Corporate taxation and FDI within the EU25

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Abstract

The influence of tax differentials on FDI location is a source of concern both in the EU15 and the NEM. EU15 countries fear that investment be diverted towards low-taxation, eastern European neighbors. As to the NEM, they have been experimenting a strong inflow of foreign capital during the transition period, as a result of both their rapid opening-up and the privatization process. With both processes now going to an end, the permanence of long-term foreign capital inflow is an important issue. The NEM could feel the temptation of attracting further FDI by tax incentives, as this is the only tool left once monetary policy is dedicated to entering the EMU, and fiscal policy is partly constrained by the Maastricht treaty.

This paper investigates the impact of tax incentives on the location of FDI within the enlarged European Union. In order to capture the structural determinants of location choices, this issue is explored using a gravity framework, where the market potential of recipient countries is taken into account. Tax incentives are measured both by statutory and apparent taxation, and the whole empirical work is led on bilateral data.

The paper shows that FDI does react to tax differentials within the EU25. This is especially the case when an ex-post measure of taxation that accounts for all possible allowances and exemptions, is used to measure tax differentials.

This result is robust to the inclusion of other major determinants of FDI attraction, such as unit labor costs and/or the real exchange rate. Differentiating between positive and negative tax differentials seems to indicate that tax incentives are especially strong for FDI directed to the NEM. Moreover, a higher taxation in the competitors leads to an increase of FDI in the destination country. Hence, the risk of a tough tax competition to attract FDI does exist in the European Union. This risk is however limited by the prominent importance of non-tax factors in the location of FDI.

1. Introduction

The tax competition literature has long been stating that increasing international integration might impose a growing pressure on tax policies, as raising taxes creates an incentive for mobile tax payers to relocate abroad. Because tax base relocation is proportionally more important in small countries than in large ones, this literature further shows that small countries have stronger incentives than large ones to cut taxes, and that they can initiate a "race to the bottom". The recent entry of small, low-taxation countries in the EU therefore raises a number of issues about the future of capital taxation in the enlarged European Union.

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We are grateful to Delphine Prady for excellent research assistance.

However, perfect capital mobility does not necessarily mean high sensitivity of capital movements (and especially FDI) to tax differentials. In particular, imperfect competition models show tax competition to be consistent with persistent tax discrepancies, because trade costs induce a home-market bias if they combine with scale economies. Location incentives are consequently higher in “large” countries, which can then impose higher tax rates than “small” countries without loosing attractiveness. Such conclusions are reinforced in the light of the new economic geography literature, which points out that, in the presence of agglomeration economies, attractive countries benefit from taxation rents. This could be an underlying force leading to the long-lasting tax differentials in Europe.

This paper aims at measuring the impact of corporate taxation differentials on foreign direct investment within the European Union, when gravity factors are controlled for. The analysis is run on bilateral FDI flows across the 25 member of the EU, over the 1990-2002 period, using panel econometrics. Corporate taxation is identified through two alternative variables, namely statutory and apparent tax rates.

The paper is organized as follows. Section 2 presents basic statistics concerning both corporate taxation and foreign direct investment within the European Union. In Section 3, the econometric methodology is detailed. The results are discussed in Section 4. Section 5 concludes.

2. Stylised facts

1.1 Taxation

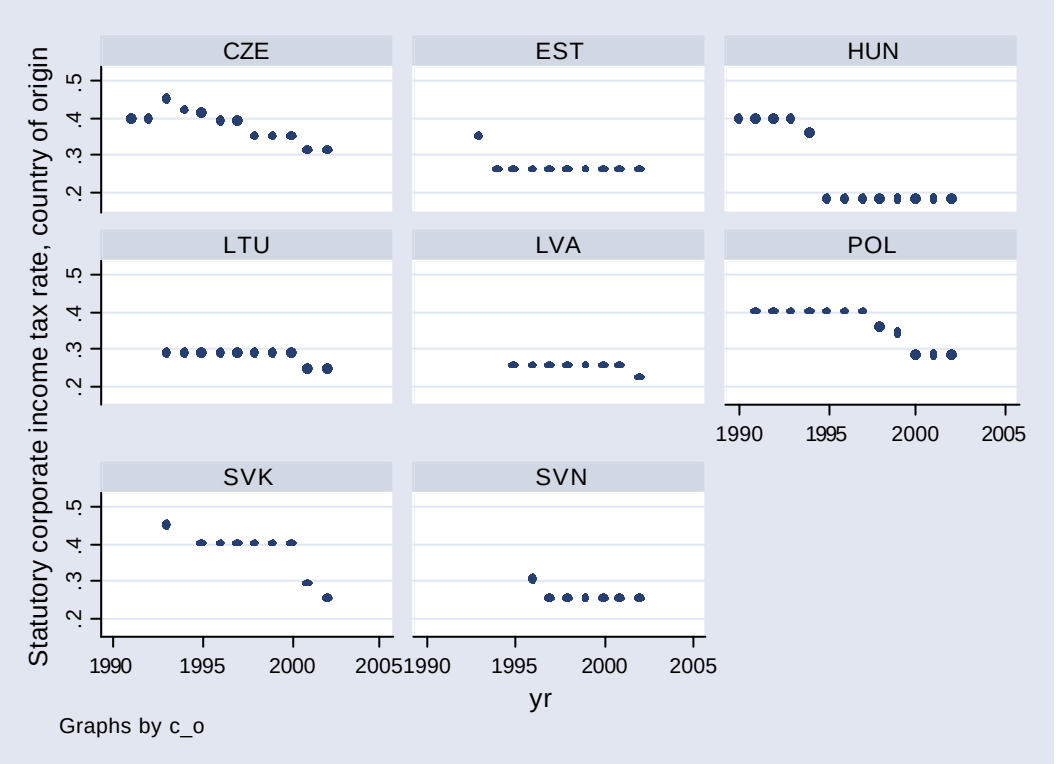
Statutory tax rates

One of the main issues in the tax competition debate surrounding the 2004 EU enlargement is the continuously decreasing burden of corporate taxation in the new European member states.

Indeed, as shown in Graph 1, statutory corporate taxes have been following a downward trend since the liberalization process took place in the new member countries, with tax rates declining everywhere, following different speeds however: while the cut in statutory tax rates has been spectacular in Hungary, the decrease is smooth but as important in size in Poland or in the Czech Republic.

It should be noticed that some special taxation regimes are not taken into account in the graph, as the zero taxation which is allowed in Estonia in special cases for multinational firms.

Graph 1. Statutory corporate taxation in the new European member states



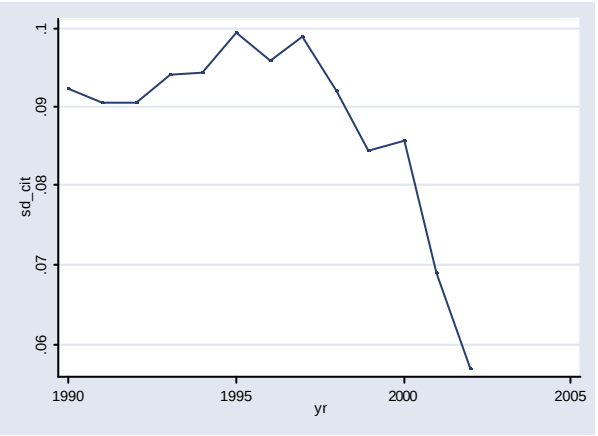
Source: Eurostat and national sources

While the decrease in statutory taxation is obvious in the new Eastern European members of the EU, it should be noted that a declining trend has also been observed in several EU 15 members since the late 1990s (Graph 2). On the whole, there has been a downward convergence in statutory tax rates in the EU 25, with several high tax countries (such as Germany, the Czech Republic, Hungary or Poland) having cut their rates dramatically towards low tax countries (such as Ireland or Slovenia). This convergence is illustrated in Graph 3 showing a fall in the standard deviation of tax rates in the late 1990s and early 2000s.

