strands of literature including public finance, the strategic trade literature and new economic geography. We use a game theoretic approach to address two types of questions:
-   Does fiscal competition lead to "a race to the bottom" and to an under provision of public goods?
-   How can tax holidays and subsidies grants result as a bargaining process between firms and governments?

This literature allows us to better understand the following situations:

In January 2003, the French automobile group PSA Citroën chose Trnava in Slovakia as the location for its new manufacturing plant in Central Europe, rejecting bids from Poland and Hungary. Apparently, the tax and investment incentives offered by Poland, Slovakia, and Hungary were identical. In December 2001, Toyota and Peugeot decided to locate a new manufacturing plant in Kolin in the Czech Republic rather than in Dabrowa Gornicza in Southern Poland. In July 2001, BMW finally choose to locate its new plant in Leipzig, Germany; the Kolin site in the Czech Republic (subsequently selected by Toyota) was among the short-listed contenders, along with sites in Hungary and Spain. All of the countries offered attractive incentives packages

The Ford motor company returned to Philippines in 1998 after an absence of 15 years, agreeing to build a USD 100 million assembly plant. It was reported to have won "concessions setting new standards for generous investment incentives", following intensive lobbying. Soon afterwards, Chrysler and General Motors made it known that they were keen to return, if assured of obtaining similar concessions.

Within days of Philips concluding an agreement (in April 2000) with the Czech government, under which it was to receive tax incentives for establishing a television manufacturing plant, two rival producers—Matsushita and Tyco—negotiated similar concessions.

In 1999, Romania introduced special tax incentives for large investments that met certain conditions: The legislation was commonly known as the "Renault Act", since the qualifying conditions were obviously tailored to accommodate the planned acquisition by Renault of a major share in the Dacia motor company. At around the same time, other tax incentives were being eliminated. All these examples are from Easson (2004).

1.1. Fiscal Competition and Business Taxation: "Race to the Bottom" versus "Taming the Leviathan"

The Basic Model of Tax Competition

The basic model (which also addresses issues of competition over public inputs and public infrastructure) comes from the public finance and fiscal federalism literature. The theoretical foundations of numerous papers including Wildasin (2005) and Madiès, Paty and Rocaboy (2004) are the pioneer works by Zodrow and Mieszkowsky (1986), Wildasin (1991) and Hoyt (1991) (see Wilson 1999).[3]

Public decision-makers are assumed to be benevolent in the sense that their objective is to maximise the welfare of their own citizens. Households are assumed to be immobile and consume both a private good and a regional public good. The latter is financed by a source-based tax on capital. Since capital is assumed to be perfectly mobile across regions, when a given government raises its tax rate, net return on capital located there falls and capital chooses to relocate. Marginal productivity of capital within the jurisdiction of departure increases, while marginal productivity of capital in the host jurisdiction decreases. Capital flows carry on until the net return on capital becomes identical everywhere.

Tax competition is thus modelled as a non-cooperative game where strategic variables are tax rates. The main result is that, at the Nash equilibrium, tax rate are too low and public goods are under-provided. In the case where the government can also tax labour, source-based tax on capital tends to zero at equilibrium leading to the so-called "race to the bottom." Note that Razin and Sadka (1991) show that perfect international capital mobility can lead to a zero taxation of capital earnings.[4] This inefficiency results from the fact that each jurisdiction sees capital flight driven by a tax increase as a cost and does not consider the positive fiscal externality generated for other jurisdictions. Consequently, competing jurisdictions perceive

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[3] Wildasin (2005) underlines the importance of modeling tax competition in a dynamic setting and addressing consistency issue of tax policies.

[4] For a survey on international tax competition and coordination, see for instance Fuest, Hubert and Mintz (2005) and Vondra (2006).

the marginal cost of public funds as higher than it is in reality for the economy as a whole. Furthermore, it can be straightforwardly shown that the higher the elasticity of capital (or to put it differently, the greater the number of competing jurisdictions), the greater the difference to the social optimum (Hoyt 1991).

Some Useful Extensions to Developing Countries

The basic model of tax competition has been the object of numerous refinements without questioning the main result of sub-optimality. Here, we only deal with those extensions that shed some light on empirical evidence presented below.

(i) *Asymmetric tax competition* – Bucovetsky (1991) and Wilson (1991) show that when tax competition takes place between a small and a big country (or region), at the asymmetric equilibrium, the small country/region sets a low tax rate and is a net capital importer while the big country (region) sets a higher tax rate and is a net capital exporter (see also Hwang and Choe (1995) for a more general model).

(ii) *Leviathan hypothesis, fiscal competition and corruption* – Previous literature supposed that decision-makers were benevolent. Other papers in line with Brennan and Buchanan (1980) challenge this view and conversely assume that governments behave like Leviathan or highly predatory governments.[5] The general result is that intergovernmental competition—and more generally greater decentralization—helps to tame the Leviathan and to increase efficiency of the public sector together with curbing corruption (this last argument is partly supported by Shleifer and Vishny 1993 but challenged by Treisman 2000).[6] An interesting point made by Cai and Treisman (2007) using a fiscal competition model is that competition over public inputs (productivity-enhancing public goods) leads to a situation where poorly endowed regions invest less in infrastructure and focus instead on non productive public consumption (not to say on "incumbent officials consumption of public funds").

(iii) *Vertical externalities.* As an illustration, the Brazilian government introduced in 1995 a new regime to stimulate domestic production of automobiles and promote foreign investment in that sector. It was accompanied by fierce competition among states to attract those investments. Within a period of two years, the duration of tax holidays on offer increased from 5 years to 30 years. Municipal authorities joined in the competition, offering exemptions from local services tax, with the result that potential investors were receiving tax concessions at three levels. The competition became so destructive that successive presidents asked the Congress to legislate restrictions on the states' fiscal powers. The local public finance literature has focused on fiscal interdependence due to tax base mobility among similar local jurisdictions, generating what is known as the "tax competition literature". However, this literature has for a long time ignored the possibility of vertical externality arising from the existence of a federal government

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[5] Edwards and Keen (1996) assume that regional policymakers act as Leviathans but look, to some extent, after their citizens' utility. Their conclusion is that tax coordination is better than tax competition if the marginal propensity of governments to misappropriate resources (used a measure of "political inefficiency") is lower than the elasticity of capital demand to the tax (used as a measure of "economic inefficiency").

[6] Gurgur and Shah (2005) and Weingast (2006) provide further discussion and references about the long strand of literature dealing with the very controversial relationship between decentralization and corruption (Fisman and Gatti (2002) provide empirical evidence that fiscal decentralization in government expenditure is strongly and negatively associated with lower corruption).

acting as a player (in the sense that it exercises some discretion over tax rates) and not only as a mechanical device aimed at internalising fiscal inefficiencies at the local level (Keen 1998). The recent literature, drawing on the seminal paper by Flowers (1988), has focused on a particular vertical externality that arises from interactions between overlapping governments that share one (or several) tax bases. Indeed, tax base sharing (also called concurrent taxation) is a widely spread tax arrangement in both developed and developing countries. The usual theoretical analysis assumes that each layer of government acts either as a Leviathan (see Flowers 1988; Wrede 1996; Flochel and Madiès 2002; Keen and Kotsogiannis 2004) or as benevolent (Keen 1998; Keen and Kotsogiannis 2002). Theoretical models generally show that the combined (aggregated) equilibrium tax rate of two overlapping revenue-maximising governments, which share a common tax base, is higher than a single revenue-maximising government tax rate (see e.g., Flowers 1988).7 However, interjurisdictional tax competition at the local level will reduce the combined tax rate set by the two overlapping governments and hence result in rising (and not reducing) aggregated tax revenues since the combined tax rate lies initially on the backward-bending section of the Laffer curve (see e.g., Keen 1998 and Flochel and Madiès 2002). The explanation behind this result is clear-cut: "As states compete more intensively against one another, setting lower tax rates, so the position of the federal policy maker becomes closer to that of an untrammelled monopolist" (Keen 1998 p. 473).8 For the same kind of reasons, note that if there are two levels of governments who are corrupted and set bribes, there is no reason to think that decentralization would decrease the aggregate bribe burden (technically as for tax-base sharing arrangements, it will depend on whether central and local bribery are strategic substitutes or complements). Treisman 2007 (p.155) underlines that "if fiscal decentralization motivates local governments to become less predatory, by the same logic it should render the central government more predatory". Finally, when there are several overlapping governments (central government and middle-tier governments) who offer subsidies and tax incentives in order to attract the same investment, the aggregated incentives enjoyed by investors will tend to be "too high". Similarly, when there are two overlapping revenue-maximizing governments, Beck (1993) shows that tax abatements as a form of discriminatory taxation have an a different impact on tax revenue of the two levels of governments depending on whether they abate only their own taxes or whether one level of government is allowed to abate all taxes (its own and those of the lower level).

