

Tax Competition and FDI : The Special Case of Developing Countries*

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Abstract

According to the foreign direct investment (FDI) literature, the elasticities between FDI and its determinants vary considerably with the level of host country development. This may be a major concern when dealing with the influence of corporate tax rates on FDI in developing countries, since most studies concentrate on developed countries. Using data on Japanese firm location choices between 1990 and 2000, we contrast differences in regional tax rates in order to reveal an asymmetry between developed and developing countries. By looking at the interaction effects between Japan and host developing countries' tax systems, we also put forward the idea that special tax sparing provisions signed with Japan can alter the effect of host country taxes on Japanese firms' location choices. Finally, we find that even though tax competition can be strong in developing countries, this competition should not lead to an effective rate of zero taxation for these countries in their competition for FDI inflows.

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1 Introduction

The impact of corporate tax rates on foreign direct investment (FDI) has seldom been investigated in the case of developing countries. All countries, however, compete against each other over corporate taxes to attract FDI. Statutory rates of corporation taxes have fallen considerably over the last decade, leading to substantially lower tax rates in developing countries than in developed countries. Nevertheless, the impact of taxes on FDI in developing countries has largely been neglected by the tax literature. Understanding the influence of tax rates on FDI inflows may be crucial in developing countries, because it is empirically unclear whether low taxation is seen by investors as a second rank determinant for FDI with a marginal effect, or if on the contrary, it is seen as an opportunity to compensate for weak economic fundamentals. Indeed, the literature points out that when foreign investment flows to developing countries are considered, market-related variables are the strongest determinants of FDI¹. More recently, however, theoretical and empirical studies have demonstrated that a country's disadvantages in market-related variables such as market size and market potential can be compensated by direct fiscal incentives, such as lower corporate tax rates (Bucovetsky, 1991; Wilson, 1991; Bénassy-Quéré et al., 2005).

One explanation for the lack of empirical evidence regarding the link between foreign investment and corporate tax rates in developing countries is the difficulty in calculating appropriate measures of taxation. The only available measure of taxation for developing countries is the top statutory tax rate which may not correspond to the effective tax rate paid. The former has nevertheless been found to play a role in the determination of firm locations² (Devereux and Griffith, 1998). In this paper we investigate the sensitivity of Japanese firm location choices to statutory corporate tax rates across developing countries. The consideration of this relationship in these particular countries is interesting for at least four reasons.

First, estimates of the tax elasticity of FDI vary across empirical studies, depending on the econometric methodology, the measure of tax rates, the period studied, and the geographic area selected³. Hartman (1984), Boskin and Gale (1987), Newlon (1987), Young (1988) and Murthy (1989) each consider the influence of the after tax rates of return on FDI inflows into the USA.

¹Schneider and Frey (1985), Wheeler and Mody (1992), Tsai (1994), and Taylor (2000).

²Average effective tax rate data can be found for some developing countries but only for U.S multinationals (U.S Treasury Controlled Foreign Corporations files compiled by the Internal Revenue Service).

³The empirical literature of the impact of corporate tax rates on FDI location has been reviewed by Hines (1999).

These studies report a positive correlation between levels of foreign investments and after-tax rates of returns. Other studies extend this literature with a better control of macroeconomic events, with a more appropriate measure of taxation, by distinguishing investments coming from a tax credit system and a tax exemption system, or by distinguishing investment financed by retained earnings or transfers of parent funds (Slemrod, 1990; Auerbach and Hassett, 1993; Swenson, 1994; Devereux and Freeman, 1995; Bénassy-Quéré et al., 2005). In these studies, the implied elasticity of FDI with respect to corporate tax rates in the USA or in a sample of OECD countries is always negative, suggesting the obvious capacity of tax policies to affect the location and volume of FDI⁴.

Among the empirical work dealing with the influence of international tax rates on foreign capital, the following three studies have included developing countries in their geographical coverage: Grubert and Mutti (1991), Hines and Rice (1994) and Mutti and Grubert (2004). Grubert and Mutti (1991) and Hines and Rice (1994), however, have not *specifically* investigated the impact of taxes on FDI in developing countries. Their studies report negative elasticities of American-owned property plant and equipment with respect to tax rates but they do not distinguish high-income countries from low-income countries. The pooling of developed and developing countries in the same sample implicitly makes the restrictive assumption that estimated elasticities of tax rates on FDI are identical for both sets of countries. Nevertheless, Blonigen and Wang (2005) have established that the factors determining the location of FDI “vary systematically” between developing and developed countries. Thus, pooling data of developed and developing countries into one sample might be inappropriate as the estimated coefficient is forced to be the same for both types of countries. One study that does demonstrate a negative and statistical significant relationship between taxes and FDI in developing countries is Mutti and Grubert (2004). This study, which analyzes the sensitivity of U.S. multinationals’ real activity to foreign taxes and the location decisions of U.S. multinationals, offers an estimation that omits high-income countries from the sample. The elasticity between the logarithm of 1 minus the average effective tax rate and U.S affiliates real gross product is 4.84. This paper proposes to pursue this issue by measuring the elasticity between corporate tax rates and the locational decisions of Japanese multinational firms in developing countries.

Second, a growing literature insists on the compensating effects of the fiscal instrument.

⁴See Hines (1999), Devereux and Griffith (2002) and Mooij and Ederveen (2003) for a comprehensive survey of the literature dealing with the impact of taxation on FDI.

According to this literature, there is some evidence that low taxes can help to offset the weak influence of a small host country market size and market potential. Haufler and Wooton (1998) analyze theoretically tax competition between two countries of unequal size. Their results indicate that foreign investors prefer to locate themselves in larger countries -providing a higher producer price- even if tax levels are higher. According to Raff and Srinivasan (1997) and Haufler and Wooton (1998), imperfect competition induces small countries to choose lower tax rates relative to large countries in order to compensate for their unattractive small market size. Consequently, the effect of corporate taxes should be higher in determining FDI location in small countries than in large ones (Bucovetsky, 1991; Wilson, 1991). The findings of Bénassy-Quéré et al. (2005) tend to corroborate this idea with a different approach. They analyze the effects of various measures of tax differentials on FDI flows across eleven OECD countries from 1984 to 2000.⁵ Their results indicate that FDI reacts negatively to tax differentials and that these tax differentials have the capacity to offset differences in market potential. Indeed, one of their estimations suggests that a host country suffering from a 10% disadvantage in terms of market potential, compared to other host countries, can compensate for this handicap *via* a lower statutory tax rate of 5%. Low corporate tax rates would thus compensate for economic characteristics which are not in favor of FDI establishments. FDI inflows remain concentrated in developed countries, accounted for over 80% of total flows between 1990 and 2000. The level of FDI flows devoted to developing countries was 4.5 times lower than the amount of FDI received by developed countries in 2000 (UNCTAD, 2005). It is straightforward that developing countries have a global environment which is less in favor of FDI expansion. In such a case, these weaknesses, in terms of infrastructures, skill labor, property rights, policy credibility or economic stability, may be compensated by fiscal burden reductions. Following this idea, it seems interesting to compare investors' sensitivity to corporate tax rates in developing countries and in developed countries, as the effect of corporate taxes should be higher in determining FDI activity in countries which are relatively less endowed with economic fundamentals.