Graph 2. Statutory tax rates in the EU15

Source: Devereux & Griffith database, Eurostat and national sources

Graph 3. Standard deviation of statutory corporate tax rates in the EU25.



Apparent taxation

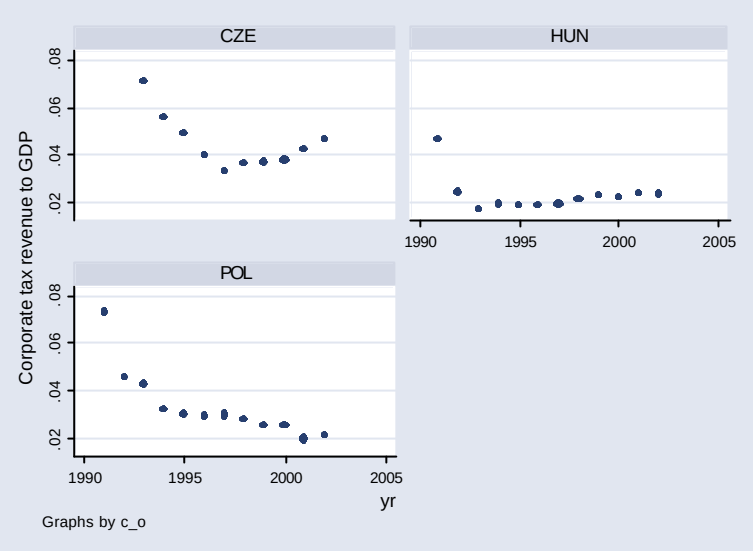
While statutory taxation gives an insight on the burden of taxation that can be expected ex ante, it is only a very tough indicator, as it gives – for instance – no account of the various allowances and taxable income definition rules that might affect ex-post taxation. Therefore, any attempt to analyze taxation should rely both on ex-ante and ex-post taxation data.

Ex-post taxation is the amount of corporate taxation which is de facto levied by the government. Here, it is normalized to GDP.[1]

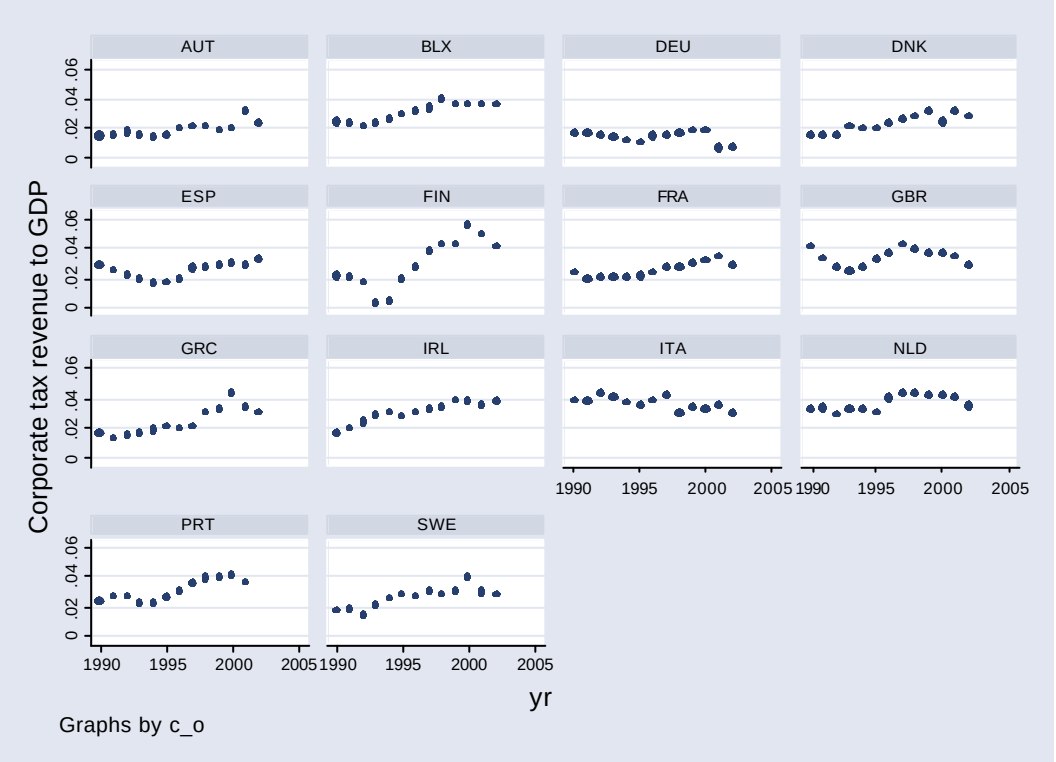
[1] Normalizing by the gross value added (World bank, WDI data) does not change the picture.

The results can change dramatically, as can be seen in Graph 4 and Graph 5. For instance, while statutory taxation has been deeply decreasing in the Czech Republic, apparent tax rates have been growing up in this country, which can be the result of this small country attracting enough investment (domestic as well as foreign) for the increase in taxable income to compensate for the decrease in the taxation rate. In the EU15 countries, apparent tax rates do not exhibit any common declining trend.

Graph 4. Ex-post effective taxation (to GDP) in the new EU members

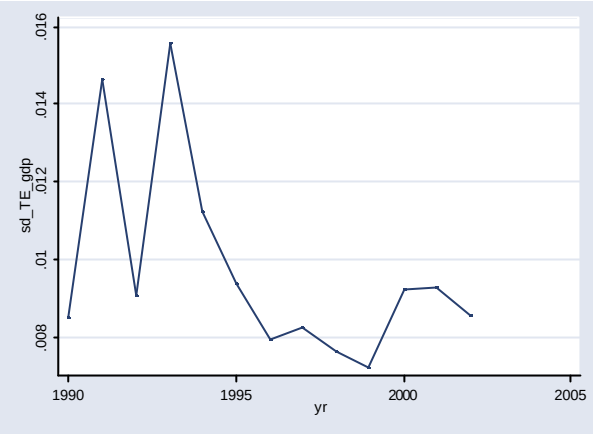


Graph 5. Ex-post effective taxation (to GDP) in the EU15.



As a consequence, the dispersion of effective tax rates does not exhibit as smooth developments as the dispersion of statutory taxation. The decrease is much steeper, and much earlier, whereas the dispersion in effective taxation tends to widen out at the beginning of the 2000s (Graph 6).

Graph 6. Standard deviation of ex-post effective corporate tax rates in the EU25.