(iv)   *Soft budget constraint* – This issue concerns both government borrowing and vertical transfers among levels of governments, and is relevant for developing countries (see e.g., Rodden, Eskeland & Litvak 2001).[9] It has been argued that tax competition may

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[7] It can also be straightforwardly shown that the global tax rate is increasing with respect to the number of vertically related governments.

[8] More generally, when vertical and horizontal externalities are at work in a federation, they generally distort levels of taxation in opposite directions (Keen and Kotsogiannis, 2002). On the one hand, inter-jurisdictional tax competition (some observers also call it horizontal tax competition) leads to tax rates being too low since each local government ignores that it harms others when it cuts its tax rate in order to attract a mobile base (which is very often capital). On the other hand, co-occupation of a common tax base results in taxes being too high. Indeed, when a policy-maker raises its tax rate unilaterally, it ignores the loss in revenues due to the induced contraction of the common tax base that the other level of government will suffer from.

[9] For a theoretical analysis and further recent references regarding the soft budget constraint issue see for instance Treisman (2007), Weingast (2006), Vignault (2007), Breuillé, Madiès and Taugourdeau (2010) and Breuillé and Vignault (2010).

lead to harder regional budget constraints as tax induced mobility increases the opportunity cost of government to bail-out and, hence, strengthens their commitment vis-à-vis lower levels of governments and state-own enterprises (Qian and Roland 1998). Breuillé and Vignault (2010) challenge this view using a multi-tier federation composed of an upper layer of government (central or federal), an intermediate layer and a lower layer of governments (cities). Vertical transfers are granted according to an overlapping upward equalization scheme. Each region allocates transfers to the cities located within its jurisdiction in order to equalize marginal utilities from the local public good provision. Tax competition among regional rescuers does not act as a commitment device to harden budget constraints at the bottom-most tier. Whether the bailout to cities is financed by a regional lump-sum tax or a distortive tax on mobile capital has no impact on the inability of the region to commit dynamically not to bail out. This opposite result is due to the fact that tax competition externalities are perfectly internalized by regions. Equalization scheme implemented by the central government insulates regions from harmful tax competition (Köthenburger 2004).

Box 1. Yardstick Competition: An Alternative to Tax Competition

Salmon (1987) and Besley and Case (1995) have used alternative or complementary explanations of public decision-making processes in a setting of fiscal federalism. These authors use as an explanation for fiscal interactions not the concept of mobility, but the idea of information asymmetries between voters and their representatives. In a world of imperfect and asymmetric information, voters have restricted possibilities to evaluate the performance of the representatives in their polity. Selfish representatives aim at gathering political rents and hence have incentives to withhold information about their opportunistic behaviour from voters. However, voters can draw inferences on politician's behavior by comparing it to the performance of governments and parliaments in neighboring jurisdictions. Other things being equal, neighbors serve as yardsticks for voter evaluation. A bad performance in their own jurisdiction compared to other jurisdictions will penalize representatives and they will not be re-elected. In such a view, public choice is not only driven by information gathering from neighboring jurisdictions but also by mimicking behavior. Because representatives anticipate the yardstick mechanism, they are able to stay in power by adapting to the policies of their neighbors.

1.2. Justifications for Tax Incentives and Subsidies and Bidding Wars between Governments

> "The winner's curse … posits that winners of common-value auctions will tend to bid in excess of the return they receive or they should expect to receive from their investment … The phrase describes a cognitive phenomenon of routinized overbidding by winning bidders in common-value auctions. The rationale for its presence is that where there are multiple bidders for the same good, the winner is required to bid more aggressively. As a result, the probability that the winner will have overestimated the value of the good increases since those with lower estimations will not win the auction." (Gillette 1997 quoted by Easson, 2004, p. 102)

Rationale for Tax Holidays. One common feature of many tax incentives and subsidies is that benefits to firms are concentrated in the early years of location. The archetype is the tax holiday in which the firm receives a reduced tax rate for a fixed period of time but pays taxes at a higher rate when the holiday comes to an end. The puzzling question which arises is the following: Why is the reduction in tax rate concentrated on a short period rather than being evenly distributed over the investment time period if we assume that both the country and the firm have the same discounted rate and that both reductions in tax rates have equivalent present value? One explanation is given by Doyle and van Wijnbergen (1994) who examine the intertemporal structure of a firm's tax payments when governments are not able to commit

not to raise taxes in the future. They note that a firm will lose part of its bargaining power vis-à-vis public authorities once it has incurred the sunk costs associated with locating in a particular jurisdiction (which make it partially immobile). As a result, the firms will use their extra bargaining power to extract concessions before deciding to locate somewhere. The two authors show that in a multi-period model the outcome of the bargaining process will then be a tax rate that increases over time, reflecting the increased bargaining power of the country.[10]

Bond and Samuelson (1986) present an alternative explanation of the same phenomenon underlining the role that signal tax holidays may play. The basic setting is the following. The main assumption is that a firm is uncertain as to the productivity of the country in which it will potentially locate (countries are of two types: low and high productivity). A tax holiday and even a subsidy (as opposed to uniform tax rates) may play the role of a signal in this model because it potentially allows high-productivity countries to distinguish themselves in the early period in which a country's productivity is unknown. Tax payments occur in subsequent periods in which the country exploits the fixed investment made by the firm. The firm will accept relatively high subsequent tax rates in a high-productivity country, allowing the latter to recoup its initial subsidies. However, the firm will abandon a low-productivity country rather than pay such tax rates, preventing the low-productivity country from recovering its initial subsidies and profitably offering a similar tax holiday. The high-productivity country can then use tax holidays to identify itself (technically it is shown that there exists a separating equilibrium) and then induce firms to enter at higher tax rates than would be the case without such tax holidays. Two results distinguish Bond and Samuelson (1986) model of tax holidays from Doyle and van Wijnbergen (1994). The latter model requires the presence of fixed cost in order to generate a tax holiday. This is not the case in Bond and Samuelson model as long as the source country is sufficiently attractive relative to the host country: A tax holiday will appear in spite of the absence of any fixed cost. Secondly, the presence of uncertainty can even lead a first-period tax rate to be negative (subsidy).

Intergovernmental Competition as a Menu Auction: A Benchmark Case. Intergovernmental competition can be modelled as an auction in which governments (principals) are bidders who want to induce firms (agents) to locate within their own jurisdiction. In such a setting, competition between governments arises because the location and output decisions of firms create benefits for the region in which they take place (knowledge spillovers, reduction of employment, etc.). However, firms' decisions may also create externalities for other countries or regions. We focus here on a simple model (Besley and Seabright 1999) where it is assumed that valuation of benefits and costs associated to any firm's location is public information. The possibility of an efficient outcome when governments compete to attract a firm that generates externalities can be illustrated with a numerical example. Suppose that a single firm must decide whether to locate in one of two countries: A or B. The payoffs to country A and B from having the firm locate in either country are

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[10] The same kind of results is obtained by Lee (1997) who considers a two-period model of tax competition (in line with public finance literature) where transaction costs are limiting capital mobility. While the budget needs to be balanced during both periods, the author shows that if tax rates in both periods are compared with the symmetric model without transaction costs, lower tax rates are imposed during the first period, and higher rates later on. Comparing the equilibrium obtained at Nash equilibrium in the static model of tax competition, there is even less public good offered in the first period. However, the public good is overprovided during the second period (along the same line, Coates 1993 using a repeated tax game shows that equilibrium tax rates are negative in the first period).

