

# Fiscal decentralization

VERTICAL, HORIZONTAL, AND FDI

## SUMMARY

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*Both in the developed and developing world, decentralization of fiscal policy is frequently argued to foster investment, because allowing investors to choose between competing locations should make it difficult for each jurisdiction to tax the investment's returns. We point out that this 'horizontal' dimension of decentralization cannot eliminate ex post incentives to tax investments once they are irreversibly located in a jurisdiction, and that the negative ex ante investment effects of such 'hold up' problems are actually stronger when decentralization inevitably leads to multiple levels of taxation power in each location. Empirically, we detect significant negative effects on FDI of the 'vertical' dimension of decentralization, measured by the number of government layers, in a data set containing many countries and many suitable control variables. Indicators of overall fiscal decentralization do not appear to affect the investment climate negatively per se, but our theoretical arguments and empirical results suggest that policymakers should consider very carefully the form and degree of government decentralization if they aim at improving the investment climate.*

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# Foreign direct investment and the dark side of decentralization

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## 1. INTRODUCTION

Countries differ in their government architecture. Some countries are characterized by a high degree of concentration of fiscal, administrative, judicial, executive and lawmaking powers, whereas others have decentralized many functions and responsibilities of government to different jurisdictions and various levels of government. The cross-country differences in the organization of government are also not static but have been subject to substantial change in many countries. The co-existence of different organizational patterns of government has created an important debate regarding the determinants of particular government structures as well as questions regarding the optimality of different forms of organization.

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We aim at contributing to this debate by analysing the role of decentralized governance for attracting foreign direct investment (FDI). Decentralized governance, understood here as institutional rules which allocate some governmental decision rights in a country to independent regional governments of non-overlapping territories inside the country, has important effects on the potential of countries to attract FDI. We offer a number of theoretical considerations in this regard, and highlight various effects of the degree of decentralization on FDI that we believe have not been sufficiently recognized. Our main contribution, however, is empirical in nature as we empirically assess the effects of decentralization on FDI.

We point out that, in theory, decentralization of government operates along both a *horizontal* and a *vertical* dimension. Consider first the *horizontal* dimension. Decentralization comes along with the partitioning of the state territory into smaller districts or regions with some autonomy in governmental decision making. The local governments are ‘closer’ to their constituency, both physically and in terms of accountability. Also, potential competition and benchmarking between the regions becomes feasible whereas this is not feasible under a unified central government. In the policy debate, these aspects of horizontal segregation play an important role. In the traditional view it is argued that horizontal disintegration may also have some disadvantages, as it becomes more difficult for the disintegrated entities to cope with inter-regional spillovers and economies of scale in the public sector. But it is frequently maintained that the beneficial effects that stem from inter-regional competition dominate, in particular with respect to attracting FDI. Horizontal segregation ‘permits a degree of institutional competition between centres of authority that can . . . reduce the risk that governments will expropriate wealth’ (World Bank, 2004, p. 53). To a large extent, this reasoning is rooted in the view that bureaucrats and politicians are not purely benevolent but they may try to use their power to tax in order to extract revenues, and investment projects that are owned by foreigners may be welcome targets for extractive activities. Competition between jurisdictions for mobile factors of production makes opportunistic behaviour of bureaucrats and politicians more difficult (see Weingast, 1995; Qian and Weingast, 1997), a view that can be traced back to Hayek (1939) and Tiebout (1956). That inter-jurisdictional competition may serve as a welcome supplement to inadequate constitutional constraints and imperfect political institutions has also been emphasized by Brennan and Buchanan (1977, 1980). Also, it is argued that the competition between horizontally segregated regional governments may alleviate some time consistency problems of taxation that emerge even if politicians pursue the welfare of their citizens (Kehoe, 1989).

Complete horizontal disintegration and competitive governmental decision making on the regional level is the implication of decentralization, if decentralization is meant to be a complete break up of a nation into many small and fully independent nations. However, such a complete break up typically does not happen, and should not happen from an efficiency point of view: scale effects and difficulties with the internalization of inter-regional spill-over effects or global public goods suggest that only some, but not

all decision rights should be allocated to local or regional governments. Some decisions will continue to be made on more aggregate levels, for example, by the district level government, by state level government, or by the federal government, depending on the architecture of government layers that is chosen. The creation of local governments and the process of horizontal segregation are typically accompanied by a process of *vertical* disintegration. A firm owner who is located in a particular city deals with the governmental decision making of governments of the city, the district in which this city is located, the state in which this district is located and the federal government. When choosing locations, investors should accordingly take into account that they will be subject to the jurisdiction of all such government tiers. An exclusive focus on the benchmarking, competition and accountability features of inter-regional competition that may result from horizontal segregation fails to acknowledge this other side of decentralization.

Our analysis identifies the vertical disintegration of governmental decision making as a major source of disadvantages of decentralization. If the private sector has dealings with several tiers of government, this will potentially create problems of rivalry between the different tiers, coordination failures, free-riding incentives between government decision makers from different government tiers, common pool problems between them when making independent tax and expenditure decisions, problems when it comes to the enforcement of implicit contracts between the government and private investors, and moral hazard problems from joint accountability of politicians from different vertical tiers. These problems affect a country's attraction as a location for FDI in several ways. Suppose governments are tempted to extract revenue from existing investment projects that are owned by foreigners. If governments from several tiers are able to extract revenue from the same investment project a common pool problem emerges that may increase the amount of extractive activity. Governments may also subsidize or make bids for attracting investment projects that are future targets for extractive policy or benefit the host-country in other ways. If local, regional and federal governments can make such bids, they may free ride on one another.

At the end of the day, only empirical evidence can tell whether decentralization, and its different dimensions, has positive or negative effects on the level of FDI inflows. Our econometric analysis provides novel evidence in this respect. Introducing measures of decentralization in a 'knowledge-capital' model and using firm data on cross-border acquisitions, our findings suggest, in line with our theoretical perspective, that a one-dimensional and positive view of decentralization is not appropriate. Employing various decentralization measures in our empirical work, we derive insights as to which aspects of decentralization are conducive to FDI and which turn out to be rather problematic.

The vertical dimension of decentralization, measured by the number of government tiers in a country, is found to affect FDI negatively. On the other hand, fiscal decentralization can have significant positive effects. Expenditure decentralization is found to be correlated with more FDI, while revenue decentralization appears to have a negative influence on FDI.

Our results are highly relevant for policy makers as policy reforms that change the degree of decentralization of governance have been high on the policy agenda both for the developed and the developing world. Poor economic performance of many developing countries is often attributed to the failure of centralized bureaucracy and centralized decision making, and many consultants advocate decentralization of policy-decision making as a way to sustain or increase growth and prosperity. Decentralization is also a frequent advice given by international organizations. Substantial resources have been geared towards programs that promote decentralization of policy decision making. Recently, for instance, the OECD, the World Bank, the Council of Europe, the Open Society Institute (Budapest), the UNDP and USAID have joined forces and introduced the Fiscal Decentralization Initiative to assist developing countries in carrying out intergovernmental reforms (OECD, 2002). The prime objectives of this initiative are to encourage local democracies to improve the capacity of local governments to plan and administer expenditures and raise revenues, and to support local governments in their efforts to become more responsive and accountable. This tendency is expected to continue well into the future.

Practitioners and academics have not been unaware of potential pitfalls of decentralization. For example, the World Bank states that ‘sub-national governments are not immune from governance problems – and in some contexts may be more vulnerable to them than national authorities’ (World Bank, 2004, p. 53). Similarly, Bardhan and Mookherjee (2000, 2005) discuss the incidence of corruption in centralized and decentralized systems. From our perspective, the question whether local or central governments are more corrupt, easier captured, better informed, etc. is only one aspect of the decentralization debate, albeit an important one. Still, our argument is that this view remains incomplete. It is not sufficient to consider just the incentives and capabilities of each *individual* government. We stress that the *distribution* of power, responsibilities and accountability across different government levels within a federal system has important effects. These effects interact and typically reinforce the governance problems that exist at each individual level of government. This paper is not the first to highlight problematic aspects of decentralization, and that tries to single out more precisely the specific conditions and institutional provisions that are necessary for federalism to unleash its potential for improving the countries’ economic performance. For instance, an important feature of the usual efficiency argument for decentralization is that it is developed in a system within which there is a clear division of powers between the different government tiers, in which all spillovers, including vertical fiscal externalities are absent by assumption or are contracted away (Riker, 1964). Vertical fiscal externalities have recently been identified as a source of inefficiency in the context of tax competition (see, for instance, Wrede, 1997, 2000; and Keen and Kotsogiannis, 2002, 2003, 2004) and it has been argued that they are difficult to avoid, even if seemingly different tax bases are assigned to different tiers of government, and regardless whether politicians and bureaucrats are assumed to be benevolent or perfectly selfish.

Treisman (1999a, 1999b, 2000b, 2003) has put forward a number of further arguments why decentralization may lead to a less satisfactory performance, and Cai and Treisman (2005) show that the disciplinary effect of inter-regional competition, even where it could be at work in principle, may lead to adverse effects if regions are asymmetric, making some of them drive out all mobile capital and specialize on a high level of oppression. This and other consequences of a federal structure may also reduce FDI.

## 2. DECENTRALIZATION AND FOREIGN DIRECT INVESTMENT

The analysis of the benefits and costs of decentralization has generated a number of important general insights. We provide a brief overview in Box 1. While the conclusions from this work also have a bearing on countries' ability to attract FDI, we seek to go beyond these established results and to dwell deeper into the specific relationship between decentralization and the attractiveness of host countries for potential foreign investors. In particular, we focus on two questions. First, can the potentially beneficial effect of inter-regional fiscal competition really unfold its effectiveness on FDI? Second, are there potentially harmful effects of the vertical dimension of decentralization on FDI and how do they operate?

### 2.1. The nature of FDI and the hold-up problem

Consider the timing of decision making between the investor and the government that has jurisdiction in the location in which the FDI takes place, which creates what is called the *hold-up problem* in the context of FDI<sup>1</sup>: an investor can freely choose where to locate its FDI. Once the investment is made, some share of it is sunk and irreversible. The host government which has the jurisdiction in this location can now choose how much to demand from the investment returns, and may even choose to appropriate the investment completely. These incentives arise if the government is simply revenue maximizing, but also if the government is benevolent or acts in the interest of the citizens in the host country for political reasons, simply because the owners of the FDI that occurs in a host country are foreigners in that country by definition. If foreign investors anticipate this extractive behaviour, they will invest too little or not invest at all. Even investment projects that yield a very high gross return and would be highly profitable in the absence of the threat of confiscatory taxation do not take place. Unless the government can credibly commit not to make use of the opportunities to extract, or can compensate investors upfront, investors will not invest if they anticipate that the whole returns on their investments are confiscated.

<sup>1</sup> For a characterization and some essential aspects of this problem see Eaton and Gersovitz (1983), Janeba (2000), Konrad and Lommerud (2001) and Schnitzer (1999).

### **Box 1. Arguments for and against decentralization**

Decentralization of fiscal responsibility to sub-central government is thought to change the public sector's *allocative efficiency*, and the policy makers' *accountability* to their constituencies.

Oates (1972, 1999) suggested that decentralization allows local preferences to be reflected more sensitively in the decentralized provision of local public goods. One of his arguments is rooted in the view that the central government is relatively poorly informed about local tastes for public goods and about the cost of producing them, pointing to the problem of discovering local preferences. Also, he suggests a tendency of the central government to choose local public goods uniformly across different regions. Mobility of labour across jurisdictions has been suggested as a solution to this information problem in a decentralized context. If citizens feel discontent with the pattern of local taxes and spending in their own locality, they may express this discontent by 'voting with their feet' and may move to other jurisdictions they find more suited to their preferences. In the limit one can conceive a situation in which citizens sort themselves across localities in such a way that the allocation of resources is entirely efficient: no reallocation is possible such that citizens' welfare increases. This view, that labour mobility alone is enough to secure efficiency in the pattern of local public expenditure, is known as the Tiebout hypothesis (see Tiebout, 1956).

Decentralization may change the accountability of government that stems from the existence of local elections in decentralized structures (see, e.g., Seabright, 1996). With decentralized policy decision making, and separate elections in each locality, politicians are elected on the basis of their performance on the local policies and not on 'an average' measure of performance as it would be under centralization (see, among others, Besley and Smart, 2003, and Kessler *et al.*, 2005). There is a variety of considerations pointing to centralized policy decision making. With the risk of over-simplification these considerations can be divided into two broad categories: *efficiency* and *administration*. As regards efficiency, the mobility of factors of production may generate inefficiencies in the allocation of resources due to fiscal externalities in the context of tax competition between localities for a mobile tax base. Possible remedies to this problem are multilateral reforms that coordinate taxes, or, inside a federation with a central government, Pigouvian subsidies for the localities, 'presumably administered by a higher level government' (Wildasin, 1989). As regards administration, decentralization entails duplication of certain fiscal activities. As Oates (1972, p. 201) notes, this may suggest that the optimal degree of centralization is a function of country size.

This picture alludes to an empirically important investment obstacle. Full expropriation may be less likely to be the outcome in reality, because the actual returns that accrue from an investment depend, to a considerable extent, on other factors of production (such as the amount of workers employed, or managerial effort) that are chosen by the investor at the point when the host government(s) made their choices on taxes and other extractive efforts.<sup>2</sup> This ability to adjust production activity *ex post* will generally lead to less than full confiscation. The relationship between the anticipated level of confiscatory taxation and overall revenue that accrues will typically follow a ‘Laffer’ curve. The overall tax burden in the equilibrium depends on the governance structure, and we may ask whether the hold up problem of FDI is mitigated or aggravated by (a) horizontal competition between independent regions, and (b) the vertical organization of governance. We turn, starting with the former question, to this next.

## 2.2. The benefits of horizontal competition

Federalism and decentralization of authority comes along with horizontal and vertical disintegration. Consider first the aspect of a horizontal split up of a unitary country into regions with independent governments. Kehoe (1989) highlighted an important aspect of inter-regional competition. He addressed a time consistency problem in capital income taxation that is related to the hold-up problem in FDI and had been discussed by Kydland and Prescott (1980). They considered the choice of savings of private households if they have to invest their savings within one country with a unitary government. The government chooses its future tax system time consistently. It minimizes the excess burden that is caused by the taxes at the point in time when the taxes are chosen. In such a single unitary country, households anticipate that their savings will constitute a fully immobile tax base in the future and that the government will try to make use of this non-distortionary source of taxes. But if the households anticipate that their savings will be taxed quite heavily, or even completely confiscated, they will not save. Kehoe (1989) suggested that this problem of time consistent capital income taxation can be solved if there are many countries or many regions with local governments who choose their tax policy independently, if the private households can choose in which country to locate their savings at a point in time when the countries have already chosen their capital income tax rates. Even though the total amount of savings is given when the countries or regions choose their tax policy, governments still have to consider that the owners of capital may relocate its existing stock from a country that chooses high tax rates to low tax countries, and in the equilibrium, this drives down the tax rates chosen by the different governments.

Formally, decentralization of single countries into many small regions is not needed to implement this type of competition. International capital mobility may be sufficient.

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<sup>2</sup> Charlton (2003) argues that only a share in the total assets, that constitute an FDI project, consists of fully immobile property plant and equipment.

But this mechanism may function even better for the competition between regions, as the transaction cost of shifting capital from one region to another may be lower than for shifting capital across country borders.

Applied to FDI, the competition between the governments in different regions could be to the benefit of foreign investors who can choose their investment location, as they can choose the most attractive offer, and competition between the regions is likely to drive down the rents that can be appropriated by the regional government and its citizens. This competition aspect is emphasized by many writers on federalism and FDI. As a prominent example Weingast (1995, pp. 5–6) expresses this view in the following statement:

[i]f a jurisdiction attempts to confiscate the wealth of an industry, the mobility of capital implies that firms will relocate. The mobility of resources thus raises the economic cost of those jurisdictions that might establish certain policies, and they will do so only if the political benefits are worth these and other costs. Federalism thus greatly diminishes the level of pervasiveness of economic rent-seeking and the formation of distributional coalitions.

This view is quite influential in the policy debate. However, it is important to note that inter-regional competition of the kind underlying Kehoe's (1989) argument addresses the problem of savings well, but it is not suitable to address and solve the hold-up problem in FDI. One of the implicit preconditions for Kehoe's mechanism to work in the FDI context is that the investors or capital owners are able to relocate their capital between regions or countries at a point of time when the politicians or bureaucrats have made their policy choices. To some extent, this may also be true for some FDI, and, but to a different degree, for different types of investment.<sup>3</sup> Also, if the existing stock of investment and future investment has to be treated equally and uniformly, competition for future flows of FDI may make the aggregate stock of FDI that accumulates over time more elastic with respect to how foreign investors are treated once the investment has been made and is sunk. Still, much of the investment in a specific FDI project, and most notably the physical capital is fixed and tied to the local region in which it is installed, and cannot react further to changes in taxes, regulation and bureaucratic demands.

For the beneficial effects of competition between localities for investors to unfold it is required that this competition opens up alternatives for investors at the point of time when a locality has chosen how investors are treated in terms of taxes and public services. Only if investors can easily adjust their activities by moving from one locality to another as a reaction to this treatment, the threat to do this will discipline the policy makers and give them incentives not to exploit investors. If, at some stage, the investors have irreversibly made investments in a locality that are sunk, moving these investments into another locality is no longer an option, and the investors are at the mercy of the decision makers who have jurisdiction over the particular locality in which they are locked.

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<sup>3</sup> For instance, the share in property plant and equipment in total assets that is used in Charlton (2003) is a rough measure for how immobile a given foreign direct investment is.

### 2.3. Harmful effects of vertical disintegration

Consider now how the vertical dimension of decentralization bears on investment and taxation decisions. (For a formalization and extensions of the following reasoning, readers should refer to Kessing *et al.*, 2006a.)

Delegation of some governmental choices to lower tiers of government, without complete disintegration of the top level of government, leads to a situation in which an investor who made a decision to build a plant in, say, Munich has to deal with several governments: with the city government of Munich, with the district government in the district in which Munich is located, with the government of the State of Bavaria in which Munich is located, and with the federal government of Germany, as Munich also belongs to Germany. If one considers the European Union as another level of government, since Germany is a member of the European Union, and the Union's decisions affect most firms in important ways, there is even a fifth level.

To the extent that the investment is fixed and irreversible, the investor is subject to all these governments' policies, whereas the existence of other cities or states and their different jurisdiction becomes unimportant for the investor. This joint responsibility of several government tiers is an inevitable consequence of federal decentralization and can have a significant effect on the attractiveness of a locality for FDI. The argument put forward in this paper is that the various governance problems that exist between a host government and a foreign investor, and in particular the severity of the hold-up problem, may depend on whether an investor who has chosen a given investment location has to deal with few or many vertical layers of government.