Third, the analysis of the effect of taxes on FDI location in developing countries cannot be done without taking into account bilateral tax treaty agreements and more precisely a specific provision called "tax sparing" which can play an important role in the attractiveness of these countries. The aim of this provision, signed between a developed and a developing country

⁵The different measures of the corporate tax rate are the statutory tax rate, the average effective tax rate, the marginal effective tax rate and the apparent effective tax rate. They use tax differentials between the host and the home country of investors for each tax measure.

solely, is to promote economic development by ensuring that fiscal grants to foreign investors in the host country are not nullified by the taxation of income in the home country. Indeed, when investors are coming from tax credit countries, like Japan, they are subject to taxes on their worldwide income. In order to avoid double taxation on foreign-earned income, Japanese investors are allowed to claim foreign tax credits for income taxes paid in the host country. If the host country grants tax holidays, or simply decreases its level of taxes, no benefits remain in the hands of the investors, as the spared amount is transferred to the treasury of the home country⁶. However, under a tax sparing provision, the amount of tax exempted or reduced under certain incentives is deemed to have been paid and thus becomes creditable with respect to the payment of Japanese taxes⁷. Besides the direct protection of host country tax incentives for foreign capital, tax sparing provisions present two other related advantages. First, the signature of this provision allows avoidance of competitive disadvantages abroad. Indeed, without tax sparing, firms coming from a tax credit country will suffer from a heavier tax burden compared to firms whose countries of residence provide tax sparing or compared to firms coming from a tax exempt country. Second, developing countries tend to reduce withholding taxes for the country's partner's investments when a tax sparing provision is signed. The literature demonstrates that fiscal advantages provided by tax sparing provisions have the opportunity to increase the location and volume of FDI in developing countries (Hines, 2001; Azémar et al., 2007). Given that tax sparing provisions seem to play a non-negligible role in the location of FDI, the relationship between the level of statutory tax rates and the location of FDI is not obvious. Under tax sparing the host country statutory tax rate represents a fixed foreign tax credit that firms can subtract from the taxes owed to the home country, even if the foreign effective taxes paid are lower due to tax incentives. No theory or previous empirical analysis links the effects of the statutory tax rate on FDI behaviors in tax sparing countries, however, the description of tax sparing seems to suggest that Japanese firms should prefer high tax rates in tax sparing countries. This is because the high tax rate would generate a larger fictitious

⁶It is worth noting that investors coming from a tax credit system can partly benefit from host country fiscal advantages in non tax sparing countries as they can defer home country taxes until profit and earnings are repatriated. This tax deferral also facilitates the manipulation of transfer pricing realized in order to shift income from high-tax countries to low-tax countries.

⁷A quick numerical example can be given. The profit of a foreign affiliate in a developing country is 100\$. The corporate income tax is 30% in the host country and 40% in the home country. The firm is allowed to claim a credit to the home country for the foreign taxes paid. Thus it pays 30\$ to the host country and $40-30=10$ \$ to the home country. A fiscal incentive is now granted by the host country and the firm does not have to pay the 30% tax rate. Without tax sparing the firm has to pay 40\$ to the home country as it does not pay foreign taxes. With tax sparing, the 30% foreign corporate tax rate is deemed to have been paid and thus become creditable; so in that case the firm pays 0\$ to the host country and $40-30=10$ \$ to the home country.

tax payment to the host government which would offset taxes owed in Japan. However, tax incentives such as tax holidays can be limited by a number of years. Considering that fiscal incentives are not maintained indefinitely, what will be the strategies of investors? Investments from sectors which involve lower levels of non-redeployable assets, such as retail trade or the service sector, are more able to move from one jurisdiction to another and may be more likely to locate in high statutory tax rate countries until the disappearance of tax incentives. Investments in other activities, that involve higher sunk costs, may have a longer-term strategy pushing them to locate themselves in countries with moderate tax rates. Hence, the expected sign and the statistical significance of the relationship between the statutory tax rate and Japanese FDI may depend on the share of FDI conducted by highly mobile companies and less mobile companies. Globally, the presence of tax sparing agreements in developing countries tends to increase the difference between the statutory tax rate and the corporate taxes effectively paid by investors, diminishing the influence of the statutory tax rate on multinational firm behavior. All in all, the complex relationship between the statutory tax rate and FDI in tax sparing countries suggests that we need to distinguish tax sparing countries from non-tax sparing countries.

Finally, increasing international integration cast doubt on the dominance of traditional FDI determinants. The tax competition literature underlines the growing influence of corporate tax rates on the location of foreign capital, and suggests that this may lead to a “race to the bottom”. Even if since Tiebout (1956), it has been demonstrated that the level of a tax base depends on the combination between taxes and public goods in a host country -implying that a country increasing its provision of highly-valued (by firms) public goods can increase its taxes without losing investments- the fear of tax competition leading to a zero taxation of capital earnings is present and amplified for countries suffering from a lack of attractiveness. These countries may try to compensate business climate weaknesses by lower corporate tax rates and are more likely to be subject to a growing pressure on their tax policies. However, the growing importance of corporate taxes as a determinant of FDI is accompanied by the increasing importance of “the quality of infrastructure, the ease of doing business and the availability of skills” (UNCTAD, 1996), as other determinants of FDI. The magnitude of the coefficients of these variables can provide an idea of the tax competition situation of developing countries. A strong sensitivity of FDI to public goods or public governance can significantly reduce the risk of a “race to the bottom” as variables other than tax rates matter and investment in infrastructure is financed in part through corporate tax revenues. In this paper, the role of public goods, and the quality of institutions in the Japanese firm location decisions are measured and compared to the effect

of corporate tax rates.

This paper is organized as follows. Section II presents the data and the econometric model. This section details the Japanese firm level variable and the tax variable used, and presents the characteristics of econometric count models. Next, empirical section III tests the relationship between Japanese firm location decisions and the level of taxation. This section follows the four points discussed above. Finally, section IV concludes the paper.

2 Data and Estimation

2.1 Japanese Firm Level Data

To test the links between statutory tax rates and multinational firm location choices in developing countries, we focus on Japanese firm implantations in Africa, Latin America and Asia, between 1990 and 2000. We compare effects of taxation between developing and developed countries, consequently we also consider Japanese investments in high-income countries. As in prior studies by Delios and Henisz (2001) or Head and Ries (2003), the Japanese firm level dataset comes from the 2000 Japanese Language edition of Kaigai Shinshutsu Kigyō Souran-Kuni Betsu (Japanese overseas investments by country). The Toyo Keizai publication contains a list of FDI transactions made in a given year. For each Japanese FDI, the country, the founding date, and industry are provided.

Table 1 presents the cumulative distribution of Japanese direct investments across sample countries for the period 1990-2000. The leading recipients of Japanese affiliates are China and the United States with 2,941 and 2,620 locations respectively, while several countries, such as El Salvador or Zimbabwe, only received one investment during the decade.

2.2 Tax Variable

The measurement of taxes on income from capital is now the focus of a large amount of literature. The purpose of such a measurement is on the one hand to determine what should or should not be included in the tax measure of capital income, and on the other hand to determine what are the appropriate tax measures in order to explain discrete choice locations, or the volume of FDI. According to Devereux and Griffith (1998), while the impact of taxes on

Table 1: Japanese Foreign Direct Investments 1990-2000

Countries	Nb of Investments	Countries	Nb of Investments
Angola	1	Italy	157
Argentina	26	Korea	334
Australia	309	Luxembour	15
Austria	39	Malaysia	657
Bahamas	7	Malta	1
Bahrain	4	Mauritius	3
Bangladesh	7	Mexico	164
Barbados	2	Morocco	1
Belgium	99	Netherland	319
Bolivia	2	Nigeria	3
Brazil	124	Norway	15
Cambodia	3	Oman	2
Canada	171	Pakistan	17
Chile	40	Panama	119
China	2941	Paraguay	1
Colombia	14	Peru	12
Costa Rica	3	Philippines	387
Denmark	16	Portugal	27
Dominica	1	Saudi Arabia	3
Ecuador	4	South Africa	36
Egypt	7	Spain	122
El Salvador	1	Sri Lanka	20
Fiji	2	Sweden	45
Finland	17	Switzerland	37
France	297	Tanzania	2
Germany	443	Thailand	948
Guatemala	1	Tunisia	3
Honduras	2	United Kingdom	727
India	148	Uruguay	1
Indonesia	612	USA	2620
Iran	4	Venezuela	10
Ireland	44	Vietnam	228
Israel	11	Zimbabwe	1

the capital stock depends on the effective marginal tax rate⁸ (EMTR), discrete location choices depend instead on the effective average tax rate⁹ (EATR). More precisely, their analysis puts forward that the effect of global tax liabilities on discrete location choices can be written as a non-linear combination of the EMTR and the statutory tax rate and that the EATR can summarize the interaction of both tax measures.