Outcome	Payoff Vector
firm in A	(5,0)
firm in B	(3,3)

where the first element of the payoff vector refers to A's payoff and the second to B's. It is clear that there is an externality as the firm affects the payoff in the other country when it makes its location decision. In a menu auction, each government formulates a bidding strategy that offers a payment to the firm if it locates in either country. It is assumed that the firm is indifferent between the two locations. With these payoffs, country A has the highest private value from having the firm locates in its own country (or region). However, social surplus is highest when the firm locates in B. Hence, we need to show that Nash equilibrium in bids that are truthful will lead to the firms deciding to produce in B. Since country A has a true marginal willingness to pay of 2 for location in A and country B has true marginal willingness to pay for location in B of 3, the firm will get the highest subsidy from locating in B and the efficient outcome will prevail. This logic is much more general, as Berhneim and Whinston (1986) have shown. However, this basic model assumes implicitly that governments are benevolent in the sense that they aim at maximizing the payoffs of their citizens. Relaxing this assumption and supposing that governments are partly selfish or corrupted (they are for instance interested in a firm being located in their area in order to extort bribes from it in order to gain the support of voters on elections) may breakdown the former result. Indeed, when government preferences fail to meet those preferences of the citizens and divert part of the resources for its own, a common agency problem arises and it may be the case that firm locates in country A which is the welfare-maximizing location (applied to the citizens' payoffs).

A number of earlier papers have offered explanations of the tax breaks given to mobile firms but these papers have described the negotiations between a single firm and one or two governments (see Han and Leach 2008 for a bargaining model of tax competition). The dynamic model developed by King, McAfee and Welling (1993) introduces uncertainties about firm productivity. In particular, the social value of a firm is given by the surplus that it generates by producing in a given region, but this surplus is uncertain to both the firm and regional governments prior to actual production. Two regions compete for the firm over two periods. After choosing a location in the first period the firm is free to relocate in the second period. However, since a sunk cost is incurred when the plant is built in the first period, mobility in subsequent periods is limited. This allows the region in which the firm initially locates to extract a share of the surplus produced in subsequent periods, without fear of the firm being bid away to another region. One of the main results is that the subsidy is increasing in the level of sunk cost, and decreasing in the disparity of the expected productivity between regions. *This is an interesting result as it means that "bidding wars" are more likely to occur when competing regions are not differentiated from each other.* Along the same line, a strand of the literature models tax competition between two or more governments for a firm whose characteristics are partly unobservable (for instance the degree to which it is mobile) as a common-agency problem with the governments serving as multiple principals and firm as the agent (see for instance Osmunden, Hagen and Schjelderup (1998)). In this case, it is shown that governments must base in tax on observable decisions of the firm such as it investment decisions and that the later extracts "information rent" from its private information (see Wilson 1999, p. 286-287 for more details).

1.3. Infrastructure Competition: A Wasteful Process or a Way to Attenuate Tax Competition?

There are many ways in which governments can compete for mobile factors. One possibility is to compete through the use of public inputs (think about some public infrastructures) that improve the productivity of private capital or firms (see Noiset 1995; Bayindir-Upman 1998; Matsumoto 1998 and 2000; Bénassy-Quéré, Gobalraja and Trannoy 2007; Hauptmeier, Mittermaier and Rincke 2009). The literature on fiscal competition shows that, in this case, public inputs may be overprovided and tax rates may be too high—this challenges the main "race to the bottom" result. Madiès (2006) shows however that this result does not necessarily hold where there is an overarching government that share a common tax base with lower-level of governments. Along the same line, Keen and Marchand (1997) argue that the equilibrium pattern of expenditures is distorted toward too much public input provision and too little public good provision. Breuillé, Madiès and Taugourdeau (2010) partly challenge this view in a decentralized leadership model where the central government aims at equalizing public good provision. They show that the optimal composition of public expenditure depends on whether the equalization scheme at work in the federation is a "net" equalization scheme or a "gross" equalization scheme.

Competition for Infrastructure: Analogy with the Innovation Race – Jurisdictions competing for an industrial project by building infrastructure might well be wasting resources. The problem is analogous to models of "innovation races" in the private sector—namely, public authorities expect a reward in terms of additional tax resources and jobs which is similar to a rent brought about by a patent when innovators are successful. The faster a jurisdiction spends money, the faster it develops its infrastructure. This boosts its chance of winning the industry. Each jurisdiction seeks the rate of spending that will maximize its expected gain from competing. Taylor (1992) shows that infrastructure competition might lead to a waste of substantial resources when it takes place between regions that start out with the same level of initial infrastructure (and incur sunk costs) but only one will gain the "prize". Conversely, when regions significantly differ in their initial endowment in infrastructure, the weak regions drop out as their chances of winning are very low and they do not want to throw their money away. Infrastructure competition leads to increasing inequalities between regions which pleads in turn for federal subsidies on regional expenditures on infrastructure.

Infrastructure Investment as a Way to Differentiate Regions – King, McAfee and Welling (1993) are not as pessimistic as Taylor (1992) in their conclusions. Their basic assumption is that each region can invest in infrastructure. More precisely, before the sequential auction in bids takes place, the two regions play a Nash game in investment levels, under which each region sets its investment level optimally, given the level chosen by the other region. They demonstrate that only an asymmetric equilibrium exists where the equilibrium investment levels differ. In the first period, the firm locates where the investment is higher. However the losing region may choose a lower but positive investment level in order to induce the firm to switch of location in the second period. This implies that the losing region's investment is not socially wasteful (as in Taylor's model).

Justman, Thisse and van Ypersele (2005) propose a model where regions can offer infrastructure services that are differentiated. Competition between regions over potential investors is then less direct, allowing them to realize greater benefits from foreign investors. The two polar cases of full and incomplete information about investors' needs are studied. In both cases, there is regional differentiation. However, fiscal competition is efficient in the

former case but not in the latter. Finally, it is shown that free entry in the location market calls for some regulation because of the excessive number of competing regions that would prevail in equilibrium. By the same token, Ben Zissimos, Myrna and Wooders (2006) argue that, because governments are able to relax tax competition through public good differentiation, traditionally high-tax countries can continue to set taxes at a relatively high rate even as markets have become more integrated. The key assumption is that firms vary in the extent to which public good provision reduces their costs. The authors show that Leviathan (i.e., revenue-maximizing) governments are therefore able to use this fact to relax tax competition, thus reducing efficiency. When firms can 'vote with their feet' tax competition leads firms to locate in 'too many' jurisdictions (for a closely-related model where regions compete in taxes and investment under fiscal equalization, see Hindricks, Peralta and Weber 2008).

Jayet and Paty (2006) go one step further in giving an explanation for the evidence that business area and industrial premises are often under-occupied or empty, i.e., over-provided. The authors propose a model where local jurisdictions must engage a development cost before competing for hosting a firm with uncertain preferences among possible sites. They first show that even an optimizing central planner managing all jurisdictions would develop more sites than there are plants to host because by doing so, he diversifies his supply and has a higher probability of hosting the firm. Then they show that, if every jurisdiction is managed by a local government, there are more developed sites than with the central planner, which implies excess supply. The outcome is analogous to overentry of firms on a market of diversified products, a point ignored for long in the literature of tax competition.