**2.3.1. The common pool problem.** Suppose that an investor contemplates investing in one of two countries: a hierarchically organized one (federal), denoted by  $F$ , and one where there is only one level of government (unitary), denoted by  $U$ . Suppose also that in both countries governments cannot credibly commit to not making use of the opportunity to extract revenue from the investor's project, and that investment is irreversible: its cost cannot be recovered, and production activities cannot be relocated.

Consider first the choices open to an investor who is vulnerable to *ex post* expropriation. In both countries, governments' inability to commit not to expropriate (and the resulting weakness of private property rights) implies lower incentives to invest. Once investment has been made, and to the extent that production uses variable factors and effort as well as irreversible physical assets, it also bears on the amount of production and profits resulting from a given investment. More intense extractive efforts (higher tax rates) lead to lower production, so that the relationship between the overall rate and the overall tax revenues is an inverted-U 'Laffer curve'. Revenues are zero for a zero tax rate, and also zero if taxes approach a 100% confiscatory rate.

Consider next the choice of the tax rate by the two types of government. For simplicity assume that governments maximize tax revenue that can be extracted from the foreign direct investor. A unitary country will choose a confiscatory tax rate that

generates the maximum overall tax revenue. It chooses the peak of the Laffer curve. In a decentralized country, several governments can try to appropriate from the same source of revenues, and typically do. They may also choose their appropriation activities non-cooperatively and extract from a common pool. Because of the presence of vertical fiscal externalities the resulting joint tax rate will be excessive. The country  $F$  therefore will end up with an overall tax on the wrong side (i.e., the right-hand side) of the Laffer curve. The actual tax revenue will not be larger than in a unitary country, but the marginal tax burden will be higher. When investors consider where to invest, they anticipate this behaviour and this makes the federal country with many government tiers a less attractive place as an investment destination.

Countries are typically decentralized to some degree in the sense that economic power and responsibility are shared between interdependent levels of government. This is likely to create fiscal interdependencies between the different levels of government. A clear-cut instance in which vertical interdependencies arise is when there is commonality of tax bases between the central government and lower-level governments (in the sense that several levels of government tax the same tax base).

Tax base commonality creates a common pool problem (with the fiscal decisions of each level of government inducing responses that affect the common tax base) that gives rise to negative vertical fiscal externalities. It generally leads to excessive taxation. Note that the common pool problem cannot be alleviated by an increase in horizontal competition between regions. Once the investment is sunk, and has taken place in a particular locality, say  $S$ , the existence or behaviour of other local governments which do not have jurisdiction over investors in locality  $S$  is not relevant for the resulting common pool problem. The common pool problem emerges because of the vertical dimension of decentralization, that is, because there are several government tiers who all have some independent jurisdiction over investments made in  $S$ , and which have independent policy objectives that are not perfectly aligned.

Of course, in a larger picture tax policy is not completely targeted towards a single investment project. Hence, some tax policy will affect a stock of projects that cannot be relocated in reaction to the tax policy, and the flow of new projects. The larger or more important is this latter share, the more important becomes the dimension of horizontal tax competition and the closer become the results to the standard results on the interaction between horizontal and vertical tax competition for a generally mobile tax base.<sup>4</sup>

The common pool problem could be avoided if the ability to expropriate revenues from the foreign direct investor could be attributed to one of the government tiers. This is often assumed to be the case in the literature on federalism, and sometimes

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<sup>4</sup> There is a growing literature on vertical externalities. Johnson (1988), Dahlby (1996), Boadway *et al.* (1998), Wrede (2000), Keen and Kotsogiannis (2002, 2004) provide, among others, a treatment of vertical externalities when the policy makers are benevolent. For a treatment of the case in which policy makers are revenue-maximizing Leviathans see Wrede (1996), and Keen and Kotsogiannis (2003). For an early survey on vertical externalities see Keen (1998).

even included in the definition of what ideally constitutes federalism. However, it is extremely difficult or impossible in reality. Different tax bases are (implicitly) interdependent with similar incidence effect. The different levels of government might have formally different tax bases, but these may overlap in real terms through general equilibrium effects. Taxes on labour income and VAT taxes, or the corporate income tax and local business taxes may, for instance, be governed independently by different government tiers. As these pairs of taxes have very similar tax incidence, the common pool problem emerges, despite the nominal independence.

**2.3.2. The free-rider problem in the subsidy game.** A further disadvantage that decentralized countries with disintegrated vertical government tiers face, vis-à-vis unitary countries, emerges when locations can compete for foreign direct investors by offering them economic favours in a process that has been described by the term ‘bidding for firms’. Bidding for firms (and to pay a firm upfront what the firm will have to pay in terms of confiscatory taxation in later periods) is one way to cope with the hold-up problem. Central (‘federal’) and lower-level (‘regional’) governments may engage in either active or defensive incentive strategies aimed at attracting FDI in competition with other locations. Bids offered by governments to foreign investors may be direct cash payments or indirect in the form of offering cheap or subsidized investment ground, or of special deals when taking over existing plants and equipment or consumer relations in the context of foreign direct investment that takes place as a joint venture.

Turning to the difference between unitary and federal countries in the bidding process, the bid of a unitary government internalizes the country’s full benefits of the foreign direct investment and in particular the full tax revenues that will emerge from this investment. If the bid is made by a government which belongs to a hierarchical system of governments then, in the absence of full cooperation between the governments at all levels of hierarchy, it will only take into account the benefits that accrue to its own sphere of responsibility. This, as a consequence, results in the government bidding less aggressively for the foreign investor if the government belongs to a federation. In the bidding competition between various countries with various degrees of decentralization the investment is therefore more likely to be attracted by the country that has fewer government levels.

**2.3.3. Interaction between common pool and free-riding problems.** The free-riding problem in bidding for firms reduces the equilibrium bids of a government that belongs to a federation, compared to a government in a unitary state for the same, given total benefits that accrue to the country as a whole from attracting the FDI project. The common pool problem suggests that the total gross benefits that accrue from attracting an FDI project are smaller in the federally structured country than if the country is governed by a unitary government. Reconsider, for instance, the Laffer curve analysis. If the federal country chooses an aggregate tax rate that exceeds the

tax rate that maximizes total tax revenue, the total amount of taxes obtained by all government tiers is smaller than in the unitary country, and each tier receives only a share of this smaller amount, with all shares adding up to this smaller amount. Accordingly, the government of each tier has a smaller gain from attracting the FDI than the government in a unitary government, and even all governments in the federal country taken together have a smaller willingness to pay to attract the FDI project than the government in the unitary country. This shows that the two problems compound and mutually enforce each other. Not only is the government in a federation unwilling to bid according to the whole benefits that accrue to this country if it attracts the FDI project, in addition, this total amount would be smaller in the federally organized country.

**2.3.4. Multiple tiers weaken implicit contracts.** The preceding analysis has emphasized the possibility that hold-up problems in FDI may be more severe in decentralized government structures with many government tiers. This then raises the question how ‘likely’ it is for these countries to develop institutions that credibly commit to pre-announced policies and, hence, do not resort to confiscatory taxation or to other extractive activities *ex post*. Given the interaction between the hold-up problem and the common pool problem, countries with more government tiers have more to gain from developing such ‘credible’ institutions. If such institutions are successfully implemented, foreign direct investors can more safely invest in these countries, and as a consequence the number of government tiers becomes less important as an impediment to FDI.

The term ‘institutions’ may, but need not be meant in a literal sense. An important ‘institution’ in the interaction between economic agents is the implicit contract that may be enforced and enforceable by repeated interaction. Previous work on the hold-up problem in FDI (see, for instance, Eaton and Gersovitz, 1983; Thomas and Worrall, 1994) has stressed that the main element that prevents governments from expropriation and confiscatory taxation is the prospect of future benefits from repeated investment. Kessing *et al.* (2006b) show that it may be more difficult to develop such implicit institutions and to sustain an equilibrium with ‘tacit collusion’ in a country with a federal structure with several tiers of governments than in a unitary country.

Consider an investor who invests in a decentralized host country infinitely repeatedly. The sequential nature of the relationship means that ‘players’ (the government levels and the investor) can adopt strategies that depend on behaviour in previous interactions. The returns to investment accrue in every period for which investment takes place, and the taxation of these returns is subject to the common pool problem identified earlier. Similar to the discussion of tacit collusion in oligopoly theory, governments may collude in the sense that they all abstain from excessive taxation and share in the continued flow of benefits of tacit collusion, because a deviation from the collusive outcome by any of the players would be ‘punished’ by all players by reversion

to an equilibrium in which no investment takes place and, hence, no tax revenue at all occurs in all future periods. Each government may also decide in a given period to deviate and extract more than the share that it should receive according to the collusive outcome, and, in the period in which a government makes use of this opportunity, its payoff is higher. However, it will be punished for this in all future periods. Tacit collusion is feasible if a government's additional period benefit from deviating does not exceed its present value of the sacrifice in future periods. Both the gain and the loss from deviating depend on the number of governments. In particular, the potential to punish a deviating government is reduced with an increase in the number of governments. This provides the intuition for why vertical decentralization reduces the range of feasible implicit contracts with 'tacit collusion'. First, with a larger number of governments the spoils of cooperation for each government is lower than with a smaller number of governments and so is the punishment (loss of future tax revenues if punished). Hence, the future losses from deviating decrease in the number of governments. Second, it is also the case that it is more rewarding for each of the government players to defect from the agreed cooperation if the number of government layers is larger. Both identified effects make cooperation more difficult to be sustained in more decentralized government structures. The situation is largely analogous to the possibility of sustaining collusion between firms. The more firms are operating in a given market, the more difficult it becomes to sustain collusion.

**2.3.5. Multiple tiers and joint accountability.** The issue of accountability in federal systems can be analysed in a political economy context in which politicians are elected and, among other things, care about re-election. These studies typically compare the politicians' and voters' choices for a case in which decentralization simply means that a given territory is governed by one government, or broken up into two completely separate countries with independent governments (see, for an example and further references, Hindriks and Lockwood, 2005). Due to the higher measurability of a politician's performance, and possibly due to benchmarking, accountability may increase by this break up. But as discussed, the horizontal separation of a country into regions is only one side of decentralization. Decentralization also leads to vertical disintegration. As a result of decentralization, many relevant economic performance measures for a region will depend not only on the decisions and the competence of the local politician, but also on the decisions of the politicians on the higher government tiers that join in the jurisdiction of a given local region. Compared to unitary government, this joint responsibility leads to joint accountability. In turn, this may generate problems similar to those that have been discussed in other contexts as the problems of moral hazard in teams, sabotage in team work production etc. An aspect that makes this reasoning less straightforward in the context of FDI is the fact that there may be a conflict of interests and an accountability problem not only between the government(s) and its citizens, but also between the citizens and the foreign direct investors, where citizens have the right to vote and foreign investors do not.

**2.3.6. The importance of property rights and other institutions.** The discussion of feasibility of tacit collusion as a function of the number of tiers already shows that the ability of countries to attract FDI should depend on institutions. Of course, vertical disintegration is a potentially important institutional aspect, but not the only institutional aspect that matters. In addition, some other institutional features may interact with the aspect of vertical disintegration, and may lighten up or further darken this dark side of federalism.

Any government strong enough to protect property rights can also use this strength to coerce (e.g., North and Weingast, 1989). When illustrating the dark aspects of vertical decentralization, we focused on governments which do not have the appropriate institutions to restrain themselves from using their strength to enforce high confiscatory taxes. More generally speaking, governments may use their power for extracting rents, including the means of expropriation, and this caused the hold-up problem in FDI. As discussed, even a benevolent government that acts on behalf of its citizens or politicians who are motivated by prospects of re-election would like to attract FDI first and then, once the investment has been made, would like to extract revenue from the investor. Good institutions that endow the government with the power to commit not to extract an excessively large share in the returns *ex post* are therefore very desirable.

Countries differ both in the quality of institutions that restrain government from using its power to coerce and in the degree of vertical disintegration. A natural question to ask now is how the vertical dimension and the protection of property rights interact. No clear answer, however, can be given from a theoretical point of view. As a starting point it is useful to think about two extreme cases. First, if property rights protection is perfect, that is, if governments do not resort to confiscatory taxation at all, there should be no effect of increasing the extent of vertical disintegration. If government actors do not affect the investors' profits, increasing their number does not have any effect. On the other hand, if property rights protection is completely absent, that is, if any single government would completely appropriate the investors' profits, there would also be no additional effect of further vertical disintegration. Increasing the number of government actors does not have an additional effect, if the entire investment is taken anyway. For levels of property rights protection in between these two extreme cases there will be an additional effect of increased vertical disintegration, but it is not clear *a priori*, whether this effect will be stronger for high or low levels of property rights protection. If property rights protection is low, there may be little scope for further worsening the effect on FDI, but the interaction may compound the effect sufficiently. On the other hand, for higher levels of property rights protection, the interaction may not have such strong compounding effects, but there is more scope for reducing the level of FDI. The bottom line of this reasoning is that we expect a non-monotonic relationship regarding the interaction of the level of property rights protection and the vertical dimension of decentralization. It should be zero at the two extremes and positive in between, potentially displaying an inverted U-shape.

Before we turn to the empirical analysis, we should mention that there are potential further channels through which vertical decentralization can negatively affect FDI, and that those other channels are typically related to some other dimension of governance. While we have focused on the governments' incentives to extract revenue from the investment, similar arguments should hold for the regulatory framework an investor is facing, for example. The commonality problem will typically result in over-regulation, possible mismatch of regulatory activity and an excess of red tape the investor faces.

### 3. EMPIRICAL ANALYSIS

#### 3.1. The main hypothesis

Our theoretical perspective suggests that vertical decentralization impinges negatively on the amount of FDI inflows. We can accordingly state our main hypothesis:

**Hypothesis 1:** An increase in the amount of vertical decentralization of a host country has a negative effect on the amount of FDI that is attracted by this host country.

Our discussion has acknowledged that federalism affects a country's performance along several dimensions and also has beneficial effects. We would expect that the negative relationship between FDI and the measure of decentralization is strongest for measures of decentralization that are closest to measuring the aspect of vertical disintegration. We will be able to draw on a variable that is closely related to the vertical dimension of decentralization when we test hypothesis 1.

As discussed, other dimensions of decentralization may improve or worsen the climate for FDI. On *a priori* grounds, decentralization measures that quantify other aspects besides vertical decentralization may therefore have a positive or a negative impact on the size of FDI in the empirical analysis. Introducing such variables is interesting and important for at least two reasons. First, to some degree they allow to disentangle the effects of vertical decentralization (for which we have a fairly good measure) from these other effects. Second, the quantitative effects of these decentralization variables are of interest for policy making.

#### 3.2. Empirical strategy

Our empirical strategy to test our hypothesis and to reveal the effects of decentralization on FDI is straightforward. We add decentralization variables to the 'knowledge-capital' model.

**3.2.1. The 'knowledge-capital' model.** The 'knowledge-capital' model has solid theoretical foundations from the theory of the multinational firm and has emerged over recent years as the workhorse for analysing international FDI flows. Multinationals are typically distinguished in 'horizontal' firms which produce the same goods

and services in multiple countries, and ‘vertical’ firms, which geographically fragment production by stages. The ‘knowledge-capital’ model, developed by Markusen *et al.* (1996), and Markusen (1997), is a framework that nests both horizontal and vertical motives for FDI into a unified framework. It assumes that ‘knowledge’ (or ‘knowledge-based’ assets) is (a) skilled labour intensive relative to production, (b) geographically mobile, and (c) a joint input to multiple production facilities and so has a public-goods character in that it can be supplied to additional facilities at very low cost. The latter assumption implies there is a market size motive if there are plant scale economies and so gives support to horizontal FDI. The first two assumptions relate to differences in relative factor endowments, and these consequently give rise to an incentive for vertical fragmentation of production. The proper treatment of relative factor endowments in the estimation of the model has spanned some considerable controversy, see Carr *et al.* (2001, 2003) and Blonigen *et al.* (2003). We avoid this debate and employ a variant that has become popular recently among scholars of international economics. It circumvents some of the problems involved in the earlier formulations and has been proposed by Markusen and Maskus (2002), and employed by Buch *et al.* (2005) and Herger *et al.* (2005). This version possesses the following structure. The amount of FDI from source country  $i$  to host country  $j$  is a function of

- the sum of source and host country’s GDP,  $\Sigma GDP$
- the square of the difference in source and host country GDP,  $(\Delta GDP)^2$
- measures of proximity between source and host country
- measures of trade costs between source and host countries<sup>5</sup>
- measures of investment costs in the host country
- three interaction variables ( $INT1$ ,  $INT2$ ,  $INT3$ ).

These interaction variables relate to the different incentives for vertical and horizontal fragmentation of production. They interact factor endowments with relative country size and market size. The first interaction we introduce,  $INT1 = \Delta SKILL * \Delta GDP$ , if  $\Delta SKILL > 0$ , 0 otherwise, captures vertical fragmentation. Horizontal motives are captured in the second and third interaction variables  $INT2 = \Delta SKILL * \Sigma GDP$ , if  $\Delta SKILL > 0$ , 0 otherwise,  $INT3 = -\Delta SKILL * \Sigma GDP$ , if  $\Delta SKILL < 0$ , 0 otherwise, where  $\Delta SKILL$  captures the skill endowment difference between the source and the host countries. The theoretical foundation and the relationship of this specific formulation to its theoretical foundation are summarized in Markusen and Maskus (2002).

<sup>5</sup> The original formulation of the ‘knowledge-capital’ model asks for the specification of trade costs in the host and the source country separately. The availability of such measures for individual countries is limited, so that, because we are interested in having a large cross-section of countries, we use bilateral trade costs proxies instead.