As the EATR is not available for developing countries, we run our estimates with the statutory tax rate. Even if the effect of the statutory tax rate in explaining firm location choices is likely to be less important than the more direct effect of the EATR, the use of the statutory tax rate can be advantageous for two reasons. First the statutory tax rate has the advantage of being more easily taken into account in firms' strategic location decisions, compared to more complex measures. In addition, if we consider that discretionary fiscal incentives generate complexity in the tax system, we can make the assumption that tax legislation can appear to be more opaque in developing countries due to weaknesses of their institutions. Thus, difficulties in considering more complicated measures of taxation, such as the EATR, may increase in developing countries. Second, the statutory tax rate plays an important role in the location choices of multinationals as firms prefer to locate real activities in low statutory tax rate countries in order to benefit from shifting income coming from an affiliate located in high-tax countries (Grubert and Slemrod, 1998).

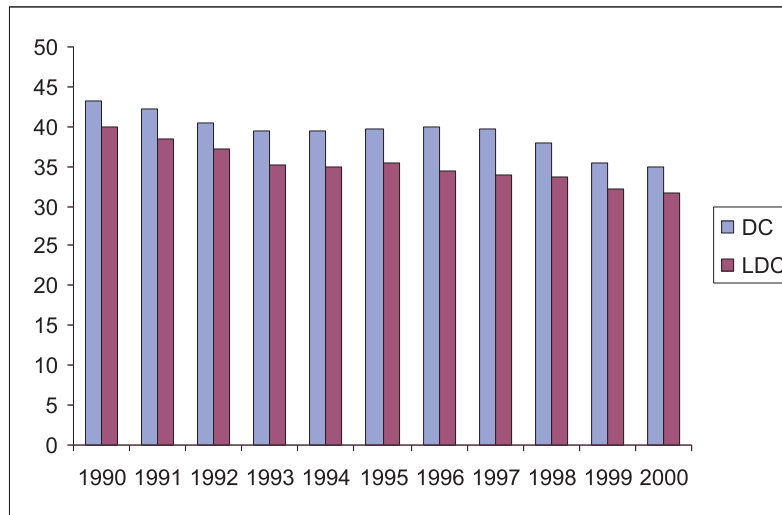
The statutory tax rate data are from the University of Michigan World Tax Database, and correspond to the maximum marginal tax rates faced by businesses. Figure 1 describes the mean evolution of this tax measure for less developed countries (LDC) and developed countries (DC). Statutory corporate tax rates have fallen substantially over the last decade in both developing and developed countries. While the average rate amongst developing countries in the early 1990s was nearly 40%, by 2000 this had fallen to under 32%. In industrialized countries, the average rate was equal to 43% in 1990 and had dropped to 35% in 2000. It is not rare to explain declining corporate tax rates by the pressure of international tax competition on tax policies. In order to attract foreign direct investment, countries compete with each other by diminishing fiscal burdens on corporate profit. However, developing countries often propose lower statutory tax rates, with a nearly 4% points difference with developed countries during the last ten years.

⁸The effective marginal tax rate measures the extent to which the tax generates an increase in the pre-tax required rate of return on an investment project.

⁹The effective average tax rate measures how taxes affect the post-tax level of profit available in each potential location.

This may mean that developing countries suffer from more “harmful” effects of tax competition than other countries. The differences between developed and developing countries’ tax rates lend support to this paper’s hypothesis, in the sense that developing countries try to compensate for weaker economic fundamentals through lower tax rates.

Figure 1: Statutory Tax Rates Evolution Between 1990 and 2000



2.3 Control Variables

The vector of explanatory variables used in the estimation is based on the literature and included usual FDI determinants in developing countries, detailed in the Data Appendix. Measures of market size, GDP per capita, trade openness, an East Asia and Pacific dummy, the cost of production (exchange rate and distance), public goods, and the quality of institutions are used as control variables in this paper.

2.4 Count Models: Econometric Model of Location Choices

The study of firm location decisions is generally realized *via* a conditional logit model (CLM). Indeed, providing an adequate framework, the CLM is useful to estimate the impact of several alternatives on the location decision of a multinational company. However, the CLM is limited by the implementation of its methodology. It makes the assumption of the “independence of irrelevant alternatives” (IIA) which implies that the odd ratios in the model are independent of the other alternatives and so do not change if outcomes are added or deleted. When the

IIA property is not respected by the CLM, and this is usually the case, the estimates lose their good properties. In that case, following Guimaraes et al. (2003) an alternative measure is to use Poisson regression as a “tractable solution” to the CLM methodology problems.

Like the CLM, the Poisson regression model provides a satisfactory framework to model firm location decisions because of its compatibility with Random Utility Maximization. Furthermore, the Poisson regression model is commonly used to study count data which are characterized by the particularity of their discrete nature, small values, and a large number of zeros.

The Poisson parameter is denoted as λ and $\ln\lambda = X\beta$ is specified in the application, where X is a vector of control variables. Denote n_{it} as the observed event count for unit i during the time period t . The Poisson probability specification is:

$$Pr(n_{it}) = f(n_{it}) = \frac{e^{-\lambda_{it}} \lambda_{it}^{n_{it}}}{n_{it}!} \quad (1)$$

The regression property of the Poisson specification implies the assumption that the variance of n_{it} equals its mean.

However, it is not uncommon to have over-dispersion in the data (i.e the variance is larger than the mean). We consider this possibility by testing overdispersion and by using an alternative model, the negative binomial model, which relaxes this assumption. This model arises from a formulation of cross section heterogeneity and is used to estimate models of the number of occurrences of an event when the event has extra-Poisson variations. The negative binomial model is a generalization of the Poisson model with the introduction of an individual, unobserved effect into the conditional mean (Greene, 2003). Following Hausman et al. (1984), we assume that the Poisson parameter λ_{it} follows a gamma distribution with parameters (γ, δ) and we specify that $\gamma_{it} = e^{X_{it}\beta} + e^{\varepsilon_{it}}$ with δ common both across firms and across time. Thus the negative binomial distribution is:

$$Pr(n_{it}) = \int_0^{\infty} \frac{1}{n_{it}!} e^{-\lambda_{it}} \lambda_{it}^{n_{it}} f(\lambda_{it}) d\lambda_{it} \quad (2)$$

$$= \frac{\Gamma(\gamma_{it} + n_{it})}{\Gamma(\gamma_{it})\Gamma(n_{it} + 1)} \left(\frac{\delta}{1 + \delta}\right)^{\gamma_{it}} (1 + \delta)^{-n_{it}} \quad (3)$$

The omitted variable e^{ε_i} follows a gamma distribution with mean 1 and variance α . We refer to α as the over-dispersion parameter: the larger α is, the greater the over-dispersion (Poisson model corresponds to $\alpha = 0$). For each regression, a likelihood ratio test is realized to ascertain whether α differs significantly from 0. If α is significantly different from 0, a negative binomial model is more appropriate than a Poisson model. Due to over-dispersion in the data, the negative binomial model is a better specification than the Poisson model in this study.

