

**Federalism and Foreign Direct  
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An Empirical Analysis**

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# Federalism and Foreign Direct Investment – An Empirical Analysis

## Abstract

Previous empirical studies suggest that decentralization, measured by the number of government layers, is associated with less foreign direct investment (FDI). With an improved dataset on tax autonomy of sub-federal government tiers, we present evidence that fiscal decentralization (*de facto*) does not reduce FDI. If local governments can set their tax rates and bases independently, they attract more FDI. Analyzing 83,458 corporate cross-border acquisitions (CBA), between 148 source and 187 host countries from 1997 to 2014, we also find that takeovers between two countries increase with size, cultural similarities and common borders of two economies. Shared institutions such as membership in a customs union facilitate CBA. These results apply for high-income hosts but not for middle-income countries.

JEL-Codes: G340, H250, H710.

Keywords: fiscal decentralization, cross-border acquisition (CBA), Foreign Direct Investment (FDI), tax autonomy.

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## 1. Introduction

The decision of investors to allocate capital in different jurisdictions is related to several economic and cultural traits that may dampen or promote investment. An interesting institutional question is whether federalism (fiscal decentralization) attracts or deters foreign direct investment (FDI). Theoretically, federalism may have each of both directions of influence. On the one hand, federalism might have a positive effect on FDI, if competition among autonomous sub-federal jurisdictions promotes opportunities for investors. With tax autonomy, sub-federal jurisdictions can credibly signal that taxes will not be raised *ex post* (after the investment has taken place), such that FDI will be higher the more autonomous the units are. On the other hand, federalism can have a detrimental effect on FDI, if a higher number of governments has access to the same tax base and cannot credibly commit to avoid increasing taxes *ex post*, such that a hold-up problem arises.

If, from a theoretical point of view, contradicting effects are conceivable, it is useful to analyze the impact of federalism on FDI empirically. However, there is no consensus on the economic effects of federalism on foreign direct investment in the empirical literature either. According to some empirical findings, competition between sub-federal jurisdictions within a country (horizontal dimension) attracts FDI (e.g., Jensen and McGillivray 2005), while a higher number of jurisdictions with which investors have to deal (vertical dimension) deters investments from abroad, a typical case of hold-up and common-pool problems (e.g., Kessing, Konrad and Kotsogiannis 2007).

Regarding the existing empirical research on the effect of federalism on FDI, it can be questioned as to how federalism is measured. Federalism has many different dimensions: legally as vertical division of powers, politically as a way to reconcile different interests, or economically with different instruments of fiscal federalism and fiscal decentralization. In this paper, we analyze the effects of fiscal decentralization on FDI by focusing on the degree of tax autonomy of sub-federal jurisdictions, i.e., their autonomy to set tax bases and tax rates.

Instead of simple capital flows, cross-border acquisitions (CBA) can be used to evaluate the impact of fiscal decentralization on the attractiveness of a jurisdiction for foreign capital. By employing an extensive dataset of cross-border acquisition (CBA) as the preferred measure of FDI flows between two countries in a given year, we provide evidence that a higher tax autonomy of sub-federal

jurisdictions attracts a higher number of CBAs, controlling for a set of FDI determinants that have already been studied in previous empirical works. Our dataset comprises 83,458 corporate cross-border acquisitions (CBA) between 148 source and 187 host countries from 1997 to 2014. We apply a negative binomial model for count data as the econometric approach using two main measures of fiscal decentralization: The number of different levels of government as a proxy for the vertical dimension of fiscal federalism and the degree of tax autonomy of sub-federal units.

According to our results, the higher the number of different levels of government, the lower the number of CBAs for both developed and emerging economies implying that federalism has a detrimental effect on FDI. However, when fiscal decentralization is measured as tax autonomy of sub-federal units, the effect is reversed: a higher degree of tax autonomy attracts more FDI. In quantitative terms, an additional tier of government in a high-income country is associated with roughly 0.85 less cross-border acquisitions. However, if we resort to the measure of tax autonomy of high-income hosts, a single standard deviation change in tax autonomy is associated with 1.2 more CBAs, and the observed effect for the number of sub-federal levels disappears.

The paper is organized as follows: Section 2 discusses the link between decentralization and FDI from a theoretical perspective, the empirical findings of the determinants of FDI are presented along with previous works that assess the effect of decentralization on FDI. Section 3 deals with the data and the econometric specifications. Section 4 presents and discusses the empirical results. Section 5 summarizes the findings.

## 2. Literature Review

We motivate our study with inconclusive theoretical considerations on the effects of fiscal federalism on FDI. This requires an understanding what fiscal federalism means. In line with Litvack and Seddon (1999), fiscal decentralization is "the transfer of authority and responsibility for public functions from the central government to subordinate or quasi-independent organizations or the private sector". According to Riker (1964), a political system is defined as federal when (i) a hierarchy of governments, that is, at least two tiers of government, rule the same country and people, each with a delineated scope of authority, so that each level of government is autonomous

in its own well-defined sphere of political authority; and (ii) the autonomy of each government is institutionalized in a manner that makes the restriction of federalism self-reinforcing.

Federalism comes with positive and negative effects for fiscal policy. On the one hand, decentralization can show its positive side, as more autonomous units provide public goods to the citizenry closer to their representatives (horizontal dimension). On the other hand, in its vertical dimension, the delegation of authority to subnational units can magnify the well-known time-inconsistency problem of taxation, i.e., the hold-up problem. Weingast (1995) puts this dilemma of federalism as follows: "A state strong enough to protect private markets is strong enough to confiscate the wealth of its citizens." Which effect dominates in the case of FDI, however, can only be resolved by empirical evidence.

In the following, both theoretical arguments of the effect of fiscal decentralization on FDI (positive in its horizontal dimension and negative in its vertical characteristics) are briefly presented. Furthermore, the empirical findings are discussed, which also include the determinants of FDI that must be considered when assessing the effect of fiscal decentralization on FDI.

## **2.1 Benefits of decentralization for FDI – horizontal dimension**

In general, a theoretical line of fiscal decentralization argues that shifting the provision of public goods to sub-federal jurisdictions is desirable, as decisions on public expenditure taken by levels of government closer to voters are more likely to correctly capture local demand. Hayek (1939, 1945) argues, e.g., that local governments have better information about local conditions and citizens' preferences than a central authority, such that better decisions are made. Moreover, following Tiebout (1956), competing sub-federal jurisdictions are able, through sorting and matching, to efficiently offer a variety of tax-expenditure combinations according to citizens' preferences.

Similar results obtain if citizens of neighboring jurisdictions compare the performance of their representatives within a framework of so-called "Yardstick Competition". Not to be forgotten is the shift of government accountability to local representatives. If political decision-makers follow their own selfish interests, tax competition between jurisdictions can lead to a stronger focus on voters – thus limiting taxing powers (Brennan and Buchanan 1977, 1980). Overall, factor mobility, the

absence of spillover effects and the lack of soft budget constraints (Oates, 2005) are the basis for competing sub-federal jurisdictions promoting welfare gains and limiting excessive taxation.

Regarding the effects of decentralization on FDI, it should be noted that the largest part of capital is location-specific and not geographically mobile. This is primarily the case for physical capital. The extent to which investors are able to respond to *ex post* changes in national policies and legislation in the host country depends primarily on the nature or, more specifically, the mobility of FDI.

The advantages generated by fiscal decentralization in the context of interregional competition for FDI might be insufficient in a particular environment of time-inconsistent tax policy. Starting with a staggered sequence of decisions by investors on their investments and by the government on the level (and objective) of taxation, the *ex ante* location decision by investors will allow public authorities to take any *ex post* decision on taxing their investment. The hold-up problem describes the risk of a foreign investor to be dependent on state charity in the absence of strong enforcement of legal contracts. Due to a lack of binding obligation, the public sector inevitably has the possibility to excessively increase taxes *ex post*. Investors who anticipate such behavior by the state reduce their investments or do not invest at all. The deterrent effect of excessive taxation leads to inefficient levels of investments.

Therefore, the question arises as to how political institutions should be designed in order to increase the credibility of the state in limiting its own discretionary powers in economic policy. The central components of a credible commitment (analogous to the idea of self-tied hands of Ulysses) must be formed by self-fulfilling characteristics, which align enforcement and self-interests of political decision-makers.

Kehoe (1989) offers a time-consistent solution regarding the taxation of capital gains. If investment owners can decide where to place their investments among multiple authorities with independent and non-cooperative tax regimes, governments will reduce their tax rates to equilibrium. In a decision-making environment with alternative investment opportunities, interstate tax competition partially operates as a credible commitment to a reliable tax policy. It is likely that such a mechanism within a federal state will work even more efficiently at the regional level. Kehoe's argument regarding competition is only partially applicable to solve the hold-up problem

of FDI, as this mechanism implies that investors can move their capital after governments have set their tax policies. This condition holds at best partly for FDI.

Schnitzer (1999) investigates investment decisions of multinational corporations (MNCs) with a focus on the relocation option. Especially when authorities of federal systems have such outside options, these alternatives have relevance. Insufficient attractiveness of outside options means a weak bargaining position of the investor. The host nation can afford higher taxation, so MNCs are expected to underinvest.

Doyle and van Wijnbergen (1994) model this problem as part of a sequential game, in which the negotiation between the foreign investor and the host country results in an equilibrium solution with a dynamic structure. If the investor is still granted tax reliefs even after the investment has been realized, the tax rate is gradually increased. This so-called "tax holiday" acts as an instrument to alleviate the hold-up problem.

Hence, in the absence of strong legal enforcement or political institutions aligned towards a time-consistent behavior by federal units, if FDI is not fully mobile, there is an incentive for tax increases *ex post* by all levels of government in a decentralized state. The more levels of government, the more this problem can arise, as the potential drawbacks of fiscal federalism (vertical dimension) play a role.

## **2.2 Drawbacks of decentralization for FDI – vertical dimension**

As Romano (1985) shows, the delegation of constitutional powers to self-contained sub-federal jurisdictions leads investors to be constantly exposed to the policies not only of the national government, but depending on how fiscal authority is delegated, of various governments. The multiple jurisdictions of several government tiers do not only cause a multiplication of governance problems between the host country and investors but may even lead to an intensification of the hold-up problem.

Unlike a unitary state, more financially autonomous governments in a federation have access to the same source of tax revenue (common pool problem), which might not be as mobile as suggested before. Their competition means that the respective tax base of one government level



depends on other levels (Keen, 1997). Thus, a vertical fiscal externality emerges and causes excessive taxation.

Since potential investors know this common pool problem *ex ante*, the attractiveness of a location falls in their eyes of investors with vertical disintegration (Keen und Kotsogiannis 2002, Kessing, Konrad und Kotsogiannis 2006, 2007). This common pool problem may act as a catalyst for the hold-up problem: The interaction between the two phenomena makes it more attractive, especially for countries with multi-level government, to institutionalize a coordinated tax policy.

Although countries cannot rely on credible commitments, investors and host countries remain free to enter into sustainable agreements. The motivation for the host country to conclude such implicit contracts is the future tax revenues from other investments – the extent to which such agreements are in fact sustainable is still debatable, especially related to FDI (Weingast 1995).

A criticism that speaks against the negative aspect of vertical fiscal federalism lies in the externalities: Besides the common pool problem, multiple responsibilities of federal structures lead to positive externalities in terms of subsidies. Take, as an example, a municipality that attracts investors with tax reductions and consequently benefits the state-level government as well as the federation. While the sub-federal jurisdiction bears the cost of subsidizing the investor alone, taxpayers' money also flows into the accounts of all people accessing the tax base in the upper levels of the federation.

This leads to free rider behavior at other levels of government, causing insufficient promotion of investment. Thus, with attractive offers for foreign companies such as the tax holidays discussed above, "bidding for firms" represents a way to mitigate the hold-up problem (Black and Hoyt 1989). However, the higher the number of government tiers, the less investors can expect a subsidy policy. Kessing, Konrad und Kotsogiannis (2007) thus argue that the free rider and the common pool problems reinforce each other because the benefits of winning an investment are underestimated from the perspective of any government unit, such that tax revenues for all other jurisdictions could be lower as a result of common excessive taxation.