1.4. Economic Integration and Fiscal Competition: A Bell-shaped Relation?

The existence of increasing returns of scale and of monopolistic competition corresponds to an agglomeration force which makes the idea of mobile factors marginally reacting to slight changes in tax rates illusory.[11] Inertia resulting from agglomeration forces implies a situation where fiscal competition does not necessarily lead to tax rates which are "too low" (as it is the case in non-increasing to scale returns models), since the mobile factor is concentrated and produces a taxable rent (see Baldwin and Krugman 2004). Furthermore, recent literature shows that agglomeration rent is bell-shaped in trade openness: economic integration, characterised by the diminution of transportation costs at first reduces the intensity of fiscal competition then increases it later on. Agglomeration effects—and thus the taxable rent—are the highest for intermediate transportation costs, in other words, for costs that are sufficiently low to make agglomeration happen and sufficiently high for spatial concentration to be a necessity.[12] The consequences for tax competition are *(i)* that the equilibrium tax gap is also bell-shaped. Starting from a low level of openness and making trade freer first increases the tax gap, but then decreases it; *(ii)* that core countries can engage in a "limit tax" game in which they set a tax rate sufficiently low to make the periphery countries abandon the idea of trying to attract the core (Baldwin and Krugman 2004). Gilbert, Lahrèche-Révil, Madiès and Mayer (2005) run an econometric study of the bell shaped relationship between economic integration and the tax gap between countries in order to determine a threshold of openness

[11] See Ludema & Wooton (1998) Kind et al (1998), Andersson & Forslid (2003), Forslid & Ottaviano (2003).

[12] Baldwin and Krugman (2004) present data to show that corporate tax rates in core countries (France, Germany, Italy and Benelux) have always been higher than tax rates in the poorer periphery countries (Ireland, Greece, Spain and Portugal). Data on the effective average tax rate developed by Devereux and Griffith (2003) appears to confirm Baldwin and Krugman's assertions. In 2003 the average tax rate in the periphery was significantly below that in the core, at 23 percent compared to 31 percent respectively.

beyond which core countries lie below this threshold. Most UE country pairs lie below this threshold so that more integration may come along with high tax gaps.

We conclude from this brief survey of the theoretical literature on intergovernmental competition and fiscal incentives that, contrary to common wisdom, there are various reasons why tax competition is not likely to lead to a race to the bottom. Public infrastructure that has a positive impact on firms' productivity, as well as agglomeration effects, lessens tax competition.

II.   Does FDI Respond to Fiscal Incentives in Developing Countries?

Two main questions arise when it comes to analyze multinational firm decisions to engage in FDI. Why do firms choose to invest abroad and what causes them to invest in one country rather than another? These are often distinct questions since, in most cases, a decision is made to invest abroad first and only then does the multistage process of selecting the investment location starts (Harding and Smarzynska-Javorcik 2007). First a particular region of the world may be selected by the multinational firm, then a shortlist of potential host countries is drawn up. Finally, one country is chosen and a precise location is selected.

The purpose of this part is not to list the main determinants of FDI location in developing countries—this would drive us far beyond the purpose of our paper (for a survey on this topic, see Easson 2004). Our aim is rather to check whether corporate income taxation and fiscal incentives in host countries have an impact on FDI location. This question would not have been raised ten years ago since it was considered that tax motives played a secondary role in comparison to more traditional FDI determinants. But the increasing economic integration of regions (e.g., through regional trade agreements) has caused that tax incentives have become a decision factor of growing importance for FDI location.

According to the World Bank's 2008 *Doing Business* report, 20 non-OECD countries cut their corporate income tax rates in 2007 including Bulgaria (from 15 to 10 percent), Turkey (from 30 to 20 percent), South Africa (from 12.5 to 10 percent), Colombia (from 35 to 34 percent), Israel (from 31 to 29 percent) and Malaysia (from 28 to 27 percent). Asian countries have been very aggressive on the tax front. China's new 25 percent corporate tax rate, down from 33 percent, came into effect in January. The Korean government has announced that it would cut its corporate tax rate from 25 to 22 percent, Taiwan is considering cutting its rate from 25 to 17.5 percent, and Hong Kong from 17.5 to 16.5 percent. In response to these developments, an advisory panel has called upon the Japanese government to cut its corporate tax rate to remain competitive and avoid discouraging foreign investment.

II.1. Are Fiscal Incentives Good or Bad for Developing Countries?

Fiscal incentives do not require direct payments of scarce public funds and this is a major reason why they are widely used instruments in developing countries (see Easson 2004 for an extensive survey of tax incentives in both developed and developing countries). Fiscal incentives are defined as any tax provision granted to a qualified investment project that represents a favorable deviation from the provisions applicable to investment projects in general. Thus, the key feature is that it applies only to certain projects" (Fletcher 2002). All fiscal incentives will have an impact on the cost of capital, effective tax rates and, ultimately,

on where FDI locate.[13] A debate is currently ongoing over whether fiscal incentives for FDI are beneficial or detrimental to host developing countries (Blomtröm and Kokko 2003; Morisset 2003). Among tax incentives, tax holidays have been favoured by policymakers. Cleeve (2008) reports that, in 2004, 70% of African countries use tax holidays to attract FDI compared to only 20 % of OECD countries. Tax holidays provide benefits as soon as companies begin earning income while the benefits of corporate tax rate accrue more slowly and over a longer period.

Table 1 - Types of Fiscal Incentives Used, by Geographical Region

Fiscal Incentives	Africa	Asia	Latin America & Carib.	Central & Eastern Europe	Western Europe	Other Coun-tries	Total	OECD	Devel oping
(# of Countries)	(23)	(17)	(12)	(25)	(20)	(6)	(103)	%	%
Tax Holidays	16	13	8	19	7	4	67	20	55
Accelerated Depreciation	6	8	6	12	10	5	47	30	30
Investment Allowances	4	5	9	3	5	-	26	30	49
Import duty Exemption	15	13	11	13	7	4	63	5	56
Duty Drawback	10	8	10	12	6	3	49	5	24

Sources: Bora 2002, UNCTAD, FDI/TNC database and Cleeve 2008

Supporters of fiscal incentives for FDI argue that they are needed to increase investment which, in turn, create jobs and generate economic and social benefits such as positive externalities or spillovers conveyed by foreign firms. Local firms may be able to improve their productivity as a result of forward and backward linkages with multinational firm affiliates. Several other arguments in favour of public support to FDI that have been identified by cases studies and econometric studies (see Boadway and Shah 1992; Blömstrom and Kokko 2003; Easson 2004). The point is however that the foreign firms differ from local firms and possess specific intangible assets (for instance knowledge and technology that can spill-over to local companies). The multinational firm will not include these spillovers in their private assessment of the cost and benefits of investing abroad and may consequently invest less than what would be socially optimal.[14] Therefore, the question is to check empirically whether spillovers and externalities associated with FDI are strong enough to justify fiscal incentives. The earliest discussions of spillovers in the FDI literature date back to the 1960s but surveying this ample empirical literature would lead us too far. Blömstrom and Kokko (2003) conclude that there is strong evidence pointing to the potential for significant spillovers benefits from FDI but also that spillovers do not occur automatically. The latter conclusion is mainly due to the fact that most developing countries do not have the capability in terms of technical skills and human capital to benefit from FDI. The most favorable tax treatment should therefore be focused on foreign investment generating ample spillovers. The problem is obviously that it is difficult for the host country to measure the social benefits derived from FDI location. An interesting point is that in the presence of FDI spillovers, not only should foreign investment be subsidized but also local firms should strengthen their capacity to absorb foreign technology.

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[13] For an analysis of the impact of tax incentives on the cost of capital, see Boadway and Shah (1992) and Shah (2003) for an application of the cost-of-capital methodology to fiscal incentives in Pakistan.
[14] This argument is in line with the theoretical point by Besley and Seabright 1999 mentioned above.

Arguments against tax incentives are quite numerous.

- First, these regimes are costly to administrate and subject to delay and uncertainty for investors. The duration of tax breaks (especially for tax holidays) together with their design (targeted versus none targeted) influence their attractiveness for investors.