Although each country of the sample is selected at least once by Japanese firms, our count data may include a lot of zeros as several countries are not chosen each year. Count data with many zeros need a different statistical methodology because a regular Poisson model or a negative binomial model would “inflate” the probability of zero. In that case, two models can be adopted: the zero-inflated-Poisson (ZIP) or the zero-inflated negative binomial (ZINB), regression models introduced by Lambert (1992) and Greene (1994). The zero-inflated model fits two distinct parts simultaneously, a part dealing with the determinants explaining the number of Japanese firm locations in a given country and a part with the determinants deterring these firms. A non-reported Vuong (1989) statistic test¹⁰ which is run with the zero-inflated model to obtain a test of ZIP versus Poisson or a test of ZINB versus a negative binomial model indicates that a nonzero-inflated standard model is a better specification with the sample analyzed in this study.

When cross-sectional time-series data are used, a major concern dealing with both the Poisson model and the negative binomial model is that time variations are not appropriately considered. The possible consequences of this limitation are to underestimate standard errors and to inflate t -ratios. Furthermore, the panel nature of the data induces to account for heterogeneity in order to reduce serial correlations. The random and fixed Poisson models and negative binomial models allow to overcome these limitations. To address the traditional concerns in panel data, a random negative binomial model is used in the empirical analysis¹¹. Hausman et al. (1984) choose the ratio $\delta_i/(1 + \delta_i)$ to be distributed as a beta random variable with parameters (a, b) . The $\delta_i/(1 + \delta_i)$ ratio has a density function:

¹⁰Positive values of this statistic are in favor of zero-inflated model and negative values are in favor of the nonzero-inflated standard model. Values close to zero in absolute value favor neither model.

¹¹Random -rather than fixed- effects negative binomial model is used for several reasons. First, in their study of patent applications, Hausman et al. (1984) using both the fixed and random negative binomial models underline that the random effect negative binomial model provides more efficient estimators than the fixed effect model. Second, parameters of time-invariant variables, such as distance, cannot be estimated with the fixed effect model. Finally, a random effects model is performed on the basis of the Hausman test of the random versus fixed effects specification.

$$f(z) = [B(a, b)]^{-1} z^{a-1} (1 - z)^{b-1} \quad (4)$$

where $B(\cdot)$ is a beta function. Thus, integrating the beta density, the random effect binomial negative model distribution is:

$$Pr(n_{i1}, \dots, n_{iT} | X_{i1}, \dots, X_{iT}) = \int_0^1 \prod_{i=1}^T \left[\frac{\Gamma(\gamma_{it} + n_{it})}{\Gamma(\gamma_{it}) \Gamma(n_{it} + 1)} z_i^{\gamma_{it}} (1 - z_i)^{n_{it}} \right] f(z_i) dz_i \quad (5)$$

$$= \frac{\Gamma(a + b) \Gamma(a + \Sigma \gamma_{it}) \Gamma(b + \Sigma n_{it})}{\Gamma(a) \Gamma(b) \Gamma(a + b + \Sigma \gamma_{it} + \Sigma n_{it})} \prod_t \frac{\Gamma(\gamma_{it} + n_{it})}{\Gamma(\gamma_{it}) \Gamma(n_{it} + 1)} \quad (6)$$

which is the specification used for the empirical analysis presented in the next section.

3 Empirical Results

3.1 Effects of Taxes on FDI in Developing Countries, and Comparison to developed Countries

Table 2 reports random effect negative binomial estimates of the determinants of Japanese firm location choices between 1990 and 2000. All specifications include a full set of time dummies. This Table also reports a Hausman test and on its basis, the random effects model is used. Influential observations, both in terms of leverage and outlieriness, have been removed according to a Cook's D test. All variables, except the statutory tax rate, are in logarithms. Many of the coefficients have the expected sign and are consistently significant across the various specifications. Host country GDP and trade openness positively affect the probability that Japanese multinationals will choose a given location. Furthermore, as other studies of Japanese FDI have shown, Japanese investors tend to locate in their geographical zone of influence, namely East-Asian and Pacific-rim countries. The non-significance of the distance variable can be explained by the fact that part of the explanatory power of this variable is captured by the East Asia and Pacific dummy¹². The exchange rate variable and GDP per capita exert no impact on the location choices of Japanese firms. Dealing with the GDP per capita, it is not rare to observe a negative relationship between this variable and FDI. Indeed, this sign could be

¹²When the estimation is run without the East Asia and Pacific dummy, the distance variable has a statistically significant negative sign.

Table 2: Foreign Taxes and the Number of Japanese Firm Locations between 1990 and 2000: Developed countries versus Developing Countries

	Random NBM				
	(1)	(2)	(3)	(4)	(5)
ln GDP	0.917 ^a (0.087)	0.901 ^a (0.089)	0.949 ^a (0.085)	0.890 ^a (0.087)	0.931 ^a (0.088)
ln GDP per capita	-0.058 (0.159)	-0.269 (0.182)	-1.136 ^a (0.309)	-0.012 (0.156)	-0.021 (0.153)
ln Trade	0.684 ^a (0.176)	0.639 ^a (0.179)	0.637 ^a (0.172)	0.696 ^a (0.180)	0.715 ^a (0.176)
ln Real exchange rate	-0.022 (0.045)	-0.006 (0.045)	-0.050 (0.046)	0.005 (0.045)	-0.024 (0.045)
ln Distance	0.239 (0.287)	0.251 (0.289)	-0.067 (0.289)	0.249 (0.287)	0.311 (0.279)
East Asia and Pacific dummy	1.400 ^a (0.419)	1.121 ^a (0.421)	1.121 ^a (0.421)	1.209 ^a (0.440)	1.600 ^a (0.401)
STR	-2.542 ^a (0.774)		-26.139 ^a (6.031)		
dummy LDC*STR		-3.571 ^a (0.892)			
dummy DC*STR		-1.465 ^c (0.880)			
ln GDP per capita*STR			2.627 ^a (0.668)		
dummy LDC*High STR				-7.763 ^a (2.150)	
dummy DC*High STR				-0.571 (2.124)	
dummy LDC*Low STR					-2.873 ^a (1.062)
dummy DC*Low STR					-0.420 (1.412)
Constant	-24.241 ^a (3.577)	-21.805 ^a (3.768)	-12.391 ^a (4.578)	-24.749 ^a (3.545)	-26.780 ^a (3.423)
Observations	541	541	541	541	541
Number of countries	62	62	62	62	62
Log likelihood	-1162.331	-1159.5759	-1155.3164	-1160.4864	-1164.2442
Likelihood-ratio test vs. pooled	256.81	262.24	257.98	259.73	238.11
Likelihood-ratio test of alpha=0	1462.42	1464.28	1373.41	1476.29	1391.57
Hausman test	1.36	4.68	1.90	5.65	1.68
Prob>chi2	1.0000	0.9985	1.0000	0.9953	1.0000

Notes: The letters “a”, “b” and “c” indicate respectively significance levels at 1, 5 and 10 percent. Standard errors are in parentheses. Time dummies are included. All p-values for the likelihood ratio tests are less than 0.001.

interpreted either as the impact of low return to capital in capital-abundant countries (Asiedu, 2002) or as the negative impact of high wages (Globerman and Shapiro, 2002).