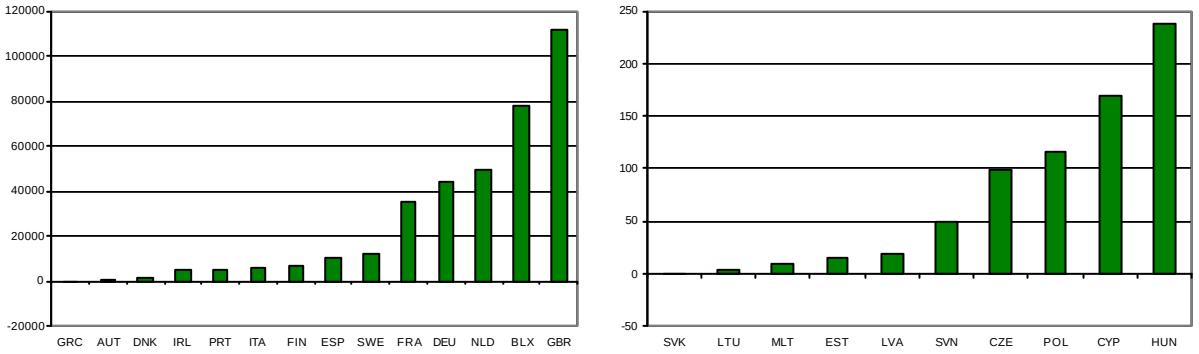
1.2 FDI

In a context of high capital mobility, corporate taxation is expected to increase the before-tax profit rate required by capital owners, hence to reduce investment. However, because capacity-building investment reacts sluggishly to supply-side incentives, most studies look more specifically to the impact of taxation on FDI. Capital (and more specifically FDI) is by definition mobile at the worldwide level, and might react faster to tax incentives because location decisions are made directly at the word (or regional) level.

The liberalization of capital movements has even increased the ability of firms to design international investment strategies. The new EU members have taken advantage of these developments to attract important amounts of FDI. The privatization process in operation in these countries has also contributed to attract foreign capital.

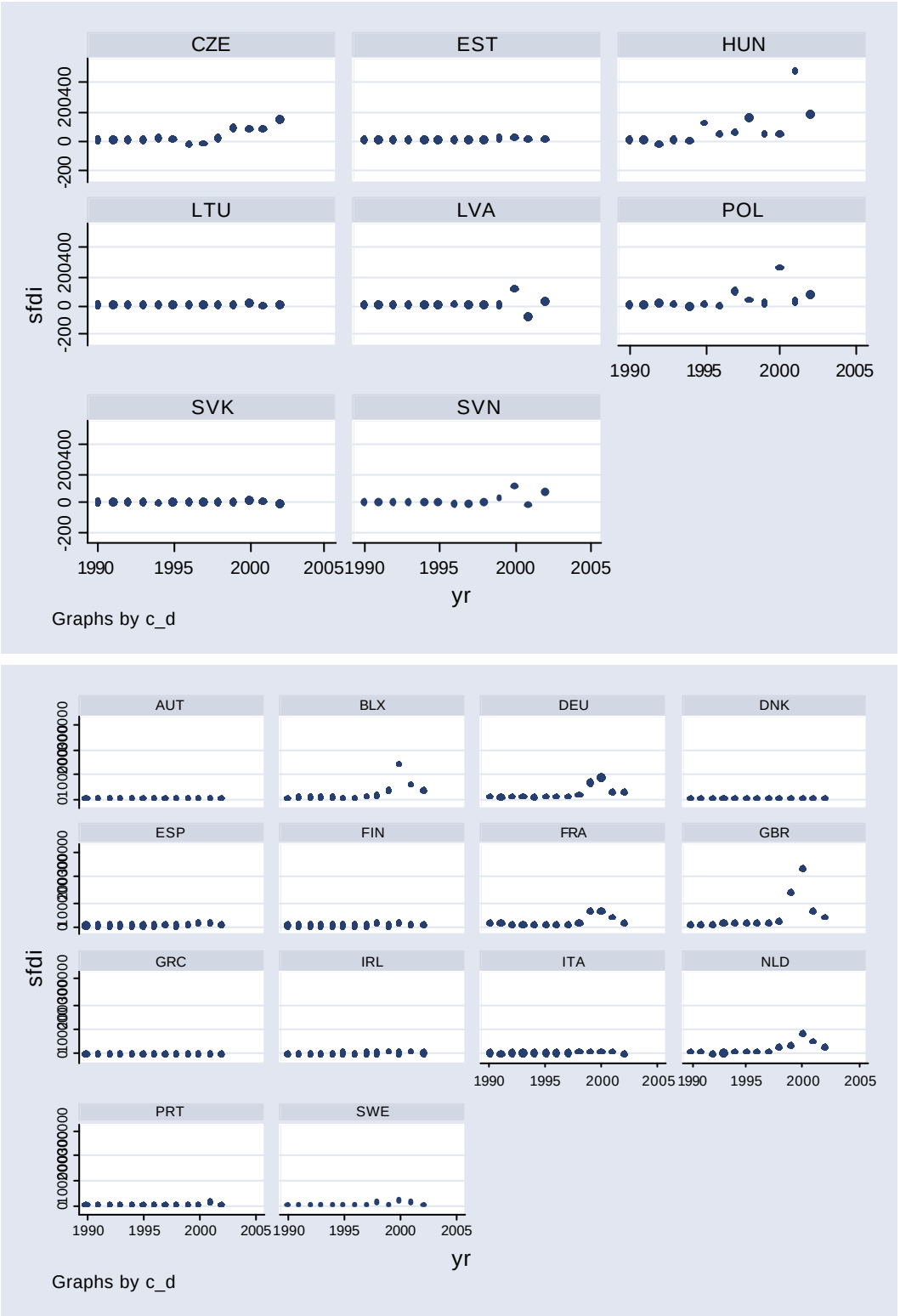
Inward FDI is very unevenly distributed across the countries of the sample, with developed countries attracting structurally much more FDI than transition ones (Graph 7). However FDI to accession countries (especially Hungary) has been rising dramatically in the early 2000s (Graph 8).

Graph 7. Inward FDI in the countries of the sample, millions of EUR 2000-2002 average.



Source: Eurostat

Graph 8. Total inward FDI in the countries of the sample, 1990-2002, in millions of EUR.



Source: Eurostat

3. Econometric methodology

3 .1 Theoretical foundations

The traditional theory of tax competition points out that, in open economies with fully mobile capital, capital taxation should tend to zero, because it is dominated by taxation of immobile factors, which cannot, by definition, escape taxes through relocation (Diamond and Mirrlees, 1971, Gordon, 1986, Razin and Sadka, 1991, and Wilson, 1999, for a survey). The liberalization of capital flows has made this theory more and more relevant to corporate profit taxation, as foreign direct investment (FDI) allows firms to choose their location on taxation grounds. According to Gordon and Hines (2002), "Tax policies are obviously capable of affecting the volume and location of FDI, since, […] higher tax rates reduce after-tax returns, thereby reducing incentives to commit investment funds".

This feeling that FDI should react to corporate profit taxation is widely shared, both in academic and operational circles, even though several reasons could justify this impact to be empirically unnoticeable and even misleading. First, the use of transfer pricing and intra-firm debt contracting allows firms to shift profits where taxation is the lowest, therefore disconnecting the location of profit and production. Second, location decisions depend on the combination of taxation and public goods provision in host countries (Tiebout, 1956), which can soften the link between the tax level and the amount of FDI located in a country. Along the same line, the impact of tax differentials on FDI location decisions may not compare to that of structural determinants like the proximity to final markets, the characteristics of competition on the labor and goods markets, and so on (Markusen, 1995). Third, a higher tax rate can result in lower capital price (such as land price) which raises pre-tax return with little impact on investment (Scholes and Wolfson, 1990). Finally, tax differentials can be an equilibrium outcome in an imperfect competition setting combining economies of scale with trade costs and/or agglomeration forces (Haufler and Wooton, 1999, Andersson and Forslid, 1999, Baldwin and Krugman, 2004, Ludema and Wooton, 2000). In this case, tax differentials just compensate for location rents.