The benefit of a tacit collusion at all levels of government is that taxpayers' money will be available in the long run. If the agreement on lower tax rates is not observed at the federal level, this will

lead to a decline in investment and tax revenues for all public actors in the future. There is an incentive for individual governments to renege on the agreement in order to generate higher tax revenues until others follow suit with higher tax rates. The trade-off between higher short-term revenues and long-term losses is decided between defection and cooperation.

According to Kessing, Konrad und Kotsogiannis (2006), vertically decentralized federalist systems favor defection of governments in two ways. First, with an increasing number of government tiers, the penalty in terms of tax losses fails in the long run. Second, a unilateral tax increase is more valuable the higher the number of levels of government.

### **2.3 Empirical findings**

Ultimately, FDI is determined by the establishment of credible institutions, alongside other economic traits that influence capital flows across countries. To this end, fiscal decentralization, in its horizontal dimension, is theoretically hypothesized to have positive effects on FDI and, in its vertical dimension, negative effects, also taking into account other determinants of FDI. In order to assess which dimension (horizontal or vertical) of fiscal decentralization/federalism dominates, one has to resort to empirical analysis.

Over time, the empirical literature on the effects of decentralization on FDI has jointly evolved with newly available datasets and recent developments in econometric techniques. By using a sample of 115 countries from 1975 to 1995, Jensen and McGillivray (2005) provide an empirical assessment of whether federalism – measured by a score ranging from 0 if a state is unitary to 2 if the state is a fully fledged federation – has an impact on attracting foreign investments. According to the main hypothesis of the study, federal states are able to build a self-reinforcing commitment mechanism that prevents a unit from deviating *ex post* from a contract (e.g., a greenfield investment project), if the reputation costs are given. Reputation costs are expected to limit the "misbehavior" of sub-federal unit's jurisdiction such that FDI can be attracted. Using an OLS approach with FDI flows measured year on year as a percentage of GDP and usual controls, the authors find a positive effect of federalism on FDI implying that a shift from a unitary to a federal system increases FDI by 0.6125 percent of GDP. This effect is more pronounced in autocracies – an observation closely related to the fact that democracies already have higher FDI flows.

In a more restricted sample comprising 60 countries within the same period, Jensen (2005) is unable to report an impact of fiscal federalism as measured by the percentage of total government revenue allocated to a country's state and local units. Again, FDI is measured as the change in FDI flows as a percentage of GDP. This evidence only tentatively suggests that federalism has a positive impact on FDI with no effect of fiscal decentralization on attracting foreign capital.

Kalamova and Kessing (2007) propose a disaggregation of characteristics of federalism to be analyzed into vertical and horizontal decentralization, the former measured as the number of administrative levels in a country (Tiers) and the latter as the average area attributed to a unit that belongs to the first administrative level (community, prefecture, county, etc.). Although the empirical analysis does not deal with FDI, but with trade, it is important to note the different implications of both traits of decentralization: The vertical dimension can increase the cost of internal transactions, thus making foreign goods relatively cheaper increasing international trade. The horizontal dimension makes economic agents subject to different jurisdictions with potentially diverse tax systems, regulations and infrastructures, thus restricting international trade. By using the gravity model (Anderson and van Wincoop, 2003) and a sample of 129 countries in the period from 1993 to 2000, Kalamova and Kessing (2007) provide evidence in support of those arguments.

Although the study is not directly linked to the effect of decentralization on FDI, it provides evidence that different characteristics of federalism can have different effects on economic outcomes: For instance, can horizontal decentralization promote FDI as a substitute for the curbing effect on international trade? Or can vertical decentralization restrain FDI as trade is already facilitated and there is no need to invest abroad to gain market access?

The empirical evidence of both dimensions of decentralization on FDI is assessed by Kessing, Konrad and Kotsogiannis (2007), although with slight changes in the measurement of the horizontal dimension as compared to Kalamova and Kessing (2007). In a sample of 67 source countries and 147 host nations joined together when a cross-border acquisition took place between two countries from 1997 to 2003, the authors use a negative binomial regression model (for count data) and the theoretical background of the Knowledge-Capital Model to evaluate whether FDI, measured by the number of cross-border transactions between a pair of countries, is affected by vertical decentralization, measured by the number of levels of government (Tiers),

and by horizontal decentralization – this time proxied by the share of both local and state revenue/expenditure in total government revenue/expenditure.

The main result – controlled for a rich set of covariates – points to the following: (i) vertical decentralization, as measured by the number of government tiers, has a negative impact on FDI; (ii) horizontal decentralization has a mixed effect on FDI, as expenditure decentralization is associated with more FDI, whereas revenue decentralization is correlated with less FDI between country pairs. Although the main result related to vertical decentralization does not survive the inclusion of property rights protection as control variable and is much more associated with European hosts of foreign investment, the remaining robustness tests build a somewhat solid evidence that the more layers a country holds in administrative terms, the less FDI it can attract, given that such subdivisions provide room for the hold-up problem previously discussed.

Kalamova (2008) continues the analysis of the impact of different traits of decentralization on FDI by estimating the effect of its vertical dimension. As the measure of vertical decentralization, the author uses the variables proposed by Stegarescu (2005), which take into account taxes on which sub-federal levels of government can autonomously decide. Additionally, the hypothesis is tested that decentralization together with a common pool problem represents the hold-up problem for investors. With a sample of OECD host countries from 1994 to 2005 (a total of 1,601 cross-country observations) and both a Tobit and a Maximum Likelihood estimate, Kalamova (2008) concludes that tax decentralization has a detrimental effect on the attractiveness of FDI – the more sub-federal levels of government can choose their own tax bases and tax rates, the less FDI will be observed. Curiously, expenditure decentralization (included as a control and constructed as a share of sub-federal expenditure to total government expenditure) also has a negative effect on FDI, contrary to the results by Kessing, Konrad and Kotsogiannis (2007).

Finally, Kalamova (2009) uses a sample of high-income country pairs (29 mainly European countries and 19 OECD hosts) over a period from 1994 to 2002, including more than a thousand observations, to analyze how both characteristics of decentralization affect FDI. The preferred measure of decentralization is the same as in Stegarescu (2005) taking into account the tax autonomy of sub-federal levels. Contrary to other empirical work, FDI is measured as a three-year average of the stock of investments in constant US dollars from source to host country. The results

estimated by the use of Tobit models point to a negative nonlinear effect of tax decentralization on FDI for high-income country pairs – an effect that loses some of its explanatory power if the specifications take into account the decentralization measure for expenditure.

In sum, empirical evidence suggests that federalism, and more specifically fiscal decentralization, can have a negative impact on FDI. It is remarkable that, using different measures of decentralization and of foreign investment flows as well as depending on the econometric specification, the results might differ and provide an inconclusive pattern. Therefore, any empirical assessment must put emphasis on the measure of foreign investment flows and the correct measurement of the characteristics of decentralization/federalism.

## 2.4 Hypotheses

Federalism in its vertical dimension can have a negative impact on attracting foreign direct investment and its effect might dominate the positive impact of the horizontal dimension. This relationship is the focus of our analysis, so the hypothesis reads as follows:

Hypothesis H<sub>1</sub>: An increase in the decentralization degree of an FDI host country reduces the amount of foreign direct investment.

In order to test H<sub>1</sub>, we resort to fiscal decentralization variables and to the *de jure* measure of government layers. We use both revenue and expenditure decentralization variables from the IMF's Global Fiscal Statistics (GFS) and the number of government levels (Tiers) taken from Kessing, Konrad and Kotsogiannis (2007) as updated and revised for changes that have occurred during the period of our dataset.

Based on theory, we expect less FDI where subnational tax revenues are higher, as the share of total tax revenue. However, we expect a positive relationship between FDI and the proportion of subnational government spending, as the share of total government expenditure. As Kessing, Konrad and Kotsogiannis (2007) suggest, despite being attracted by a higher provision of public goods at the local level, foreign investors are deterred by the expected higher taxation by subnational units and hence reduce capital allocation towards countries with more governmental layers. We examine these hypotheses in H<sub>1</sub> by using the number of government levels in a country (Tiers) as the *de jure* measure.

As mentioned, we propose a more meaningful variable to measure fiscal decentralization in its *de facto* trait: the power that sub-federal government levels have to establish their tax bases and rates (Tax Autonomy). And the more autonomous the subnational unit, the more it can by itself attract investments by credibly committing to maintain taxation *ex post*. Hence, the previous hypothesis can be modified as follows:

Hypothesis H<sub>2</sub>: Tax autonomy of sub-federal units increases the amount of foreign direct investment.

In order to test the hypothesis, we keep the same fiscal decentralization measures from the IMF (regarding revenues and expenditure at subnational levels), and use the *de facto* measure of tax autonomy, in addition to the *de jure* measure (Tiers).

We also expect a significant impact of demographic and geographical variables as well as of macro- and institutional economic variables on the basis of the empirical findings in the literature (Dellis, Sondermann and Vansteenkiste 2017, Erel, Liao and Weisbach 2012, Asiedu 2002). Geographical proximity, a common (official) language, customs unions and/or membership in free trade agreements and high market capitalization may exert a positive influence on the attractiveness of foreign direct investment. Increases in real exchange rates, the distance between the source and the host country of FDI and higher costs to start a business may have a negative impact on the attractiveness of foreign direct investment.

These control variables reflect the Knowledge-Capital Model by Markusen et al. (1996) and Carr, Markusen and Maskus (2001) as the standard model for studying FDI flows. The basic Knowledge-Capital Model employed to test the hypotheses explains FDI flows based on size and differences among economies, and it identifies several investment motives according to which individuals in multinational companies make their investment decisions. Some motives are related to geographical proximity, while others take into account differences between the source and host countries in their ability to produce goods more efficiently.

### 3. Data and Econometric Test Strategy

In order to assess whether federalism has a positive (horizontal dimension dominates) or a negative (vertical decentralization dominates) effect on the attractiveness of a country for foreign investment, we turn to an extensive dataset that comprises 18 years of cross-border acquisitions (CBA) among different combinations of source and host countries. In the following Section 3.1 we introduce the database and in Section 3.2 we present the econometric approach applied to test the hypotheses.

#### 3.1 The dataset

There are several popular databases that measure international capital flows. For this study, following the approaches of Erel, Liao and Weisbach (2012) and Kessing, Konrad and Kotsogiannis (2007), we use the "SDC Platinum" database from Thomson Reuters Financial.

The SDC database provides a total of 83,465 acquisitions of companies in which more than 50% of the shares of the firm were purchased by a new foreign owner. The variable covers 148 source countries and 187 host nations, what comprises a total of 17,295 pairs of countries across the period from 1997 to 2014 (number of observations).

The data were collected in February 2016 and comparisons with databases from UNCTAD or from Bloomberg have also been performed. Given that the number of observations in the "SDC Platinum" database is four times higher, it is the preferred dataset.

The dependent variable  $CBA_{ijt}$  is given in non-negative integers  $N = [1, 2, 3, 4, \dots, n]$ . If the variable  $CBA_{CHE,BEL,2004}$  assumes the number 4, it means that in 2004 there were four corporate acquisitions of Swiss companies by investors located in Belgium. Figure 1 (top left) provides an overview of the distribution of the number of CBAs and it displays that approximately 75% of all observations take the value 1, 2 or 3.

The variables that are also key to our study are presented in Figure 1 in addition to the dependent variable. First, and the focus of interest, is the variable *Tiers*, which represents the number of government layers in the host country. We took the variable from Kessing, Konrad and Kotsogiannis (2007) and updated it. In the appendix, the update and the underlying sources are described. In

the scatterplot CBA/Tiers (Figure 1, top right) it can be observed that there is only a small number of FDI host countries that have more than 4 government levels. The majority of observations lies between 2 and 4 governmental tiers.