Of particular interest, the statutory tax rate variable is first tested without distinguishing developed countries from developing countries, similarly as to other control variables¹³. The coefficient of this variable is statistically significant with a negative sign for this estimation. However, as we consider that this pooled coefficient may misrepresent the real relationship

¹³As underlined by Blonigen and Wang (2005), differences in the magnitude of the coefficients of these variables can be expected considering separately the case of developing countries and the case of developed countries. However, when testing the impact of control variables on FDI by distinguishing both type of countries, the results indicate that these variables have the same impact on Japanese FDI in developing and developed countries. Differences among coefficients are not significant, suggesting that developed and developing countries tend to share the same structural determinants.

between taxes and FDI in both types of countries, we estimate, in Column 2, the coefficient of the statutory tax rate for developed countries and for developing countries. To do so, we generate a dummy that takes the value of 1 when a country is a developed country (DC) and a dummy which takes the value of 1 when a country is a less developed country (LDC)¹⁴. These dummies are then interacted with the statutory tax rate (STR) variable. First, the statutory tax rate coefficient is statistically significant with the expected sign for developing countries. The magnitude of this coefficient implies that taxes play a key role in the location choices of Japanese FDI in these economies. Indeed, for a 1 percentage point increase in tax rates, the annual number of locations of Japanese firms in developing countries decreases by 3.5%¹⁵, holding all other variables constant. Thus, without controlling for tax sparing provision, we observe an important link between the level of taxes and the location of Japanese firms in developing countries.

Second, as can be seen in Column 2, the statutory tax rate plays a more important role in the location choice of Japanese firms in developing countries than in developed countries. The negative impact of a 1% point increase in the statutory tax rate on the number of Japanese establishments is 2.4 times larger in developing countries. The difference between both coefficients is statistically significant. This empirical finding corroborates the hypothesis that investors are more sensitive to the level of tax rates in countries relatively less endowed with good institutional and economic fundamentals, giving credence to potential compensating effects of fiscal policies. To go further with this idea, we add in Column 3 an interaction term between the GDP per capita and the statutory tax rate. This interaction term suggests that the effects of the statutory tax rate diminish for countries with higher levels of GDP per capita, in other words, with the country's stage of development. Thus, tax variables seem to matter more in developing countries where incentives to invest are lower, and are less harmful in countries that have good amenities or institutions, whose benefits are reflected in high earnings or income. Compared to developed countries, developing economies provide less favourable conditions for foreign multinationals to enter and operate, but corporate taxes seem to modify a country's attractiveness in the eyes of foreign companies. This argument can be seen as an extension of the Bucovetsky (1991), Wilson (1991), or Bénassy-Quéré et al. (2005) demonstrations that low taxes can help to offset disadvantages in terms of a country's market size and market potential.

¹⁴The distinction between developed and developing countries is realized according to the World Bank level of income criteria.

¹⁵The percent change coefficient for STR is calculated as follows: $100[\exp(-3.571/100)-1]$.

Finally, it is worth noting that since Japan applies a credit tax system, the effects of host country taxes will depend on the host country rate. Indeed, Japan levies tax on the worldwide income of its resident corporations. In order to avoid double taxation of the foreign income, Japanese investors are allowed to claim foreign tax credits for income taxes paid in the host country, up to the Japanese statutory tax rate. Thus, foreign tax rates in excess of Japan's rate will trigger higher taxes, while rate differences among countries with lower rates should be irrelevant. The nature of the tax credit system should effectively induce a neutrality between foreign taxes - which are lower than the home country tax - and FDI. However, several factors can mitigate this neutrality. As previously suggested, Japanese firms can defer Japanese tax liabilities until the moment when the profit is repatriated in the form of dividends in Japan. Deferred distribution may be profitable as re-invested foreign profits should capitalize at a higher rate than home profits, leading to a greater repatriated dividend. The manipulation of transfer prices should enhance this possibility, by allowing to shift taxable income from an affiliate located in a high-tax country to an affiliate located in a low-tax country. Even if these factors can justify a negative and statistically significant relationship between low-tax rates and FDI, this effect should be lower compared to the influence of high-tax rates. To investigate if Japanese investors are more deterred by taxation when host countries' tax rates are higher than the Japanese one, in comparison to host countries' tax rates lower than the Japanese one we use : $\max [0, (STR_h) - (STR_j)]$ and $\max [(STR_h) - (STR_j), 0]$ as measures of taxes. By construction the first variable called "high STR", takes the value 0 when the host country STR is lower than the Japanese one, and takes the value of the difference between the host country STR and the Japanese one, when the host country STR (STR_h) is higher than the Japanese one (STR_j). An increasing gap between STR_h and STR_j should have a strong negative influence on the location of FDI. The second measure of taxation, "low tax", takes the value of the difference between STR_h and STR_j when $STR_h < STR_j$, and the value 0 when $STR_h > STR_j$. This measure of tax should have no impact on the location of FDI coming from a tax credit system, since the benefit coming from low tax rate in the host country is compensated by the tax burden owned to home country fiscal authorities. However, the possibility to defer taxes until the repatriation of the profit and tax planning activities such as transfer pricing may encourage FDI to react negatively with a decrease of the gap between STR_h and STR_j . The high tax variable and the low tax variable are added in Column 4 and 5 respectively, by distinguishing developing countries from developed countries ¹⁶. An asymmetry can be observed between the

¹⁶Without distinguishing both type of countries, the coefficient of the high tax variable is -4.468 with a

effects of taxes on FDI in developing countries and the non-influence of taxes in developed countries. Coefficients of both variables are statistically significant with a negative sign in the case of developing countries. As expected, these coefficients diverge in their magnitudes, and the detrimental effect of taxes on FDI is higher in high-tax countries compared to low-tax countries. If high-tax developed countries indirectly compensate firms with investment incentives such as infrastructure or worker training, the non-significance of the high tax variable in this case is consistent with the result that the impact of taxes diminish with the level of development of the host country.

3.2 Tax Sparing versus no Tax Sparing

The tax literature has investigated the role of taxation in the location of FDI, but it does not necessarily predict a difference in how circumstances specific to developing countries affect investors' sensitivity to taxes. This paper hypothesizes that bilateral tax treaties can alter the effect of taxes on firm location choices, particularly when a special provision named "tax sparing" is signed.

To consider this potential difference in investor responses to the statutory tax rate, we test a model that distinguishes tax sparing countries from non-tax sparing countries (Table 3). Among developing countries, two dummies are generated. The first dummy takes the value of 1 when developing countries are non-tax sparing countries (noTS). The other dummy takes the value of 1 when developing countries have signed a tax sparing provision with Japan (TS). We then interact these two variables with the statutory tax rate. Although, we expected to observe a negative impact of taxes on the location choice of Japanese multinationals in non-tax sparing countries, finding the same relationship in tax sparing countries is somewhat surprising. The estimates show a higher coefficient for non-tax sparing countries, however, there is no statistical difference in the statutory tax rate across the two coefficients tested.

This strong negative finding is thus a puzzle. Could the result be related to countries that have signed a tax sparing provision with Japan in the mid-1990's that is, during the data period analyzed? Three countries: Bangladesh, Mexico, and Vietnam, have signed a tax sparing status within the period studied. Hence, they are shifted from the non-tax sparing category to the tax sparing category in the year in which they shifted their membership. Thus, their changing

standard error of 1.576, and the coefficient of the low tax variable is -2.048 with a standard error of 0.927. The difference is statistically significant.

status should not have an impact on the statutory tax rate coefficient, except if investors need time to integrate the signature of tax sparing provisions in their strategic choices of locations. To examine this idea, we run the same model, but without including Bangladesh, Mexico and Vietnam. As can be seen in Column 2, the degree of responsiveness to the statutory tax rate changes considerably when countries that have changed their tax sparing status within the sample period are removed from estimation. Increasing the level of the statutory tax rate in non-tax sparing countries significantly reduces the number of Japanese firm locations in these countries; however the same increase has no impact on Japanese firm locations in tax sparing countries. Furthermore, the difference between these two estimated coefficients is statistically significant.