Despite these various reasons why FDI might be insensitive to tax differentials, empirical evidence shows that multinational firms (MNF thereafter) do react to tax incentives, be they embedded in tax rules (which avoid double taxation problems through credit or exemption schemes) or tax rates. Extensive reviews of the literature include Hines (1999) and Gordon and Hines (2002). According to the meta-analysis by de Mooij and Ederveen (2003), the semi-elasticity of FDI to tax rates varies from –22.7 to +13.2, with a mean of –3.3 or –4.0, depending on whether non significant estimates are included in the sample or not. As for the elasticity of FDI to tax rates, it ranges from –0.6 to –2.8, depending on the estimation method (Desai and Hines, 2001).

Some studies refine investigations by looking at the tax sensitivity of different kinds of FDI: reinvested earnings versus direct transfers (Hartman, 1984, Slemrod, 1990) or mergers and acquisitions versus new plants and plant extensions (Swenson, 2001a). Desai and Hines (2001) show US FDI to be sensitive not only to taxes on profits, but also to indirect (non-income) taxes.

A series of papers also underline the impact of double-taxation rules, in line with the theoretical studies initiated by Hamada (1966) and Musgrave (1969). Specifically, exemption schemes are expected to enhance FDI outflows to low-tax countries, because repatriated profits are then exempted from taxation. Conversely, FDI flowing from countries operating credit schemes should be less sensitive to tax incentives because repatriated profits are then subject to home-country taxation, the MNF being refunded for the tax bill paid abroad. Empirical results in this field are not conclusive. This is probably due in part to the fact that most studies concern FDI flowing in or out of the US, which does not allow disentangling the impact of tax schemes from the impact of other omitted variables. The study by Gropp and Kostial (2000), based on a panel of OECD countries between 1988 and 1997, is an exception, but the use of aggregate FDI data does not allow them to study the impact of tax differentials combined with double-taxation arrangements.

3.2 The gravity setting

The gravity framework was first developed to investigate the structural determinants of trade between countries. The basic assumption is that trade should be all the more important that the trading partners are large and close to each other. Structural sources of trade frictions should also be taken into account, as shown by Anderson and van Wincoop (2003), together with more institutional determinants, such as common borders or common language.

While initially devoted to the analysis of international trade, the gravity setting has been progressively applied to capital flows, ranging from portfolio investment to FDI (e.g. Eaton and Tamura, 1994, Portes and Rey, 2000, Wei, 2000, Bloningen and Davies, 2000, 2002, or Stein and Daude, 2001, 2003).

Here the basic gravity equation is the following:

$$LFDI_{dot} = a_1 TAXdo_{dot} + a_2 LPOT_{dt} + a_3 LGDP_{ot} + a_4 LDIST_{do} + a_5 CLNG_{do} + a_6 BORDER_{do} + v_d + w_o + e_{dot}$$

(Eq. 1)

where $LFDI_{dot}$ is the (log of) foreign direct investment inflows in the destination country *d* from the origin country *o* at time *t*. Foreign direct investment at constant price (the deflator being the price index of the gross capital formation of the destination country) is expressed in euro. v_d and w_o are fixed effects for the destination and the host country. The estimate does not include a time fixed-effects. There are only 432 negative observations on a total of 2,651 available observations. Hence, 16% of observations are ignored due to the log-transformation of FDI data.

Data cover the 1990-2002 period, on an annual basis. The gravity variables are the following.

$LPOT_{dt}$ is the *market potential* of the destination country at time t. While trade equations simply look at the GDP of the destination country as a determinant of trade, the case might be a bit different in the case of FDI. Indeed, when considering a foreign location, MNF are not only concerned by the size of the host domestic market, but also by its density, i.e. the concentration of domestic demand around the main income centers. The main decision variable might therefore be the market potential associated with each possible location, i.e. the distance-weighted average of national regions. This variable (transformed into log), labeled $LPOT_{dt}$, is inspired from Harris (1954). However, another possible decision variable could be, in the case of the enlarged EU, the *enlarged market potential*, which is defined so as to take into account both the market potential of the host country, and the access that it allows to neighboring markets. This variable is labeled $LEPOT_{dt}$ (in logs). The two variables are alternatively used in the gravity equation. Both are in volume and converted using PPP exchange rates (World Bank, WDI), in order to cancel out the impact of nominal exchange rate fluctuations.

The *size of the investing country* ($LGDP_{it}$) is measured by the (log of the) GDP in purchasing parity standard. Because large countries have a greater potential than small countries for investing abroad, a positive sign is expected for this variable.

In gravity models of trade, *distance* (which is a proxy for transportation, transaction or, more generally, information costs) is a crucial determinant of trade flows. Its impact on FDI is debated however, because transportation costs interact with economies of scale. Increasing returns reduce the efficient number of plants, while impediments to trade have the opposite effect (Brainard, 1997). Hence, when plant fixed costs are limited compared to trade costs, the MNF will locate production units close to the markets, and FDI will be a substitute for trade: in this case, larger distance between the investor and the host raises FDI at the expense of trade. However geographic distance also stands for transaction and information costs and cultural distance. It is then as detrimental to FDI as it is to trade. Furthermore, whenever FDI inflows involve additional imports (inputs or investment goods), FDI and trade are complements, and distance can be detrimental to FDI just because it is so to trade (see Fontagné, 1999). In brief, the sign of the coefficient on (log of) the investor-to-host distance variable ($LDIST_{do}$) in theoretically indeterminate.

Finally, two traditional gravity variables are introduced in the analysis. The first one is a common language dummy ($CLNG_{do}$), which is designed to catch cultural factors that significantly contribute to international trade and financial linkages between countries, for instance through network externalities. A common border ($BORDER_{do}$) dummy is also included to catch potential non-linearities in the impact of distance.

In addition to traditional gravity variables, tax variables are introduced into the empirical estimation.

The measurement of taxation is a non-trivial issue. Statutory rates are the most obvious and readily available measure, but they can be misleading since low statutory rates can be offset by a broader definition of taxable income. Apparent tax rates (the ratio of observed receipts to observed taxable income) provide a more accurate measure of the effective tax burden, as they also account for any possible exemption. This advantage is balanced by the ex post nature of this measure: if MNF locate in tax-friendly countries, the host-country taxation can appear heavier ex post than it is ex ante (Hines and Rice, 1994). In addition, apparent corporate tax rates seem to be cyclical (Nicodème, 2001),

meaning that changes in apparent tax rates could be endogenous to FDI inflows. Both measures are therefore complementary when analyzing taxation issues.

Whenever empirical analysis is run on a single recipient or exporting country, the impact of corporate tax policies can only be caught through the tax-level of the partner country. Using a bilateral, multinational panel allows one to catch tax incentives more properly, through the computation of the tax differential between the host and the investor country.

TS_{dot} is the statutory corporate tax rates differential between the destination country (d) and in the country of origin of the FDI (o), computed as a simple difference. TE_{dot} refers to the (similarly computed) corporate tax differentials on apparent tax rates, computed as the ratio between corporate tax receipts and GDP (TE_GDP_{dot}) or gross value added (TE_VA_{dot}) using World Bank (WDI) data.