To measure the degree of fiscal decentralization, we use data from the International Monetary Fund (IMF). They capture the share of sub-federal (municipal and provincial) government expenditure from total government spending and the share of sub-federal (municipal and provincial) government revenue from total revenue of all government levels. We expect an increase in the proportion of sub-federal government spending to total government spending to have a positive effect on a country's attractiveness for FDI. Due to the expected higher tax burden at the local level, one can speculate that a higher proportion of sub-federal government revenues will have a negative impact on the attractiveness for FDI.

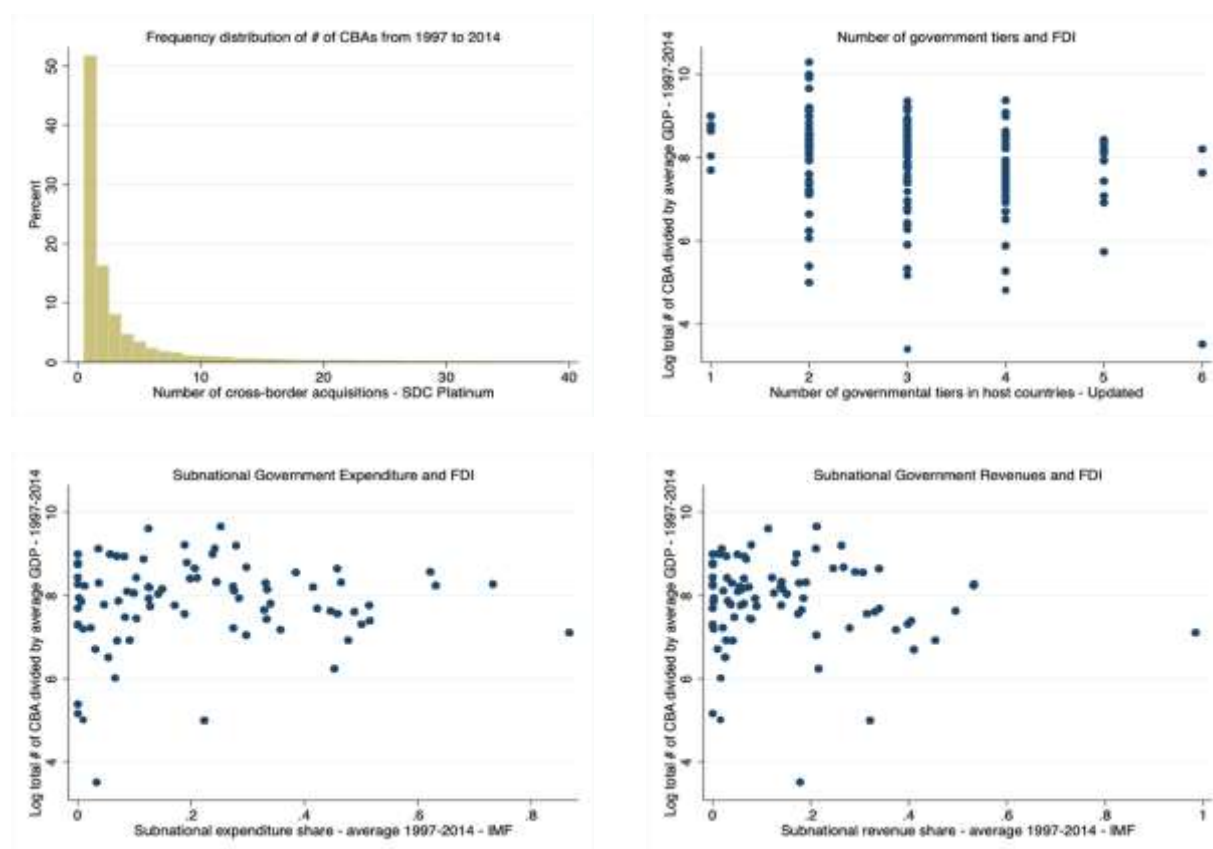


Figure 1: Distribution of the dependent variable (CBA) and decentralization measures

As the variable Tiers only measure the *de jure* characteristics of a decentralized government organization, a more meaningful variable that can identify the tax autonomy that sub-federal units



enjoy is necessary. Therefore, we resort to a variable previously proposed by Stegarescu (2005) and also used by Baskaran (2012). The variable called Tax Autonomy refers to the share of subnational total tax revenue controlled by subnational units, either when it sets the tax base, the tax rate, or both without resorting to central government. We construct the variable based on OECD classifications of subnational taxes as follows:

**Table 1: OECD's taxonomy of tax autonomy**

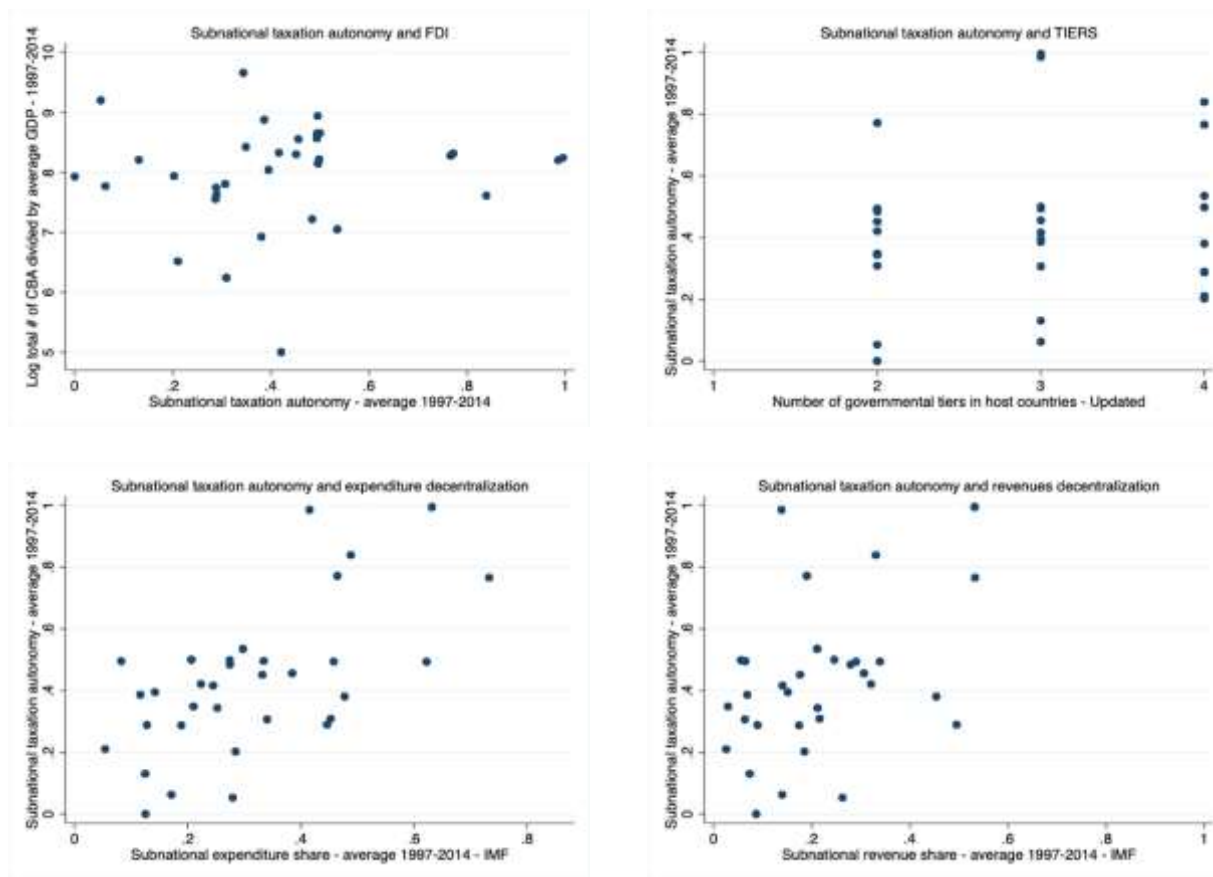
a.1	- The recipient SCG sets the tax rate and any tax reliefs without needing to consult a higher-level government.
a.2	- The recipient SCG sets the rate and any reliefs after consulting a higher-level government.
b.1	- The recipient SCG sets the tax rate, and a higher-level government does not set upper or lower limits on the rate chosen.
b.2	- The recipient SCG sets the tax rate, and a higher-level government sets upper and/or lower limits on the rate chosen.
c.1	- The recipient SCG sets tax reliefs – but it sets tax allowances only.
c.2	- The recipient SCG sets tax reliefs – but it sets tax credits only.
c.3	- The recipient SCG sets tax reliefs – and it sets both tax allowances and tax credits.
d.1	- There is a tax-sharing arrangement in which the SCGs determine the revenue split.
d.2	- There is a tax-sharing arrangement in which the revenue split can be changed only with the consent of SCGs.
d.3	- There is a tax-sharing arrangement in which the revenue split is determined in legislation and where it may be changed unilaterally by a higher-level government, but less frequently than once a year.
d.4	- There is a tax-sharing arrangement in which the revenue split is determined annually by a higher-level government.
e	- Other cases in which the central government sets the rate and base of the SCG tax.
f	- None of the above categories a, b, c, d or e applies.

As the data are already given as a percentage of total taxation and it is further split into state level and local levels, we define our Tax Autonomy variable as it follows:

$$(1) \text{ Tax Autonomy} = \frac{(\% \text{ of state level own tax revenues a. 1 to c. 3} + \% \text{ of local level own tax revenue a. 1 to c. 3})}{2}$$

Thus, our measure is an average of tax autonomy enjoyed by state and local levels in relation to their own tax revenues.

Below we plot the Tax Autonomy variable against the number of CBAs, the number of governmental levels (Tiers) and the fiscal decentralization variables:



**Figure 2: Tax Autonomy and CBA, Tiers and decentralization measures**

It is worth noting that within the same number of government levels (Tiers), Tax Autonomy can greatly vary, ranging from no autonomy in the case of a two-tier country to full control over tax base and rates in the case of a three-tier nation.

Also remarkable is the fact that within countries with the same number of government levels, Tax Autonomy can heavily vary, which indicates that simply accounting for Tiers may not truly capture how decentralized the power to tax can be in a federation. The relatively even distribution of Tax Autonomy for nations with four government levels also confirms the point.

In addition, to isolate the effects of decentralization on FDI, we employ a workhorse model to explain financial flows, and also control for characteristics that may play a role in attracting FDI, such as institutional traits (ease of doing business, property rights protection, World Governance Index score), legal framework that could facilitate business (free trade agreements, custom union membership) and previous FDI from a source country to a host nation. We further explain the

hypotheses tested along with the variables used in the following sections. All the variables are described in the Appendix (Table A.1).

### 3.2 The econometric model

In order to investigate the effects of fiscal decentralization on FDI, we define foreign-direct investments as  $CBA_{ijt}$ , the number of cross-border corporate acquisitions between a host country  $i$  and the source country  $j$ , over the period  $t$  and therefore look at a variety of events that may determine the number of cross-border acquisitions in a given year between the two countries, by resorting to the Knowledge-Capital Model.

Until the 1990s, there was still a two-tier model for the explanation of FDI (Horstmann and Markusen 1987). It was assumed that multinational companies produce their goods and services in many countries simultaneously using identical production processes. On top of that, it was assumed that companies only outsource parts of the value chain, so that different pre- or part-products are produced in different and specialized countries. This second explanation is where the different factor endowments between source and host countries are more prominent. According to this approach, FDI occurs mainly where low factor costs prevail.

Because of these central features, the Knowledge-Capital Model is the suitable theoretical model for our interest. The model allows us to assess the influence of decentralization on FDI, measured as cross-border acquisitions (CBA), taking into account other factors such as investment motives. The basic Knowledge-Capital Model employed here explains FDI flows based on size and differences among economies. Therefore, the main regressors are the sum of gross domestic product (GDP) of the source and host nations, the difference of GDP per capita of the source and the host countries (squared) and three interaction terms: INT 1, INT 2 and INT3.

INT 1 is the interaction term between the difference in per capita income multiplied by the difference in GDP of the source and host countries. We expect a negative coefficient as CBAs are lower when per capita income in the source country is higher than in the host country and at the same time the source country has a higher national income than the host country. This interaction term describes in particular FDI inflows from developing countries.