### 3.3. Data

To measure international direct investment flows we use a recent data set on international cross-border mergers and acquisitions (CBAs) provided by the SDC platinum database of Thomson Financial. These data appear to be currently the only ones that allow us to (a) cover a large number of host countries that differ in their degree of decentralization, (b) embed our analysis in the ‘knowledge-capital’ model which requires bilateral FDI flows, and (c) increase the power of our analysis by using a large cross-section of source countries which substantially increases the number of country pairs. This database is increasingly employed in the analysis of international capital flows, see, for instance, Di Giovanni (2005), Rossi and Volpin (2004), and Herger *et al.* (2005). The former two contributions have focused on the values of CBAs whereas the latter also considers counts of CBAs constructed from the original dataset. These CBA counts are constructed by counting the number of firms acquired by buyers from a source country  $i$ , in a host country  $j$  in a given year  $t$ . Only deals in which the acquiring firm acquired a controlling share of at least 50% are counted.<sup>6</sup>

In our analysis we consider both types of aggregate measures, in terms of values and of counts, since arguments can be made in favour of both measures. Using counts of CBAs may be justified by three reasons. The first is the limited coverage of the value of the deals in the original data set. For the OECD countries, for instance, for less than 50% of all deals the value of the transaction paid by the acquiring firm is reported. For developing countries this number is lower and in some instances well below 15%.<sup>7</sup> Second, the focus on the value of acquisitions might introduce a particular bias in the analysis as some major deals, which were particularly observed in the stock market rally of the late 1990s, may dominate the aggregate values (see Herger *et al.*, 2005). Third, the literature on FDI, typically, refers to the decision of the mother company in the source country to invest (or not) in a host country rather than to the value of the investment. On the other hand, there are also good arguments in favour of considering the values of the investments. First, the values contain information on the size of the investments which obviously also depends on the investment conditions in the host country. Moreover, most factors that determine the profitability of an investment should determine the price actually paid for acquiring a given firm and therefore, we should be interested in the effect of decentralization on the value of the transactions. Using both measures gives justice to both sides of the argument and insures that the results do not hinge on the particular way of measuring FDI. It turns out that the results are very similar for the two measures, which is not surprising given that the number of CBAs for a particular year country pair and the aggregate value of these deals are closely correlated. Considering only the deals where the value is reported in the original data, the correlation coefficient between them is 0.79.

<sup>6</sup> The count data set has been assembled by Herger *et al.* (2005), from the original data, for the time period 1997–2003.

<sup>7</sup> For the total sample around 57% of completed CBAs have no reported deal value.

The coverage of the data is extensive. Our original sample reports yearly CBAs counts and yearly values in US\$ millions for the period 1997–2003. It contains information on CBAs from 67 source countries to 147 host countries.<sup>8</sup> Table 1 gives an overview of the most important host countries for CBAs. Table 2 lists the host countries that are actually included in our study. Developed countries experience more CBAs, in total value and in numbers. There are, however, a large number of developing countries that are experiencing substantial amounts of CBAs, with, important for our purpose, substantial variation among these countries.

There are also some potential problems with using CBAs as a measure of FDI. They are only an imperfect measure of total FDI activity, since not all FDI takes the form of CBAs. However, CBAs comprise a substantial part of world FDI which makes them suitable for such an analysis. UNCTAD (2001) has recently reported that, by around 2000, CBAs' share of all FDI was around 80% in value of the investment. CBAs play an increasingly important role in developing countries too: with the share of CBAs being around 40% in the late 1990s, up from around 10% in the late 1980s. This tendency is most likely to continue in the future (UNCTAD, 2001).

One must notice that, because CBAs only comprise a part of all FDI, albeit an important one, there are potential composition effects caused by our variable(s) of interest, which could give rise to invalid inference. In particular, if an increase in vertical decentralization leads to an increase or decrease in the share of CBAs in total FDI, this will affect the estimations that consider only the number of CBAs. From our theoretical perspective, however, we expect green field investment to be more strongly negatively affected by the vertical dimension of decentralization. Thus, this will make it even harder to detect a negative effect of vertical disintegration using data on CBAs, and our estimations are likely to underestimate the negative effect of vertical decentralization on total FDI.<sup>9</sup>

### **3.3.1. Measurement of decentralization and intergovernmental overlap.**

For the main variable of interest to test our hypothesis regarding the negative effects of the vertical dimension of decentralization, we consider the number of government tiers in the host country. This variable has been constructed by Daniel Treisman (see Treisman, 2000a). It measures particularly well the vertical dimension of decentralization. The theory aspects identified in Section 2 are conceptually directly related to the number of tiers of government. This is because what is decisive for the amount and the success of foreign direct investment is (a) the number of rival decision makers that potentially try to appropriate their share after an investor has irreversibly

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<sup>8</sup> In the actual estimations the number of the source and host countries will reflect the availability of the control and the decentralization variables.

<sup>9</sup> A similar argument holds with respect to CBAs induced by bad governance and hold-up problems. To escape the bad governance, locals sometimes own their own firms through some foreign holdings, and that inflates the number of CBAs even if it is just disguised local investment. However, since we expect a negative correlation between vertical disintegration and local property rights security, such induced CBAs bias the results against our main hypothesis.

**Table 1. CBA host countries**

Rank	Host country	# CBA	Fraction of CBA in %	Value in US\$ millions
1	United States	6939	14.9	1 178 252.8
3	Germany	3259	7.0	446 918.3
5	Canada	2447	5.2	189 863.8
6	China	1537	3.3	87 190.8
7	Australia	1512	3.2	92 411.2
8	Netherlands	1389	3.0	158 434.2
9	Italy	1229	2.6	152 145.5
10	Spain	1189	2.5	62 169.4
11	Sweden	1172	2.5	117 019.1
12	Switzerland	944	2.0	64 707.9
13	Brazil	888	1.9	66 594.9
14	India	876	1.9	8641.0
15	Hong Kong, China*	827	1.8	30 136.1
16	Belgium	780	1.7	71 391.7
17	Poland	725	1.6	15 186.6
18	Norway	652	1.4	52 621.7
19	Argentina	618	1.3	48 055.4
20	Denmark	613	1.3	29 090.7
21	Finland	597	1.3	32 931.9
22	Mexico	559	1.2	40 786.0
23	Singapore	559	1.2	18 605.1
24	Korea, Rep.	554	1.2	55 608.8
25	Czech Republic	535	1.1	16 355.0
26	Japan	529	1.1	40 492.2
27	Austria	509	1.1	20 333.3
28	New Zealand	451	1.0	17 585.8
29	Ireland	449	1.0	24 707.7
30	Thailand	432	0.9	9143.8
31	Malaysia	412	0.9	4292.6
32	South Africa	407	0.9	24 594.7
33	Indonesia	365	0.8	13 496.3
34	Hungary	354	0.8	6206.3
35	Russian Federation	311	0.7	4076.3
36	Portugal	309	0.7	9127.1
37	Israel	285	0.6	14 234.8
38	Chile	268	0.6	21 863.6
39	Romania	255	0.5	4360.2
40	Philippines	250	0.5	7333.5
41	Bulgaria	215	0.5	3362.7
42	Estonia	196	0.4	733.4
43	Lithuania	168	0.4	1644.3
44	Turkey	160	0.3	3372.3
45	Slovak Republic	158	0.3	4247.2
46	Ukraine	138	0.3	866.0
47	Luxembourg*	133	0.3	26 452.3
48	Colombia	129	0.3	6522.7
49	Peru	128	0.3	6543.9
50	Venezuela, RB	124	0.3	7424.1
51	Greece	119	0.3	4327.5
52	Croatia	113	0.2	2357.1
53	Latvia	103	0.2	846.6
54	Egypt, Arab Rep.	83	0.2	4514.2
55	Vietnam	77	0.2	620.2

**Table 1.** *Continued*

Rank	Host country	# CBA	Fraction of CBA in %	Value in US\$ millions
56	Bermuda	76	0.2	21 573.9
57	Puerto Rico	70	0.1	5367.9
58	Kazakhstan	59	0.1	4204.8
59	Slovenia	53	0.1	1554.9
60	Uruguay	52	0.1	619.2
...	...	...	...	...
All		45 168	100	4 162 966

*Note:* Countries marked with \* not included in the analysis for lack of available control variables.

**Table 2. Decentralization variables**

Country	Tiers	Exp.-decentralization	Rev.-decentralization
Angola	4		
Albania	3	0.20	0.02
United Arab Emirates	3		
Argentina	3	0.38	0.32
Armenia	3		
Australia	3	0.41	0.28
Austria	4	0.30	0.27
Azerbaijan	3		
Burundi	3		
Belgium	4	0.12	0.06
Burkina Faso	4	0.03	
Bangladesh	5		
Bulgaria	4	0.19	0.16
Belarus	4	0.30	0.28
Bolivia	4	0.18	0.18
Brazil	4	0.34	0.25
Botswana	3		
Canada	4	0.57	0.52
Switzerland	3	0.51	0.46
Chile	4	0.08	0.06
China	5		
Côte d'Ivoire	5		
Cameroon	6		
Colombia	3	0.29	0.19
Costa Rica	4	0.03	0.03
Czech Republic	3		
Germany	4	0.41	0.35
Denmark	3	0.44	0.31
Dominican Republic	3	0.03	0.01
Algeria	4		
Ecuador	4		
Egypt, Arab Rep.	4.5		

**Table 2.** *Continued*

Country	Tiers	Exp.-decentralization	Rev.-decentralization
Spain	4	0.24	0.15
Estonia	3	0.27	0.21
Ethiopia	5	0.02	0.02
Finland	3	0.39	0.32
France	4	0.19	0.12
United Kingdom	4	0.25	0.13
Georgia	4		
Ghana	6		
Guinea	4		
Greece	4.5	0.04	0.03
Guatemala	4	0.04	0.05
Guyana	3		
Honduras	3		
Croatia	3		
Haiti	5		
Hungary	3	0.21	0.12
Indonesia	5	0.11	0.03
India	5	0.46	0.33
Ireland	3	0.24	0.09
Iran, Islamic Rep.	4	0.03	0.04
Iceland	2	0.23	0.23
Israel	3	0.11	0.07
Italy	4	0.22	0.07
Jamaica	2		
Jordan	3		
Japan	3		
Kazakhstan	4		
Kenya	6		
Kyrgyz Republic	4		
Cambodia	4		
Korea, Rep.	4		
Kuwait	3		
Lebanon	4		
Sri Lanka	4	0.03	0.04
Lithuania	3	0.29	0.22
Latvia	3	0.23	0.19
Moldova	3		
Madagascar	5		0.05
Mexico	3	0.20	0.20
Macedonia, FYR	2		
Mali	4		
Mongolia		0.37	0.27
Mauritania	4		
Mauritius	3	0.04	0.01
Malawi	4		
Malaysia	3	0.19	0.16
Namibia	3		
Niger	4		
Nigeria	4		
Nicaragua	4	0.07	0.08
Netherlands	3	0.25	0.07
Norway	3	0.33	0.22
Nepal	3		

**Table 2.** *Continued*

Country	Tiers	Exp.-decentralization	Rev.-decentralization
New Zealand	3		
Oman	3		
Pakistan	4.5		
Panama	4	0.02	0.02
Peru	4	0.18	0.07
Philippines	4		
Poland	3	0.23	0.15
Korea, Dem. Rep.	4		
Portugal		0.10	0.07
Paraguay	3	0.04	0.03
Romania	3	0.13	0.09
Russian Federation	4	0.38	0.40
Rwanda	4		
Saudi Arabia	3		
Sudan	4		
Senegal	6		
Singapore	1		
Sierra Leone	4		
El Salvador	3		
Suriname	3		
Slovak Republic	4		
Slovenia	2		
Sweden	3	0.36	0.33
Swaziland	4		
Togo	4		
Thailand	5	0.08	0.05
Tajikistan	4		
Turkmenistan	4		
Trinidad and Tobago	2	0.04	0.03
Tunisia	4	0.05	0.02
Turkey	4		
Tanzania	6		
Uganda	6		
Ukraine	4		
Uruguay	2	0.09	0.10
United States	4	0.44	0.40
Uzbekistan	4		
Venezuela, RB	4	0.00	0.00
South Africa		0.24	
Congo, Dem. Rep.	5		
Zambia	3	0.04	0.05
Zimbabwe	5	0.19	0.17

*Note:* Baseline regressions without decentralization variables also include Benin, Bosnia-Herzegovina, Congo, Fiji, Morocco, Mozambique, Papua New Guinea, Syria, Chad, Vietnam, and Yemen as host countries. Expenditure and revenue decentralization are 1980–95 averages of the ratio of sub-national government expenditures to total government expenditures and the ratio of sub-national government revenues to total government revenues, respectively.

invested in the host country, and (b) the amount of implicit or explicit (tax) overlap between these government players. The tax overlap is difficult to assess in a unified measure that can be compared across countries. The number of decision makers, however, is approximated quite well by the number of government tiers.

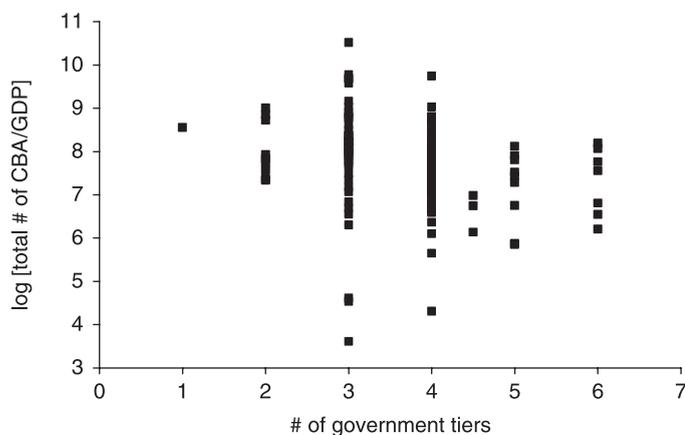
One can argue that the number of government tiers should be corrected for some measure of country size, such as population or area. This would be in line with the insights of Oates (1972) in his classic study of federalism, where the optimal degree of decentralization is related to the size of the country in terms of population.<sup>10</sup> Of course, any normalization carries the danger of inducing spurious correlation, if FDI is correlated with the variable used for the normalization. We consider the unadjusted number of government tiers as our main variable of interest to avoid these potential problems, but also report some results for the number of government tiers adjusted by population.

We also consider the effects of fiscal decentralization in the host country. As empirical measures of fiscal decentralization we employ the ratio of sub-national tax revenues to total government revenues, and the ratio of sub-national government expenditures to total government expenditures. Of course, the ratio of sub-national tax revenues to total government revenues could be low because there is little fiscal autonomy at the sub-national level (and so minimum tax base overlap), or because there is a lot of fiscal autonomy (with tax base overlap effects) but tax competition between sub-national governments has resulted in low tax revenues at sub-national level. The same applies to the other fiscal decentralization measure, the ratio of sub-national government expenditures to total government expenditures. These share measures, however, do pick up some aspects of decentralization, such as the power distribution between the central government and lower levels of government within the host country. By the same token one may regard these measures as measuring ‘closeness’ of the government to its people and firms. Given their distinct focus on government revenues and expenditures, they also allow additional qualitative insights into the nature of decentralization and its effects on governments’ behaviour and the consequences of these for firms.

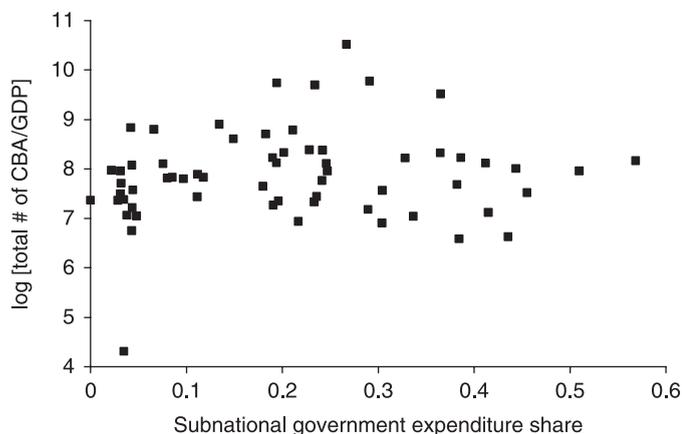
To avoid potential endogeneity problems and to increase the cross-section of host countries, we use the 1980–95 average of the fiscal decentralization variables. An overview of the values of tiers, and the fiscal decentralization variables of the host countries present in our study, are presented in Table 2. Before we turn to our estimations, we have a first cursory look at the data. Figures 1–4 plot the decentralization

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<sup>10</sup> Oates (1972, pp. 200–1) writes: ‘one important factor influencing the extent of centralization should be the size of the nation in terms of population . . . In a relatively small country, for example, there are likely to be real cost-savings in centralizing a substantial portion of the activity in the public sector. As a nation becomes larger, however, it becomes efficient for decentralized jurisdictions, because of their own significant size, to provide their own outputs of a wide range of public services. Moreover, as a country grows in size, central administration becomes more difficult and is likely to result in a less effective use of resources within the public sector. For these reasons we would expect the degree of fiscal centralization to vary inversely with the size of a country.’



**Figure 1. Number of government tiers and log of # of CBA over GDP**

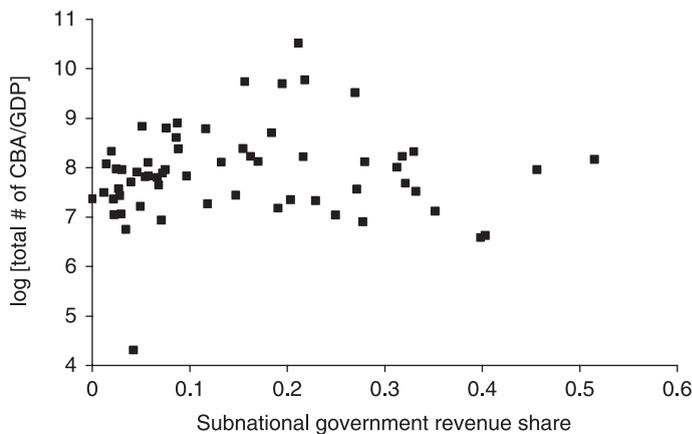


**Figure 2. Average (1980–1995) expenditure decentralization and log of # of CBA over GDP**

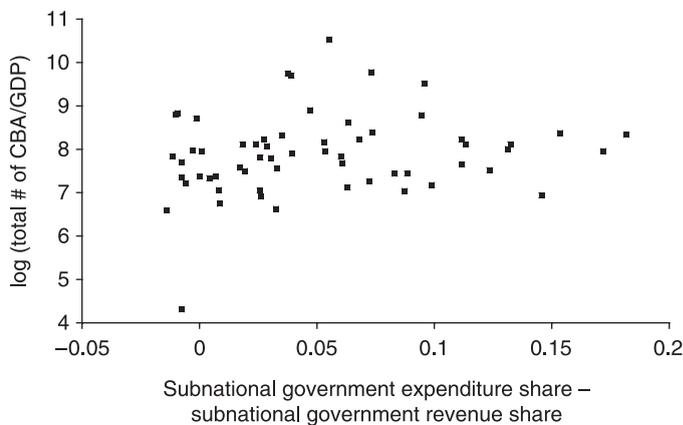
variables against the log of the number of acquired firms by foreigners over average host country GDP for the entire period 1997–2003. These figures are quite illustrative and partly foreshadow the results of our more formal analysis. Figure 1 suggests a negative relationship between the number of government tiers and FDI. On the other hand, average expenditure decentralization and average revenue decentralization appear to be somewhat positively correlated with incoming CBAs. Also, we see that the differential effect of average expenditure and average revenue decentralization is positively correlated with CBA inflows.