Finally, taxation should not be considered as the only cost determinant of FDI. In order to control for other potentially important cost variables, two additional determinants are introduced in the analysis. The first one is differential in the (log of) unit labor costs, $dLULC_{dot}$. The second one is the (log of the) bilateral real exchange rate (defined as $e_{do}.p_o/p_d$, hence a rise signals a real depreciation in the destination country, and should increase inward FDI).

4. Empirical results

4.1 Baseline results

Table 1 displays the results of a first series of estimations, where the impact of "structural" attractiveness is first investigated. Indeed, it is widely accepted in the literature that structural attractiveness (for instance, location or the size of the market) is the dominant determinant of FDI.

Table 1. Baseline estimation: taxation and the measurement of the destination country structural attractiveness

Model :	1	2	3	4	5	6
# obs :	1938	1842	1829	1938	1842	1829
TS_{dot}	0.537			0.586		
	(0.612)			(0.608)		
TE_GDP_{dot}		-9.115~			-8.452~	
		(3.867)			(3.841)	
TE_VA_{dot}			-8.526~			-7.827~
			(3.520)			(3.493)
$LPOT_{dot}$	1.754*	2.084*	2.385*			
	(0.50)	(0.506)	(0.533)			
$LEPOT_{dot}$				1.822*	2.057*	2.319*
				(0.495)	(0.499)	(0.521)
$LGDP_{ot}$	7.902*	7.570*	7.287*	7.946*	7.740*	7.515*
	(0.675)	(0.691)	(0.711)	(0.643)	(0.656)	(0.671)
$LDIST_{do}$	-0.951*	-0.977*	-0.971*	-0.945*	-0.972*	-0.965*
	(0.077)	(0.085)	(0.085)	(0.077)	(0.085)	(0.085)
$BORDER_{do}$	0.401*	0.371*	0.388*	0.394*	0.364*	0.379*
	(0.119)	(0.124)	(0.124)	(0.119)	(0.124)	(0.124)
$CNLG_{do}$	-0.322~	-0.306~	-0.304~	-0.331~	-0.317~	-0.316~
	(0.131)	(0.132)	(0.133)	(0.131)	(0.132)	(0.133)
Intcpt	-235.707*	-233.562*	-232.378*	-247.587*	-248.028*	-248.906*
	(10.899)	(11.263)	(11.326)	(9.909)	(10.247)	(10.282)
R-sq	0.723	0.703	0.704	0.724	0.703	0.704

Standard errors between brackets. *, ~: significant at the 1% and 5% level respectively.

The estimated coefficients of the gravity variables are significant and of the expected sign: (enlarged) market potential, GDP of the origin country, distance, and common language. Notice that there is not much difference between the simple market potential (market density of the destination country) and the enlarged market potential (which takes into account, in addition, the GDP of neighboring countries). The impact of distance is significantly negative, with an estimated coefficient close to 1,

which is the order of magnitude that is usually found in gravity models of trade. Previous analysis on the OECD countries that included the US and Japan failed to find any significant impact of distance. This suggest that in an integrated and continuous economic area, where the costs of distance are relatively low, an important part of FDI aims at re-exporting the goods produced: therefore FDI is a complement to trade, and distance is detrimental to it as it is to trade. Alternative explanations relate to the fact that distance can be a proxy for network effects in FDI.

A common border increases FDI by an 1.5 factor (exp(0.40)), while a common language increases FDI by factor 1.3 when significant.

Turning to taxes, the results are less clear cut. Statutory taxation differentials are not significant. This result is not unexpected, as statutory taxation does not account for the calculation of the taxable income, which can vary significantly across countries. As to apparent taxation, it has the negative, expected impact on inward FDI. The inclusion of gravitational variables allows to balance the impact of "structural" and tax-related factors on inward FDI (Table 1, Column (6)). The average standard deviation of the enlarged market potential is 11% in the time dimension. With an estimated elasticity of 2.3 for the enlarged market potential, an increase in this variable by one standard deviation can be compensated by an increase of the apparent tax differential by 3.1% percentage points in the recipient country (2.3×0.11/8).

4.2 Investigating other cost and competitiveness variables

Other cost or competitiveness determinants need to be taken into account when estimating the impact of taxation on bilateral FDI. Here we alternatively study the impact of relative unit labour costs between the destination and the origin country ($DLULC_{dot}$) and the bilateral real exchange rate ($LRER_{dot}$), both in logarithms. The former variable is closer to cost competitiveness, but it only covers labor costs. The latter variable, which is calculated with consumer price indices, is closer to price competitiveness, but it incorporates all costs. Hence, each variable has its pros and cons. Note that a rise in $DLULC_{dot}$ denotes a rise in relative costs in the destination country, whereas a rise in $LRER_{dot}$ indicates a rise in price competitiveness in the destination country. Hence, the coefficient is expected to be negative for $DLULC_{dot}$ but positive for $LRER_{dot}$.

The results are reported in Table 2. Strikingly, the coefficient on relative labour costs is significantly *positive*, which means that higher costs in the destination country tends to attract more FDI. This result is not unusual in the literature. It might be related to the fact that ULC are an imperfect proxy for labor quality which is not correctly accounted for in aggregate productivity. Conversely, a real depreciation in exchange rates tends to significantly attract FDI. When introduced altogether in the estimation, both variables remain significant and their signs do not change. Tax variables do not seem to be very robust to the inclusion of these cost variables: the inclusion of unit labor cost differentials cancels out the significance of tax variables. However tax differentials remain significant once price-competitiveness (instead of relative unit labor costs) is taken into account.

Table 2. Price and cost competitiveness determinants of bilateral inward FDI.

Model :	1	2	3	4	5	6	4	5	6
# obs :	1934	1842	1829	1885	1789	1776	1881	1789	1776
TS_{dot}	0.941			0.50			0.862		
	(0.612)			(0.611)			(0.615)		
TE_GDP_{dot}		-2.654			**-10.449***			-4.678	
		(4.183)			**(3.946)**			(4.309)	
TE_VA_{dot}			-3.392			**-9.854***			-5.337
			(3.738)			**(3.580)**			(3.860)
dulc	0.985*	0.90*	0.846*				1.166*	1.038*	0.970*
	(0.238)	(0.261)	(0.259)				(0.284)	(0.316)	(0.314)
lrer				0.333	0.554	0.565	0.918~	1.059*	1.049*
				(0.357)	(0.376)	(0.376)	(0.391)	(0.405)	(0.406)
$LEPOT_{dot}$	1.142~	1.344~	1.583*	3.025*	3.546*	3.836*	1.808~	2.282*	2.588*
	(0.524)	(0.539)	(0.566)	(0.684)	(0.694)	(0.710)	(0.748)	(0.792)	(0.816)
$LGDP_{ot}$	8.489*	8.370*	8.153*	7.034*	6.601*	6.346*	8.073*	7.711*	7.436*
	(0.654)	(0.679)	(0.697)	(0.728)	(0.745)	(0.758)	(0.770)	(0.816)	(0.835)
$LDIST_{do}$	-0.928*	-0.961*	-0.954*	-0.945*	-0.965*	-0.957*	-0.926*	-0.955*	-0.948*
	(0.077)	(0.084)	(0.085)	(0.077)	(0.085)	(0.085)	(0.077)	(0.085)	(0.085)
$BORDER_{do}$	0.417*	0.384*	0.399*	0.40*	0.375*	0.391*	0.427*	0.395*	0.411*
	(0.119)	(0.124)	(0.124)	(0.120)	(0.124)	(0.124)	(0.119)	(0.124)	(0.124)
$CNLG_{do}$	-0.352*	-0.335~	-0.332~	-0.383*	-0.368*	-0.366*	-0.385*	-0.366*	-0.365*
	(0.130)	(0.132)	(0.132)	(0.132)	(0.134)	(0.134)	(0.132)	(0.133)	(0.134)
intcpt	-244.547*	-246.427*	-246.914*	-254.164*	-255.820*	-256.611*	-249.945*	-252.363*	-253.045*
	(9.925)	(10.226)	(10.273)	(10.338)	(10.610)	(10.630)	(10.372)	(10.632)	(10.667)
R-sq	0.725	0.705	0.705	0.731	0.71	0.711	0.732	0.712	0.713

Although both *DLULC* and *LRER* are simultaneously significant in Table 2 (Columns (7) to (9)), they still carry similar information. Given the potential heterogeneity of the sample (and in particular the divide between EU15 and new EU members), it is possible that the various countries of the sample be sensitive to only one of these two variables. To investigate this possibility, we introduce a multiplicative dummy variable $EU15_d$ that is equal to one when the destination country *d* is an EU15 members, 0 otherwise.