INT 2 is the interaction term between the difference in per capita income multiplied by the sum of GDP of source and host countries provided that per capita income in the source country is higher than in the host country. We expect a positive coefficient as CBAs rise when per capita income in the source country is higher than in the host country. This interaction term particularly describes FDI outflows from developed economies to so-called "emerging economies".

INT 3 is the interaction term between the difference in per capita income multiplied by the sum of GDP of source and host countries, provided that per capita income is higher in the host than in the source country. We expect a negative coefficient as CBAs fall when per capita income in the host country is higher than in the source country. This interaction term models, in particular, the FDI flows from "emerging economies" to developed ones.

Given these main features of the Knowledge-Capital Model, it can be appended with our variables of interest to estimate and isolate the effects of decentralization on FDI. In order to test our hypotheses  $H_1$  and  $H_2$ , we resort to the variables Tiers and Tax Autonomy, being the number of government levels and the autonomy that sub-federal units enjoy in setting their taxes, respectively. In testing both hypotheses, the model also contains other decentralization measures, such as the shares of spending and revenues at subnational levels.

The controls that may also explain the motives for FDI between two countries were derived from different sources: The distance between source and host, whether they share a common border and/or language, can be retrieved from Glick and Rose (2016). Membership of custom unions and/or free trade/services agreement was gathered from the World Trade Organization (WTO). The market capitalization of a host country as well as the real exchange rate and the ease of doing business in the host nation were obtained from different databases of the World Bank.

Finally, institutional controls can be used, such as the WGI score from the World Bank and the property rights protection index from the Heritage Foundation. In addition, some specifications may contain important regressors that help to explain FDI flows, such as the lagged dependent variable (in the sense that once FDI has occurred between two countries, it is easier to establish new transactions).

The data is available as integers and to perform a regression of such nature, we use a Count Data approach for a distribution that follows a negative binomial curve (Cameron and Trivedi 2013). In its simplest form, we assume that the distribution of CBAs between the source country  $j$  and the host country  $i$  in year  $t$  is subject to a process in which the variance and the mean are equally distributed. The variance here is larger than the mean. The model is specified as follows:

$$(2) E[CBA_{ijt}|x_{ijt}, d_{ijt}] = \exp(\text{controls}'_{ijt}\beta_1 + DEC'_{ijt}\beta_2 + d_{ijt}),$$

where  $CBA_{ijt}$  depends on the covariance vector  $x_{ijt}$  and the shift variable  $d_{ijt}$ . This process should be described by the control vector  $\text{controls}'_{ijt}$  and the decentralization variable  $DEC'_{ijt}$ , where  $\beta$  represents the parameters to be estimated.

In its simplest form, count-data models imply that the natural integers of the variable  $CBA_{ijt}$  follow a Poisson distribution with parameter  $\lambda_{ijt}$ . Formally, it can be written:

$$(3) f(CBA_{ijt}|x_{ijt}) = (e^{-\lambda})\lambda^{CBA_{ijt}} / CBA_{ijt}!, \text{ where } \lambda_{ijt} = \exp(x'_{ijt}\beta)$$

with the covariate vector  $x_{ijt}$ , such as  $\beta$  is the parameter to be estimated by the model.

We assume time-invariant effects for each calendar year of the study between 1997 and 2014. In addition, we cluster the standard errors between the country pairs, so that we approximate a "quasi-fixed effects" parameter estimate. We also control for population and for the area of the host country (squared and its inverse), the latter as a time-invariant characteristic (what rules out annexations of territories).

## 4. Results

In presenting the results of the regressions based on the Knowledge-Capital Model, the dependent variable is always the number of cross-border acquisitions (CBA) between a country pair in a given year. We also show several specifications that take into account different sets of controls and focus on the explanatory variables of interest: the decentralization measures.

In all tables, specification (1) to (5) control for the typical determinants of FDI according to the empirical literature. In specifications (6) to (10), new controls are added to take into account the income level of the host country, the lagged dependent variable (once FDI has occurred between

two countries, the doors are open and it is easier to reinvest), a World Governance Index score, and the protection of property rights in the host country. We also divide the sample into two subgroups of FDI hosts according to their income levels (high- and middle-income hosts) and finally present the results with the preferable *de facto* measure of fiscal decentralization (Tax Autonomy).

#### 4.1 The Benchmark Model

In the Benchmark Model, the whole sample for the period from 1997 to 2014 is used to estimate the general factors that determine FDI based on the Knowledge-Capital Model as appended by the fiscal decentralization measures and by our set of controls.

With regard to general factors, specifications (1) to (10) in Table 1 confirm the empirical evidence from previous studies. If the language of the host and source countries is identical, if they share a common border or when both are members of a customs union, more FDI will be observed. The greater the distance between two countries, the less cross-border acquisitions will occur. We also acknowledge the economic explanations for FDI derived from the Knowledge-Capital Model: the greater the sum of the GDP of the host and source countries, the higher the number of cross-border acquisitions.

Moreover, we confirm a significant impact of the differences in factor endowments: if per capita income in the host country is higher than in the source country (INT 3), there are significantly fewer corporate acquisitions. This effect is confirmed in all estimates as the squared national income difference (always a positive number) between source and host countries is negative and significant in all specifications. These findings lead to the conclusion that, in addition to the size effects, economic development is also decisive for the explanation of FDI flows.

In comparison to the estimates in Kessing, Konrad and Kotsogiannis (2007), we can only confirm statistical significance for the interaction term INT 1 in the less strict specifications (1, 2, 6 and 7). Moreover, the interaction term INT 2 is no longer significant in any specification, while the interaction term INT 3 remains significant.

In connection with H<sub>1</sub>, we review the two related hypotheses on the effect of fiscal decentralization on FDI: First, we expect less FDI, the higher local and subnational tax revenues (as a percentage of total tax revenues, i.e., Rev. Decent.). Second, we expect a positive relationship between FDI and

a high proportion of local and subnational government spending (Exp. Decent.). We test both hypotheses in the specifications (3), (4), (5), (8), (9) and (10) and find no significant evidence in all specifications, although the direction hypothesized by economic theory is the one expected.

**Table 2: Full sample of hosts. Dependent variable: CBA**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Tiers		-0.136*** (0.047)		-0.230*** (0.068)			-0.132** (0.052)		-0.185*** (0.072)	
Exp. Decent.			0.488 (0.374)	0.295 (0.375)	0.322 (0.349)			0.385 (0.312)	0.292 (0.316)	0.275 (0.307)
Rev. Decent.			-0.526 (0.354)	-0.225 (0.364)	-0.357 (0.349)			-0.454 (0.291)	-0.233 (0.304)	-0.324 (0.286)
Tiers*Pop.					-0.854 (0.746)					-0.762 (0.575)
$\Sigma$ GDP <sub>ij</sub>	0.403*** (0.022)	0.413*** (0.022)	0.396*** (0.028)	0.402*** (0.027)	0.398*** (0.028)	0.221*** (0.034)	0.235*** (0.037)	0.214*** (0.039)	0.222*** (0.041)	0.215*** (0.039)
$\Delta$ GDP <sub>ij</sub> <sup>2</sup>	-0.016*** (0.002)	-0.017*** (0.002)	-0.015*** (0.003)	-0.016*** (0.003)	-0.015*** (0.003)	-0.009*** (0.002)	-0.010*** (0.002)	-0.008*** (0.002)	-0.008*** (0.002)	-0.008*** (0.002)
INT 1	-0.002** (0.001)	-0.002* (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001* (0.001)	-0.001* (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
INT 2	-0.001 (0.001)	-0.001 (0.001)	-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.001)	0.000 (0.001)	0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)
INT 3	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)
Distance	-0.081*** (0.018)	-0.083*** (0.018)	-0.088*** (0.019)	-0.090*** (0.019)	-0.088*** (0.019)	-0.057*** (0.015)	-0.059*** (0.015)	-0.061*** (0.016)	-0.063*** (0.016)	-0.061*** (0.016)
Com. Border	0.528*** (0.111)	0.528*** (0.112)	0.556*** (0.119)	0.546*** (0.119)	0.552*** (0.119)	0.348*** (0.094)	0.349*** (0.096)	0.395*** (0.100)	0.388*** (0.101)	0.392*** (0.100)
Com. Language	0.557*** (0.096)	0.579*** (0.096)	0.580*** (0.114)	0.609*** (0.116)	0.596*** (0.113)	0.360*** (0.084)	0.376*** (0.086)	0.372*** (0.091)	0.394*** (0.095)	0.384*** (0.091)
Market Cap.	0.067*** (0.017)	0.067*** (0.017)	0.055*** (0.017)	0.054*** (0.017)	0.054*** (0.017)	0.043*** (0.014)	0.045*** (0.013)	0.039*** (0.014)	0.038*** (0.013)	0.038*** (0.014)
REER	0.005*** (0.001)	0.009*** (0.002)	0.004** (0.002)	0.010*** (0.002)	0.005*** (0.002)	0.003** (0.001)	0.006*** (0.002)	0.000 (0.002)	0.006*** (0.002)	0.002 (0.001)
Inflation	0.456 (1.121)	0.155 (1.107)	1.270 (1.586)	0.746 (1.478)	1.296 (1.558)	0.721 (0.929)	0.276 (0.905)	1.865 (1.237)	1.291 (1.184)	1.883 (1.217)
Free Trade	0.112 (0.122)	0.101 (0.120)	0.120 (0.134)	0.127 (0.134)	0.118 (0.135)	0.049 (0.102)	0.048 (0.101)	0.064 (0.110)	0.071 (0.110)	0.066 (0.109)
Free Services	0.313* (0.172)	0.301* (0.173)	0.347* (0.188)	0.337* (0.190)	0.342* (0.192)	0.112 (0.132)	0.102 (0.133)	0.151 (0.146)	0.141 (0.148)	0.142 (0.148)
Custom Union	0.256** (0.104)	0.250** (0.104)	0.264** (0.105)	0.269*** (0.104)	0.257** (0.106)	0.206** (0.095)	0.204** (0.094)	0.223** (0.098)	0.222** (0.098)	0.212** (0.098)
Costs	-0.480*** (0.128)	-0.637*** (0.205)	-1.741*** (0.546)	-1.105** (0.548)	-1.686*** (0.543)	-0.454** (0.183)	-0.428* (0.230)	-0.415 (0.551)	0.033 (0.514)	-0.344 (0.543)
Time	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.003* (0.002)	0.003* (0.002)	0.002 (0.001)	0.002* (0.001)	0.002 (0.001)	0.002* (0.001)	0.002* (0.001)
Procedures	-0.046*** (0.013)	-0.031* (0.016)	-0.022 (0.017)	-0.022 (0.018)	-0.024 (0.017)	-0.032*** (0.011)	-0.024** (0.012)	-0.031** (0.013)	-0.030** (0.014)	-0.029** (0.014)
GDP per capita						0.004 (0.003)	0.003 (0.003)	0.004 (0.004)	0.002 (0.004)	0.003 (0.004)
Nr CBA (t-1)						0.032** (0.014)	0.032** (0.014)	0.032** (0.014)	0.031** (0.014)	0.032** (0.014)
WGI Score						-0.140 (0.112)	-0.159 (0.118)	-0.229 (0.157)	-0.178 (0.153)	-0.151 (0.154)
Property Rights						0.175** (0.071)	0.194*** (0.074)	0.238*** (0.087)	0.224*** (0.087)	0.202** (0.087)
Pop. controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Area controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Adj. Deviance R <sup>2</sup>	0.6902	0.6940	0.6847	0.6902	0.6856	0.7360	0.7381	0.7271	0.7301	0.7275
N	5,845	5,821	4,738	4,737	4,737	4,725	4,721	3,928	3,928	3,928
# of CBA	32,462	32,435	27,728	27,727	27,727	30,941	30,937	26,615	26,615	26,615

Panel estimates (1997-2014). Dependent variable is number of yearly CBA for source-host country pairs from SDC Platinum. These include 148 different source countries and 187 different host countries. Standard errors are clustered by country pair. All estimations include year dummies and p-values are denoted as follows: \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

Additionally, our main variable of interest at the moment (Tiers) has a statistically significant negative effect, meaning that the more government layers, the less FDI a host nation will attract – this confirms the previous findings that the vertical dimension trumps the horizontal dimension of decentralization by curbing investments. This finding is also present in Kessing, Konrad and Kotsogiannis (2007) and so the evidence survives to our extended dataset.