### 3.4. Estimation

We employ two different econometric techniques in our estimations depending on whether we consider the count or the value of CBA. To explain the number of firms



**Figure 3. Average (1980–1995) revenue decentralization and log of # of CBA over GDP**



**Figure 4. Average (1980–1995) differential fiscal decentralization and # of CBA over GDP**

acquired by buyers from source country  $i$  in host country  $j$  in a given year  $t$  we use a negative binomial model for count data. The conditional expected number of CBAs from country  $i$  to country  $j$  in year  $t$  is specified as a non-linear function of the vector of control variables, the decentralization variable(s), and the parameter vectors to be estimated. The details of this model are spelled out in Appendix 1. To explain the aggregate value of all CBAs from source country  $i$  to host country  $j$  in a given year  $t$  we run Tobit regressions, thus accounting for the fact that the left-hand side variable is zero for many country pairs in many years.

Our basic control variables are the key factors for estimation of the ‘knowledge-capital’ model: the sum of source and host country GDP, the squared difference of

source and host country GDP, and the three interaction variables (explained above)  $INT1$ ,  $INT2$ , and  $INT3$ . Furthermore, we control for the costs of starting a business in the host country, taken from Djankov *et al.* (2002): the number of days it takes to start a business which we call duration, the number of procedures to complete, and the costs of setting up business as a percentage of per capita GDP. The variables measuring the proximity of source and host country and the ease of trade between them are dummy variables regarding the existence of a common language and the existence of a common border, respectively, and a dummy on the existence of an agreement on trade in services, a dummy that captures the existence of a free trade agreement, and a dummy that captures the existence of a customs union. We also use the distance between the capitals of source and host countries. Di Giovanni (2005) has emphasized that capital market deepening is an important determinant of FDI flows. To capture this, we include domestic stock market capitalization relative to GDP. Furthermore, we include the real exchange rate, since changes of the real exchange rate alter the price of CBAs. Finally, we include variables for the size of the host country, as a country's size may systematically influence capital inflows. In particular, decentralization ('tiers') is systematically correlated with these variables, so including them avoids that the tiers variable picks up the effects of country size. The host country size variables are the surface area of the host country and the population of the host country. We also use the inverse and the square of both of these variables to make sure that the decentralization variables do not pick up existing non-linear relationships between country size and FDI inflows. All estimations with yearly data also contain time dummies. A description and the sources of all variables used in our analysis can be found in Appendix 2.

Although the tiers variable and past average fiscal decentralization are constant over time, we use panel estimations including all observations from all 7 years from 1997–2003 to exploit the variance in the controls over time. Given that some of the controls are not available for all years the panel is unbalanced. We also report the estimation results using the pure cross-section of averages to make sure that the significance of our results regarding the number of tiers are not driven by the increased sample size or the unbalanced nature of the panel.

## 3.5. Results

**3.5.1. Benchmark model with count data.** In Table 3 we report the results of estimating negative binomial models using the count data on cross-border acquisitions. We first estimate a benchmark 'knowledge-capital' model without any decentralization variables. The results are given in column (1) of Table 3. The signs of the estimated coefficients are by and large in accordance with the theoretical predictions. The theoretical foundations of the 'knowledge-capital' model predict a positive coefficient of the sum of host and source country GDP, and a negative coefficient of the squared difference of the two countries' GDPs. The negative signs of the first and the third

interaction variables are also perfectly in line with the ‘capital-knowledge’ model. The positive coefficient of the second interaction variable indicates evidence for vertical FDI. Several variables measure proximity between host and source countries, either physically, as in the case of distance and the existence of a common border, or culturally as in the case of a common language. Higher proximity implies larger FDI flows between host and source countries. In line with the findings of Di Giovanni (2005), domestic stock market capitalization in the source country plays a significant positive role, and also the real exchange rate affects CBAs significantly. The existence of a free trade agreement, a customs union, or an agreement on trade in services all affects bilateral investment flows positively. The costs of setting up a business, as measured directly by the setup costs, or indirectly by the number of procedures to be fulfilled, affects investment negatively. Thus, all control variables are significant with signs that can be theoretically justified, except for the duration to set up a business.<sup>11</sup> Not surprisingly, these results are broadly consistent with the results of Herger *et al.* (2005), who use a slightly different set of control variables. The control variables for the size of the host country are also found to be significant determinants of FDI flows.

To the benchmark model we subsequently add the decentralization variables we are interested in. Column (2) of Table 3 reports the results of individually adding tiers. The number of government tiers has a significant negative effect on inward CBAs. If the sub-national expenditure share and the sub-national revenue share are added individually, they both are found to have a significant positive impact on the number of CBAs (results not displayed). Column (3), which includes both fiscal decentralization measures, shows that this finding is spurious regarding the degree of revenue decentralization. The positive effects found for revenue share is due to the high correlation between expenditure decentralization and revenue decentralization.<sup>12</sup> Expenditure decentralization affects investment positively, whereas revenue decentralization affects it negatively. This is also confirmed by the estimation reported in column (4) of Table 3 which includes all three decentralization variables, and by column (5) which replaces ‘tiers’ with ‘tiers normalized by population size’.

**3.5.2. Benchmark with CBA values.** Table 4 shows the results for the specification with values. By and large, they are very similar to the analysis using CBA counts. We report the estimates of the baseline model without decentralization variables in column (1). The findings are mainly analogous to the count data model with the exception of two of the interaction variables. Interaction variable 1 is now positive, but insignificant, and interaction variable 2 is now negative and significant. The latter

<sup>11</sup> The positive sign of the coefficient may reflect better institutions in developing countries that are positively correlated with the duration of setting up a business. In fact, estimates we report below show that when we re-estimate the model using only OECD host countries, duration is found to have a negative coefficient. Alternatively, the costs of setting up a business may be more important for green field investment, and the positive sign may reflect a substitution effect from green field investment to mergers and acquisitions.

<sup>12</sup> The correlation coefficient between them is 0.92.

**Table 3. Benchmark estimations counts**

	(1)	(2)	(3)	(4)	(5)
$\Sigma GDP$	1.31 (0.07)***	1.27 (0.07)***	1.07 (0.07)***	1.06 (0.07)***	1.03 (0.07)***
$(\Delta GDP)^2$	-0.09 (0.01)***	-0.09 (0.007)***	-0.08 (0.01)***	-0.08 (0.01)***	-0.08 (0.01)***
$INT1$	-0.03 (0.01)***	-0.03 (0.01)***	-0.003 (0.01)	-0.001 (0.01)	-0.001 (0.01)
$INT2$	0.02 (0.01)**	0.02 (0.01)**	0.000 (0.007)	-0.001 (0.006)	-0.001 (0.01)
$INT3$	-0.01 (0.002)***	-0.01 (0.002)***	-0.01 (0.002)***	-0.01 (0.002)***	-0.005 (0.002)**
$POP$	0.003 (0.001)***	0.004 (0.001)***	0.004 (0.002)**	0.004 (0.002)***	0.002 (0.002)
$POP^{-1}$	-1.39 (0.31)***	-1.92 (0.49)***	-1.04 (0.32)***	-0.96 (0.26)***	1.65 (1.05)
$POP^2$	$-2.99*10^{-6}$ ( $7.54*10^{-7}$ )***	$-3.63*10^{-6}$ ( $8.2*10^{-7}$ )***	$-4.19*10^{-6}$ ( $1.45*10^{-6}$ )***	$-5.03*10^{-6}$ ( $1.47*10^{-6}$ )***	$-3.2*10^{-6}$ ( $1.53*10^{-6}$ )**
$AREA$	$3*10^{-4}$ ( $4*10^{-5}$ )***	$2*10^{-4}$ ( $4*10^{-5}$ )***	$2*10^{-4}$ ( $4*10^{-5}$ )***	$2*10^{-4}$ ( $4*10^{-5}$ )***	$1.71*10^{-4}$ ( $4.26*10^{-5}$ )***
$AREA^{-1}$	0.98 (0.17)***	0.38 (0.18)**	-3.14 (0.94)***	-3.69 (0.98)***	-2.1 (1.17)*
$AREA^2$	$-1.92*10^{-8}$ ( $2.47*10^{-9}$ )***	$-1.74*10^{-8}$ ( $2.4*10^{-9}$ )***	$-1.34*10^{-8}$ ( $2.65*10^{-9}$ )***	$-1.39*10^{-8}$ ( $2.63*10^{-9}$ )***	$-1.36*10^{-8}$ ( $2.64*10^{-9}$ )***
$DISTANCE$	-0.13 (0.01)***	-0.13 (0.01)***	-0.12 (0.01)***	-0.12 (0.01)***	-0.12 (0.01)***
$COMMON BORDER$	1.26 (0.14)***	1.19 (0.14)***	0.88 (0.15)***	0.81 (0.15)***	0.8 (0.15)***
$COMMON LANGUAGE$	1.31 (0.1)***	1.31 (0.11)***	1.51 (0.13)***	1.5 (0.13)***	1.51 (0.13)***

**Table 3.** *Continued*

	(1)	(2)	(3)	(4)	(5)
<i>DOM. MARKET CAPITALIZATION</i>	0.77 (0.04)***	0.78 (0.05)***	0.83 (0.06)***	0.84 (0.06)***	0.83 (0.06)***
<i>REAL EXCHANGE RATE</i>	-0.38 (0.05)***	-0.38 (0.05)***	-0.58 (0.06)***	-0.6 (0.07)***	-0.63 (0.07)***
<i>FREE TRADE AGREEMENT</i>	0.45 (0.12)***	0.42 (0.13)***	0.43 (0.16)***	0.41 (0.16)**	0.42 (0.16)**
<i>SERVICE AGREEMENT</i>	0.81 (0.17)***	0.8 (0.17)***	0.63 (0.19)***	0.61 (0.18)***	0.56 (0.18)***
<i>CUSTOMS UNION</i>	0.38 (0.19)**	0.36 (0.19)*	0.44 (0.2)**	0.4 (0.2)**	0.4 (0.2)**
<i>SET UP COSTS</i>	-0.01 (2*10 <sup>-3</sup> )***	-0.005 (2*10 <sup>-3</sup> )***	-0.002 (4*10 <sup>-4</sup> )***	-0.002 (4*10 <sup>-4</sup> )***	-0.002 (3.7*10 <sup>-4</sup> )***
<i>DURATION</i>	0.002 (0.002)	0.003 (0.002)*	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)
<i>PROCEDURES</i>	-0.11 (0.01)***	-0.11 (0.01)***	-0.07 (0.02)***	-0.07 (0.01)***	-0.07 (0.01)***
<i>TIERS</i>		-0.39 (0.06)***		-0.14 (0.08)*	
<i>TIERS/POPULATION</i>					-1.16 (0.54)**
<i>SUBNAT. EXPENDITURE SHARE</i>			5.28 (0.82)***	5.46 (0.84)***	5.61 (0.82)***
<i>SUBNAT. REVENUE SHARE</i>			-3.38 (0.88)***	-3.57 (0.87)***	-3.45 (0.86)***
Obs.	49 969	44 464	22 103	21 355	21 355

*Notes:* Panel estimates (1997–2003) including all countries as given in Table 2. Dependent variable is the count of yearly CBA for source-host country pairs. Standard errors are clustered by country pair. All estimations include year dummies.

**Table 4. Benchmark estimations: Values**

	(1)	(2)	(3)	(4)	(5)
$\Sigma GDP$	2683.21 (68.96)***	2680.02 (71.54)***	2818.87 (101.19)***	2824.73 (103.47)***	2775.78 (102.61)***
$(\Delta GDP)^2$	-174.91 (7.91)***	-174.04 (8.27)***	-196.04 (11.61)***	-200.09 (11.92)***	-188.96 (11.84)***
$INT1$	2.79 (3.5)	3.74 (3.61)	19.86 (4.52)***	21.17 (4.57)***	19.51 (4.58)***
$INT2$	-23.72 (3.68)***	-24 (3.79)***	-36.56 (4.61)***	-36.63 (4.65)***	-35.89 (4.66)***
$INT3$	-33.17 (2.5)***	-34.42 (2.57)***	-27.62 (3.5)***	-27.29 (3.54)***	-24.37 (3.57)***
$POP$	8.13 (1.52)***	10.43 (1.65)***	15.78 (3.11)***	17.86 (3.26)***	9.37 (3.36)***
$POP^{-1}$	-3287.46 (355.73)***	-4465.09 (426.2)***	-2958.07 (494.54)***	-2706.5 (480.1)***	9436.5 (1878.05)***
$POP^2$	-0.007 (0.001)***	-0.008 (0.001)***	-0.02 (0.003)***	-0.02 (0.003)***	-0.01 (0.003)***
$AREA$	0.81 (0.06)***	0.8 (0.07)***	0.7 (0.09)***	0.74 (0.09)***	0.7 (0.09)***
$AREA^{-1}$	2875.63 (314.45)***	1622.73 (356.01)***	-6312.7 (2750.35)**	-7569.11 (2835.11)***	162.39 (2949.99)
$AREA^2$	$-50.6*10^{-6}$ ( $4.57*10^{-6}$ )***	$-49.8*10^{-6}$ ( $4.71*10^{-6}$ )***	$-51.1*10^{-6}$ ( $6.18*10^{-6}$ )***	$-54.2*10^{-6}$ ( $6.29*10^{-6}$ )***	$-51.7*10^{-6}$ ( $6.28*10^{-6}$ )***
$DISTANCE$	-240.15 (15.72)***	-254.5 (16.69)***	-286.68 (22.92)***	-297.75 (23.34)***	-311.97 (23.66)***
$COMMON BORDER$	1758.3 (238.8)***	1662.41 (251.48)***	922.16 (322.69)***	841.73 (329.82)**	797.27 (330.81)**
$COMMON LANGUAGE$	3024.16 (162.89)***	3141.96 (176.5)***	4213.66 (252.7)***	4253.85 (255.71)***	4229.62 (256.64)***
$DOM. MARKET CAPITALIZATION$	1477.41 (75.06)***	1523.91 (80.18)***	1875.11 (110.87)***	1899.4 (113.42)***	1884.63 (113.93)***

**Table 4.** *Continued*

	(1)	(2)	(3)	(4)	(5)
<i>REAL EXCHANGE RATE</i>	-913.32 (85.24)***	-936.2 (90.62)***	-1578.58 (125.88)***	-1656.73 (130.15)***	-1762.96 (131.89)***
<i>FREE TRADE AGREEMENT</i>	1618.99 (253.02)***	1505.43 (274.93)***	1296.09 (357.62)***	1229.98 (363.1)***	1206.81 (360.91)***
<i>SERVICE AGREEMENT</i>	1611.84 (316.71)***	1683.79 (335.57)***	1580.78 (411.26)***	1524.66 (417.94)***	1374.28 (415.16)***
<i>CUSTOMS UNION</i>	2318.9 (368.18)***	2291.06 (389.61)***	1642.69 (472.49)***	1572.42 (481.28)***	1550.55 (478.86)***
<i>SET UP COSTS</i>	-9.99 (0.87)***	-7.6 (0.89)***	-3.16 (0.85)***	-2.87 (0.87)***	-2.87 (0.85)***
<i>DURATION</i>	5.56 (2.38)**	7.14 (2.57)***	-0.98 (4.01)	-2.47 (4.08)	0.75 (4.11)
<i>PROCEDURES</i>	-258.99 (22.42)***	-259.17 (23.75)***	-173.58 (32.06)***	-166.13 (32.39)***	-178.69 (32.56)***
<i>TIERS</i>		-845.02 (101.01)***		-310.19 (176.67)*	
<i>TIERS/POPULATION</i>					-5619.96 (890.34)***
<i>SUBNAT. EXPENDITURE</i>			13410.68 (1831.28)***	14073.75 (1914.77)***	13685.89 (1887.85)***
<i>SHARE</i>					
<i>SUBNAT. REVENUE</i>			-10441.19 (1949.9)***	-10884.59 (1975.54)***	-9952.08 (1988.2)***
<i>SHARE</i>					
Obs.	48212	42901	21330	20608	20608
Uncensored obs.	3771	3584	2834	2786	2786
Pseudo R <sup>2</sup>	0.09	0.09	0.08	0.08	0.08

*Notes:* Panel estimates (1997–2003) including all countries as given in Table 2. Dependent variable is total yearly value of CBA for source-host country pairs. All estimations include year dummies.

findings would be in line with the horizontal model of FDI (Markusen and Maskus, 2002).<sup>13</sup>

Adding decentralization variables to the baseline model gives a set of results that entirely parallel the results of the count data specification. Adding tiers shows a significant negative effect. Again, both fiscal decentralization variables have a positive effect if added individually (not shown). However, if both enter the estimation simultaneously, as reported in column (3), only expenditure decentralization is found to influence investment positively, whereas revenue decentralization affects investment negatively. Analogously to the count specification, the positive coefficient of expenditure decentralization is larger in absolute value than the coefficient of revenue decentralization, suggesting that a simultaneous increase in expenditure and revenue decentralization has a net positive effect. If tiers and the fiscal decentralization variables are added at the same time the significance of tiers drops to the 10% level, analogously to the count data model. This drop in significance may be caused either directly by the fiscal decentralization variables, or it may be due to the reduction in the sample that is caused by lower availability of the fiscal decentralization variables. Re-estimating the model using only tiers for the reduced sample reveals that the main factor is the effect of the fiscal decentralization variables, since tiers are found to be significantly negative in that specification (not shown). However, we demonstrate in the next section that the low significance of tiers in the joint specification results from controlling insufficiently for the quality of governance in the host country.

**3.5.3. Governance quality.** We now extend our analysis to allow for additional measures of governance quality. This is interesting from a theoretical point of view, because we have highlighted potential relationships between several dimensions of governance quality, in particular in the form of property rights protection, and the vertical dimension of decentralization. Thus, we ask, whether the significance and the size of the effects of decentralization variables we have found in our benchmark estimation are changed by the inclusion of governance variables. This is also an important check of the robustness of our findings. In particular, in the raw data there are some countries from sub-Saharan Africa with a high number of government tiers. Therefore we need to inquire whether our findings regarding the number of government tiers are possibly spurious and only driven by a potential correlation with important governance variables.