The estimated equation is then the following, where Z_{dot} is the vector of gravitational variables and $COST_{dot}$ relates either to *LRER* or *DLULC* variables (or both):

$$LFDI_{dot} = a_1 TAX_{dot} + a_2 COST_{dot} \cdot EU15_d + a_3 COST_{dot} \cdot (1 - EU15_d) + a_4 Z_{dot} + v_d + w_o + e_{dot}$$

The results are reported in Tables 3a to 3c. They tend to show that the adequate cost variable is relative unit labor costs when the destination country belongs to the EU15, whereas it is the bilateral real exchange rate when the destination is a new EU member state. Still, higher unit labor costs seem to raise FDI inflows in EU15 countries.

Table 3. Differentiating the impact of RER and ULC in the EU15 and NEM

3a.

lfdi	Coef.	Std. Err.	P>|t|	Coef.	Std. Err.	P>|t|	Coef,	Std, Err,	P>|t|
# obs.		1934			1842			1829	
TS_{dot}	0.47	0.62	0.452						
TE_GDP_{dot}				**-7.82**	4.33	0.071			
TE_VA_{dot}							**-7.85**	3.85	0.042
$EU15_d$*$DLULC_{dot}$	**2.44**	0.46	0.000	**2.58**	0.47	0.000	**2.59**	0.47	0.000
$(1-EU15_d)$*$DLULC_{dot}$	**0.54**	0.27	0.045	0.26	0.30	0.384	0.21	0.29	0.469
$LEPOT_{dt}$	1.37	0.53	0.009	1.71	0.54	0.002	1.96	0.57	0.001
$LGDP_{ot}$	8.29	0.65	0.000	7.99	0.68	0.000	7.76	0.70	0.000
$LDIST_{dt}$	-0.93	0.08	0.000	-0.96	0.08	0.000	-0.95	0.08	0.000
$BORDER_{do}$	0.41	0.12	0.001	0.37	0.12	0.002	0.39	0.12	0.002
$CLNG_{do}$	-0.36	0.13	0.006	-0.34	0.13	0.009	-0.34	0.13	0.010
_cons	-245.21	9.89	0.000	-245.75	10.18	0.000	-246.24	10.22	0.000
R^2		0.727			0.708			0.785	

3b.

lfdi	Coef.	Std. Err.	P>|t|	Coef.	Std. Err.	P>|t|	Coef.	Std. Err.	P>|t|
# obs.	1885			1789			1776		
TS_{dot}	0.67	0.60	0.266						
TE_GDP_{dot}				**-9.39**	3.86	0.015			
TE_VA_{dot}							**-8.72**	3.50	0.013
$EU15_d$*$LRER_{dot}$	0.14	0.35	0.682	0.39	0.37	0.295	0.40	0.37	0.281
$(1-EU15_d)$*$LRER_{dot}$	0.40	0.35	0.249	**0.66**	0.37	0.072	0.68	0.37	**0.066**
$LEPOT_{dt}$	3.05	0.67	0.000	3.53	0.68	0.000	3.83	0.70	0.000
$LGDP_{ot}$	7.00	0.71	0.000	6.59	0.73	0.000	6.33	0.74	0.000
$LDIST_{dt}$	-0.93	0.08	0.000	-0.97	0.08	0.000	-0.96	0.08	0.000
$BORDER_{do}$	0.45	0.12	0.000	0.39	0.12	0.001	0.41	0.12	0.001
$CLNG_{do}$	-0.38	0.13	0.003	-0.36	0.13	0.005	-0.36	0.13	0.006
_cons	-253.84	10.13	0.000	-255.16	10.38	0.000	-255.99	10.40	0.000
R^2	0.741			0.722			0.723		

3c.

Lfdi	Coef.	t	P>|t|	Coef.	Std. Err.	P>|t|	Coef.	Std. Err.	P>|t|
# obs	1881			1789			1776		
TS_{dot}	.6652858	1.08	0.279						
TE_GDP_{dot}				**-7.963158**	4.382576	0.069			
TE_VA_{dot}							**-7.986436**	3.90691	0.041
$EU15_d$*$LRER_{dot}$	.7183884	1.87	**0.061**	.8826202	.3959158	**0.026**	.8702621	.397067	**0.029**
$(1-EU15_d)$*$LRER_{dot}$	.9686569	2.53	**0.011**	1.145715	.3954706	**0.004**	1.134257	.396615	**0.004**
$EU15_d$*$DLULC_{dot}$	2.151352	4.38	**0.000**	2.305799	.4981875	**0.000**	2.284548	.5003527	**0.000**
$(1-EU15_d)$*$DLULC_{dot}$	.7981866	2.66	**0.008**	.5146399	.3403085	0.131	.4477958	.3365218	0.183
$LEPOT_{dt}$	1.9922	2.72	0.007	2.587631	.7770176	0.001	2.916048	.7998227	0.000
$LGDP_{ot}$	7.889851	10.46	0.000	7.369734	.8005765	0.000	7.074782	.8187069	0.000
$LDIST_{dt}$	-.915701	-12.16	0.000	-.9575125	.0824824	0.000	-.9485797	.0826186	0.000
$BORDER_{do}$	.4645672	3.97	0.000	.4010681	.1210077	0.001	.4176429	.1212566	0.001
$CLNG_{do}$	-.3829637	-2.98	0.003	-.3664985	.1299662	0.005	-.3661698	.1305637	0.005
_cons	-249.991	-24.63	0.000	-251.1748	10.37652	0.000	-251.9101	10.40692	0.000
R^2	0.743			0.726			0.727		

Indeed, differentiating the impact of competitiveness variables according to the destination country leads to strongly significant results. Statutory taxation once again fails to significantly explain the location choices of FDI investors, which depend only on cost and structural factors in this case. But apparent taxation significantly contributes to the determination of the investment location. Real exchange rates are significant in explaining FDI location. However, the elasticity is higher when the destination country belongs to the group of the new member states. As to unit labor costs, they only contribute to the location choice when the destination country belongs to the EU15. The coefficient is either not significant for NEM (apparent taxation) or significantly lower (statutory taxation).

4.3 Differentiated impact of taxation

Since FDI flowing into EU15 member states and into new EU members seem to react differently to relative costs, there is no reason why they should not react differently to corporate taxation itself. Here we investigate this possibility by multiplying tax differentials by the same EU15 dummy as in the previous paragraph. The results are reported in Table 5.