In the specifications (6) to (10) we control for institutional characteristics of host countries (measured both by the WGI Score – an average of the normalized World Governance Index – and by the property rights index) and include the (log of) GDP per capita and the lagged dependent variable (it does not imply there was a CBA in a certain country pair in the previous year, but in any previous period) and repeat the test sequence as in (1) to (5). Only the lagged dependent variable and the protection of property rights are consistently and positively significant across specifications, which confirms our point that once FDI has occurred between two countries, it is easier to repeat the move and that investors seek jurisdictions less prone to expropriation.

Although we control for institutional characteristics of the host country, the impact of the Tiers variable, to which we devote our attention as a measure of federalism, remains robust, even with the timely extension of the dataset and the the inclusion of additional controls. In quantitative terms, adding one more layer of government can reduce the number of CBAs by almost 1 unit per year (ranging from -0.7942 in specification 4 to -0.8766 in specification 7) to a host nation. The effect of a standard deviation change in Tiers is roughly the same – from 0.8250 to 0.8938 less CBA.

This latter effect is important to be stressed because the average Tiers of the sample lies around 3.15 with a standard deviation of approximately 0.85. That is, moving from the average to 4 tiers would decrease the number of CBAs observed by 1 unit on average a year for a given host. Hence, the results suggest that countries with less government layers would be better off in attracting FDI than its counterparts with a more decentralized framework.

Even though we control for the income of the FDI hosts in some specifications, there are still great differences between them that can drive the results for the full sample. Hence, in order to assess possibly different effects depending on income levels, the FDI host countries are classified according to their income group as defined by the World Bank and the samples are examined separately. In econometric terms, this division is useful: data availability for the group of high-



income countries, in particular in terms of institutional and fiscal decentralization variables, is higher than for middle-income hosts.

## 4.2 High-income hosts

For the high-income hosts subset, there are 9,933 observations (pairs of source and host with at least one CBA in the period, or approximately 57,5% of the sample and which make up 65,372 CBAs, or about 78,3% of the total number of acquisitions in the database. It is worth noting that the sample is restricted to FDI hosts based on their income. An acquisition of a German company by a South African enterprise is still part of the subsample, as the interest is how fiscal decentralization in host nations affects FDI. Based on the Knowledge-Capital Model we test whether fiscal decentralization affects FDI for the subsample as shown below.

While we have seen a significantly negative impact of the number of Tiers on FDI for the full sample, this effect tends to remain with a similar economic impact – one more government layer is associated with roughly 0.86 less CBA per year for the high-income hosts (ranging from -0.8596 in specification 7 to -0.8687 in specification 4).

The results can also be interpreted in the following manner: moving one standard deviation (approximately 0.9) from the average number of Tiers (around 3.15) to the next subdivision (of 4 layers) would decrease the number of CBAs by 0.88 per year for a given host. The evidence found in the whole sample is thus confirmed in the subset of high-income hosts: size effects (as measured by the sum of the GDP of source and host countries) and differences in factor endowments retain their significance with the expected sign.

With regard to the hypotheses of the effect of fiscal decentralization on the attractiveness of FDI ( $H_1$ ), the high-income subsample offers some empirical evidence to the theory for Revenue Decentralization: we find a negative coefficient of revenue decentralization in all but one specification (without Tiers in the less strict specification). Even if we control for institutional variables, a more decentralized revenue collection is linked to less FDI in high-income hosts.

The empirical evidence suggests that the effect of a negative relationship between decentralization (as measured by the number of government layers) and FDI is still present for high-income hosts. So far, a more decentralized state holds up FDI as measured by the variables at hand.

Table 3: High-income hosts. Dependent variable: CBA

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Tiers		-0.141* (0.078)		-0.147* (0.088)			-0.151* (0.078)		-0.150* (0.087)	
Exp. Decent.			0.637 (0.517)	0.560 (0.517)	0.703 (0.438)			0.628 (0.473)	0.602 (0.477)	0.549 (0.453)
Rev. Decent.			-0.901** (0.457)	-0.708 (0.449)	-0.981** (0.425)			-0.863** (0.356)	-0.705** (0.356)	-0.774** (0.345)
Tiers*Pop.					0.306 (1.058)					-0.407 (0.890)
$\Sigma$ GDPij	0.414*** (0.026)	0.414*** (0.026)	0.421*** (0.029)	0.422*** (0.028)	0.421*** (0.029)	0.247*** (0.041)	0.250*** (0.042)	0.251*** (0.044)	0.255*** (0.045)	0.252*** (0.044)
$\Delta$ GDPij <sup>2</sup>	-0.017*** (0.002)	-0.017*** (0.002)	-0.018*** (0.003)	-0.018*** (0.003)	-0.018*** (0.003)	-0.010*** (0.002)	-0.010*** (0.002)	-0.010*** (0.003)	-0.010*** (0.003)	-0.010*** (0.003)
INT 1	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
INT 2	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)
INT 3	-0.004*** (0.001)	-0.004*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)
Distance	-0.079*** (0.021)	-0.081*** (0.020)	-0.077*** (0.021)	-0.078*** (0.021)	-0.077*** (0.021)	-0.055*** (0.019)	-0.057*** (0.018)	-0.054*** (0.019)	-0.055*** (0.019)	-0.053*** (0.019)
Com. Border	0.557*** (0.130)	0.562*** (0.131)	0.606*** (0.138)	0.600*** (0.138)	0.607*** (0.137)	0.392*** (0.111)	0.395*** (0.113)	0.450*** (0.115)	0.444*** (0.116)	0.449*** (0.115)
Com. Language	0.639*** (0.120)	0.640*** (0.122)	0.620*** (0.130)	0.630*** (0.132)	0.617*** (0.125)	0.451*** (0.105)	0.455*** (0.107)	0.435*** (0.109)	0.446*** (0.112)	0.439*** (0.108)
Market Cap.	0.060*** (0.016)	0.059*** (0.015)	0.063*** (0.017)	0.062*** (0.017)	0.063*** (0.018)	0.048*** (0.015)	0.047*** (0.014)	0.049*** (0.015)	0.048*** (0.014)	0.048*** (0.015)
REER	0.004*** (0.002)	0.007*** (0.002)	0.002 (0.002)	0.006*** (0.002)	0.002 (0.002)	0.002 (0.002)	0.006** (0.002)	0.001 (0.002)	0.005** (0.003)	0.002 (0.002)
Inflation	0.201 (0.958)	-0.693 (1.019)	0.792 (1.673)	0.509 (1.684)	0.719 (1.632)	-0.132 (0.979)	-1.212 (0.914)	-0.615 (1.587)	-1.125 (1.525)	-0.601 (1.590)
Free Trade	0.193 (0.150)	0.192 (0.149)	0.237 (0.161)	0.227 (0.162)	0.240 (0.162)	0.146 (0.127)	0.154 (0.127)	0.186 (0.135)	0.188 (0.135)	0.189 (0.135)
Free Services	0.318 (0.206)	0.305 (0.211)	0.320 (0.223)	0.315 (0.227)	0.320 (0.221)	0.129 (0.168)	0.110 (0.171)	0.135 (0.180)	0.123 (0.182)	0.130 (0.182)
Custom Union	0.382*** (0.116)	0.379*** (0.115)	0.395*** (0.122)	0.390*** (0.121)	0.396*** (0.122)	0.345*** (0.119)	0.342*** (0.118)	0.350*** (0.126)	0.346*** (0.126)	0.348*** (0.126)
Costs	-1.397** (0.621)	-1.184* (0.620)	-1.779** (0.715)	-1.437** (0.721)	-1.805** (0.711)	0.177 (0.658)	0.379 (0.650)	-0.018 (0.840)	0.360 (0.838)	0.106 (0.815)
Time	0.003 (0.002)	0.004** (0.002)	0.004* (0.002)	0.004** (0.002)	0.003* (0.002)	0.003 (0.002)	0.004** (0.002)	0.003* (0.002)	0.004** (0.002)	0.003** (0.002)
Procedures	-0.043** (0.017)	-0.041** (0.018)	-0.027 (0.020)	-0.029 (0.019)	-0.026 (0.018)	-0.042*** (0.016)	-0.040** (0.016)	-0.035** (0.018)	-0.037** (0.018)	-0.036** (0.017)
GDP per capita						0.001 (0.004)	-0.001 (0.004)	-0.001 (0.004)	-0.003 (0.004)	-0.002 (0.004)
Nr CBA (t-1)						0.027* (0.014)	0.026* (0.014)	0.026* (0.014)	0.026* (0.014)	0.026* (0.014)
WGI Score						0.043 (0.145)	0.074 (0.147)	0.045 (0.193)	0.093 (0.200)	0.100 (0.211)
Property Rights						0.122 (0.099)	0.110 (0.099)	0.124 (0.109)	0.114 (0.110)	0.108 (0.115)
Pop. controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Area controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Adj. Deviance R <sup>2</sup>	0.7016	0.7035	0.7025	0.7042	0.7024	0.7356	0.7376	0.7337	0.7353	0.7336
N	4,292	4,292	3,716	3,716	3,716	3,587	3,587	3,136	3,136	3,136
# of CBA	29,091	29,091	25,409	25,409	25,409	28,105	28,105	24,609	24,609	24,609

Panel estimates (1997-2014). Dependent variable is number of yearly CBA for source-host country pairs from SDC Platinum. These include 138 different source countries and 65 different host countries. Standard errors are clustered by country pair. All estimations include year dummies and p-values are denoted as follows: \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

### 4.3 Middle-income hosts

In the subsample of middle-income countries (that includes upper-middle and lower-middle income) as FDI hosts, there are 6,510 pairs over the entire period (approximately 37,6% of

observations), that comprises 16,747 CBAs, or 20,0% of acquisitions in the whole sample. The results based on the Knowledge-Capital Model for the subsample are below:

**Table 4: Middle-income hosts. Dependent variable: CBA**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Tiers		-0.147** (0.066)		-0.318*** (0.120)			-0.128** (0.063)		-0.247* (0.139)	
Exp. Decent.			0.515 (0.540)	-0.109 (0.605)	0.456 (0.523)			0.723 (0.539)	0.458 (0.579)	0.552 (0.554)
Rev. Decent.			2.166*** (0.795)	1.927** (0.758)	1.738** (0.801)			1.374* (0.728)	0.953 (0.733)	1.213* (0.731)
Tiers*Pop.					-1.893** (0.798)					-1.669 (1.042)
$\sum$ GDPij	0.246*** (0.066)	0.259*** (0.063)	0.182** (0.077)	0.186** (0.076)	0.173** (0.077)	0.119** (0.057)	0.123** (0.056)	0.109* (0.057)	0.113** (0.057)	0.113** (0.057)
$\Delta$ GDPij <sup>2</sup>	-0.003 (0.004)	-0.004 (0.004)	-0.003 (0.006)	-0.003 (0.006)	-0.003 (0.006)	-0.002 (0.003)	-0.002 (0.003)	-0.001 (0.004)	-0.001 (0.004)	-0.001 (0.004)
INT 1	-0.005*** (0.002)	-0.005*** (0.002)	-0.017*** (0.006)	-0.017*** (0.006)	-0.016*** (0.006)	-0.002* (0.001)	-0.002* (0.001)	-0.005 (0.005)	-0.005 (0.005)	-0.005 (0.005)
INT 2	0.002 (0.002)	0.002 (0.001)	0.015*** (0.006)	0.015*** (0.006)	0.014*** (0.006)	0.001 (0.001)	0.001 (0.001)	0.003 (0.005)	0.003 (0.005)	0.003 (0.005)
INT 3	-0.070*** (0.019)	-0.070*** (0.019)	-0.057*** (0.021)	-0.059*** (0.020)	-0.058*** (0.020)	-0.072*** (0.018)	-0.069*** (0.017)	-0.061** (0.024)	-0.059** (0.023)	-0.060** (0.023)
Distance	-0.064*** (0.025)	-0.068*** (0.025)	-0.069*** (0.024)	-0.074*** (0.024)	-0.070*** (0.024)	-0.018 (0.017)	-0.019 (0.017)	-0.031 (0.020)	-0.033* (0.020)	-0.032 (0.020)
Com. Border	0.241 (0.184)	0.246 (0.181)	0.168 (0.234)	0.172 (0.230)	0.145 (0.233)	-0.013 (0.139)	-0.014 (0.137)	0.101 (0.137)	0.108 (0.136)	0.091 (0.133)
Com. Language	0.136 (0.149)	0.196 (0.148)	0.213 (0.174)	0.258 (0.175)	0.268 (0.175)	0.054 (0.107)	0.102 (0.109)	0.061 (0.125)	0.113 (0.129)	0.109 (0.125)
Market Cap.	0.096** (0.046)	0.098** (0.047)	-0.036 (0.035)	-0.030 (0.034)	-0.037 (0.036)	-0.087* (0.050)	-0.083* (0.049)	-0.006 (0.026)	-0.003 (0.027)	-0.006 (0.027)
REER	0.004*** (0.001)	0.009*** (0.002)	0.002 (0.002)	0.006** (0.003)	0.003 (0.003)	0.004** (0.002)	0.007*** (0.002)	0.004 (0.003)	0.007** (0.004)	0.006* (0.003)
Inflation	0.551 (0.774)	0.423 (0.752)	-0.171 (0.665)	-0.175 (0.641)	0.052 (0.635)	0.339 (0.654)	0.231 (0.648)	-0.319 (0.848)	-0.299 (0.831)	-0.112 (0.790)
Free Trade	-0.107 (0.206)	-0.060 (0.203)	-0.064 (0.198)	-0.020 (0.197)	-0.053 (0.197)	-0.149 (0.168)	-0.108 (0.168)	-0.096 (0.159)	-0.051 (0.159)	-0.071 (0.157)
Free Services	0.310 (0.210)	0.278 (0.211)	0.307 (0.212)	0.181 (0.215)	0.236 (0.204)	0.139 (0.170)	0.131 (0.171)	0.320* (0.173)	0.272* (0.164)	0.265* (0.160)
Custom Union	0.038 (0.123)	0.011 (0.125)	-0.069 (0.109)	-0.039 (0.107)	-0.105 (0.115)	-0.043 (0.082)	-0.062 (0.082)	-0.037 (0.083)	-0.024 (0.084)	-0.050 (0.085)
Costs	-0.525*** (0.192)	-0.523*** (0.192)	-1.518* (0.870)	-0.295 (0.704)	-1.099 (0.832)	-0.314* (0.187)	-0.335* (0.199)	-0.478 (0.621)	0.144 (0.658)	-0.145 (0.622)
Time	0.002 (0.002)	0.003 (0.002)	0.005 (0.004)	0.006 (0.004)	0.006 (0.004)	-0.000 (0.002)	0.000 (0.002)	-0.003 (0.003)	-0.000 (0.002)	-0.000 (0.002)
Procedures	-0.016 (0.013)	-0.004 (0.015)	-0.017 (0.015)	-0.004 (0.015)	-0.001 (0.015)	-0.013 (0.011)	-0.008 (0.012)	-0.011 (0.014)	-0.005 (0.014)	-0.001 (0.015)
GDP per capita						0.019 (0.014)	0.033*** (0.013)	-0.027 (0.029)	-0.003 (0.024)	-0.028 (0.028)
Nr CBA (t-1)						0.074*** (0.014)	0.073*** (0.013)	0.094*** (0.015)	0.092*** (0.014)	0.093*** (0.015)
WGI Score						-0.046 (0.116)	-0.192* (0.115)	0.239 (0.218)	-0.065 (0.202)	0.253 (0.218)
Property Rights						0.111 (0.081)	0.147* (0.080)	0.043 (0.106)	0.088 (0.103)	-0.014 (0.113)
Pop. controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Area controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Adj. Deviance R <sup>2</sup>	0.3601	0.3723	0.2680	0.2825	0.2764	0.5672	0.5707	0.4725	0.4761	0.4767
N	1,471	1,459	1,020	1,019	1,019	1,099	1,097	792	792	792
# of CBA	3,277	3,262	2,317	2,316	2,316	2,788	2,786	2,006	2,006	2,006

Panel estimates (1997-2014). Dependent variable is number of yearly CBA for source-host country pairs from SDC Platinum. These include 126 different source countries and 119 different host countries. Standard errors are clustered by country pair. All estimations include year dummies and p-values are denoted as follows: \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

The panel estimates of middle-income FDI hosts show a negative and significant coefficient of the Tiers variable in every specification, as in the whole sample and in the high-income subset, what confirms the evidence that the vertical dimension of decentralization overwrites any possible

effect of the horizontal dimension and hence less FDI will occur in more decentralized states. In columns (2) and (4) we find evidence of this effect at the highest level of significance – if we do not control for institutional traits.

The magnitude of the effect is basically similar to the ones observed for the full sample and for the high-income hosts. An extra governmental layer for the middle-income hosts can reduce the number of CBAs from -0.7279 (specification 4) to -0.8797 (specification 7). In other words, moving one standard deviation (of around 0.6) from the average number of Tiers (of approximately 3.2) would reduce the number of CBAs by almost one cross-border acquisition (from -0.8447 to -0.9254) for a given host nation.

Therefore, the evidence found on the negative impact of fiscal decentralization (as measured by the number of Tiers) does not rely on a subsample of countries and is consistent for hosts of different income levels. However, contrary to the expectations of the hypothesis H<sub>1</sub> confirmed in the high-income sample, a positive coefficient for the revenue decentralization can be observed. The concentration of revenues at local or subnational levels of government leads to a significantly higher number of transnational corporate acquisitions in middle-income countries.

#### **4.4 Filling the gap: tax autonomy and corporate tax differential**

So far, the decentralization measures, either Tiers or the fiscal variables capture traits of decentralization. Although they actually measure some characteristics of federalism and fiscal decentralization, they do not truly reflect the autonomy that regional and local authorities have in setting their taxes. In sum, they do not measure whether taxation is *de facto* controlled by sub-federal levels in terms of freely choosing the tax base and its rate.

Fundamentally, this is the problem that can arise to affect FDI attractiveness – whether local authorities can increase taxes *ex post*. Such movement depends on the control local governments have on their tax policy and it is not correctly measured simply by the number of layers (control on taxes can remain at national level) or by revenue/expenditure proportions (still, revenues can come from transfers from national level or expenditure can be earmarked).

A more meaningful variable that can correctly represent the tax autonomy of sub-federal layers would ideally measure whether lower government levels are free to increase and decrease their

tax base and their tax rates without resorting to central government. To capture the tax autonomy of sub-federal units properly, we turn to our variable called Tax Autonomy that refers to the proportion of sub-federal tax revenue controlled by the subnational unit itself, either when it sets the tax base, the tax rate, or both. Disaggregated data for sub-federal tax autonomy are available for the years 1995, 2002, 2005, 2008, 2011 and 2014. For the years in which the data are not published by the OECD, a simple interpolation method to fill the blanks has been applied.

As related to hypothesis H<sub>2</sub>, one might expect that a positive effect will arise from Tax Autonomy to FDI, given that local units can credibly commit not to increase taxes *ex post*, as they control their tax base and rates the more autonomous they are. Hence, given the sample at hand and the institutional controls that already capture credibility, we expect a positive coefficient of Tax Autonomy, meaning the competition among units to attract investments dominates and the hold-up problem is eliminated.

In addition to tax autonomy of subnational levels, from a theoretical perspective corporate tax can have an effect on a country's attractiveness for FDI, especially if it varies at local or sub-federal levels. Such a variable, if set in relation to the total aggregated corporate taxes of any country and interacted with the number of government levels, would be a suitable way to meaningfully measure the strength of decentralization effects on FDI. However, data is available only on aggregated corporate tax rates for OECD countries. Nevertheless, corporate taxes can be used to attract FDI, and a corporate tax differential variable can be created to assess whether investors also seek investments in countries where income tax is lower. As compared to their national counterparts.

If the corporate tax rates in the source country are higher than in the host nation (i.e.,  $\Delta Corp. Tax_{ji} > 0$ ), we expect a positive and significant impact on the number of cross-border acquisitions.

These new variables are only available for OECD members. Thus, we empirically test their effect on FDI for high-income hosts (this rules out OECD members such as Mexico and Chile). We first test the Tax Autonomy variable alone and then add as a new regressor the corporate tax differential and an interaction term of these variables.

Table 5: OECD high-income hosts. Dependent variable: CBA; control: Tax Autonomy

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Tax Autonomy	0.640*** (0.161)	0.646*** (0.170)	0.620*** (0.231)	0.645*** (0.222)	0.578*** (0.212)	0.656*** (0.180)	0.706*** (0.191)	0.694*** (0.242)	0.781*** (0.246)	0.843*** (0.230)
Tiers		-0.012 (0.099)		-0.034 (0.097)			-0.067 (0.083)		-0.096 (0.083)	
Exp. Decent.			0.534 (0.604)	0.495 (0.563)	0.670 (0.478)			0.449 (0.582)	0.347 (0.568)	0.126 (0.526)
Rev. Decent.			-0.592 (0.472)	-0.560 (0.450)	-0.724* (0.406)			-0.630 (0.391)	-0.549 (0.380)	-0.389 (0.363)
Tiers*Pop.					0.578 (1.047)					-1.243 (0.859)
∑GDPij	0.430*** (0.025)	0.430*** (0.025)	0.438*** (0.027)	0.438*** (0.027)	0.437*** (0.027)	0.303*** (0.043)	0.304*** (0.043)	0.307*** (0.046)	0.308*** (0.047)	0.310*** (0.047)
Δ GDPij <sup>2</sup>	-0.018*** (0.002)	-0.018*** (0.002)	-0.019*** (0.002)	-0.019*** (0.002)	-0.019*** (0.002)	-0.012*** (0.003)	-0.012*** (0.003)	-0.013*** (0.003)	-0.013*** (0.003)	-0.013*** (0.003)
INT 1	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)
INT 2	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	-0.000 (0.001)
INT 3	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.003*** (0.001)
Distance	-0.082*** (0.022)	-0.082*** (0.022)	-0.072*** (0.022)	-0.072*** (0.022)	-0.074*** (0.023)	-0.066*** (0.022)	-0.064*** (0.023)	-0.059*** (0.022)	-0.057*** (0.023)	-0.056*** (0.023)
Com. Border	0.551*** (0.129)	0.551*** (0.130)	0.581*** (0.132)	0.582*** (0.132)	0.579*** (0.132)	0.416*** (0.117)	0.421*** (0.117)	0.452*** (0.117)	0.456*** (0.118)	0.454*** (0.118)
Com. Language	0.779*** (0.113)	0.778*** (0.115)	0.759*** (0.116)	0.756*** (0.117)	0.757*** (0.113)	0.617*** (0.108)	0.611*** (0.108)	0.591*** (0.109)	0.584*** (0.109)	0.594*** (0.110)
Market Cap.	0.061*** (0.017)	0.061*** (0.017)	0.065*** (0.019)	0.065*** (0.019)	0.065*** (0.019)	0.048*** (0.015)	0.048*** (0.015)	0.053*** (0.017)	0.053*** (0.017)	0.053*** (0.017)
REER	0.001 (0.002)	0.001 (0.003)	-0.001 (0.002)	-0.000 (0.002)	-0.002 (0.002)	-0.001 (0.002)	0.001 (0.003)	-0.003 (0.002)	0.000 (0.002)	-0.001 (0.002)
Free Trade	0.953 (2.052)	0.933 (2.042)	0.157 (1.692)	0.221 (1.712)	0.026 (1.614)	-0.611 (2.032)	-0.849 (1.931)	-2.459 (1.530)	-2.374 (1.561)	-2.635* (1.513)
Inflation	0.085 (0.118)	0.087 (0.119)	0.122 (0.119)	0.125 (0.120)	0.119 (0.120)	0.084 (0.119)	0.097 (0.119)	0.127 (0.119)	0.142 (0.120)	0.153 (0.120)
Free Services	0.480*** (0.182)	0.478** (0.186)	0.509*** (0.194)	0.506** (0.198)	0.515*** (0.196)	0.290* (0.166)	0.280* (0.167)	0.320* (0.174)	0.309* (0.175)	0.296* (0.178)
Custom Union	0.452*** (0.118)	0.454*** (0.119)	0.487*** (0.120)	0.490*** (0.122)	0.485*** (0.121)	0.423*** (0.128)	0.428*** (0.129)	0.452*** (0.132)	0.460*** (0.134)	0.461*** (0.133)
Costs	-2.180*** (0.723)	-2.166*** (0.696)	-2.361*** (0.734)	-2.337*** (0.731)	-2.348*** (0.733)	-0.306 (0.840)	-0.248 (0.830)	-0.461 (0.845)	-0.360 (0.843)	-0.161 (0.834)
Time	0.000 (0.002)	0.000 (0.002)	0.000 (0.002)	0.000 (0.002)	0.000 (0.002)	-0.000 (0.002)	0.000 (0.002)	0.000 (0.002)	0.001 (0.001)	0.000 (0.002)
Procedures	-0.034* (0.019)	-0.034* (0.020)	-0.026 (0.019)	-0.026 (0.020)	-0.026 (0.019)	-0.047*** (0.018)	-0.047** (0.018)	-0.041** (0.019)	-0.040** (0.019)	-0.043** (0.019)
GDP per capita						-0.005 (0.005)	-0.005 (0.005)	-0.007 (0.005)	-0.008 (0.005)	-0.010** (0.005)
Nr CBA (t-1)						0.017 (0.011)	0.017 (0.011)	0.017 (0.011)	0.017 (0.011)	0.017 (0.011)
WGI Score						0.143 (0.185)	0.149 (0.185)	0.135 (0.214)	0.166 (0.215)	0.293 (0.231)
Property Rights						0.158 (0.117)	0.164 (0.117)	0.191 (0.123)	0.190 (0.123)	0.185 (0.124)
Pop. controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Area controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Adj. Deviance R <sup>2</sup>	0.7455	0.7453	0.7443	0.7441	0.7443	0.7612	0.7611	0.7594	0.7595	0.7597
N	3,876	3,876	3,452	3,452	3,452	3,286	3,286	2,932	2,932	2,932
# of CBA	27,887	27,887	24,516	24,516	24,516	27,061	27,061	23,808	23,808	23,808