We can gain further insight into the perception which firms have regarding the entry into force of a tax sparing provision, by adding an interaction term between the number of years subsequent to the date of signature of this provision and the statutory tax rate (Column 3). This interaction term suggests that the influence of the statutory tax rate on the location decisions of Japanese multinationals decreases with the number of years subsequent to the date of signature of the tax sparing provision. Consistent with previous estimates, these results highlight the crucial importance of tax sparing provisions, which clearly play a role in the responsiveness of investors with respect to corporate taxes.

The implication that the statutory tax rate has little influence on Japanese investment in countries that have signed tax sparing agreements seems to be consistent with the fact that those host countries offer tax incentives that benefit Japanese firms, increasing the difference between the statutory tax rate and the taxes effectively paid by these firms. However, in a paper investigating the role of host country tax rates on the amount of U.S capital invested abroad, Grubert and Mutti (2000) find that countries with restrictive trade and regulatory policies get little benefit from lower tax rates, because they are a poor platform in which to produce and export. If these kinds of countries are also tax sparing countries, the non-significance of the statutory tax rate may thus have two explanatory reasons. Following this line of reasoning, considering the impact of the trade regime on the relationship between FDI and the statutory tax rate seems necessary to clarify the implication of the tax sparing provision. To do so, two dummies are generated: a trade openness dummy and a trade restriction dummy. The trade openness dummy takes the value of 1 when the host country measure of trade openness ($(\text{Importations} + \text{Exportations})/\text{GDP}$) is above sample average. The trade restriction

Table 3: Foreign Taxes and the Number of Japanese Locations between 1990 and 2000: Tax Sparing countries versus no Tax Sparing countries

	Random NBM			
	(1)	(2)*	(3)	(4)*
ln GDP	0.894 ^a (0.091)	0.842 ^a (0.098)	0.858 ^a (0.092)	0.786 ^a (0.099)
ln GDP per capita	-0.241 (0.197)	-0.074 (0.217)	-0.219 (0.185)	0.054 (0.219)
ln Trade	0.638 ^a (0.179)	0.707 ^a (0.191)	0.588 ^a (0.178)	0.514 ^b (0.200)
ln Real exchange rate	-0.005 (0.045)	-0.011 (0.047)	-0.003 (0.045)	-0.020 (0.047)
ln Distance	0.288 (0.305)	0.540 (0.351)	0.361 (0.291)	0.277 (0.363)
East Asia and Pacific dummy	1.436 ^a (0.427)	1.658 ^a (0.448)	1.550 ^a (0.431)	1.524 ^a (0.454)
dummy DC*STR	-1.478 ^c (0.882)	0.458 (0.775)	-1.194 (0.886)	0.415 (0.777)
dummy LDC*STR*noTS	-3.607 ^a (0.898)	-2.057 ^b (0.899)		-1.770 ^b (0.898)
dummy LDC*STR*TS	-3.366 ^a (1.047)	-1.518 (1.362)		
dummy LDC*STR*TS*dummy trade openness				-0.032 (1.443)
dummy LDC*STR*TS*dummy trade restrictions				-1.671 (1.347)
dummy LDC*STR			-3.661 ^a (0.891)	
Number of year TS*STR			0.048 ^c (0.027)	
Constant	-22.220 ^a (3.911)	-25.577 ^a (4.592)	-22.130 ^a (3.724)	-22.319 ^a (4.743)
Observations	541	518	541	518
Number of countries	62	59	62	59
Log likelihood	-1159.506	-1099.6835	-1158.0379	-1096.2605
likelihood-ratio test vs. pooled	245.55	225.17	245.38	212.09
Likelihood-ratio test of alpha=0	1454.42	1328.43	1391.82	1201.56
Hausman test	11.61	12.35	14.59	12.14
Prob>chi2	0.8667	0.8284	0.6898	0.8797

Notes: The letters “a”, “b” and “c” indicate respectively significance levels at 1, 5 and 10 percent. Standard errors are in parentheses. Time dummies are included. All p-values for the likelihood ratio tests are less than 0.001. * Three countries are dropped from the estimation: Bangladesh, Mexico and Vietnam. These countries have signed tax sparing agreements during the data period.

dummy takes the value of 1 when the host country measure of trade openness is below sample average. These dummies, which are interacted with the statutory tax rate (Column 4), allow for distinguishing the impact of taxes on FDI in tax sparing countries restricting trade, from the impact of taxes on tax sparing countries relatively more open to trade. Both coefficients are not significant, suggesting that the statutory tax rate has no influence on the location of Japanese multinationals either in closed or open to trade tax sparing countries. Furthermore, the difference between both coefficients is not statistically significant ($p=0.256$), indicating that in tax sparing countries, the non-influence of the statutory tax rate can hardly be explained by the trade regime of the host country.

3.3 Race to the bottom?

Our results indicate that taxes play a significant role in the location of FDI in developing countries, even when determinants related to imperfect competition are controlled for in the estimations. This suggests that the fear of tax competition is not completely unfounded as foreign investors do react to different levels of statutory tax rates. The magnitude of the tax variable impact on FDI corroborates the literature findings on the growing influence of this foreign capital location determinant. However, in parallel, public goods have also experienced an increasing importance in the determination of FDI flows. In addition, one key result in the tax literature is based on the work of Tiebout (1956), indicating that firm and individuals will locate in the jurisdiction where they can obtain their most preferred tax-public goods package. In this package, a trade-off between the level of taxes and the quality of public goods available is realized by investors before choosing to locate themselves in a foreign country. Thus perfect international capital mobility should not lead to a zero taxation of capital earnings.

To investigate this question, we test the role of public goods and the quality of institutions in the location choice of Japanese firms and compare their effects to the tax variable ones. We first consider the role of public goods. We develop three variables that control for education (gross secondary enrolment ratio: G), infrastructure (telephone/GDP: T), and health (life expectancy at birth: L) which are added to the estimations in Table 4. These variables, which can proxy for several components of public goods, are highly correlated together and can hardly be included in the same model due to high level of correlation. Nevertheless, despite a high coefficient of correlation (between 0.69 and 0.82) these variables also have information not in common. Hence, we combine their respective information through a principal components

analysis. The first principal component, called GTL, is the linear combination of the standardized variables, which accounts for the maximum amount of total variance in the observed variables. To distinguish the effects of public goods on the location of Japanese multinationals between developed and developing countries, GTL is interacted with a dummy variable which takes the value of 1 when a country is a developing country and with a dummy variable which takes the value of 1 when a country is a developed country. The results of Column 1 indicate that public goods have a significantly positive effect on Japanese firm location in developing countries. For instance, one standard deviation increase in the quantity of public goods increases the annual number of Japanese establishments by 50.7%¹⁷. As health and education enhance workers' productivity and therefore lower absolute wage rates, it is not surprising to find a positive correlation between firm locations and public goods¹⁸. As discussed above, a number of papers have found evidence that multinationals are particularly interested in good labor skills and high-quality infrastructure (Carr et al., 2002; Alsan et al., 2004; Globerman and Shapiro, 2002). Dealing with taxes, this variable still exhibits a strong negative coefficient in developing countries. For one standard deviation increase of the statutory tax rate, the number of Japanese multinationals decreases by 31.2%. Note that the level of taxation can indirectly measure public goods received in return, so the inclusion of public goods presents the advantage to insulate the effect of taxes. The statistical significance of public goods reveals their importance in the strategic decision of firms and tends to diminish the risk to lead to a zero taxation of capital since corporate taxes are used to finance public goods.