Not only property rights protection, but also other dimensions of host country governance are likely to be important determinants of foreign investment flows, and likely to be linked to government architecture. Corruption, for example, has been

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<sup>13</sup> It may be possible to explain these differences between the estimations using the counts and the values of the investment respectively by the average size of the investment. A plausible conjecture would be that horizontal investments are larger in size on average and therefore the horizontal investment motive dominates if we consider the value of the overall investments, whereas the pure count could be dominated by the vertical motive. We do not analyse these questions further, since they are beyond the scope of this analysis.

shown to negatively influence FDI (see, for example, Wei, 2000). Corruption has also been related to government structure, see Shleifer and Vishny (1993). Thus, the effect of tiers we find in the baseline specification without governance variables may be picking up the importance of corruption which deters foreign investors. Similar arguments are likely to hold for other dimensions of governance. Therefore, we employ a large set of governance variables. These are voice and accountability, regulatory quality, corruption, government effectiveness, rule of law, political stability, and property rights protection. The latter variable is measured by the Heritage Foundation property rights index. All other governance variables are taken from Kaufman *et al.* (2005).<sup>14</sup>

Table 5 presents our estimation results when the governance variables are included in the specification. We use CBA counts as well as their value as our dependent variable. Columns (1)–(3) present the count specification. Column (1) includes only tiers. Column (2) includes the fiscal decentralization variables and tiers, and column (3) includes both fiscal decentralization variables and tiers divided by population. Column (1) of Table 5 shows that all governance variables with the exception of the rule of law are found to be significantly important for the determination of foreign investment. Except for corruption, all have the expected positive sign, that is, better quality of governance in the host country increases the amount of foreign investment inflows. The effect on the tiers variable is a drop in its coefficient to around 0.3. In the specification with all decentralization variables, rule of law is found to be significant, but regulatory quality is insignificant in this case. The more important message of column (2), however, regards the tiers variable. The inclusion of the governance variables results in an increase in the significance level of tiers to 1%. Thus, tiers are a significant negative determinant of CBAs. This specification also returns a coefficient of 0.27, which is very close to the estimate without the fiscal decentralization variables. Columns (4)–(6) report the same specifications for the Tobit estimations using the values of yearly CBAs as the dependent variable. The evidence on the significance of the various governance variables mirrors the findings of the count specification. In both estimations, nearly all are significant, and only corruption has the wrong sign. Column (4) indicates that, including these variables, the coefficient of tiers is reduced in absolute magnitude, just as in the count specification, but in case of the joint specification shown in column (5), the effect of tiers is increased compared to the estimation that does not include the governance variables. However, the evidence on the tiers variable in column (4) shows again, that, controlling for governance quality raises dramatically the significance of tiers in the joint specification.<sup>15</sup>

Finally, we also consider interaction effects between the level of property rights protection and the number of government tiers. As argued above, our theoretical perspective

<sup>14</sup> The Heritage Foundation index is available on a yearly basis. It ranges from 1 to 5 (with integer values only) and we use it in inverse scale, so that higher values imply better property rights protection. The other governance variables range from –2.5 to 2.5. It is available on a bi-annual basis from 1997–2003, and we use linearly interpolated values for the three intermediate years.

<sup>15</sup> To achieve this effect it is already sufficient to include only property rights protection as an additional governance variable.

**Table 5. Governance**

	(1)	(2)	(3)	(4)	(5)	(6)
<i>VOICE AND ACCOUNTABILITY REGULATORY QUALITY</i>	0.6 (0.07)***	0.3 (0.12)**	0.41 (0.12)***	1295.38 (162.47)***	610.85 (318.24)*	910.2 (316.87)***
<i>CORRUPTION</i>	0.34 (0.09)***	0.03 (0.1)	0.18 (0.09)**	1222.76 (221.54)***	530.21 (299.8)*	1134.32 (314.11)***
<i>RULE OF LAW</i>	-0.92 (0.14)***	-0.95 (0.17)***	-0.94 (0.17)***	-1987.69 (315.38)***	-1745.26 (464.95)***	-1934.17 (470.94)***
<i>GOVERNMENT EFFECTIVENESS</i>	-0.03 (0.17)	0.56 (0.22)**	0.4 (0.22)*	15.47 (368.77)	1104.47 (650.85)*	1076 (643.93)*
<i>PROPERTY RIGHTS PROTECTION</i>	0.92 (0.13)***	0.37 (0.14)***	0.35 (0.14)**	1912.9 (298.6)***	376.92 (441.56)	142.36 (443.84)
<i>TIERS</i>	0.18 (0.06)***	0.35 (0.07)***	0.28 (0.08)***	238.22 (145.75)	881.97 (222.51)***	572.91 (225.8)**
<i>TIERS/POPULATION</i>	-0.3 (0.05)***	-0.28 (0.07)***		-648.1 (106.07)***	-628.62 (187.2)***	
<i>SUBNAT. EXPENDITURE SHARE</i>			-1.48 (0.51)***			-6748.28 (925.89)***
<i>SUBNAT. REVENUE SHARE</i>		3.33 (0.98)***	3.77 (0.95)***		8339.83 (2276.86)***	8721.67 (2262.66)***
		-2.28 (0.95)**	-2.04 (0.95)**		-7758.7 (2163.79)***	-6457.94 (2192.63)***
Obs.	42 994	21 126	21 126	41 483	20 387	20 387
Uncensored obs.				3553	2782	2782
Pseudo R <sup>2</sup>				0.09	0.08	0.08

*Notes:* Panel estimations (1997–2003) including all controls as displayed in Table 3 and Table 4. Dependent variable in (1), (2), and (3) is the count of yearly CBA for source-host country pairs. Dependent variable in (4), (5), and (6) is total yearly value of CBA for source-host country pairs. Standard errors of (1), (2), and (3) clustered by country pair. All estimations include year dummies.

**Table 6. Interaction between tiers and property rights protection**

	(1)	(2)	(3)	(4)
...	.	.	.	.
<i>VOICE AND ACCOUNTABILITY REGULATORY QUALITY</i>	0.6 (0.07)***	0.32 (0.12)***	1269.32 (162.91)***	641.08 (319.3)**
<i>CORRUPTION</i>	0.35 (0.09)***	0.07 (0.1)	1183.85 (222.46)***	567.27 (300.46)*
<i>RULE OF LAW</i>	-0.94 (0.14)***	-0.94 (0.17)***	-1903.93 (318.78)***	-1758.75 (464.78)***
<i>GOVERNMENT EFFECTIVENESS</i>	-0.1 (0.17)	0.51 (0.22)**	-40.45 (369.79)	1065.28 (652.44)
<i>PROPERTY RIGHTS PROTECTION TIERS</i>	0.91 (0.13)***	0.34 (0.14)**	1934.72 (298.74)***	338.78 (442.76)
<i>TIERS*PROPERTY RIGHTS PROTECTION</i>	0.41 (0.19)**	0.98 (0.25)***	-381.38 (380.52)	1617.85 (653.25)**
<i>SUBNAT. EXPENDITURE SHARE</i>	-0.08 (0.17)	0.38 (0.24)	-1231.46 (348.91)***	142.18 (668.72)
<i>SUBNAT. REVENUE SHARE</i>	-0.06 (0.05)	-0.17 (0.06)***	170.67 (97.0)*	-200.53 (167.08)
<i>Obs.</i>	42 994	21 126	41 483	20 387
Uncensored obs.			3553	2782
Pseudo R <sup>2</sup>			0.09	0.08

*Notes:* Panel estimations (1997–2003) including all controls as displayed in Table 3 and Table 4. Dependent variable in (1) and (2) is the count of yearly CBA for source-host country pairs. Dependent variable in (3) and (4) is total yearly value of CBA for source-host country pairs. Standard errors of (1) and (2) clustered by country pair. All estimations include year dummies.

does not exclude the possibility of interaction between the number of tiers and governance variables such as property right protection. However, theoretically, it is *a priori* not clear which way such interaction effects should point. Columns (1) and (2) of Table 6 report count estimations with only tiers and with tiers and the fiscal decentralization variables, respectively, where we have added an interaction variable between property rights protection and tiers in both specifications. Columns (3) and (4) report the same exercise for the Tobit model using the values. Here we encounter the rare instance of differences between the count and the value specification. The count specification finds no evidence of interaction if the fiscal decentralization variables are left out, and a significant negative interaction effect if they are included. The value specification, however, indicates a positive interaction effect without the fiscal decentralization and no interaction, if the fiscal decentralization variables are included. These conflicting results are in line with our perspective that has argued in favour of an ambiguous prediction for the direction of potential interaction effects.

**3.5.4. Non-linear relationships.** Thus far we have included the number of tiers as such into our estimations. However, this may be insufficient for at least two

reasons. First, the specification of the count estimation implies that a reduction or an increase in the number of government levels has the same proportional effect on the amount of FDI received by a particular host country regardless of its given number of government levels. Similarly, the value specification implies a constant marginal effect of a change in government tiers. Second, also from a theoretical perspective, it may be that there is something like an optimal amount of vertical decentralization and one should expect inverted U-shapes regarding the optimal amount of decentralization. Of course, such an optimal degree of decentralization will also depend on several other characteristics of countries, in particular their size in terms of population or area.

Since we found the governance variables to be important determinants of foreign investment, we use our benchmark specification enlarged with the set of governance variables as the baseline in all further specifications. We add quadratic and cubic terms of tiers to assess whether there are signs of such non-linear structures in the data. Similar to the analysis of the interaction terms, the results are somewhat different depending on whether all decentralization variables are included or whether the decentralization variables are being left out.

Columns (1) and (3), and (2) and (4), respectively, of Table 7 show the result of adding quadratic and cubic terms of tiers to the specification including only tiers and to the specification including all decentralization variables for the count specification. In both cases there is strong evidence of a non-linear relationship regarding tiers and FDI. However, the nature of this relationship appears quite different in the two specifications. Without the fiscal decentralization variables, tiers and its cubic term are found to have a significant negative coefficient and the quadratic tiers term has a positive significant coefficient (column (3) of Table 7). In the specification that includes expenditure and revenue decentralization shown in column (4), however, all the signs of these terms are reversed. This effect appears to be driven by the reduced sample of countries for which the fiscal decentralization variables are available, since estimating the same specification for this reduced sample, but without the fiscal decentralization variables, gives very similar results.

It is interesting to characterize the estimated third degree polynomials more closely. In the case of the estimation without the fiscal decentralization variables, column (3) in Table 7, FDI is decreasing in the number of tiers over the entire relevant range of the tiers variable between 1 and 6 tiers. With the fiscal decentralization variables, column (4), the polynomial has a more volatile shape over this range. FDI is decreasing in the range of 3 and 4 tiers only, where, however, most of the observations are located. The estimated parameters are more sensible in the former estimation as we discuss below when we consider the quantitative importance of our results. The Tobit estimates for the values show an analogous picture, again indicating that non-linearity is important, and that the form of the non-linearity is quite dependent on the controls added and sample that is being used. In summary, there is evidence of non-linear patterns regarding the effects of tiers on FDI, but its specific form depends on the

**Table 7. Non-linearity in tiers**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>TIERS</i>	0.23 (0.23)	-2.74 (0.65)***	-2.39 (1.1)**	19.07 (3.11)***	993.28 (622.16)	-7167.85 (1643.68)***	-11388.39 (2831.4)***	27751.7 (8861.52)***
<i>TIERS</i> <sup>2</sup>	-0.07 (0.03)**	0.34 (0.09)***	0.61 (0.29)**	-5.77 (0.88)***	-209.58 (78.63)***	912.51 (228.4)***	3021.56 (727.21)***	-8921.87 (2445.09)***
<i>TIERS</i> <sup>3</sup>			-0.06 (0.02)**	0.56 (0.08)***			-268.73 (60.37)***	899.94 (221.55)***
<i>SUBNAT. EXPENDITURE</i>		3.67 (1.0)***		1.42 (1.13)		9404.4 (2277.4)***		5357.98 (2477.2)**
<i>SUBNAT. REVENUE</i>		-2.48 (0.94)***		-1-28 (0.99)		-8334.01 (2162.53)***		-5898.21 (2241.39)***
Obs.	42 994	21 126	42 994	21 126	41 483	20 387	41 483	20 387
Uncensored obs.					3553	2782	3553	2782
Pseudo R <sup>2</sup>					0.09	0.08	0.09	0.08

*Notes:* Panel estimations (1997–2003) including all controls as displayed in Table 3 and Table 4, and including all governance controls as given in Table 5. Dependent variable in (1), (2), (3) and (4) is the count of yearly CBA for source-host country pairs. Dependent variable in (5), (6), (7), and (8) is total yearly value of CBA for source-host country pairs. Standard errors of (1), (2), (3) and (4) clustered by country pair. All estimations include year dummies.

specific sample of countries and the added control variables. Also the non-linear estimates suggest that there is a negative relationship between tiers and FDI, at least over the most relevant range.

**3.5.5. Quantitative importance.** The estimated coefficients can be interpreted quantitatively. The estimated negative coefficient of tiers somewhere between  $-0.25$  and  $-0.3$  implies that reducing the number of government tiers will increase the number of CBAs per year by around 30%. This is a large number and should be treated with care. The estimations using also squared and cubic tiers, suggest different magnitudes. These estimations do not assume that the effects of reducing the number of tiers are independent of the number of existing levels. The estimated third degree polynomials suggest that moving from 4 to 3 levels of government increases the number of firms acquired by about 5% in the estimation without the fiscal decentralization variables, see column (3) in Table 7, whereas the estimation with the fiscal decentralization variables (see column (4) in Table 7), suggests an increase by 120%! However, the change from 5 to 4 levels or from 3 to 2 levels is found to reduce CBAs substantially in that latter specification.

The Tobit estimates also suggest substantial magnitudes of the effects of the number of tiers. The coefficient of the tiers variable imply that an increase in the number of tiers by 1 in all countries will result in a reduction of the average value of yearly CBA flows between any two countries in the sample by US\$61 million.<sup>16</sup> This is again a high number in relation to the average yearly CBA flow of US\$170 million, but is quite in line with the results from count data. The total marginal effect can be split up into the effect of increased investment for those country pairs that are already experiencing CBA inflows ( $-18$  million) and in the effect of those country pairs that will seize to have positive flows, as the number of government tiers in the host country are reduced ( $-43$  million). Again, these numbers should not be taken at face value. The significance of the non-linear specification as shown in Table 7 underlines that the simple linear specification using tiers is open to challenge, and that its estimated quantitative implications are subject to substantial qualifications.

We can also consider the quantitative effects of the estimated coefficients for fiscal decentralization. The estimated coefficients such as from the count specification given in Table 5, column (2), indicate that an increase in average expenditure decentralization by one percentage point would have, on average, increased the number of CBAs by about 3%. An increase of revenue decentralization by one percentage point would have resulted in a reduction of CBAs by about 2%. This implies that a joint increase in expenditure and revenue decentralization would have increased CBAs by about 1%. The Tobit estimates, such as reported in column (5) of Table 5, imply that an increase in average expenditure decentralization by one percentage point would have resulted in an increase of the average value of CBA flows by about US\$8

<sup>16</sup> These calculations assume that the errors are normally distributed.

million, compared to an average flow of US\$170 million. An increase in average revenue decentralization by one percentage point would have resulted in a reduction by US\$7.5 million. Thus, joint fiscal decentralization of expenditure and revenue would have resulted in an average net increase of about US\$0.5 million. These magnitudes of the effects of fiscal decentralization appear plausible and give an indication of the size of the potential gains from fiscal decentralization on the investment climate, although it should be stressed that the actual magnitudes will vary largely for different host countries.

In summary, the effects of the vertical dimension of decentralization are found to be substantial. We find that the size of the effects for the number of government tiers can be quite large. However, different specifications leave us with a substantial range of the effects, which imply that the results should not be taken at face value but must be treated with care. With regards to fiscal decentralization, the results are also found to be substantial and quite plausible in size.

### 3.6. Extensions and robustness

We have seen that the magnitude of the effects of the decentralization variables and their significance are somewhat sensitive to the inclusion of appropriate control variables. To ensure that our findings are sufficiently robust, we carry out a number of robustness checks. These exercises also generate further qualitative insights and important qualifications regarding the validity of specific policy recommendations that can be derived from our analysis. Again, all robustness and sensitivity checks are carried out including the full set of all governance variables.

**3.6.1. Poor countries, rich countries.** Rich countries are different from poor countries. It is, therefore, conceivable that the motivations of firms to invest are different for these groups of countries. Our approach of imposing one model with constant parameters may be too restrictive, and could be a source of potential bias. Furthermore, the effects of the different forms and the degree of decentralization on FDI could be different across these two groups of countries.

To investigate these possibilities, we split up the sample of our host countries into OECD and non-OECD countries. The latter group consists mainly of developing countries, although it also contains a few countries which have a relatively high level of per capita income. Table 8 reports results for the non-OECD countries, Table 9 the analogous estimations for the OECD host countries. For both groups of host countries we again use the evidence from the negative binomial model using count data, as well as the Tobit estimates using values. The conjecture that FDI in OECD countries may be structurally different from FDI in the developing world is reflected in the findings regarding the coefficients of the 'knowledge-capital' model. For instance, the estimations for the OECD countries (Table 9) show a negative coefficient for the second interaction variable, consistent with the theoretical implications of horizontal

**Table 8. Non-OECD host countries**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>INT1</i>	-0.05 (0.01)***	-0.05 (0.01)***	-0.05 (0.01)***	-0.05 (0.01)***	-15.10 (1.63)***	-17.62 (2.85)***	-17.51 (2.86)***	-17.55 (2.85)***
<i>INT2</i>	0.03 (0.01)***	0.02 (0.01)***	0.02 (0.01)***	0.02 (0.01)***	5.53 (1.54)***	1.85 (2.65)	1.81 (2.65)	1.79 (2.65)
<i>INT3</i>	0.08 (0.03)**	-0.16 (0.11)	0.17 (0.11)	-0.15 (0.11)	23.78 (9.85)**	-81.86 (39.27)**	-83.45 (39.34)**	-80.36 (39.25)**
<i>TIERS</i>	-0.27 (0.05)***	-0.02 (0.09)	6.48 (4.53)		-119.04 (19.92)***	-25.3 (45.06)	1416.57 (2097.84)	
<i>TIERS</i> <sup>2</sup>			-1.91 (1.32)				-420.66 (613.26)	
<i>TIERS</i> <sup>3</sup>			0.18 (0.12)				39.65 (58.55)	
<i>TIERS/POPULATION</i>				-0.62 (0.5)				-357.1 (280.27)
<i>SUBNAT. EXPENDITURE</i>		2.18	1.07	1.99		1931.52	1690.44	1856.64
<i>SHARE</i>		(1.82)	(2.2)	(1.79)		(744.8)**	(827.7)**	(746.1)**
<i>SUBNAT. REVENUE</i>		3.78	4.6	3.88		-376.26	-192.69	-289.54
<i>SHARE</i>		(2.1)*	(2.3)**	(2.13)*		(941.21)	(995.86)	(938.75)
Obs.	32 498	12 970	12 970	12 970	31 357	12 517	12 517	12 517
Uncensored obs.					1483	989	989	989
Pseudo R <sup>2</sup>					0.12	0.1	0.1	0.1

*Notes:* Panel estimations (1997–2003) including all controls as displayed in Table 3 and Table 4, and including all governance controls as given in Table 5. Dependent variable in (1), (2), (3), and (4) is the count of yearly CBA for source-host country pairs. Dependent variable in (5), (6), (7) and (8) is total yearly value of CBA for source-host country pairs. Standard errors of (1), (2), (3) and (4) clustered by country pair. All estimations include year dummies.