Panel estimates (1997-2014). Dependent variable is number of yearly CBA for source-host country pairs from SDC Platinum. These include 134 different source countries and 35 different host countries. Standard errors are clustered by country pair. All estimations include year dummies and p-values are denoted as follows: \*  $p<0.1$ ; \*\*  $p<0.05$ ; \*\*\*  $p<0.01$ .

For this subset, there are 9,943 observations (pairs of source and host in given years) for the period (approximately 57,5% of the full dataset), which make up 61,764 CBAs, or about 74,0% of the total number of acquisitions in the database. When we use the model with corporate tax differential,

the subsample is comprised by 8,377 pairs of country for the period which are responsible for 59,145 cross-border acquisitions.

When the measure of tax autonomy is added to the model, to correctly capture the scale of fiscal decentralization enjoyed by local governments, the previously observed effects of Tiers and revenue decentralization on FDI disappear. As our new variable better reflects the power to tax by subnational governmental levels, this is the decentralization measure that matters for FDI.

This means that, when Tax Autonomy is taken into account, the net effect of having an extra layer of government is irrelevant for attracting FDI. In none of the specifications the number of governmental layers is significant in explaining cross-border acquisitions. But what can be observed is that the *de facto* measure of fiscal decentralization has a positive impact on attracting FDI, an evidence that sheds some light into the possibility that the horizontal dimension of federalism (competition among units) can trump the vertical dimension.

In quantitative terms, moving from zero to 100% autonomy could increase the number of CBAs by almost 2 per year for a given host (from 1.7832 in specification 5 to 2.3243 in specification 10). Such movement (from zero to full) can be hardly observed, but the quantitative effect of more autonomy to lower government levels can also be stated as it follows: one standard deviation of more autonomy (around 25% more on the tax base/rate) could lead to approximately 1.2 more CBAs per year for a given host (ranging from 1.1574 in specification 5 to 1.2346 in specification 10). The following figures give a glimpse of such effect, by using the predicted values of CBAs of specifications 4 and 9, the ones that take into account both the Tax Autonomy variable and the governmental layers measure (Tiers), on top of the other controls.

It should be noted that the other determinants of FDI in high-income hosts remain statistically significant, such as the Knowledge-Capital Model variables, the geographical traits (distance and common border), the cultural characteristics (common language), the membership in custom unions and the ease of doing business as measured by the cost of and procedures for starting a business (in some specifications).

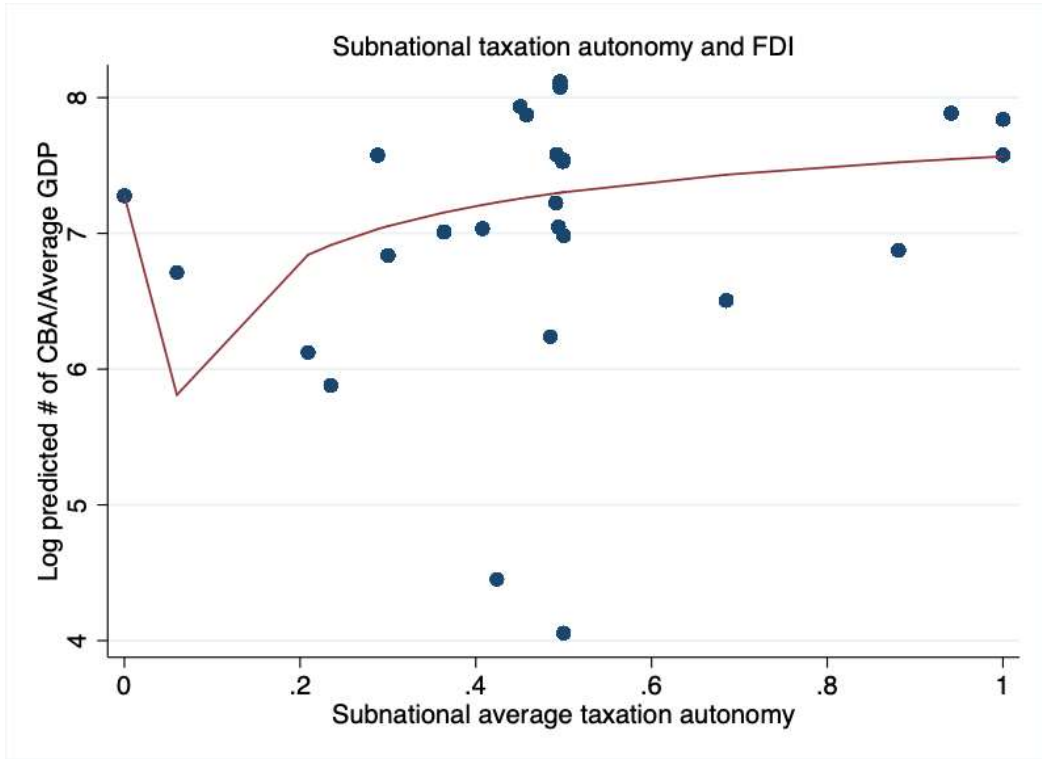


Figure 3: Tax Autonomy and CBA (predicted by specification 4)

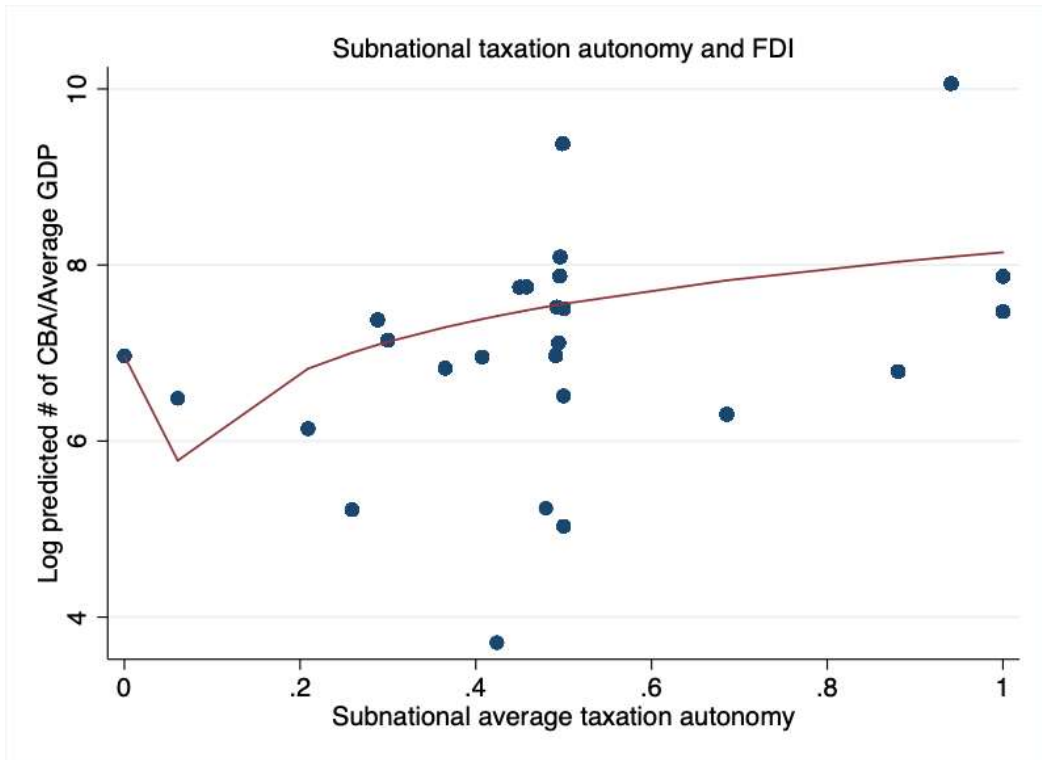


Figure 4: Tax Autonomy and CBA (predicted by specification 9)



Table 6: OECD high-income hosts. Dependent variable: CBA; controls: Tax Autonomy and Corporate Tax Differential