We next focus on the importance of public governance, and test whether six aggregate governance indices estimated by Kaufmann et al. (1999b) have an effect on Japanese firm locations (Column 2). The first of these, voice and accountability, measures various aspects of the political process, civil liberties and political rights. The second one, political stability and absence of violence, attempts to capture the process by which those in authority are selected and replaced and also measures armed conflict, domestic violence, and terrorism. Therefore, government effectiveness measures the quality of public good provisions, red tape, and bureaucracy. The regulatory quality index is related to a government's ability to formulate and implement sound

¹⁷The percent change coefficient of public goods is calculated as follows: $100 * [\exp(0.386 * 1.063) - 1]$, with 1.063 being the standard deviation of public good.

¹⁸The non significance of public goods availability in developed countries stems probably from the small variation of this data for industrialized countries. The standard deviation of this variable is considerably higher for developing countries. To illustrate this difference we calculate the ratio between the mean and the standard deviation for both set of countries. The ratio is equal to 0.48 for developing countries and to 5.09 for developed countries.

Table 4: Effects of Taxes, Public Goods and Public Governance on the Number of Japanese Locations between 1990 and 2000

	Random NBM				
	(1)	(2)	(3)	(4)	(5)
ln GDP	0.847 ^a (0.089)	0.922 ^a (0.088)	0.876 ^a (0.089)	0.931 ^a (0.086)	0.971 ^a (0.086)
ln GDP per capita	-0.634 ^a (0.208)	-0.430 ^b (0.197)	-0.894 ^a (0.224)	-0.319 (0.198)	-0.420 ^b (0.189)
ln Trade	0.392 ^b (0.180)	0.685 ^a (0.181)	0.411 ^b (0.183)	0.625 ^a (0.175)	0.659 ^a (0.176)
ln Real exchange rate	-0.052 (0.046)	0.004 (0.046)	-0.041 (0.048)	-0.036 (0.045)	-0.004 (0.046)
ln Distance	0.001 (0.286)	0.238 (0.296)	0.089 (0.299)	-0.044 (0.296)	0.144 (0.294)
East Asia and Pacific dummy	1.471 ^a (0.417)	1.447 ^a (0.418)	1.645 ^a (0.422)	1.067 ^b (0.427)	1.322 ^a (0.424)
dummy LDC*STR	-3.720 ^a (0.866)	-3.504 ^a (0.864)	-3.567 ^a (0.833)		
dummy DC*STR	0.077 (0.925)	-0.915 (0.954)	-0.432 (0.992)		
dummy LDC*GTL	0.386 ^a (0.114)		0.460 ^a (0.122)		
dummy DC*GTL	-0.327 (0.214)		-0.202 (0.243)		
dummy LDC*Gov		0.203 ^b (0.096)	0.179 ^c (0.093)		
dummy DC*Gov		-0.088 (0.099)	0.226 ^c (0.128)		
STR				-3.268 ^a (0.784)	-3.583 ^a (0.778)
STR*GTL				3.524 ^a (0.904)	
GTL				-1.004 ^a (0.324)	
STR*Gov					1.303 ^a (0.328)
Gov					-0.293 ^b (0.121)
Constant	-14.194 ^a (4.203)	-20.832 ^a (3.749)	-13.443 ^a (4.205)	-19.200 ^a (3.855)	-21.037 ^a (3.622)
Observations	541	541	541	541	541
Number of countries	62	62	62	62	62
Log likelihood	-1148.4635	-1156.8664	-1144.8036	-1154.7101	-1153.4062
likelihood-ratio test vs. pooled	268.13	262.96	272.17	257.18	248.84
Likelihood-ratio test of alpha=0	1472.43	1482.86	1467.34	1398.33	1346.93
Hausman test	10.99	20.32	35.55	4.88	21.31
Prob > chi2	0.9242	0.3754	0.6878	0.9990	0.2643

Notes: The letters “a”, “b” and “c” indicate respectively significance levels at 1, 5 and 10 percent. Standard errors are in parentheses. Time dummies are included. All p-values for the likelihood ratio tests are less than 0.001.

policies, and it measures price controls, foreign trade, inadequate bank supervision, representing burdens for investors. The index, rule of law, measures the level of confidence of an agent in the rules of society, including property rights, contract enforcement, and the effectiveness of the judiciary. The last index, control of corruption, measures the extent of bribery. These variables, which proxy for various components of public governance, are highly correlated and thus we combine them through a principal components analysis. In order to test for the impact of public governance in developed and developing countries, we control for the first principal component extracted from the raw data, which we call “Gov”, through two multiplicative dummies, one for each type of country.

The results indicate that the quality of public governance attracts Japanese multinationals as the Gov variable has a positive and statistically significant coefficient for the set of less developed countries¹⁹. For one standard deviation increase in the quality of public governance, the number of Japanese establishments increase by 34.9%, holding other variables constant. While public goods and public governance variables were expected to have a positive influence on the location choice of Japanese firms, as they are entered in separate regressions, it is impossible to determine whether they are proxies for the same general characteristics. Accordingly, to make this test, we enter public goods and public governance simultaneously in the model estimated in Column 3. Both variables appear to have a complementary impact on the location of Japanese firms in developing countries as they remain significant when they are tested together. However, comparing the increase in Japanese establishments due to one standard deviation increase in both variables, the capacity of a government to provide crucial public goods has a stronger influence on FDI activity compared to the quality of institutions. From these results it seems that a government should place its greatest efforts in improving the provision of public goods in order to attract more multinational corporate activity.

The magnitude and significance of taxes, robust to the inclusion of the quality of institutions or public goods, reveal the strong importance of corporate taxes as a determinant of FDI in developing countries and suggests that policymakers and academics have reason for concern since competition for capital can considerably decrease the level of corporate income taxes. However, tax differentials between countries and the significant role of corporate tax rates in the location of FDI also allow developing countries to compensate for the weaknesses in

¹⁹Like the public goods variable, the Gov variable does not vary much across developed countries. The ratios of the mean divided by the standard deviation are equal to 0.88 for developing countries and to 2.49 for developed countries.

economic fundamentals. For example, results of Columns 3 show that a host country suffering from one standard deviation disadvantage in terms of public governance, compared to other host countries, can offset this handicap with a decrease of 6.44% point of the statutory tax rate.

We can gain some insight into the relationship between taxes, public goods/public governance and Japanese FDI by adding an interaction term between taxes and public goods and between taxes and public governance, as we do in columns 4 and 5. As it can be seen, the degree of the responsiveness of Japanese firms to the level of taxes depends upon both the quantity of public goods (column 4) and the quality of public governance (column 5). Increasing the quantity of public goods and the quality of public governance reduces the impact of the statutory tax rate on the location choices of Japanese firms. Once again, the effect of corporate tax rates on the location choices of Japanese firms should not lead to zero taxation.

Overall, public goods, public governance, and the statutory tax rate are important determinants of FDI activity in developing countries. A significant reduction in corporate income taxes represents an easy way for developing countries to improve their investment climates, since this FDI incentive can be done without direct budgetary expenses. However, the use of the fiscal instrument to attract FDI is costly and fiscal receipts are required to finance the provision of public goods and a good public governance. The improvement of public governance and the ability of a government to provide public goods such as health, education, and infrastructure, appear to be the best long-term strategy to raise national welfare because that reinforces the long-term attractiveness of the host country, benefits to every enterprises without considering their nationality, and increases the possibility of benefit from FDI spillovers (Blömstrom and Kokko, 2003). Furthermore, the last result of this empirical analysis - being that the impact of corporate taxes on FDI diminishes with an increase in public goods and public governance - suggests that providing more public goods and better institutions allows government to be less dependent from the growing tax competition for FDI.