Table 4. Different tax-sensitivity of FDI, EU15 and new member states.

lfdi	Coef.	Std. Err.	P>|t|	Coef,	Std, Err,	P>|t|	Coef,	Std, Err,	P>|t|
# obs.	1881			1789			1776		
$EU15_d$*TS_{dot}	0,96	0,66	0,143						
(1-$EU15_d$)*TS_{dot}	-0,01	0,81	0,987						
$EU15_d$*TE_GDP_{dot}				-8,75	5,04	**0,083**			
(1-$EU15_d$)*TE_GDP_{dot}				-6,67	6,01	0,267			
$EU15_d$*TE_VA_{dot}							-8,56	4,51	**0,058**
(1-$EU15_d$)*TE_VA_{dot}							-7,07	5,30	0,182
$EU15_d \times LRER_{dot}$	0,69	0,38	0,075	0,88	0,40	0,027	0,87	0,40	0,029
(1- $EU15_d$)×$LRER_{dot}$	0,94	0,38	0,014	1,14	0,40	0,004	1,13	0,40	0,005
$EU15_d \times LULC_{dot}$	2,05	0,50	0,000	2,32	0,50	0,000	2,29	0,50	0,000
(1- $EU15_d$)×$LULC_{dot}$	0,76	0,30	0,012	0,55	0,36	0,127	0,48	0,35	0,179
$LEPOT_{dt}$	2,00	0,73	0,006	2,57	0,78	0,001	2,90	0,80	0,000
$LGDP_{ot}$	7,89	0,75	0,000	7,38	0,80	0,000	7,08	0,82	0,000
$LDIST_{dt}$	-0,93	0,08	0,000	-0,96	0,08	0,000	-0,95	0,08	0,000
$BORDER_{do}$	0,46	0,12	0,000	0,40	0,12	0,001	0,42	0,12	0,001
$CLNG_{do}$	-0,39	0,13	0,003	-0,36	0,13	0,005	-0,36	0,13	0,005
_cons	-250,27	10,15	0,000	-250,78	10,46	0,000	-251,59	10,48	0,000
R^2	0.744			0.726			0.727		

Statutory tax differentials remain insignificant, both for EU and NEM countries. As to apparent tax differentials, they fail to explain FDI location in NEM countries, while they are significant at conventional levels in explaining inward FDI to EU15 countries.This might be an indication that lower taxation is not an efficient tool for attracting FDI in new EU members, but that highly integrated, close and similar countries as the EU15 ones are significantly sensitive to taxation as far as attracting FDI is concerned.

5. The impact of taxation in third countries

Until now, FDI has been treated as if it were the result of a decision between investing at home and in one given possible location. However, multinational firms are confronted to a series of possible locations, and the decision is more realistically the result of a decision between investing at home, investing in a given location and investing in all the other possible locations.

This is all the more true if a country is close to a number of similar competitors (be it a similarity in terms of distance to the investor, market potential or any variable).

As far as taxation is concerned, tax interaction between two potential recipient countries should be all the more powerful that these countries are geographically close, as they are therefore more substitutable in terms of location attractiveness. To take this into account, a new variable is built, which accounts for the average tax rate in all possible EU locations. More specifically, this variable is defined as the weighted average of tax rates in *n* potential alternative locations ($\overline{TAX}_{dt}$), the weighting factor being the ratio of the distance between the destination country *d* and each alternative location, to the maximum distance any alternative location and the destination country:

$$\overline{TAX}_{dt} = \frac{1}{n}\sum_{c \neq d} TAX_{ct} \frac{DIST_{dc}}{Max(DIST_{dc})}$$

The tax differential between the alternative locations to destination *d* and the origin country *o* is then computed ($\overline{TAX}_{dot} = \overline{TAX}_{dt} - TAX_{ot}$), and included in the estimation as follows:

$$LFDI_{dot} = \alpha_1 TAX_{dot} + \alpha_2 \overline{TAX}_{dot} + \alpha_3 COST_{dot} \cdot EU15_d + \alpha_4 COST_{dot} \cdot (1 - EU15_d) + \alpha_5 Z_{dot} + v_d + w_o + e_{dot}$$

The results are reported in Table 7. Strikingly, the statutory tax differential between the destination country and the origin country (TS_{dot}) now bear the correct, negative sign which is significant at the 5% level: a higher tax rate in the recipient country tends to discourage inward FDI. In addition, the tax

differential between the alternative locations and the origin country *o* ($\overline{TAX}_{dot}$) displays a significant and positive sign: other things equal, higher taxation in the alternative locations raises FDI flowing to country *d*. The same results are obtained with apparent taxation.

The tax differential between the destination and origin country is about the same order of magnitude as the tax differential between the partners and the origin country, namely around 0.9% (or 0.009 percentage points) for the taxation normalized by GDP. Given the estimated elasticities (-22 for bilateral tax differentials and 31 for competitors tax differentials), a one standard deviation decrease in third countries tax differentials need to be compensated for by a decrease in bilateral tax differentials by 0.0013 percentage points. Another way to put it is that a 1 percentage point change in third countries tax differentials can be compensated for by a change in the opposite direction in bilateral tax differentials, by 1.4 percentage points (31/22). This is a rather sizeable impact of third countries competition for attracting FDI.

Table 5. Accounting for taxation in alternative locations

lfdi	Coef,	Std, Err,	P>|t|	Coef.	Std. Err.	P>|t|	Coef.	Std. Err.	P>|t|
# obs.	1881			1776			1789		
TS_{dot}	-1,92	0,86	**0,025**						
$\overline{TS}_{dot}$	4,63	1,07	**0,000**						
TE_VAP_{dot}				-21,04	5,09	**0,000**			
$\overline{TE\_VA}_{dot}$				28,95	7,28	**0,000**			
TE_GDP_{dot}							-22,13	5,74	**0,000**
$\overline{TE\_GDP}_{dot}$							31,19	8,20	**0,000**
$EU15_d$*$LRER_{dot}$	1,01	0,39	0,009	0,91	0,40	0,022	0,92	0,39	0,020
(1-$EU15_d$)*$LRER_{dot}$	1,25	0,39	0,001	1,17	0,40	0,003	1,18	0,39	0,003
$EU15_d$*$DLULC_{dot}$	2,24	0,49	0,000	2,38	0,50	0,000	2,40	0,50	0,000
(1-$EU15_d$)*$DLULC_{dot}$	0,72	0,30	0,016	0,17	0,34	0,620	0,21	0,35	0,547
$LEPOT_{dt}$	2,45	0,74	0,001	3,24	0,80	0,000	2,84	0,78	0,000
$LGDP_{ot}$	7,20	0,77	0,000	7,85	0,84	0,000	8,12	0,82	0,000
$LDIST_{dt}$	-0,93	0,07	0,000	-0,96	0,08	0,000	-0,97	0,08	0,000
$BORDER_{do}$	0,44	0,12	0,000	0,39	0,12	0,001	0,38	0,12	0,002
$CLNG_{do}$	-0,36	0,13	0,005	-0,37	0,13	0,005	-0,37	0,13	0,004
_cons	-242,40	10,25	0,000	-280,58	12,62	0,000	-277,15	12,39	0,000
R^2	0.746			0.729			0.728		

4.2. Negative/positive tax differentials

The potential magnitude of tax competition strongly depends on the symmetry of the response of FDI to tax incentives. Indeed, double-taxation treaties can generate asymmetric tax incentives; while exemption rules act in a symmetric way in that lower taxes abroad should attract FDI whereas higher taxation should discourage FDI, crediting arrangements should have more limited impact, as they impose home-state taxation up to a threshold corresponding to the tax bill of the parent: because investors operating under crediting arrangements are not refunded for excess taxes paid abroad, the response of FDI to tax variations should be larger when taxation is already higher there. Head and al. (1999) indeed find such an asymmetry, concluding that Japanese investments in the US are diverted by high tax rates, but not much attracted by low tax rates.