- Second, discretionary tax incentives are susceptible to corruption and are fertile ground for rent-seekers. Non-discretionary regimes granting incentives to any company meeting clear requirements are easier to implement and are not necessarily less efficient in attracting FDI. (Often developing countries grant bundles of tax incentives that end up offsetting each other—e.g., when both capital allowances and tax holidays are jointly granted.

- Third, tax holidays and tax breaks are not innocuous incentives: they can lead to transfer pricing and other distortions. Firms try to shift as many transactions as possible to the sector of activity with the lowest taxation, or set up new firms as existing tax preferences expire (McLure 1999).

- Four, the effectiveness of tax incentives is likely to vary depending on a firm's activity and motivation for investing abroad. Tax incentives are crucial factor for mobile firms or firms operating in many markets such as banks, insurance companies and internet related business because they can better exploit different tax regimes across countries. Similarly, tax rates generally have a greater effect on the investment decisions of export-oriented companies than on those seeking domestic-market or location-specific advantages because such firms are more mobile and operate in competitive markets with very slim margins.

- Five, bilateral tax treaty agreements and in particular, the provision called tax sparing must be taken into account. The aim of this provision is to ensure that fiscal incentives to foreign investors in the host country are not nullified by income taxation in the home country. The literature demonstrates that fiscal advantages provided by tax sparing provisions have the opportunity to increase the location and volume of FDI in developing countries (Hines 2007; Azémar et al. 2007).

- Finally, tax policy appears to have some effect on the location decisions of foreign firms, especially within regional markets. The concern is that countries may end up in a bidding war favoring foreign firms at the expense of the welfare of citizens. Tax incentives could also reduce fiscal revenue and create opportunities for illicit behavior by enterprises and tax administrators—as observed in many developing and transition countries which face more severe budgetary constraints and corruption than industrial countries.

II.2. Do Taxation and Fiscal Incentives have an Effect on FDI Location in Developing Countries?

There is a long strand of literature dealing with the impact of corporate tax discrepancies on FDI which has been comprehensively reviewed by Hines (1999); Mooij and Ederveen (2003; 2008) and Djankov et al. (2009). One of the main problems empirical researchers face in measuring the corporate income tax (CIT) burden is choosing the appropriate tax measure. There is a vast literature dealing with this topic (see e.g., Haufler and Stöwhase 2003 who compare the different measures in an OECD country sample). Devereux and Griffith (1998; 2002) mention that the effective marginal tax rate should be used to measure the impact of the CIT on additional investment while the effective average tax rate should be used for choosing a discrete location (incurring a sunk cost). However, estimates are generally run using the statutory tax rate for developing countries because effective average tax rates are not available. Estimates of the semi-elasticity of FDI vary across empirical studies, depending on geographic coverage, time coverage, definition of the CIT burden and econometric method (Bénassy-Quéré, Fontagné and Lahrèche-Révil 2006). According to the meta-analysis by de

Table 2. Relative Pros and Cons of Different Types of Tax Incentives

Advantages	*Disadvantages*
1. Lower CIT rate	
• Simple to administer. • Revenue costs are more transparent.	• Largest benefits go to high-return firms that are likely to have invested even without incentive. • Invites tax avoidance through high-tax enterprises shifting profits to low-tax ones via transfer pricing (intracountry and international). • Acts as windfall to existing investments. • Unlike specific benefits, may not be tax spared by home country tax authorities.
2. Tax holidays	
• Simple to administer. • Allows taxpayers to avoid contact with tax administration (which may be important if it is complex or corrupt).	• Same as lower CIT rates, except might be tax spared. • Attracts short-run projects. • Invites tax avoidance through the indefinite extension of holidays via creative redesignation of existing investment as new investment. • Creates competitive distortions between old and new firms. • Revenue costs are not transparent unless tax filing is required, in which case administrative benefits are foregone.
3. Investment allowances and tax credits	
• Can be targeted to certain types of investment with highest positive spillovers. • Revenue costs are more transparent.	• Distorts choice of capital assets in favor of short-lived ones, since a further allowance is available each time an asset is replaced. • Qualified enterprises may attempt to abuse the system by selling and purchasing the same assets to claim multiple allowances. • Greater administrative burden. • Discriminates against investments with delayed returns if loss carry-forward provisions are inadequate.
4. Accelerated Depreciation	
• All of the benefits of investment allowances and credits. • Does not generally discriminate against long-lived assets. • Moves the CIT closer to a consumption-based tax, reducing the distortion against investment typically produced by the regular CIT.	• Some administrative burden. • Discriminates against investments with delayed returns if loss carry-forward provisions are inadequate.
5. Exemptions from Indirect Taxes (VAT, import tariffs, etc.)	
• Allows taxpayers to avoid contact with tax administration (which may be important if it is complex or corrupt).	• VAT exemptions may be of little benefit—under regular VAT, tax on inputs is already creditable; outputs may still get taxed at later stage. • Prone to abuse—easy to divert exempt purchases to unintended recipients.
6. Export Processing Zones	
• Allows taxpayers to avoid contact with tax administration (which may be important if it is complex or corrupt).	• Distorts locational decisions. • Typically results in substantial leakage of untaxed goods into domestic market, eroding the tax base.

Source: Fletcher (2002)

Mooij and Ederveen (2008) based on 427 individual estimates, the mean semi-elasticity of FDI to tax rates is -3.3 (a 1 percentage-point increase in a tax measure in a certain location reduces foreign investment by 3.3%), the median is –2.9 and the standard deviation of 4.4 suggesting that the variation across studies is large. The elasticity of FDI to tax rates is usually negative and of an order of magnitude of – 0.6 in time-series samples but from –1.0 to –2.8 in cross-sectional estimates, which provide a much wider range of estimates (Desai and Hines 2001). Bénassy-Quéré, Fontagné and Lahrèche-Révil (2006) use a panel of bilateral FDI flows across 11 OECD countries over 1984-2000. They find that (i) although market potential do matter, corporate tax differentials (captured through four different measures) also play a significant role in driving FDI flows; (ii) this impact is not symmetric since low tax rates fail to significantly attract FDI while higher taxes tend to discourage new FDI inflows; (iii) the composition (and not the level) of public expenditures matters. A higher provision of public investment expenditures has a positive impact on FDI flows.

The remainder of this section focuses on empirical studies of the elasticity of FDI with respect to both CIT and tax incentives in emerging and developing countries.[15]

Azémar and Dalios (2008) focus on **Japanese firm implantation over 1990-2000 in Africa, Latin America and Asia**. The vector of control variables used in the estimation includes measures of market size, GDP per capita, trade openness, an East Asia and Pacific dummy, the cost of production and the quality of institutions. A random negative binomial model is used in order to tackle the traditional concerns in panel data. Their results are the following: (i) Japanese firms implantations in developing countries are strongly and negatively influenced by the level of statutory tax rates in host developing countries. (ii) Investors from Japan, a tax credit country, do not react to tax rates in the same way in all developing countries (when a tax sparing agreement is signed between Japan and a developing country, corporate income tax has no impact on the locational decisions of Japanese firms). (iii) The inclusion of an interaction term between taxes and public goods (proxies for level of education, infrastructure and health) on the one hand, and between taxes and public governance on the other hand, shows that increasing the quantity of public goods and the quality of governance reduces the impact of the statutory tax rate on the location choices of Japanese firms. These results are consistent with those of related empirical studies dealing with the determinants of FDI in developed countries (see above). Furthermore, it appears that low tax rates can help to offset disadvantages in terms of market potential in the host country and that "productive" public expenditures have a positive and significant impact on FDI bilateral inflows which in turn runs encounter to the "race to the bottom" concern.