4 Conclusion

This paper attempts to shed light on the relationship between the level of taxation and FDI in developing countries. Although theoretical and empirical evidence supports a link between taxation and FDI location, few studies present systematic empirical evidence for this link in developing countries. Investigating the location of Japanese firms over the 1990 to 2000 period,

this paper identifies the nature and the relationship between corporate tax rates and FDI in developing countries, from which we derive a number of implications.

First, this paper shows that Japanese firm operations are strongly and negatively influenced by the level of statutory tax rates in host developing countries. However, investors coming from a tax credit country like Japan do not react to tax levels in the same way in all developing countries. Indeed, when a special provision, namely tax sparing, is signed between a developing country and Japan, the level of corporate tax rates has no impact on the locational decisions of Japanese multinational firms. The lack of influence likely derives from the fact that under tax sparing, the statutory tax rate represents a fictitious tax payment that increases the difference between this tax rate and the effective tax rate. Supporting this finding, the interaction term between the number of years subsequent to the signing of a tax sparing agreement and the statutory tax rate, shows that the effects of taxes on Japanese investment decreases with the number of years following the date of signing of the provision. In non-tax sparing countries, the strong negative relationship between corporate taxes and FDI is still observed.

The inclusion of tax sparing in bilateral tax treaties is not the only phenomenon that has an implication for the complex relationship between taxes and FDI. We observe an asymmetry between the impact of corporate taxes on FDI in developed countries and in developing countries. The effects of the statutory tax rate diminish for countries with higher levels of GDP per capita during the period studied. Thus, the level of the statutory tax rates do strongly determine the destination of Japanese firms and can allow a country to compensate for disadvantages in term of public goods or public governance, but the influence of corporate taxes decreases with a high provision of public goods and with the quality of public governance.

The findings presented in this paper suggest that the relationship between FDI and corporate taxes is not obvious. This paper also provides a perspective on the situation of tax competition. The strong negative correlation we observe between these FDI and corporate tax rates is robust to the inclusion of other control variables and is not an artefact generated by outliers. Our results give some credit to the fear of the so-called race to the bottom, with respect to corporate tax rates, and particularly for developing countries. That said, downward pressures on the taxation of capital are limited by the importance of public goods and public governance which increase the attractiveness of an host country and which are partly financed by fiscal receipts derived from corporate taxes.

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5 Appendix

5.1 Data Appendix

Usual control variables

Market size (GDP): The size of the market, typically proxied by the level of GDP, appears to be the most important determinant of FDI flows. In the literature, it is common to hypothesize that a firm will have a strong incentive to invest in a country where local demand is high. On the supply side, a bigger market should diminish the cost of firms due to economies of scale. According to Root and Ahmed (1979), Schneider and Frey (1985) and Wheeler and Mody (1992), the local demand, often approximated by the GDP, has a significant influence on FDI flows in developing countries.

The gross domestic product is measured at market price in current US dollars. These data are from the "Global Development Network Growth Database" published by the World Bank.

GDP per capita (GDP/CAP): Usually this variable can control for host country development level with the hypothesis that the probability of location is positively correlated with it. However GDP per capita can also be used as a proxy for return on investment²⁰ and for wages²¹. Controlling for wages, it is generally hypothesized that lower labor costs should encourage "efficiency-seeking" FDI flows. If this relationship is not always established for industrial countries, results for developing countries indicate that wage costs are a significant determinant of FDI location (Schneider and Frey, 1985; Lucas, 1993; Wheeler and Mody, 1992).

These data are from the "Global Development Network Growth Database" published by the World Bank.

Trade openness (Trade): Firstly, the share of firms whose activities are export oriented or import inputs should be attracted to a country's degree of openness to international trade. Secondly, Wei (2000) and Islam and Montenegro (2002) have demonstrated that openness is positively associated with institutional quality, indeed rent-seeking and corruption are reduced due to higher competition and international pressures to improve institutional quality.

²⁰Asiedu (2002) wanted to test the hypothesis that FDI go to countries that offer a higher return on capital. For developing countries these data are very hard to find so she assumes that the marginal product of capital is equal to the return on capital and use the inverse of GDP per capita to control for the return on capital.

²¹As nominal wages and GDP per capita can be strongly correlated, GDP per capita can also control for labor costs. We test the correlation between GDP per capita and the labor costs per worker in manufacturing coming from Rama and Artecona (2002) "A database of labor market indicators across countries". The correlation between these two variables is 0.65.

The trade openness measured by the sum of exports and imports of goods and services divided by GDP, is lagged two years in order to avoid endogeneity bias. These data are from the “Global Development Network Growth Database” published by the World Bank.

Exchange Rate: On the one hand, a host country’s weak currency can make firms more likely to invest in the country because the local acquisition costs will be lower. On the other hand, in developing countries, a weak currency can be seen as a signal of instability and generates risk aversion. The bilateral real exchange rate between Japan and country “i”, expressed as the number of local currency units of one Yen is obtained by dividing the bilateral real exchange rate between the local currency and the United States dollar (expressed as the number of local currency units for one dollar) and the bilateral real exchange rate between the yen and the United States dollar (expressed as the number of yen for one dollar).

These data are from the real annual country exchange rates compiled by Mathew Shane from the “Economic Research Service” of the United States Department of Agriculture.

Distance: The impact of distance on firm location is controversial as two opposite effects can occur. When trade costs are higher than plant fixed costs, FDI are a substitute to trade and the distance increases FDI. However, geographic distance which is a proxy of transaction costs such as cultural difference and information costs can also be detrimental to FDI.

The distance data, between the host country and Japan, are from the CEPII.

East-Asia and Pacific Dummy: According to World Bank classification: China, Indonesia, Korea, Malaysia, Philippines, and Thailand are considered to be countries of the East Asia and Pacific region.

Public Goods and Public Governance variables

Telephone lines/GDP: According to Easterly and Levine (1997) and Collier and Gunning (1999), while telecommunications is the only infrastructure variable widely available for developing countries, it is likely that different kinds of infrastructure are highly correlated. However, the variation in stock of telecommunications can be explained by GDP per capita (Forestier et al., 2002), thus Fink and Kenny (2003) propose to measure infrastructure by the per-income stock of telephone lines in order to avoid correlations with market related variables. These data are from the “Global Development Network Growth Database” published by the World Bank.

Gross secondary enrolment ratio (GSSE): Ratio of total enrolment, regardless of age, to the population of the age group that officially corresponds to the level of secondary educa-

tion. Secondary education completes the provision of basic education and aims at laying the foundations for lifelong learning and human development. This ratio is therefore a measure of participation in education and should be correlated with the availability of skilled labour. These data are from the “Global Development Network Growth Database” published by the World Bank.

Life expectancy at birth: This variable, which can be seen as an indicator of the quality of a health system, indicates the number of years a new-born infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life. These data are from the “Global Development Network Growth Database” published by the World Bank.

Kaufmann governance indicator (Gov): Governance infrastructure is measured by six aggregate governance indices estimated by Kaufmann et al. (1999b). For a comprehensive discussion of these indicators, see Kaufmann et al. (1999a).

5.2 Japanese Tax Sparing agreements

Table 5: Japanese tax sparing agreements

Countries	Date of conclusion	Entry into force
Bangladesh	28 February 1991	25 June 1991
Brazil	24 January 1967	31 December 1967
China	6 September 1983	28 May 1984
India	5 January 1960	13 June 1960
Indonesia	3 March 1982	31 December 1982
Korea	3 March 1970	29 October 1970
Malaysia	30 January 1970	23 December 1970
Mexico	9 April 1996	6 November 1996
Pakistan	17 February 1959	14 may 1959
Philippines	13 February 1980	20 July 1980
Sri Lanka	12 December 1967	22 September 1968
Thailand	1 March 1963	24 July 1963
Vietnam	24 October 1995	31 December 1995

Source: International Bureau of Fiscal Documentation.