**Table 9. OECD host countries**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>INT1</i>	0.01 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	26.07 (6.12)***	19.20 (7.00)***	18.46 (6.99)***	21.20 (6.98)***
<i>INT2</i>	-0.00 (0.02)***	-0.01 (0.00)***	-0.01 (0.00)***	-0.01 (0.00)***	-37.67 (5.70)***	-45.99 (6.41)***	-48.80 (6.42)***	-48.43 (6.43)***
<i>INT3</i>	-0.00 (0.00)***	-0.00 (0.00)*	-0.00 (0.00)**	-0.00 (0.00)**	-27.70 (4.14)***	-23.14 (4.97)***	-23.40 (4.96)***	-24.73 (4.96)***
<i>TIERS</i>	-0.31 (0.1)***	-0.87 (0.2)***	-481.67 (65.0)***		-720.37 (343.69)**	-3513.56 (731.26)***	-16 03464 (222 641)***	
<i>TIERS</i> <sup>2</sup>			125.11 (16.90)***				414 195.6 (57 907.32)***	
<i>TIERS</i> <sup>3</sup>			-10.69 (1.44)***				-35 160.19 (4952.38)***	
<i>TIERS/POPULATION</i>				-14.28 (1.88)***				-45 880.33 (6746.13)***
<i>SUBNAT. EXPENDITURE</i>		-3.19 (2.61)	12.31 (3.55)***	4.93 (2.27)**		-24984.02 (7531.24)***	32454.57 (11151.14)***	6116.66 (7650.78)
<i>SUBNAT. REVENUE</i>		1.5 (1.98)	-10.19 (2.73)***	-3.9 (1.9)**		13616.22 (6130.12)**	30110.81 (8857.86)***	-5966.92 (6676.02)
Obs.	10 496	8156	8156	8156	10 126	7870	7870	7870
Uncensored obs.					2070	1793	1793	1793
Pseudo R <sup>2</sup>					0.07	0.06	0.07	0.06

Notes: Panel estimations (1997–2003) including all controls as displayed in Table 3 and Table 4, and including all governance controls as given in Table 5. Dependent variable in (1), (2), (3) and (4) is the count of yearly CBA for source-host country pairs. Dependent variable in (5), (6), (7) and (8) is total yearly value of CBA for source-host country pairs. Standard errors of (1), (2), (3) and (4) clustered by country pair. All estimations include year dummies.

FDI, whereas the estimations for the non-OECD hosts (Table 8) find a positive coefficient for that variable, consistent with vertical FDI (Markusen and Maskus, 2002). This implies the possibility that decentralization may impact differently on FDI in these countries for two reasons. The different nature of FDI may make certain investments more or less vulnerable to the problems originating from multiple layers of government. On the other hand, the lower level of socio-economic development and the development of the institutional framework in these countries may change the nature and the magnitude of the effects of decentralization on FDI.

The results for the non-OECD countries are mainly in line with the findings of the overall sample (see Table 8). Including tiers as the only decentralization variable shows a significant negative effect and the size of the coefficient is very similar to the results using the full sample. In the specification using tiers and the fiscal decentralization variables, however, the coefficient of tiers remains negative but is no longer significant, either in the specification using the values or using the counts. If tiers divided by population is used in this joint specification, we also find it not to be significant, although significance is substantially increased. Regarding the fiscal decentralization, we find that in the count estimation (see columns (2)–(4)), only the sub-national revenue share is found to be significant, and, contrary to the full sample, has a positive coefficient. However, the estimates using the values, columns (6)–(8), show results that are analogous to the full sample, with a significant positive effect of expenditure decentralization and a negative effect of revenue decentralization, although the latter is not significant.

For the OECD countries (see Table 9) we find that tiers have a significant negative effect on FDI inflows in all specifications. Without the fiscal decentralization variables, the estimated coefficient of 0.3 is slightly bigger than in the full sample. In the count specification, the fiscal decentralization variables are not significant, but they are in the specification using the values. However, if one considers also non-linear specifications, see columns (3) and (7), the results are highly significant and very similar to the results in the overall sample, with expenditure decentralization affecting FDI positively and revenue decentralization affecting it negatively.

In summary, decentralization appears to be important for OECD and non-OECD hosts. Tiers have a significant negative effect in both groups of countries. However, for the non-OECD hosts the effect is no longer significant, if fiscal decentralization variables are added. This finding indicates that for poorer countries the problem of government overlap may be less of a problem. One alternative explanation of this finding could be that in less developed countries the formal existence of a government level does not imply the existence of a government actor that can affect the profitability of a foreign investor's investment. In other words, the measurement error in tiers may be systematically correlated with the development level of a country. In developing countries, the number of government levels as counted from the constitutional rules of each country, may overstate the number of actual levels that hold effective power in reality.

**3.6.2. Excluding countries with extreme values of tiers.** It may appear that our results on the negative effects of vertical decentralization are driven by the extreme values in our sample. For example, Singapore is the only country in our sample with only one government level and this country had a relatively strong record of attracting FDI. On the other hand, there are several countries from sub-Saharan Africa with 5 or 6 levels of government, and most of these countries did not receive sizable amounts of foreign investments. Therefore, we ran our regressions including only those countries which have either 3 or 4 level of government. This is also a necessary exercise to understand better the results of the estimations that include the fiscal decentralization variables. These estimations suffer from the reduction of the sample, which leave very few observations with less than 3 and more than 4 levels of governments. These outliers may then affect the results strongly. Columns (1)–(4) of Table 10 report the results of the count data as well as the Tobit specifications. We find that the negative effect of tiers is robust, but the fiscal decentralization variables lose their significance in both specifications.

**3.6.3. Taxes.** Our theoretical perspective has stressed the fiscal externalities that arise between different levels of government in the hold-up problem. This makes it potentially interesting to consider whether our findings are robust to the inclusion of measures of tax burden on the investment. Columns (5)–(8) of Table 10 report results for specifications that use the statutory corporate tax rate of 2002 as reported by Ernst & Young (2002) as an additional control variable. The statutory tax rate is found to have a negative effect on FDI. This is in line with existing results in the literature (see De Mooij and Ederveen, 2003, for a survey and a meta-analysis). We also see that the results for the decentralization variables are hardly affected by the inclusion of this additional variable.<sup>17</sup>

**3.6.4. Regions.** As a further robustness check, we consider estimates for particular regions only. Given that the regions need to comprise a certain minimum number of countries for cross-sectional analysis we focus on three regions, Europe, Asia and Africa. Only for Europe does it make sense to also consider estimations that include the fiscal decentralization variables. We report the results in Table 11. The results from the full sample are broadly confirmed by the estimates for Europe, columns (7)–(10), and Africa, columns (1) and (2), which shows significant negative effects for tiers on FDI. In the case of Asia, however, we either find an insignificant negative effect of tiers for the CBA counts, column (3) or even a significant positive effect for the values, column (4). This conflicting result appears to be driven by several large economies in Asia that have received large amounts of FDI over recent years. This is confirmed by results using tiers divided by population. In the count specification, column (5), we now find

<sup>17</sup> If one uses data for 2002 only, the significant negative results for tiers can still be found, but the reduction in the sample causes the significance of the fiscal decentralization to drop below common significance levels.

**Table 10. Countries with 3–4 government tiers / Inclusion of corporate taxes**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>CORP TAX RATE</i>	.	.	.	.	.	.	.	.
					−0.03 (0.007)***	−0.01 (0.01)	−45.05 (12.33)***	−15.95 (17.02)
<i>TIERS</i>	−0.37 (0.08)***	−0.8 (0.11)***	−668.53 (172.19)***	−1742.58 (264.22)***	−0.36 (0.05)***	−0.31 (0.07)***	−740.41 (112.55)***	−740.9 (192.94)***
<i>SUBNAT. EXPENDITURE</i>		−0.77 (1.31)		641.32 (2909.81)		2.36 (1.01)**		6065.72 (2402.58)**
<i>SUBNAT. REVENUE</i>		0.07 (1.05)		−2183.05 (2490.23)		−1.48 (0.98)		−6595.74 (2273.64)***
Obs.	33 632	18 186	32 453	17 551	34 199	19 545	32 998	18 862
Uncensored obs.			3025	2512			3365	2693
Pseudo R <sup>2</sup>			0.09	0.08			0.09	0.08

*Notes:* Panel estimations (1997–2003) including all controls as displayed in Table 3 and Table 4, and including all governance controls as given in Table 5. Dependent variable in (1), (2), (5), and (6) is the count of yearly CBA for source-host country pairs. Dependent variable in (3), (4), (7) and (8) is total yearly value of CBA for source-host country pairs. Standard errors of (1), (2), (5) and (6) clustered by country pair. All estimations include year dummies.

**Table 11. Regions**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	AFRICA	AFRICA	ASIA	ASIA	ASIA	ASIA	EUROPE	EUROPE	EUROPE	EUROPE
<i>TIERS</i>	-0.28 (0.16)*	-55.49 (33.71)	-0.01 (0.2)	185.21 (65.77)***			-0.3 (0.09)***	-1102.67 (305.6)***	-0.33 (0.19)*	-1585.01 (593.99)***
<i>TIERS/POPULATION</i>					-0.67 (1.83)	-1168.84 (509.07)**				
<i>SUBNAT. EXPENDITURE SHARE</i>									-0.94 (1.65)	-6508.89 (5285.28)
<i>SUBNAT. REVENUE SHARE</i>									2.33 (1.4)*	7926.13 (4316.341)*
Obs.	10 141	9785	10 307	9943	10 307	9943	12 765	12 315	10 038	9686
Uncensored obs.		117		684		684		1721		1556
Pseudo R <sup>2</sup>		0.14		0.13		0.13		0.08		0.07

*Notes:* Panel estimations (1997–2003) including all controls as displayed in Table 3 and Table 4, and including all governance controls as given in Table 5. Dependent variable in (1), (3), (5), (7), and (9) is the count of yearly CBA for source-host country pairs. Dependent variable in (2), (4), (6), (8), and (10) is total yearly value of CBA for source-host country pairs. Standard errors of (1), (3), (5), (7) and (9) clustered by country pair. All estimations include year dummies.

a negative but insignificant effect, and the value specification, column (6), shows a negative and significant effect.

**3.6.5. The role of country size.** Our analysis has shown that appropriately controlling for governance variables is important to detect the effects of decentralization on FDI. Controlling for country size is equally important, since large countries can be expected to feature higher decentralization. But country size itself may be an important determinant of FDI, so the specification of our regression's functional forms is very delicate and debatable.

We have included tiers unadjusted for country size in most of our regressions. However, since tiers is itself systematically correlated with country size, it is essential to include sufficient controls to ensure that our tiers variable does not pick up FDI effects that should be accounted for by the effects of country size. Columns (1)–(6) of Table 12 show what happens if a reduced number of country size controls are used. The estimations of columns (1) and (2) do not control for the squared terms of area and population, columns (3) and (4) display the results of using only area and population as controls, and, finally, (5) and (6) show what happens if there are no controls at all for country size. The size of the coefficient of tiers decreases, and the significance of tiers also drops as we take out the controls for country size. Without any country size controls tiers is found to have a significant positive impact on CBAs in the values specification. This demonstrates that appropriately controlling for country size is very important. We should stress, however, that all the country size controls we use are typically found to be significant in our estimations, at least when we use the full sample, as can be seen from Tables 3 and 4.

**3.6.6. Estimates using averages.** As our final robustness check we consider estimating the model using averages. Since our variable of government tiers and our fiscal decentralization measures do not change over time, estimating a panel may be regarded as an unjustified inflation of the sample size. We therefore collapse all time varying variables to their 1997–2003 averages. For the count data model, we consider how these averages determine the total number of acquired firms of a given country pair. The Tobit specification also uses the average yearly value as the dependent variable. The results are displayed in Table 13. The coefficient of tiers is negative and significant in all specifications, and of a magnitude that is similar to the estimated coefficients in the panel model. The fiscal decentralization variables are, however, no longer found to be significant.

## 4. DISCUSSION

Our empirical analysis has detected a dark side of decentralization. Its vertical dimension, measured by the number of government tiers in the host country, has a negative effect on foreign FDI inflows into the host country. This finding is robust in the type of FDI data used as the dependent variable: count or aggregate values. It is also quite robust to the division of the sample into particular subsets of countries.

**Table 12. Sensitivity with respect to country size variables**

	(1)	(2)	(3)	(4)	(5)	(6)
$\dots$						
$\dot{POP}$	$91.16 \cdot 10^{-5}$ ( $20.25 \cdot 10^{-5}$ )***	$2.56$ ( $0.36$ )***	$74.5 \cdot 10^{-5}$ ( $20.89 \cdot 10^{-5}$ )***	$2.51$ ( $0.36$ )***	$\cdot$	$\cdot$
$POP^{-1}$	$-2.87$ ( $0.56$ )***	$-6339.61$ ( $450.19$ )***				
$POP^2$						
$\dot{AREA}$	$7.34 \cdot 10^{-5}$ ( $1.2 \cdot 10^{-5}$ )***	$0.24$ ( $0.02$ )***	$9.39 \cdot 10^{-5}$ ( $1.25 \cdot 10^{-5}$ )***	$0.29$ ( $0.02$ )***		
$AREA^{-1}$	$0.58$ ( $0.21$ )***	$1687.8$ ( $407.27$ )***				
$AREA^2$						
$\dots$						
$\dot{TTERS}$	$-0.31$ ( $0.05$ )***	$-603.59$ ( $104.34$ )***	$-0.14$ ( $0.05$ )***	$-204.4$ ( $87.53$ )**	$-0.06$ ( $0.05$ )	$158.25$ ( $81.81$ )*
Obs.	42 994	41 483	42 994	41 483	42 994	41 483
Uncensored obs.		3553		3553		3553
pseudo R <sup>2</sup>		0.09		0.09		0.09

*Notes:* Panel estimations (1997–2003) including all controls as displayed in Table 3 and Table 4, and including all governance controls as given in Table 5. Dependent variable in (1), (3), and (5) is the count of yearly CBA for source-host country pairs. Dependent variable in (2), (4), and (6) is total yearly value of CBA for source-host country pairs. Standard errors of (1), (3), and (5) clustered by country pair. All estimations include year dummies.

**Table 13. Averages**

	(1)	(2)	(3)	(4)	(5)	(6)
•••						
<i>TIERS</i>	-0.34 (0.05)***	-0.25 (0.08)***		-289.68 (69.97)***	-335.24 (135.47)**	
<i>TIERS/POPULATION</i>			-1.83 (0.36)***			-2159.5 (669.52)***
<i>SUBNAT. EXPENDITURE SHARE</i>		1.71 (0.99)*	1.77 (0.98)*		423.14 (1742.54)	707.35 (1741.96)
<i>SUBNAT. REVENUE SHARE</i>		-0.48 (0.94)	0.21 (0.95)		-658.75 (1628.1)	-218.34 (1648.08)
Obs.	5923	3340	3340	5740	3237	3237
Uncensored obs.				1291	959	959
Pseudo R <sup>2</sup>				0.08	0.07	0.07

*Notes:* Cross-section of 1997–2003 averages. Dependent variable in (1), (2), and (3) is count of total 1997–2003 CBA for source-host country pairs. Dependent variable in (4), (5), and (6) is 1997–2003 average yearly value of CBA for source-host country pairs.

Finally, this finding is robust to the inclusion of variables that control for governance as well as for other variables. Interestingly, the inclusion of governance variables is found to increase the significance of the results. The results are quantitatively important, although the magnitudes of the effects are sensitive to the specification and set of control variables included in the estimation.

We have found robust evidence of the negative effects of the vertical dimension of decentralization, very much in line with our Hypothesis 1. The importance of the different channels through which these negative effects are working is difficult to be identified. We have suggested several of such channels in our conceptual analysis in Section 2, but, with our data, it is not feasible to evaluate which of these channels is most important. Further evidence for the operation of the various mechanisms identified could be obtained with better availability of comparable cross-country data, as well as from individual case studies. We have used a large set of governance variables as controls and still identified a significant negative effect of tiers, although the inclusion of governance variables reduced the size of the effects of tiers. This latter finding relates to the results of Dreher (2006), who considers the effects of decentralization on various indicators of the quality of governance. He finds a negative effect of the number of government tiers on various measures of governance. More specifically, he finds a negative effect of the number of tiers on the rule of law, as measured by the Kaufman *et al.* (2005) index. These interdependencies point at potential endogeneity of several important variables in our analysis, including not only the governance variables, but potentially, also the decentralization variables. This may call for a modification of our econometric approach. However, there appear to be many channels through which tiers affect CBA, and it is not clear how to select among these, and what an adequately specified multi-equation model should look like. As regards the potential endogeneity problems of our decentralization variables, these are likely to differ between them. Our main variable of interest, the number of government tiers, is typically determined at the constitutional level. Further, since the tiers variable is treated as constant and relates to the beginning of our sample period, it can be regarded as exogenously given for our period under consideration. For the case of fiscal decentralization the possibility of endogeneity is more important. If the foreign investment generates substantial tax revenue, and if this revenue accrues differently to the various levels of government compared to other tax revenues, then the amount of FDI clearly affects the revenue ratio. Again, we may argue that the tax revenues stemming from a CBA in a given year will only arise in later years, and this implies that contemporaneous fiscal decentralization is exogenous to the number and the value of CBA inflows. However, since we use past average fiscal decentralization, our estimates do not suffer from this potential endogeneity problem.

The empirical analysis also showed that unlike vertical disintegration, fiscal decentralization may have positive effects. First, it should be noted that they do not contradict our theoretical perspective, but highlight that decentralization policy has several dimensions. Where the tiers variable is most suitable for measuring the vertical

dimension, fiscal decentralization measures may account for other effects. They may relate more closely to the horizontal dimension of federalism, and therefore can be seen, for instance, as measuring ‘closeness’ of the government to firms and individuals.

We have not provided an explicit theoretical perspective on the potential aspects captured by the fiscal decentralization variables, and an interpretation of the findings on the fiscal decentralization measures is of an exploratory nature. However, it is still feasible to link them to various theoretical arguments made in the literature and we can also square them with several empirical results that have been obtained by previous research. First, we can relate our findings on the research that has been carried out on the direct relationship between decentralization and governance. Fisman and Gatti (2002) and Treisman (2000b) have considered the effect of decentralization on corruption. Fisman and Gatti (2002) consider the fiscal decentralization variables only, and find that more fiscal decentralization reduces the level of corruption. Such potential positive effect of fiscal decentralization on governance in the host countries may be an additional channel that explains the positive findings of fiscal decentralization on FDI. Conversely, Treisman (2000b) considered federalism (proxied by a dummy variable) and did not find an effect on corruption. Dreher (2006) also finds a positive effect of revenue decentralization on governance variables. This is in line with reduction in the magnitude of our estimated effects when governance variables are included, but we should stress that fiscal decentralization still has significant effects when we control for the quality of governance.