Banga (2003) analyzes the **determinants of FDI inflows into 15 developing countries of South, East and South East Asia over 1986-1997 and, separately, for FDI coming from developed and developing countries into 10 developing countries of the same region for 1986-1997**. Some interesting conclusions can be drawn from the econometric test based on a random effect model: (*i*) Economic fundamentals (large market size; low labour cost; education and productivity of the labour force, quality of transportation and communication) are found to be significant determinants of aggregate FDI. However, these factors differs in terms of significance in attracting FDI from developed and developing countries; (*ii*) After controlling for economic fundamentals, FDI policies and lower tariff rates attract aggregate FDI inflows. However, lower tariffs are significant determinants of FDI from developing

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[15] We are mainly surveying large sample-based studies. For an example of sub-regional study, see e.g., Fletcher (2002) who studies the impact of tax incentives on FDI in the Mekong region.

countries but do not attract FDI from developed countries. Furthermore, fiscal incentives are found to attract FDI from developing countries but it is the removal of restrictions on their operations that is determinant for FDI from developed countries; (*iii*) Bilateral investment treaties (BITs) which emphazise non-discriminatory treatment of FDI matter. However, BITs with developed countries have a stronger and more significant impact on FDI inflows compared to BITs with developing countries. One should be careful before drawing general conclusions from this study since FDI determinants are likely to be region- or subregion-specific.

Cleeve (2008) analyzes the **impact of fiscal incentives in attracting foreign investment to Sub-Saharan Africa (SSA)**. Only SSA countries are considered on the grounds that the determinants of FDI inflow to SSA are different from those to other regions—a view supported among others by Asiedu 2002; and Barta, Kaufmann and Stone 2003. Cleeve uses cross-sectional time series data on 16 Sub-Saharan African countries for 1990-2000. He controls for variables such as host country market size (GDP per capita), degree of openness to trade and FDI, political stability (political freedom and civil liberties) as a measure of country risk and human capital (secondary school enrolment ratio). He also introduces a proxy for public infrastructure quality, believed to increase the productivity of investment and FDI flow. Finally, three proxies capture fiscal incentives offered to foreign investors with a special emphasis on tax holidays (the most popular fiscal incentive in SSA). Both random effects models and fixed effects models are estimated. The results show that traditional variables and government policies to attract foreign investment to Africa are important. Tax holidays turn to be very important for attracting FDI and other incentive generally have no significant effect.[16] An interesting point concerns the UK, USA, Germany and France (which jointly account for almost 80 percent of FDI inflow to Africa in 1996-2000) that provide their firms investing abroad with foreign tax credits. In this case, fiscal incentives lose their attractiveness for foreign firms to increase investments since lower SSA taxes may be offset one-to-one in those countries. In other words, tax incentives lead to a transfer of resources from SSA to rich countries.

Harding and Smarzynska Javorcik (2007) deal with the impact of **investment promotion agencies (IPA) on FDI inflows in 1972-2005 using a sample of 109 countries,** three quarters of which are pertaining to developing countries. Investment promotion are activities through which governments aim at attracting FDI and encompass a wide range of areas including national image building, investment generation (identifying potential investors interested in establishing a presence in the country, developing a strategy to contact them and starting a dialogue to commit them to an investment project), investor servicing (assisting committed investors in analysing business opportunities, and establishing or maintaining a business) and policy advocacy (initiatives aiming to improve the quality of the investment climate and identifying the views of private sector in this area). In this kind of analysis, the potential endogeneity of IPA existence with respect to FDI inflows and the potential reverse causality problem arising from the fact that sector targeting is a choice of the IPA are issues. Harding and Smarzynska find that investment promotion efforts lead to higher FDI inflows to developing countries (in line with Wells and Wint 2000, Morisset and Andrew-Johnson 2004, Bobonis and Shatz 2007 and Charlton and Davis 2006). Second, targeted sectors receive more than twice as much FDI as non-targeted sectors. Third, some agencies are more successful to entice FDI than other ones, depending to whom they have to report. Harding and Smarzynska

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[16] Onyeiwn and Shrestha (2005) using a fixed effect panel regression on a sample of 10 Middle East and North African countries for 1990-99 show that FDI inflows are not influenced by corporate income tax rates despite the huge efforts made by these countries to cut their tax rates.

find it difficult to distinguish the effects of investment promotion from those of investment incentives because there is a high correlation between the two variables. FDI incentives granted by competing countries from the same region divert FDI inflows while it is not the case for countries with similar income per capita. In other words, geographic distance matter to explain competition among countries while economic distance does not. Also the presence of investment promotion agencies in neighbouring countries has no impact on FDI flows whatever the definition of proximity. These results seem to suggest that competition over fiscal incentives takes place amongst geographically close countries suggesting the opportunity for those countries to coordinate their policies.

Box 3.   Tax Competition in Central and Eastern Europe

Bellak and Leibrecht (2005) provide the first empirical application of effective average tax rates (EATR) at the bilateral level to explain FDI flows to the eight Central and Eastern European Countries. Their analysis is based on the OLI-paradigm, which explains the choice for FDI versus other routes of foreign market servicing, and a panel-gravity setting. They find that FDI is positively related to both source and host-market size as well as to progress in privatisation and that FDI is inversely related to the distance between home and host countries, and to the effective corporate income tax burden and to unit labour costs. The derived tax-elasticity is very robust and higher than those derived in earlier studies on CEECs, pointing to the importance of tax policy for company location decisions. The coefficient on the EATR is always statistically significant and in the –3.3 to -4.6 range. The relative importance of the effective average tax rate as a determinant of FDI must not be over-emphasised as the results reveal that at least during 1995-2003 the EATR had no exceptional influence on FDI flows in those countries compared to other determinants.

Lahreche-Revil (2006) adds data on new members to her EU-15 sample and tries to separate the effects of corporate taxation in new members for 1990-2002. The analysis is run on *bilateral* FDI data (i.e., on pairs of investing/recipient countries). Statutory rate, implicit tax rates and EATR are taken into account. The empirical investigation relies on a gravitational setting for FDI. FDI flowing from one EU-15 country to an EU-15 or to a new member state is explained by the size of the investor, the market potential of the host, the distance between both countries and additional gravity variables (contiguity, common language). Only implicit taxation can be shown to be a significant tax determinant of FDI flows while statutory and *ex-ante* taxation fail to significantly explain location decisions. Tax differentials, when significant, only affect investment decision when the investor targets an EU-15 country with a potential non-linear impact. Taking into account competition between potential host countries for attracting FDI confirms that corporate taxation is insignificantly affecting FDI decisions only within the EU15 countries of the sample: on the whole sample, higher taxes in alternative potential locations tend to increase FDI in a given country, but this proves to be the result of the sensitivity of FDI flows going to the EU15 only, since FDI flowing to the new member states is not affected by tax changes in other potential locations.

The issue of tax competition is also examined with the use of a gravity model by Jakubiak and Markiewicz (2007). The estimation of basic equation suggests that traditional gravity variables and differences in statutory tax rates have directed FDI flows to and from new member states. It suggests that investors look at the nominal taxation when deciding about moving capital to and from the region, in addition to economic potential and distance. On the other hand, it is surprising that differences in effective taxation do not seem to matter. Perhaps the backward looking measure is the reason for that. Ordinary differences in tax rates do not seem to determine FDI flows. FDI remain determined by the economic potential of old member states, the economic potential of a destination country and the relative closeness that encourages FDI flows. However, the picture changes when distinguish for the economic potential of big vs. small countries which generates FDI. Moreover, statutory and effective corporate tax rates matter, although in an asymmetric way. If investors can pay lower taxes at home than in a destination country, it hampers FDI flows to such destinations. For effective taxation, the result is especially strong if flows originate in a new member state.

Source: Slavin (2007)

II.3. Do We Observe Strategic Behavior and Fiscal Mimicking in Developing Countries?