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$\Delta$ Corp. Tax <sub>ij</sub>		-0.457 (0.572)	-0.860 (0.644)	-0.951 (0.644)	-0.774 (0.620)		0.057 (0.574)	-0.182 (0.627)	-0.337 (0.650)	-0.360 (0.665)
Tax Autonomy		0.753*** (0.194)	0.697*** (0.237)	0.741*** (0.238)	0.672*** (0.222)		0.855*** (0.212)	0.827*** (0.255)	0.918*** (0.272)	0.930*** (0.253)
Tax Interaction		0.367 (0.726)	1.113 (0.859)	1.179 (0.858)	1.033 (0.863)		-0.232 (0.696)	0.234 (0.832)	0.355 (0.842)	0.423 (0.878)
Tiers		-0.004 (0.105)		-0.063 (0.103)			-0.041 (0.096)		-0.106 (0.096)	
Exp. Decent.			0.515 (0.606)	0.447 (0.580)	0.604 (0.512)			0.408 (0.619)	0.306 (0.615)	0.180 (0.572)
Rev. Decent.			-0.699 (0.483)	-0.654 (0.471)	-0.774* (0.446)			-0.548 (0.437)	-0.486 (0.429)	-0.404 (0.408)
Tiers*Pop.					0.422 (1.012)					-1.019 (0.932)
$\Sigma$ GDP <sub>ij</sub>	0.414*** (0.026)	0.395*** (0.028)	0.406*** (0.030)	0.408*** (0.030)	0.404*** (0.030)	0.247*** (0.041)	0.283*** (0.045)	0.286*** (0.048)	0.292*** (0.049)	0.293*** (0.049)
$\Delta$ GDP <sub>ij</sub> <sup>2</sup>	-0.017*** (0.002)	-0.017*** (0.002)	-0.018*** (0.002)	-0.018*** (0.002)	-0.018*** (0.002)	-0.010*** (0.002)	-0.012*** (0.003)	-0.012*** (0.003)	-0.012*** (0.003)	-0.013*** (0.003)
INT 1	-0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	0.000 (0.001)	-0.001 (0.001)	-0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)
INT 2	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.000 (0.001)
INT 3	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)
Distance	-0.079*** (0.021)	-0.097*** (0.024)	-0.089*** (0.024)	-0.088*** (0.024)	-0.090*** (0.025)	-0.055*** (0.019)	-0.078*** (0.025)	-0.073*** (0.025)	-0.073*** (0.025)	-0.072*** (0.025)
Com. Border	0.557*** (0.130)	0.573*** (0.130)	0.602*** (0.132)	0.606*** (0.132)	0.600*** (0.133)	0.392*** (0.111)	0.473*** (0.119)	0.496*** (0.121)	0.503*** (0.120)	0.500*** (0.121)
Com. Language	0.639*** (0.120)	0.839*** (0.119)	0.811*** (0.121)	0.805*** (0.122)	0.810*** (0.118)	0.451*** (0.105)	0.660*** (0.116)	0.639*** (0.116)	0.632*** (0.115)	0.643*** (0.118)
Market Cap.	0.060*** (0.016)	0.574*** (0.083)	0.571*** (0.087)	0.572*** (0.087)	0.572*** (0.086)	0.048*** (0.015)	0.468*** (0.088)	0.472*** (0.090)	0.475*** (0.091)	0.469*** (0.090)
REER	0.004*** (0.002)	-0.003 (0.003)	-0.004* (0.002)	-0.002 (0.002)	-0.005** (0.002)	0.002 (0.002)	-0.004 (0.003)	-0.006** (0.003)	-0.003 (0.003)	-0.004 (0.003)
Inflation	0.201 (0.958)	0.161 (1.973)	-0.341 (1.739)	-0.216 (1.779)	-0.457 (1.679)	-0.132 (0.979)	-2.533 (1.900)	-3.514** (1.654)	-3.416** (1.692)	-3.631** (1.638)
Free Trade	0.193 (0.150)	-0.346** (0.149)	-0.307** (0.151)	-0.302** (0.152)	-0.309** (0.151)	0.146 (0.127)	-0.283* (0.147)	-0.267* (0.147)	-0.253* (0.148)	-0.240 (0.147)
Free Services	0.318 (0.206)	0.865*** (0.196)	0.857*** (0.205)	0.849*** (0.209)	0.865*** (0.210)	0.129 (0.168)	0.648*** (0.189)	0.674*** (0.197)	0.661*** (0.198)	0.646*** (0.201)
Custom Union	0.382*** (0.116)	0.473*** (0.132)	0.494*** (0.133)	0.497*** (0.135)	0.494*** (0.134)	0.345*** (0.119)	0.437*** (0.138)	0.448*** (0.140)	0.454*** (0.143)	0.453*** (0.142)
Costs	-1.397** (0.621)	-2.548*** (0.717)	-2.617*** (0.730)	-2.575*** (0.727)	-2.609*** (0.729)	0.177 (0.658)	-0.757 (0.843)	-0.929 (0.843)	-0.834 (0.840)	-0.691 (0.825)
Time	0.003 (0.002)	0.000 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.003 (0.002)	0.000 (0.002)	0.000 (0.002)	0.001 (0.002)	0.000 (0.002)
Procedures	-0.043** (0.017)	-0.040** (0.020)	-0.036* (0.020)	-0.035* (0.021)	-0.036* (0.019)	-0.042*** (0.016)	-0.052*** (0.019)	-0.051** (0.020)	-0.050** (0.021)	-0.052*** (0.020)
GDP per capita						0.001 (0.004)	-0.006 (0.005)	-0.008 (0.005)	-0.009 (0.006)	-0.011** (0.006)
Nr CBA (t-1)						0.027* (0.014)	0.014 (0.009)	0.014 (0.009)	0.014 (0.009)	0.014 (0.009)
Accountability						0.043 (0.145)	0.064 (0.189)	0.014 (0.211)	0.047 (0.217)	0.140 (0.240)
Property Rights						0.122 (0.099)	0.239* (0.125)	0.276** (0.133)	0.273** (0.134)	0.268** (0.135)
Pop. controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Area controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Adj. Deviance R <sup>2</sup>	0.7016	0.7547	0.7517	0.7516	0.7515	0.7356	0.7666	0.7634	0.7635	0.7635
N	4,292	3,227	2,884	2,884	2,884	3,587	2,833	2,537	2,537	2,537
# of CBA	29,901	26,643	23,456	23,456	23,456	28,105	26,059	22,957	22,957	22,957

Panel estimates (1997-2014). Dependent variable is number of yearly CBA for source-host country pairs from SDC Platinum. These include 47 different source countries and 34 different host countries. Standard errors are clustered by country pair. All estimations include year dummies and p-values are denoted as follows: \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ .

However, a more important conclusion of including Tax Autonomy as a more meaningful method of describing fiscal decentralization is that its effect on FDI is positive: the more autonomous subnational governments are in setting their tax bases and tax rates, the more FDI the country attracts (provided it is an OECD high-income nation).

The empirical evidence presented thus supports the theory that fiscal decentralization, as measured by the Tax Autonomy of subnational units, is linked to the attractiveness of foreign direct investments, a conclusion underpinned by the horizontal dimension of fiscal decentralization. We further develop the model by adding the corporate tax differential variable along with an interaction term between it and Tax Autonomy. Such a variable would capture the potential increase or decrease in the corporate tax gap (between source and host countries) that subnational units could change given their level of tax autonomy.

The addition of the corporate tax variable (along with the interaction term) does not qualitatively alter the results from Table 5. Neither the corporate tax differential nor the interaction term play a role in attracting FDI to high-income hosts, but Tax Autonomy remains the driver of decentralization for attracting FDI.

## 5. Conclusions

The effect of a decentralized state structure on the attractiveness of foreign direct investment is both theoretically and empirically controversial. This study may help to provide more evidence in favor of a positive relation between federalism (fiscal decentralization) and FDI. So far, the literature has provided some mixed evidence of the effects of fiscal decentralization on FDI. Kessing, Konrad and Kotsogiannis (2007) set the standards in the empirical literature using a *de jure* measure of decentralization – the number of governmental levels, the so-called Tiers. Although it is a variable that theoretically captures the number of authorities an investor has to deal with regarding taxation, it measures only the legal framework of a federation and not the *de facto* taxation power held by each level of government.

By extending the work of Kessing, Konrad and Kotsogiannis (2007) and with the help of econometric evidence in Section 4, we confirm the evidence that once we apply a measure that captures only a *de jure* characteristic of decentralization, its impact on FDI is negative and does not

depend on the level of development of the FDI host country. A trivial question in assessing the effects of decentralization on economic outcomes must be whether we are measuring correctly what we want to evaluate. In this case, a decentralization measure that captures with more precision how sub-federal governments can tax investors *ex post* is vital to the conclusions.

We propose a variable that captures the tax autonomy that subnational government levels possess based on the work of Stegarescu (2005). This is a more meaningful way to assess the *de facto* traits of decentralization, as it measures how sub-federal units control their taxes. By using the Tax Autonomy variable that matters for the study of the hold-up problem, it is observed that fiscal decentralization is associated with more foreign direct investment. As lower government levels become more autonomous in OECD high-income hosts, more CBAs are observed, even controlling for factors previously known to influence FDI.

By assessing the effects for the whole sample and for different types of hosts (high- and middle-income nations), it can be noted that adding one more layer of government can reduce the number of CBAs basically by one transaction per year – the same effect as moving from the average sub-federal levels (of approximately 3.15) to the next upper level of 4 layers (equivalent to one standard-deviation change).

However, by taking into account the tax autonomy variable, the negative effect of an extra government layer disappears, and one standard-deviation increase in Tax Autonomy (an extra control of 25% of tax base/rate enjoyed by subnational units) could attract up to 2 more CBAs per year towards a specific host. This is an evidence that competition among subnational units that can credibly commit not to increase tax *ex post* has a positive effect in attracting investments. We have also tested whether the corporate tax rate differential between the source and the host countries is a determinant of FDI together with the tax autonomy of subnational governments. We have observed no significant effects for high-income host countries.

In general, the evidence provided in this study points towards a positive effect of federalism on FDI, as the horizontal dimension trumps the vertical dimension when fiscal decentralization is measured by tax autonomy at lower government levels. Naturally, further developments are necessary to confirm whether such effect is maintained for other group of hosts, as data on tax

autonomy is available only for OECD nations. An extension of the Tax Autonomy variable to other types of hosts can clarify the issue.

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## Appendix

Table A.1: Data and variables description

Variable	Units	Source	Description
$CBA_{ijt}$	Count	SDC-Platinum Thomson-Reuters	Number of Cross-border acquisitions between source and host countries.
$\sum GDP_{ijt}$	2005 Dollar (Trillion)	WDI – World Bank	Sum of real GDP of source and host countries.
$\Delta GDP_{ijt}^2$	2005 Dollar (Trillion)	WDI – World Bank	Difference of real GDP between source and host countries squared.
Population	Count (Million)	WDI – World Bank	Host country population.
Area	km <sup>2</sup> (Thousand)	WDI – World Bank	Host country area.
Distance	Kilometer (Thousand)	Glick & Rose	Distance between source and host countries' capital cities.
Com. Border	Dummy	Glick & Rose	Dummy = 1 if source and host countries share a common border.
Com. Language	Dummy	Glick & Rose	Dummy = 1 if source and host countries share an official common language.
Market Cap.	Decimal	WDI – World Bank	Host country's yearly average market capitalization as % of GDP.
REER	Index	WDI – World Bank	Host country's real effective exchange rate.
Free Trade	Dummy	Compiled WTO	Dummy = 1 if source and host countries are members of a Free Trade Agreement (either bilateral or multilateral).
Free Services	Dummy	Compiled WTO	Dummy = 1 if source and host countries are members of a Free Services Agreement (either bilateral or multilateral).
Custom Union	Dummy	Compiled WTO	Dummy = 1 if source and host countries are members of a Customs Union (either bilateral or multilateral).
Costs	Decimal	Doing Business – World Bank	Cost of starting a business as % of per capita GDP in host country.
Time	Count	Doing Business – World Bank	Number of days to start a business in host country.
Procedures	Count	Doing Business – World Bank	Number of procedures to be completed before starting a business in host country.
WGI Score	Index (0 – 5)	WGI – World Bank	Average of the rating of voice and accountability, regulatory quality, control of corruption, rule of law and government effectiveness in host country. All measures were first rescaled from (-2.5 to 2.5) to (0 to 5) and then normalized across the year. Interpolated values for years 1997, 1999 and 2001. Higher values indicate higher accountability.
Property Rights	Index (0 -100)	Heritage Foundation	Rating of property rights protection in host country on a scale from 0 to 100 with changes every 10 points.
Tiers	Count	Constitute Project and UNPAR	Number of governmental layers in host country updated for constitutional changes, different interpretation and new host countries in the sample.
Exp. Decent.	Decimal	GFS – IMF	Ratio of subnational government expenditure (local plus state level) to total government expenditure.
Rev. Decent.	Decimal	GFS – IMF	Ratio of subnational government tax revenues (local plus state level) to total government tax revenues.
$\Delta Corp. Tax_{ji}$	Decimal	CBT Tax Database	Sum of federal tax rate, local tax rate taking into account surcharge and deductibility of local taxes.
Tax Autonomy	Decimal	OECD	Tax autonomy of subnational levels, using OECD data and the approach proposed by Stegarescu (2005).