Another explanation for the increased attractiveness to foreign investors caused by fiscal decentralization can be found in the argument of Keen and Marchand (1997). They suggested that competition between cities or regions will result in a distortion of the mix of public goods provided by the regions and cities. In particular they will overinvest in infrastructure. This effect is likely to be stronger, if regions and cities have larger fiscal autonomy, as measured by fiscal decentralization. Investors will profit from such overinvestment in infrastructure and increase their investment, potentially explaining the positive effect of fiscal decentralization. This argument is also in line with the findings on the differential effect of expenditure and revenue decentralization, since it essentially relies on expenditure decentralization. Given the nature of this infrastructure competition, it is less likely in this case that fiscal decentralization is to the benefit of the country.

Finally, we should also point out that our results regarding tiers are derived on a cross-sectional base only and are therefore sensitive to unobserved country differences that could be correlated with CBAs and tiers. This is a common problem of research addressing the effects of government architecture, as variation over time is negligible compared to cross-sectional differences, and we do not have any *a priori* evidence for why such a correlation should exist, but this caveat needs to be mentioned. This caveat also holds with respect to our findings for fiscal decentralization. Nevertheless, we see our results as a useful first step uncovering the effects of the various facets of decentralization on FDI and more detailed analysis should be very welcome. This is particularly true with respect to quantifying the potential effects, as our results showed

them to be sensitive to the set of controls, the specification regarding the decentralization variables themselves, and the sample of countries included.

## 5. POLICY IMPLICATIONS

Important policy lessons can be learned from our results on the impact of decentralization on FDI. Both in the developed and developing world policy reforms towards decentralization are high on the policy agenda. Frequently, it is argued that decentralization is beneficial for improving the investment climate. In particular, the competition between regional governments could result in improved investment conditions for private investors and reduced possibilities for local governments to appropriate parts of the investment's return through taxation after an investor has invested in a particular location. This competition effect is caused by the *horizontal dimension* of decentralization, the breaking up of one state in many jurisdictions.

Policy makers who want to attract FDI, however, need to be aware of the pitfalls of decentralization. The horizontal dimension of decentralization need not resolve the hold-up problem in FDI, since this problem is rooted in the *ex post* irreversibility of investment. And the *vertical dimension* of decentralization, implied by the inevitable multiplicity of government levels that are created in the process of decentralization, has potentially negative effects for FDI. These theoretical arguments find strong support in the data, and suggest that decentralization programmes can be detrimental to growth and efficiency.

To avoid these negative consequences, policies and constitutional set-ups should be designed in a way as to minimize the negative potential arising from vertical disintegration. Our theoretical perspective leads to a number of important considerations. First, the number of government layers should not be overly expanded. In fact, the number of government levels should be reduced wherever possible. Second, as a certain amount of vertical disintegration will be unavoidable, policies and constitutional set-ups need to minimize the negative effects originating from this vertical dimension. The overlap regarding tax bases, regulatory authority, and other policies that impinge on investors should be reduced as far as possible. Thus a clear delineation of responsibilities is a pivotal aspect of the proper functioning of federal systems. But since some overlap will be unavoidable, coordination devices need to be installed that coordinate the actions of the different government levels. Such coordination has the potential to resolve the free-riding and common pool incentives outlined in Section 2.

There is also good news for proponents of decentralization. Fiscal decentralization may improve the investment climate, such that, from an investment policy perspective, expenditure and revenue decentralization can have positive effects for FDI. Further, the results on the differential effect of expenditure and revenue decentralization point at the importance of expenditure decentralization for improving the investment climate for foreign investors. As can be seen from Table 2, there is large variation in fiscal decentralization among countries, such that there is scope for many countries to engage in fiscal decentralization. Of course, the measures of fiscal decentralization

are rather crude measures and do not say much about the actual autonomy, nor do they tell us something about the kind of taxes and expenditures that are more effective in improving the investment climate. As can be conjectured from the results regarding the differential effect of expenditure and revenue decentralization, interesting results are to be expected from more detailed analyses of the structure of fiscal decentralization if the appropriate data was available. Going deeper into the structure of actual fiscal powers regarding different taxing rights and expenditure responsibilities would also allow much better targeted policy advice than what can be offered currently.<sup>18</sup>

Decentralization is often proposed as a means to improve the governance within a country. While we have treated governance as exogenously given in our empirical analysis, our findings nevertheless shed some light on the potential of decentralization to improve governance. It appears that the vertical dimension impinges negatively on the quality of governance. Fiscal expenditure decentralization appears to have positive effects. Of course, this evidence is rather indirect, but seems to point towards the same direction as our above arguments. If the problems of the vertical dimension cannot be sufficiently controlled, decentralization might not appear very suitable to improve governance. But if the vertical dimension can be controlled, decentralization in the form of fiscal decentralization has potential to improve governance.

Our results may also provide a further argument in favour of special economic zones. Such zones with special conditions regarding taxes and tariffs have been set up in many developing countries for foreign investors. From our perspective, one of the main advantages of such zones may be that several local or regional government actors, which would play a role elsewhere in the country, are locked out in such zones and the investor will typically have to deal with one government authority only.

Finally, it should again be stressed that for a sound formulation of decentralization policies two considerations are central. On the one hand, one has to consider what level of decentralization is most appropriate for the government to perform its tasks in the most efficient way. On the other hand, it is also important to consider the interaction of various government players at various levels in the government hierarchy. Our results point towards the intrinsic tension between these objectives.

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## Discussion

Allan Drazen

University of Maryland

Any comprehensive discussion of the determinants of foreign direct investment (FDI) in a country needs to consider the effect of government policy choices on FDI.

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<sup>18</sup> The recent contribution by Stegarescu (2006) can be regarded as a first important step in that direction.

This includes not only actual policy decisions, but also the decision-making mechanism itself, since this will be a key determinant of the investment environment. The decision of foreigners on whether or not to invest in a country will in turn depend on their expectations of the policy environment.

This paper by Kessing, Konrad and Kotsogiannis makes a crucial contribution to this question. It has long been realized that decentralization of government decision making across levels of government may have a significant effect on FDI. Along the horizontal dimension, that is, with competing jurisdictions at a given level of government with some autonomy in decision making, decentralization may have a positive effect on FDI. Local governments may be more able to tailor fiscal programmes to the needs of the local constituency, and this increases accountability. More importantly for FDI, potential competition and benchmarking between regions may help attract FDI, among other things because it is argued to reduce the risk that governments will expropriate wealth.

What has been less appreciated, and is the focus of this paper, is the potential *negative* effect along the vertical dimension, that is, at different levels of government, for example: local, regional, state (in a federal system), and national. More specifically, less than total vertical decentralization, so that there is overlapping authority on investment decisions may have a strong negative effect. This is the ‘dark side’ of decentralization. When investors are subject to jurisdiction of several tiers of government, there may be significant problems of coordination failures, free-riding, common pool problems, and ‘enforcement’ of implicit contracts between government and private investors.

The authors have done an extremely good job not only of highlighting this issue, but also of investigating it. Moreover, since many of my concerns about earlier drafts were admirably addressed, this discussion will be short.

Several types of arguments are presented on why less-than-complete vertical ‘dis-integration’ may have a negative effect on FDI. These problems are most easily understood by comparing, as the paper does, two hypothetical countries, identical in all respects, except that in country  $U$  there is a unitary government, while in country  $F$  there is a federal system with multiple tiers of government (for simplicity, say two tiers) that have overlapping fiscal authority. Kessing, Konrad and Kotsogiannis assume that in both countries ‘property rights are weak’ in the sense that government cannot credibly commit to not extracting revenue from the investors’ projects *ex post*, that is once the investment is sunk and cannot be relocated. Moreover, investors are aware of government incentives to expropriate one investment is irreversibly in place. (I return to a discussion of the hold-up problem below, and, following the organization of the paper, begin by assuming both types of countries share equally weak property rights.)

First, there is the common pool problem. If government maximizes tax revenue that can be extracted from a foreign direct investor,  $U$  will choose the tax rate that maximizes overall tax revenue. In  $F$  if the two levels of government that can both tax

the foreign investor choose tax rates non-cooperatively, the overall tax rate on the investor will be higher, and both investment (which is chosen anticipating this problem) and tax revenue will be lower. (Similar considerations apply when governments give subsidies to attract foreign investment – the free-rider problem is simply another inter-government externality.)

This is certainly true, but governments can foresee this common pool problem as well as investors. Hence, to the extent that the common pool problem has the potential to significantly lower investment, one might expect a federal system to try to alleviate it, for example, by defining property rights to tax bases. (In many US states, for example, certain types of taxes are constitutionally reserved for the state government, others reserved for local governments.) Kessing, Konrad and Kotsogiannis are aware of this when they write that ‘the common pool problem could be avoided if the ability to expropriate revenues from the foreign direct investor could be attributed to one of the government tiers’. They argue, however, that in practice such effective assignment is hard to do. But, this is an empirical question: do we in fact see such mechanisms in place in some countries, but not others? It would not be easy, but nonetheless useful, to see empirical evidence on the success or failure of federal systems to assign such property rights to taxes across government tiers. Their tests suggest that countries don’t fully solve the problem, but it would be nice to see more direct evidence.

It also seems that there is no reason to believe that all government tiers in a given country actually have fiscal jurisdiction over FDI and certainly not equal jurisdiction. Of course, any ‘weighting’ scheme for tiers would depend on country specifics and hence could not be applied across the sample, even if it could even be discovered. Hence, this is not a criticism of construction of the variable itself, but more a question of what are the limitations of this sort of cross-country empirical analysis.

The severity of the *ex post* ‘hold-up’ problem depends on the extent that governments try to commit themselves successfully not to expropriate sunk investment. An inability of government to make it convincing that *ex post* expropriation will not take place is listed by investors as a major disincentive to investment. However, country governments clearly differ significantly in the extent they can credibly commit not to expropriate. Hence, though in theory the hold-up problem certainly exists, its seriousness in practice is also an empirical question of effective government pre-commitment mechanisms.

A key question then becomes whether countries having a federal structure where different tiers have overlapping authority are less likely to develop institutions which address the hold-up problem than countries with a unitary government. As Kessing, Konrad and Kotsogiannis point out, since the hold-up problem in FDI may be more severe in a federal system due to the common pool problem, *F* countries have more to gain than *U* countries from developing mechanisms or institutions that address it, and hence, they may in fact have more incentive to do so.

To suggest why this may not happen, Kessing, Konrad and Kotsogiannis consider repeated interaction between governments and investors as an important mechanism in the case of FDI. Will reputational effects in the ‘implicit contract’ inherent in repeated

interactions help constrain governments, and, more importantly, is the implicit contract weaker in federal systems? Based on oligopoly theory concerning collusion among firms, they argue that the enforcement of good behaviour in the ‘implicit contract’ will be weaker in  $F$  than in  $U$  countries. With repeated interaction, agents – government levels and an investor – can adopt strategies that depend on behavior in previous interactions. Good behaviour is enforced by the threat of punishing a ‘player’ that deviates from the collusive (that is, lower-tax) equilibrium. However, as with an increase in the number of firms in oligopoly, the ability to punish a deviating government may be reduced with an increase in the number of governments. The benefit from cooperation is lower as the number of governments increase, while the net benefit from deviating may be higher.

This argument makes sense, but governments are not exactly like firms in this analogy. Government is defined as having (or supposed to have) monopoly on the use of certain powers. Hence, higher levels may have far greater powers than firms in enforcing cooperation by lower tiers (and the number of tiers is often small). The analogy of governments colluding among themselves in this repeated interaction game (induced by the existence of a dominant player on the government side) may be more realistic.

To summarize, I think Kessing, Konrad and Kotsogiannis have pointed out a number of reasons why the problems of government interaction and overlap in a federal system may depress FDI when investment has an irreversible component and investors are forward-looking. By the same token, overlapping governments that care about attracting FDI should be forward-looking as well. Hence, their attempts to address these problems may mitigate the effects. More generally, simple stylized models of government behaviour focusing on institutional differences can be very misleading. Modelling is necessarily simple and stylized, but in fact, governments facing problems due to institutional features (multiple tiers, allocation of powers, etc.) have incentives to get around them. Predictions of what can happen due to these features may be in error if it fails to take this into account.

Hence, theory alone cannot answer the question of how strong an effect the problems of incomplete vertical decentralization will have on FDI. Moreover, since even in theory, horizontal decentralization may have strong positive effects, the overall empirical effect could certainly go in either direction. I think the authors are wise therefore to focus on investigating the empirical relation between government tiers and FDI.

At the same time, I think one should be careful about interpreting the results. My point is a standard one. When countries are so different in institutional features which we cannot easily measure or control for (such as institutions to address the dark side of decentralization or even comparability of government tiers across countries), cross-country studies like this are suggestive, but far from definitive. I think that in the final analysis, some sort of country studies may also be needed to shed more light on the effect of tiers on FDI. Not to replace the analysis here, but to supplement it. The question is too important and the paper too interesting not to take this next step.

## Manuel Arellano

### CEMFI and CEPR

This paper reports empirical evidence on the effects of various aspects of decentralization on FDI. This is an interesting question. The paper provides a detailed background discussion of the literature and potential effects according to theory. The central part of the paper develops an empirical strategy:

- The FDI annual flow from a source country to a host country is proxied by the number or the value of firms acquired by firms from the source country in the host country.
- In this way it is possible to use data from up to 74 source countries and 177 host countries for 7 years.
- The basic empirical equation is a knowledge-capital regression model to which decentralization variables are added as extra regressors.

The main decentralization variable is the number of government tiers. Its estimated effect on FDI is negative, and this is the ‘dark side’ of decentralization.

### Assessment

This is a welcome contribution to the empirical assessment of decentralization. The paper contains much useful discussion and empirical results on an issue of policy relevance. It is nicely written and I enjoyed reading it.

The contribution of the paper is empirical: the finding of a negative association between the number of government layers and FDI after controlling for country differences. Since FDI itself is positively associated with growth, the policy implication is that the number of government levels should be reduced ‘wherever possible’.

Most of the limitations of this exercise are related to problems with data that hamper credibility of the estimates as causal effects. Moreover, the causal effect of decentralization on FDI is likely to be heterogeneous across countries. Understanding this heterogeneity and being able to relate it to observables is important for policy. In the remainder, I review some data limitations and provide some suggestions for future work.

### Data issues

**Lack of data on FDI flows.** As the authors note, the choice of dependent variable is problematic. One problem is that CBA is only a part of FDI (firm creation is excluded) and we do not know how the CBAs’ share of FDI depends on decentralization and other variables. Thus, the reported estimates compound the effects of decentralization on FDI and the effects of decentralization on the CBA/FDI ratio.

The other problem is the focus on counts of CBAs due to severe under-reporting of the value of the investments. Aside from necessity, there are no good reasons for using counts of CBAs as a measure of FDI.

However, from the perspective of evaluating decentralization, CBA counts could be regarded as an outcome of interest in its own right. After all, it is also associated with growth. One can also take some comfort in the fact that count and value based estimates tend to be similar to each other, at least as far as the signs of effects and their significance is concerned.

**Lack of variation in policy regimes.** Results are based on cross-sectional comparisons: differences in FDI associated with differences in number of tiers. So it is the effect of ‘being in a situation with so many government levels’ that we are looking at, as opposed to the before-after effect of undergoing decentralization. The latter is a closer notion to the policy effect of interest. The fact that results are cross-sectional (together with lack of instrumental variables) diminishes their causal credibility, because they are sensitive to unobserved country differences that cause both FDI and number of tiers.

### The policy effect of decentralization

The number of tiers has a statistically significant negative effect on FDI, but how large is this effect? Is it economically plausible? Given the exponential specification of the model for counts of CBAs, an estimated coefficient on tiers of  $-0.4$  implies that the average number of CBAs becomes 50% larger when one government tier is removed, which is a very large effect. Probably too large. The estimated effect is even larger in some of the specifications excluding countries with extreme values of tiers.

One explanation for such large effects would be the potential endogeneity of the number of tiers. Since this variable does not vary with time, we would expect a larger scope for endogeneity if the error term also contains a substantial component which does not vary with time. In this regard, it would be nice to do an analysis of variance of the residuals in order to ascertain the importance of time-invariant country-pair effects.

### Heterogeneity

Large variations in the size of the estimated effect for different subsamples suggests that heterogeneity may be important. I consider some possible dimensions.

**Different effects at different margins.** In the baseline model, the FDI effects of going from, say, 6 to 5 tiers or from 2 to 1 tier are constrained to be the same. The authors find evidence of non-linearities, but the lack of stability of the non-linear pattern across subsamples suggests that non-linear responses are not a major reason for heterogeneity in responses.

**Cross-country dependence.** The theoretical predictions implicitly hold the amount of decentralization in other countries constant. Empirically, this creates the possibility

that decentralization in one potential host country affects FDI in another. Also, spacial clustering in number of tiers suggests that the effects of *TIERS* may differ depending on the neighbours' situation. One way of addressing this issue would be to divide the world in broad regions and include an interaction of *TIERS* with average *TIERS* in the region.

**Other interactions and optimal decentralization.** The effect of *TIERS* on FDI may vary with country size, political culture, diversity, or with the nature of decentralization. It may also vary with characteristics of the source country. Regarding country size, interaction terms are as theoretically plausible as additive controls.

As for the nature of decentralization, the effect may be different, for example, depending on whether decentralization goes alongside with fiscal decentralization or not. In fact, the policy discussion in the paper suggests an interest in the effects of the nature of decentralization as much as in decentralization itself. Taken *prima facie*, the paper estimates suggest that the less decentralization the better. A different policy perspective is to presume an optimal degree of decentralization and seek its empirical characterization (searching for 'U shapes').

The analysis of heterogeneity in the impact of *TIERS* is important because an estimated effect that is an average of very different country effects is not so useful for policy (i.e. what is good for some may be bad for others). Unfortunately, we do not seem to have enough data variability to capture well determined interaction effects.

### Econometric remarks

There are nearly 7500 country pairs and more than 22 000 data points in the panel. The error terms of a given host country are likely to be correlated, and so are the errors for a given pair over time. Standard errors that treat these errors as independent may be overoptimistic. Standard errors reported in the paper are clustered by country-pair. So it is potentially important to allow for clustering in these dimensions, as done in the paper for country pairs.