Most empirical studies presented here conclude that FDI inflows in developing countries are sensitive, to various degrees, to corporate income taxation and fiscal incentives. However, this does not mean that governments are strategically engaged in tax competition. Nor does it mean that governments mimic each other when choosing their fiscal policy as the yardstick competition literature may suggest. This is important since fiscal mimicking is likely to result in a prisoner's dilemma situation which is harmful for competing countries. The most common way to check whether public authorities behave strategically with each other is to estimate fiscal reaction functions (see box 4). Besley, Griffith and Klemm (2001); Devereux, Lockwood and Redoano (2002) and Alsthuler and Goodspeed (2004) are more or less the only papers estimating an empirical model of strategic interactions in tax rates and public expenditure using large EU or OECD country datasets (though, as we will see below, there is a large number of papers dealing with tax interactions between local governments in the OECD). Redoano (2007) using annual data on Western Europe over 1970-1999 shows that (*i*) the slope of the reaction function with respect to corporate income tax rates is positive and significant. Tax competition takes place in Europe with respect to big leading countries. (*ii*) The same holds for personal income. However the explanation of tax interactions is different as there is no empirical evidence in Europe of tax-induced mobility (except for wealthy people who can enjoy special tax regimes). (*iii*) Governments behave strategically mainly with respect to those expenditures which are more directly comparable such as education spending.

This methodology has never been so far applied to developing countries because of lack of data. An exception is the paper by Klemm and van Parys (2009) which addresses two empirical questions about corporate income tax rates (CIT) and tax incentives: Are CIT and tax incentives used as tools of tax competition, and how effective are incentives in attracting investment? They use a new dataset of tax incentives in over 40 Latin American, Caribbean and African countries for 1985–2004. Using spatial econometrics techniques for panel data (spatial lag model) they find that there are strategic interactions in tax holidays as well as well-known interactions over the corporate income tax rate (however, Klemm and van Parys do not find evidence for interactions over investment allowances and tax credits). They also find evidence that lower corporate income tax rates and longer tax holidays are effective in attracting FDI (which is consistent with related studies presented above) but not in boosting gross private fixed capital formation or economic growth.

III. Competition among Local Governments in Developing Countries

There is a rich tradition of econometric research dealing with fiscal interactions among subnational governments in OECD countries. Most of these studies have established the importance of spatial interactions between local governments in these countries (see Ladd 1992; Besley and Case 1995; Rork 2003 for the United States; Heyndels and Vuchelen 1998 and Vermeir and Heyndels 2006 for Belgium; Buettner 2001 for Germany; Feld and Kirchgässner 2001 for Switzerland; Bordignon, Cerniglia and Revelli 2002 for Italy; Revelli 2002 for the United Kingdom; Solé Ollé (2003) and Bosch and Solé-Ollé 2007 for Spain; Allers and Elhorst 2005 for the Netherlands and Feld, Josselin and Rocaboy 2003 and Foucault, Madiès and Paty 2009 for France). However, most of these papers fail to identify empirically the reason why such interactions take place. It is well known that different theoretical hypotheses (tax competition; yardstick competition and public expenditure

Box 4. Fiscal Reaction Functions and Spatial Econometric Models

Most empirical tests on strategic interaction use spatial econometrics to estimate the slope coefficient of reaction functions which connects each government's policy choices to the decisions of neighboring governments and to its own socio-economic characteristics (Brueckner 2003; Revelli 2006; Madiès, Paty and Rocaboy 2006). The reaction function slope is nonzero when strategic interaction occurs. Three spatial econometrics issues have to be dealt with before estimating such spatial models (Anselin 1988).

(*i*) In order to deal with the definition of neighborhood, we have to arbitrarily specify a weighting scheme which indicates the relevance of other governments in the process of interaction. Basically, the weights capture the location of a government *i* relatively to other governments *j*. A variety of weighting schemes are often explored to allow different patterns of spatial interaction. The most common is the simple contiguity weighting scheme in which interaction is supposed to occur among jurisdictions sharing geographical boundaries. Under such a scheme, w_{ij}=1 for jurisdictions *j* that are contiguous to *i*, and w_{ij}=0 if they do not share any border. Another possible weighting scheme takes into account the distance from a given jurisdiction to its competitors as imperfect mobility of capital may be a plausible assumption in such models (Brueckner 2003). Other weighting schemes based on socio-economic characteristics such as population or income can also be used. Finally, each weight matrix is row-normalized prior to estimation so that the aggregation of tax rates consists in a weighted average.

(*ii*) Because of strategic interaction, we have to deal with the endogeneity of the jurisdictions' fiscal choices. Policy decisions are endogenous and correlated with the error term. The resulting spatial correlation means that OLS estimates would be inconsistent. In the literature, two methods are used to tackle this problem. The first one is the maximum likelihood (ML) method. A non linear optimisation routine is then used to estimate the model. The second approach is instrumental variables (IV). The fitted values used as instruments for the competitors' policy choices are uncorrelated with the error term. OLS then yields consistent estimates of the parameters. As it is easier to implement, this procedure is frequently used. Although consistent, one of the objections to IV estimators of spatial models is that they ignore the Jacobian term and are therefore less accurate than ML estimates (Anselin 1988).

(*iii*) The possible presence of spatial dependence in the errors is the third issue. Such spatial dependence can arise when the error term includes omitted explanatory variables that are themselves spatially dependent. Uncorrected error dependence may provide spurious evidence of strategic interaction. Several approaches exist in order to deal with this problem. One approach is to use ML to estimate the model, taking account of the spatially correlated error structure (Anselin 1988). Under ML procedure, a second approach based on the robust tests of Anselin, Bera, Florax and Yoon (1996) can be employed to detect spatial dependence. Finally, an easier remedy is to rely on the IV method which generates consistent parameters for the reaction function even in the presence of spatial error dependence (Kelejian and Prucha 1998).

Source: Madiès, Paty and Rocaboy (2006)

spillovers) lead to the same reduced form equation to be estimated (Revelli 2006 presents a survey). By contrast, little is known about the extent and significance of fiscal interaction among local governments in developing countries. The design of fiscal decentralization systems in these countries might drive one to conclude that there is no scope for strategic fiscal interactions among subnational governments but until recently there was little empirical evidence. A number of recent papers, which we now review, examine fiscal and yardstick competition among subnational governments in developing countries. They include papers by Yi Yao 2008; Zhang and Chen 2007; Herrmann-Pillath and Xingyuan 2010 for China; Thomas 2009 for Vietnam; del Granado, Martinez-Vasquez and Simatupang 2009) for Indonesia, de Melo 2007 and Haddad, Porsse and Ribeiro 2006 for Brazil; and finally Foucault and Rota-Grazziosi 2010 for Benin.

III.1. Fiscal Decentralization and Fiscal Autonomy in Developing Countries

Developing countries share some characteristics when it comes to decentralization:

(i) There is a huge gap between devolution of competencies as stated by the law and competencies that are eventually implemented by subnational governments. Furthermore, in most of developing and transition countries, subnational governments enjoy very little fiscal autonomy (i.e. they have a very limited discretionary control on their own expenditures) even if, in some cases, the subnational government share in total government expenditure may look important at first glance;

(ii) Tax revenue are very centralized and, for those limited resources which are under the control of local governments, subnational governments are granted little tax autonomy;

(iii) Vertical transfers (including revenue sharing arrangements) play an important role to fill the gap arising from the lack of balance between subnational revenue and expenditures responsibilities. The effects of both vertical gap and vertical transfers have been widely documented by the fiscal federalism literature (see Weingast 2006 for a survey). The disconnect between taxing and spending responsibilities and the resulting vertical transfers raise a major problem of accountability at the subnational level since lower level governments do not really enjoy fiscal autonomy. Ensuring accountability means that ability to raise tax revenue should be matched as closely as possible with expenditure needs (see Bahl and Linn 1992 and Shah 1997a, 1997b for developing countries). Vertical transfers and revenue sharing systems should be designed to provide incentives to subnational governments (especially in terms of new revenue generation) to foster local economic growth.[17]

(iv) In most developing countries, jurisdictions face restrictions on trade or factor movements across jurisdictional boundaries. Both people and firms cannot move easily from one location to another because of mobility restrictions set by the central (federal) government but also more generally because the set of location choices is narrow (few cities offer a public services bundle capable of attracting business and people). The failure of the common market condition creates a pathology in which sub-national government become a de facto "national government" within its jurisdiction (Weingast 2006). Along the same line, one can argue that "voice" and yardstick competition are less likely to work efficiently in developing countries than in developed countries because of a lack of local political accountability and, to some extent, because of the perversion of democracy that Weingast (2006, p. 38) calls "tragic brilliance". However some empirical studies (e.g., Alderman 2002 for Albania and Faguet 2004 for Bolivia) tend to qualify this blanket statement and show that there is scope for improvement in the delivery of public services when the latter are granted at the local level.

In the final section, we review a few studies providing empirical evidence of interactions between local governments in developing countries despite limited fiscal autonomy.

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[17] Careaga and Weingast (2003) call poor incentives of fiscal transfers "the law of 1/n"

III.2. Empirical Evidence of Fiscal Interactions between Local Governments

Fiscal competition and public spending pattern in China. China is considered to be the archetypal country for "market preserving federalism" (Weingast 2006). Administrative and fiscal decentralization in the 1980s led to the formation of local political interests and to a certain degree of regional and local autonomy with hard budget constraints for local governments (Herrmann-Pillath and Xingyuan Feng 2004). *De facto* both tax rates and tax bases are kept under the central government control (local and upper-level of government share fiscal revenue according to a predetermined formula). However, fiscal decentralization has created scope for inter-provincial competition as local officials are appointed and assessed by higher levels of government on their ability to foster economic development (Zhang and Chen 2007). Fiscal competition across provinces takes the form of a bundle of preferential tax regime and (more recently) business-oriented public expenditure. To some extent, this is in line with a Tiebout-type "voting with your feet" hypothesis applied to business location. Businesses vote with their feet by locating in a particular province while the mobility of individuals is restricted.

Zhang and Chen (2007) check whether fiscal competition has led to a distorted pattern of provincial public expenditure in favor of infrastructure and other productive public input at the expense of other public goods such as recreational facilities or health care (as discussed in Keen and Marchand 1997). Zhang and Chen consider a sample of 30 provinces and cities that they divide into four categories based on an index of public goods provision and a measure of provincial tax burden. They use provincial level panel data for the period 1995-2003 to analyze the impact of regional infrastructure level, public services, health care, tax burden and labour costs on the share of provincial FDI. They find that the share of FDI in a given province is negatively correlated with the level of public services, the tax burden and health care but positively related to infrastructure development.[18] This may suggest that tax competition has changed the pattern of provincial public expenditures in favor of infrastructure expenditures. Zhang and Chen argue that it is mainly due to the way local official are evaluated and to the fact that individuals' mobility restrictions prevent individuals from "voting with their feet." Zhang and Chen also show that fiscal competition among provincial governments has been shifting from tax preferential incentives to competition to improve public infrastructure.

There is a huge discrepancy in terms of size and endowments between Chinese provinces. This is likely to have an influence on fiscal setting as suggested by the theoretical literature. Yao and Zhang (2008) use panel data on 2094 rural counties and county-level municipalities for 1993 to 2005. They include as endowments the level of economic development, stock of capital, natural resource endowment and labour skills. They find that (*i*) there is strong evidence for spatial clustering of tax rates for some regions and weak (or null) evidence in others; (*ii*) Tax reduction is more effective to attract investment in coastal provinces than in inland regions; (*iii*) in 1994-2002, a cluster of rich counties competed with each other in cutting their tax rates ("race to the bottom") while a cluster of poor counties facing much tighter budget constraints than rich counties were engaged in a "race to the top" with their neighbors. As underlined by Yao and Zhang, poor countries may have been involved in predatory tax practices against the industrial and business sectors (in line with Cai and Treisman 2005).

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[18] The tax burden is measured as the ratio between business-based regional fiscal revenue and non agricultural regional GDP (as a proxy of the tax base).

Yardstick competition in Indonesia – Arze del Granado, Martinez-Vasquez and Simatupang (2009) examine whether the so-called "Big Bang decentralization reform" which took place in 2001 in Indonesia has paved the way for fiscal competition among local governments. The main feature of the "Big Bang" reform was a massive devolution of responsibility to districts and, to a lesser extent, to provinces. As a result, the share of local and provincial government in total government expenditure almost doubled before and after the reform. In East Asia, only China has more decentralized expenditures than Indonesia (though, as we note above, it might be exaggerated to call this 'decentralization' since subnational public expenditure autonomy is limited in Indonesia). Subnational governments have little autonomy with respect to taxation. Tax revenue sharing and transfers account for most subnational resources and the central government keeps all major tax sources. This study uses fiscal data on local districts for 2004 and estimates a spatial regression model. They try to sort out the different reasons for fiscal interaction in estimating an auxiliary equation (popularity of the incumbent in the case of yardstick competition or changes in tax bases in the case of tax competition). The study does not find evidence of tax competition, as expected, but finds evidence of yardstick competition among local districts on both tax and expenditure sides, suggesting that accountability mechanisms in decentralized developing countries may be reinforced by inter-jurisdiction competition in terms of local governance performance.

Interactions in public expenditures in Bénin. Rota-Grazziosi and Foucault (2010) test for the existence of strategic spending interactions between Beninese local governments using a spatial panel dataset. Since 1998, Benin has undergone a decentralization process that became effective with local elections in 2002-2003. The dataset covers the two local elections (2002 and 2008) and the 77 municipalities of Benin. The empirical analysis provides evidence of strategic interactions between Beninese local governments with respect to current expenditures; and of interactions among neighboring municipalities for those municipalities that are close to each other in terms of ethnic composition. Moreover municipalities adopt opportunistic behavior before elections by increasing public spending, and communes whose mayor has the same political affiliation as the president enjoy higher public spending.

Tax war in Brazil. Brazilian states have considerable autonomy to set their VAT rates and bases. De Melo (2007) tests for horizontal tax competition in the value-added tax (VAT) for a sample of Brazilian states in 1985-2001. His empirical findings, based on the estimation of a tax reaction function in an error-correction set-up, confirm the hypothesis of horizontal tax competition. The states react strongly to changes in their neighbors VAT code, especially those that belong to the same region. There appears to be a Stackelberg leader among the states with remaining jurisdictions responding strongly to its policy moves. Haddad (2006) uses an interregional general equilibrium model to evaluate the welfare effects of an experimental game of tax competition between two regional governments in the Brazilian federal system. The model accounts for both horizontal and vertical fiscal relationships. The results display a welfare-improving Nash equilibrium, which runs encounter to most theoretical results. The fiscal externalities of tax competition matter for such outcome not only because of the mobility of the regional tax base but also because of the substitution effect between regional goods and international goods since tax competition reduces domestic prices. Additionally, the constitutional rules impose a rigid mechanism of fiscal transfers from central to regional government and contribute to alleviating pressures on regional public goods because an increase in the central government tax base increase regional government revenue. Then, inter-jurisdictional tax competition in Brazil is associated with gains in private consumption that overcome the reduction in regional public good provisions, reinforcing the welfare-improving equilibrium.

Conclusion

A "race to the bottom" is not necessarily the more likely outcome when (developed or developing) countries compete for foreign investment with fiscal incentives. Differences in endowments and public infrastructure may lead some regions to a "race to the bottom" but others are likely to have a "race to the top". Fiscal incentives matter more to attract FDI from developing countries than from developed countries. Since most developing countries offer fiscal incentives to foreign investors, there is a risk that fiscal resources will be wasted since generally only one country wins. A better strategy would to set a low and stable corporate income tax rate is order to attract FDI from developed countries and to improve other features of the country, including governance and education of the labor force which, ultimately, matter more than fiscal incentives. There is some evidence of fiscal interactions between local governments in developing countries despite little fiscal autonomy. Yardstick competition is likely to explain it.

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