Over-dispersion may be a problem for Poisson probabilities but not for estimates of the conditional mean, which are robust to distributional misspecification. In fact, they are more robust than estimates from the negative binomial model.

The Tobit model is a restrictive specification for values in that it presumes that the same equation that determines total values when investments are positive, also determines the probability of zeros.

### Conclusion

This paper is an honest and thorough investigation of the relationship between FDI and government decentralization, which has uncovered an interestingly dark empirical regularity. It makes a policy relevant contribution and, no doubt, it will be a rich source for further research.

## Panel discussion

Wendy Carlin wondered about the welfare implications of the paper's analysis: there may or may not be good reasons to focus on incentives to attract FDI, and the relevant institutions and policies certainly have other roles. Gilles Duranton noted that perhaps the same countries that can afford the high bureaucratic costs of multi-tiered governments are also inclined to let their local governments engage in wasteful policies meant to attract FDI. Several panellists wondered whether the paper's empirical results are robust to examination of subsamples and to correlation between the number of government tiers and other relevant factors, such as corruption and the availability of natural resources, and encouraged the authors to perform the robustness checks now reported in the published version of the paper. Pierre Pestiau noted that different mechanisms may be at work in very heterogeneous countries. Decentralization may be more or less democratically chosen, and while it is often motivated by concern for efficiency, it may also lead to inefficient conflicts between layers of government. Hans-Werner Sinn and Gilles Duranton emphasized the important role of hierarchical power in layered government structures. In federal countries, such as Germany and Canada, decentralization of fiscal powers is not as extensive as it may appear, as higher levels of government can react to the behaviour of lower levels by adjusting transfers of resources.

## APPENDIX 1: ECONOMETRIC SPECIFICATION

For our study of the determinants of the number of CBA between source and host countries we use standard methods for the econometric analysis of count data. The theory of count data analysis is well summarized by Cameron and Trivedi (1998), see Cameron and Trivedi (1999) for a comprehensive introduction. The structure of the econometric model we estimate can be described by the expected number of cross-border acquisitions, conditional on the vector of controls, *CONTROLS*, the decentralization variables *DEC*,  $\beta$ , the parameter vector to be estimated and a shift variable  $d_{ijt}$ :

$$E[CBA_{ijt} | x_{ijt}, d_{ijt}] = \exp(\text{CONTROLS}'_{ijt} \beta_1 + \text{DEC}'_{ijt} \beta_2 + d_{ijt}). \quad (1)$$

In their simplest form, count data models assume that the counts, that is in our case the number of CBA from source country  $i$  to host country  $j$  in year  $t$ , denoted by  $CBA_{ijt}$  follow a Poisson distribution with parameter  $\lambda_{ijt}$ . Thus,

$$f(CBA_{ijt} | x_{ijt}) = \frac{e^{-\lambda_{ijt}} \lambda_{ijt}^{CBA_{ijt}}}{CBA_{ijt}!}, \quad (2)$$

where

$$\lambda_{ijt} = \exp(x'_{ijt} \beta), \quad (3)$$

with  $x_{ijt}$  the vector of covariates, and  $\beta$  the parameter vector to be estimated. However, given the assumption of the Poisson distribution, this model assumes equality of mean and variance. This property is termed equi-dispersion. However, in most applications the analysed data displays over-dispersion, that is, a larger variance larger than the mean. Also in our case, standard tests clearly reject equi-dispersion. This problem can be resolved, if one assumes that the Poisson parameter  $\lambda_{ijt}$  is also affected by an additional shift parameter  $d_{ijt}$  that is:

$$\tilde{\lambda}_{ijt} = \exp(x_{ijt}'\beta + d_{ijt}) = \exp(x_{ijt}'\beta)\exp(d_{ijt}). \quad (4)$$

In this case, the Poisson parameter  $\lambda_{ijt}$  becomes itself a random variable with realization  $\tilde{\lambda}_{ijt}$ . Further, we assume that  $\alpha_{ijt} = \ln d_{ijt}$  is gamma distributed with precision parameter  $\theta$ , so that  $E[\alpha_{ijt}] = 1$  and  $V[\alpha_{ijt}] = 1/\theta$ . In this case, the marginal distribution of  $CBA_{ijt}$ , given the covariates, can be shown to follow a negative binomial distribution, and the parameter vector  $\beta$  can be estimated via maximum likelihood estimation.

## APPENDIX 2

**Table A1. Description of covariates used in the analysis and their sources**

Variable	Units	Description	Source
Number of cross border acquisitions	Count	Number of international merger and acquisition deals between source and host countries.	Compiled from Thomson Financial by Herger <i>et al.</i> (2005).
Value of cross border acquisitions	US\$ millions	Value of international merger and acquisition deals between source and host countries.	Compiled from Thomson Financial by Herger <i>et al.</i> (2005).
$\Sigma GDP$	US\$ billions	Real Gross Domestic Product in US\$ with base year 1995 cumulated over source and host country.	Compiled from World Development Indicators (WDI).
$\Delta GDP$	US\$ billions	Real Gross Domestic Product in US\$ with base year 1995 in terms of difference between source and host country.	Compiled from WDI.
<i>POPULATION</i>	Count (in millions)	Total population in host country.	Compiled from WDI.
<i>AREA</i>	Thousand square km	Area of host country.	Compiled from WDI.
$\Delta SKILL$	US\$ thousands	Wage difference between source and host country measured by the corresponding difference in real GDP per capita with base year 1995.	Compiled from WDI.

**Table A1.** *Continued*

Variable	Units	Description	Source
<i>DISTANCE</i>	Thousand km	Great circular distance between capital cities of source and host country.	Compiled.
<i>COMMON LANGUAGE</i>	Indicator	Indicator variable identifying a common official language between host and source country.	Compiled from CIA World Factbook.
<i>COMMON BORDER</i>	Indicator	Indicator variable identifying a common border between host and source country.	Compiled from CEPII, available online at <a href="http://www.cepii.fr/anglaisgraph/bdd/distances.htm">http://www.cepii.fr/anglaisgraph/bdd/distances.htm</a> .
<i>DOMESTIC MARKET CAPITALIZATION</i>	Percent	Average market capitalization as a percentage of GDP in source country calculated by dividing the value of traded stocks in percent of GDP through the turnover ratio.	Compiled from WDI.
<i>REAL EXCHANGE RATE</i>	Ratio	Real exchange rate in terms of price conversion factor multiplied with the nominal exchange rate.	WDI.
<i>CUSTOMS UNION</i>	Indicator	Indicator variable identifying a customs union between source and host country.	Compiled from WTO.
<i>FREE TRADE AGREEMENT</i>	Indicator	Indicator variable identifying a free trade agreement between source and host country.	Compiled from WTO, provided by Herger <i>et al.</i> (2005).
<i>SERVICE AGREEMENT</i>	Indicator	Indicator variable identifying a service agreement between source and host country.	Compiled from WTO, provided by Herger <i>et al.</i> (2005).
<i>DURATION</i>	# of days	# of days it takes to start a business in host country.	Djankov <i>et al.</i> (2002).
<i>PROCEDURES</i>	Count	# of procedures to be completed before starting a business.	Djankov <i>et al.</i> (2002).
<i>SET-UP COSTS</i>	Percent	Cost of starting business expressed as % of host country GDP per capita.	Djankov <i>et al.</i> (2002).
<i>TIERS</i>	Count	Number of government tiers.	Provided by Daniel Treisman.
<i>SUB-NATIONAL EXPENDITURE SHARE</i>	Percent	Ratio of sub-national government expenditure to total government expenditures, 1980–1995 average.	Provided by Nils Herger, based on IMF government finance statistics.

**Table A1.** *Continued*

Variable	Units	Description	Source
<i>SUB-NATIONAL REVENUE SHARE</i>	Percent	Ratio of sub-national government tax revenues to total government tax revenues, 1980–1995 average.	Provided by Nils Herger, based on IMF government finance statistics.
<i>PROPERTY RIGHTS PROTECTION</i>	Index Score	Rating of property rights in host country. Original values have been reversed on a scale from 1 to 5 with higher values indicating more secure property rights.	Heritage Foundation.
<i>VOICE AND ACCOUNTABILITY</i>	Index Score	Rating of voice and accountability in host country. Ranges from –2.5 to 2.5 with higher values indicating higher accountability.	Kaufman <i>et al.</i> (2005).
<i>CORRUPTION</i>	Index Score	Rating of the control of corruption in host country. –2.5 to 2.5 with higher values indicating a better control of corruption.	Kaufman <i>et al.</i> (2005).
<i>RULE OF LAW</i>	Index Score	Rating of the rule of law in host country. –2.5 to 2.5 with higher values indicating a stronger rule of law.	Kaufman <i>et al.</i> (2005).
<i>GOVERNMENT EFFECTIVENESS</i>	Index Score	Rating of government effectiveness in host country. –2.5 to 2.5 with higher values indicating higher effectiveness.	Kaufman <i>et al.</i> (2005).
<i>CORPORATE TAX RATE</i>	Percent	Statutory corporate tax rate.	Provided by Margarita Kalamova, compiled from Ernst & Young (2002).

## REFERENCES

- Bardhan, P. and D. Mookherjee (2000). ‘Capture and governance at local and national levels’, *American Economic Review, Papers and Proceedings*, 90(2), 135–39.
- (2005). ‘Decentralizing antipoverty program delivery in developing countries’, *Journal of Public Economics*, Special Issue ISPE, 89(4), 675–704.
- Besley, T. and M. Smart (2003). ‘Fiscal restraints and voter welfare’, London School of Economics, *mimeo*.
- Blonigen, B.A., R.B. Davies and K. Head (2003). ‘Estimating the knowledge-capital model of the multinational enterprise: Comment’, *American Economic Review*, 93, 980–94.
- Boadway, R., M. Marchand and M. Vigneault (1998). ‘The consequences of overlapping tax bases for redistribution and public spending in a federation’, *Journal of Public Economics*, 68, 453–78.
- Brennan, G. and J.M. Buchanan (1977). ‘Towards a tax constitution for Leviathan’, *Journal of Public Economics*, 8, 255–73.

- (1980). *The Power to Tax: Analytical Foundations of a Fiscal Constitution*, Cambridge University Press, Cambridge.
- Buch, C.M., J. Kleinert, A. Lipponer and E. Toubal (2005). ‘Determinants and effects of foreign direct investment: Evidence from German firm-level data’, *Economic Policy*, 20(41), 52–110.
- Cai, H. and D. Treisman (2005). ‘Does competition for capital discipline governments? Decentralization, globalization, and public policy’, *American Economic Review*, 95(3), 817–30.
- Cameron, A.C. and P.K. Trivedi (1998). *Regression Analysis of Count Data*, Cambridge University Press, Cambridge.
- (1999). ‘Essentials of count data regression’, *mimeo*.
- Carr, D.L., J.R. Markusen and K.E. Maskus (2001). ‘Estimating the knowledge-capital model of the multinational enterprise’, *American Economic Review*, 91(3), 693–708.
- (2003). ‘Estimating the knowledge-capital model of the multinational enterprise: Reply’, *American Economic Review*, 93(3), 995–1001.
- Charlton, A. (2003). *Incentives for Foreign Direct Investment*, MPhil thesis, St John’s College, Oxford University.
- Dahlby, B. (1996). ‘Fiscal externalities and the design of intergovernmental grants’, *International Tax and Public Finance*, 3, 397–412.
- De Mooij, R.A. and S. Ederveen (2003). ‘Taxation and foreign direct investment: A synthesis of empirical research’, *International Tax and Public Finance*, 10(6), 673–93.
- Di Giovanni, J. (2005). ‘What drives capital flows? The case of cross-border M&A activity and financial deepening’, *Journal of International Economics*, 65(1), 127–49.
- Djankov, S., R. La Porta, F. López-de-Silanes and A. Shleifer (2002). ‘The regulation of entry’, *Quarterly Journal of Economics*, 117, 1–37.
- Dreher, A. (2006). ‘Power to the people? The impact of decentralization on governance’, KOF Working Paper No. 121.
- Eaton, J. and M. Gersovitz (1983). ‘Country risk: Economic aspects’, in R.J. Herring (ed.), *Managing International Risk*, Cambridge University Press, Cambridge, 75–108.
- Ernst & Young (2002). ‘Worldwide corporate tax guide’, Ernst & Young.
- Fisman, R., and R. Gatti (2002). ‘Decentralization and corruption: Evidence across countries’, *Journal of Public Economics*, 83, 325–45.
- Hayek, F.A. (1939/1960). *The Constitution of Liberty*, University of Chicago Press, Chicago.
- Herger, N., C. Kotsogiannis and S. McCorriston (2005). ‘Cross border acquisitions and institutional quality’, *mimeo*, University of Exeter.
- Hindriks, J. and B. Lockwood (2005). ‘Fiscal centralization and electoral accountability’, University of Warwick, *mimeo*.
- Janeba, E. (2000). ‘Tax competition when governments lack commitment: Excess capacity as a countervailing threat’, *American Economic Review*, 90(5), 1508–19.
- Johnson, W.R. (1988). ‘Income redistribution in a federal system’, *American Economic Review*, 78(3), 570–73.
- Kaufman, D., A. Kraay and M. Mastruzzi (2005). *Governance Matters IV: Governance Indicators for 1996–2004*, World Bank, Washington.
- Keen, M.J. (1998). ‘Vertical tax externalities in the theory of fiscal federalism’, *IMF Staff Papers*, 45, 454–85.
- Keen, M.J. and C. Kotsogiannis (2002). ‘Does federalism lead to excessively high taxes?’, *American Economic Review*, 92(1), 363–70.
- (2003). ‘Leviathan and capital tax competition in federations’, *Journal of Public Economic Theory*, 5, 177–99.
- (2004). ‘Tax competition in federations and the welfare consequences of decentralization’, *Journal of Urban Economics*, 56, 397–407.
- Keen, M.J. and M. Marchand (1997). ‘Fiscal competition and the pattern of public spending’, *Journal of Public Economics*, 66(1), 33–53.
- Kehoe, P.J. (1989). ‘Policy cooperation among benevolent governments may be undesirable’, *Review of Economic Studies*, 56, 289–96.
- Kessing, S.G., K.A. Konrad and C. Kotsogiannis (2006a). ‘Federalism, weak institutions and the competition for foreign direct investment’, Social Science Research Centre, Berlin, *mimeo*.
- (2006b). ‘Federal tax autonomy and the limit of cooperation’, *Journal of Urban Economics*, 59, 317–29.
- Kessler, A., C. Lülfsmann and G. Myers (2005). ‘Federations, constitutions and bargaining’, *mimeo*.

- Konrad, K.A. and K.E. Lommerud (2001). 'Foreign direct investment, intra-firm trade and ownership structure', *European Economic Review*, 45(3), 475–94.
- Kydland, F.E. and E.C. Prescott (1980). 'Dynamic optimal taxation, rational expectations and optimal control', *Journal of Economic Dynamics and Control*, 2(1), 79–91.
- Markusen, J.R. (1997). 'Trade versus investment liberalization', National Bureau of Economic Research Working Paper 6231, Cambridge, MA.
- Markusen, J.R., A.J. Venables, D.E. Kohan and K.H. Zhang (1996). 'A unified treatment of horizontal direct investment, vertical direct investment, and the pattern of trade in goods and services', National Bureau of Economic Research Working Paper 5696, Cambridge, MA.
- Markusen, J.R. and K.E. Maskus (2002). 'Discriminating among alternative theories of the multinational enterprise', *Review of International Economics*, 10, 694–707.
- North, D.C. and B.R. Weingast (1989). 'Constitutions and commitment: The evolution of institutional governing public choice in seventeenth-century England', *Journal of Economic History*, 49, 803–32.
- Oates, W.E. (1972). *Fiscal Federalism*, Harcourt-Brace, New York.
- (1999). 'An essay on fiscal federalism', *Journal of Economic Literature*, 37, 1120–49.
- OECD (2002). *Fiscal Decentralization in EU Applicant States and Selected EU Member States*, Paris.
- Qian, Y. and B.R. Weingast (1997). 'Federalism as a commitment to preserving market incentives', *Journal of Economic Perspectives*, 11, 83–92.
- Riker, W.H. (1964). *Federalism: Origin, Operation and Significance*, Little, Brown and Company, Boston.
- Rossi, S. and P. Volpin (2004). 'Cross-country determinants of mergers and acquisitions', *Journal of Financial Economics*, 74(2), 277–304.
- Schnitzer, M. (1999). 'Expropriation and control rights: A dynamic model of foreign direct investment', *International Journal of Industrial Organization*, 17, 1113–37.
- Seabright, P. (1996). 'Accountability and decentralisation in government: An incomplete contracts model', *European Economic Review*, 40, 61–89.
- Shleifer, A. and R. Vishny (1993). 'Corruption', *Quarterly Journal of Economics*, 108(3), 599–617.
- Stegarescu, D. (2006). *Decentralised Government in an Integrating World*, Physica-Verlag, Heidelberg.
- Thomas, J. and T. Worrall (1994). 'Foreign direct investment and the risk of expropriation', *Review of Economic Studies*, 61, 81–108.
- Tiebout, C.M. (1956). 'A pure theory of local expenditures', *Journal of Political Economy*, 64, 416–24.
- Treisman, D. (1999a). 'Russia's tax crisis: explaining falling revenues in a transitional economy', *Economics and Politics*, 11, 145–69.
- (1999b). 'Political decentralization and economic reform: A game-theoretic analysis', *American Journal of Political Science*, 43, 488–517.
- (2000a). 'Decentralization and the quality of government', UCLA mimeo.
- (2000b). 'The causes of corruption: a cross-national study', *Journal of Public Economics*, 76, 399–457.
- (2003). 'Rotten boroughs', UCLA, mimeo.
- UNCTAD (2001) *World Investment Report 2000*. United Nations Conference on Trade and Development, Geneva.
- Wei, S.-J. (2000). 'How taxing is corruption on international investors?', *Review of Economics and Statistics*, 82(1), 1–11.
- Weingast, B.R. (1995). 'The economic role of political institutions: Market-preserving federalism and economic development', *Journal of Law, Economics and Organization*, 11, 1–31.
- Wildasin, D.E. (1989). 'Interjurisdictional capital mobility: Fiscal externality and a corrective subsidy', *Journal of Urban Economics*, 25, 193–212.
- World Bank (2004). 'A better investment climate for everyone', *World Development Report 2005*, World Bank and Oxford University Press.
- Wrede, M. (1996). 'Vertical and horizontal tax competition: Will uncoordinated *Leviathans* end up on the wrong side of the Laffer curve?', *FinanzArchiv*, 53, 461–79.
- (1997). 'Tax competition and federalism: The underprovision of local public goods', *FinanzArchiv*, 54, 494–515.
- (2000). 'Shared tax sources and public expenditures', *International Tax and Public Finance*, 7, 163–75.