Previous work by the authors[2] suggests that FDI flowing from wealthy OECD countries is diverted by higher taxation abroad, but not significantly attracted by lower taxation, but that this difference is only marginally due to the different treatment of double taxation. This issue is further investigated here, through the following estimation:

[2] See Bénassy-Quéré, Fontagné and Lahrèche-Révil (2004).

$$LFDI_{dot} = a_1 POS_{dot} \times TAX_{dot} + a_1 NEG_{dot} \times TAX_{dot} + a_4 EU_d \times COST_{dot} + a_5 (1 - EU_d) \times COST_{dot} + a_6 Z_{dot} + v_d + w_o + e_{dot}$$

where POS_{dot} is a dummy that takes the value of 1 when the tax differential is positive (higher taxation in the destination country) and 0 otherwise, and NEG_{dot} is a dummy that takes the value of 1 when the tax differential is negative (lower taxation in the destination country). $EU15_d$ is the same dummy as supra, taking the value of 1 when the destination country belongs to the EU15. The results are displayed in Table 6.

Table 6. Positive and negative tax differentials

lfdi	Coef.	Std. Err.	P>|t|	Coef.	Std. Err.	P>|t|	Coef,	Std, Err,	P>|t|
# obs.	1881			1789			1776		
$TS_{dot} \times POS_{dot}$	0,03	0,90	0,974						
$TS_{dot} \times NEG_{dot}$	1,14	0,79	0,149						
$TE\_GDP_{dot} \times POS_{dot}$				-2.738558	6.286185	0.663			
$TE\_GDP_{dot} \times NEG_{dot}$				-13.37526	6.403149	**0.037**			
$TE\_VA_{dot} \times POS_{dot}$							-3,02	5,64	0,593
$TE\_VA_{dot} \times NEG_{dot}$							-13,06	5,70	**0,022**
$EU15_d$*$LRER_{dot}$	0,72	0,38	0,061	.8906292	.3959372	0.025	0,88	0,40	0,027
(1-$EU15_d$)*$LRER_{dot}$	0,97	0,38	0,012	1.15547	.3955212	0.004	1,15	0,40	0,004
$EU15_d$*$DLULC_{dot}$	2,18	0,49	0,000	2.301631	.4981515	0.000	2,28	0,50	0,000
(1-$EU15_d$)*$DLULC_{dot}$	0,82	0,30	0,007	.5681873	.3433961	0.098	0,49	0,34	0,147
$LEPOT_{dt}$	1,96	0,73	0,008	2.650271	.778818	0.001	2,97	0,80	0,000
$LGDP_{ot}$	7,85	0,76	0,000	7.307983	.8022682	0.000	7,00	0,82	0,000
$LDIST_{dt}$	-0,91	0,08	0,000	-.9548629	.0825059	0.000	-0,94	0,08	0,000
$BORDER_{do}$	0,47	0,12	0,000	.4139351	.1215039	0.001	0,43	0,12	0,000
$CLNG_{do}$	-0,40	0,13	0,002	-.3721994	.1300464	0.004	-0,37	0,13	0,004
_cons	-248,13	10,33	0,000	-251.2024	10.37553	0.000	-251,52	10,41	0,000
R^2	0.744			0.726			0.727		

Table 6 confirms that only negative tax differentials – ie lower taxes in the destination country – significantly impact on FDI. Again, the result with statutory taxation is non significant. In Table 7, the two dummies are combined.

Table 7. Positive and negative tax differentials in the EU15 and NEM.

lfdi	Coef.	Std. Err.	P>|t|	Coef.	Std. Err.	P>|t|	Coef.	Std. Err.	P>|t|
# obs.	1881			1789			1776		
$TS_{dot} \times POS_{dot} \times EU15_d$	-0,26	0,92	0,781						
$TS_{dot} \times POS_{dot} \times (1\text{-}EU15_d)$	0,79	2,47	0,749						
$TS_{dot} \times NEG_{dot} \times EU15_d$	2,24	0,94	**0,017**						
$TS_{dot} \times NEG_{dot} \times (1\text{-}EU15_d)$	0,09	0,93	0,924						
$TE\_GDP_{dot} \times POS_{dot} \times EU15_d$				-10,45	7,11	0,142			
$TE\_GDP_{dot} \times POS_{dot} \times (1\text{-}EU15_d)$				15,68	10,24	0,126			
$TE\_GDP_{dot} \times NEG_{dot} \times EU15_d$				-6,58	7,88	0,404			
$TE\_GDP_{dot} \times NEG_{dot} \times (1\text{-}EU15_d)$				-26,23	9,37	**0,005**			
$TE\_VA_{dot} \times POS_{dot} \times EU15_d$							-10,08	6,41	0,116
$TE\_VA_{dot} \times POS_{dot} \times (1\text{-}EU15_d)$							13,13	9,01	0,145
$TE\_VA_{dot} \times NEG_{dot} \times EU15_d$							-6,38	7,06	0,367
$TE\_VA_{dot} \times NEG_{dot} \times (1\text{-}EU15_d)$							-25,00	8,31	**0,003**
EU_rer	0,65	0,38	0,093	0,88	0,40	0,027	0,86	0,40	0,031
AC_rer	0,90	0,38	0,019	1,13	0,40	0,004	1,11	0,40	0,005
EU_ulc	2,03	0,50	0,000	2,30	0,50	0,000	2,28	0,50	0,000
AC_ulc	0,78	0,30	0,010	0,85	0,38	0,024	0,71	0,36	0,050
empot	1,93	0,73	0,009	2,47	0,78	0,002	2,73	0,81	0,001
lpib_o	7,85	0,76	0,000	7,40	0,80	0,000	7,16	0,82	0,000
ldist	-0,93	0,08	0,000	-0,96	0,08	0,000	-0,96	0,08	0,000
contig	0,47	0,12	0,000	0,38	0,12	0,002	0,40	0,12	0,001
comlng	-0,41	0,13	0,002	-0,35	0,13	0,008	-0,35	0,13	0,007
_cons	-247,39	10,35	0,000	-249,04	10,46	0,000	-249,44	10,50	0,000
R^2	0.744			0.727			0.728		

The results on statutory taxation stay very different from those on ex-post taxation: tax differentials are not significant, except negative tax differentials within the EU15, which are positively correlated to FDI. This is a counter-intuitive results, which could be the mirror of ex-ante taxation being insufficiently informative about the real burden of taxation. This interpretation seems to be validated by the results on apparent taxation. In this latter case, tax differentials are not significant either, except in one case: when taxation is lower in the destination country, and this country belongs to the NEM grouping. The elasticity is very high. Interestingly, unit labor costs are now significant, with the same sign as in the EU, but a much lower absolute value. These results point to the potential for tax competition in NEM countries, since EU FDI seems to be significantly attracted by lower taxes in NEM. This result should be shaded however, as the most low-tax country (Estonia) is excluded from the analysis, due to lacking data.

6. Conclusion

The influence of tax differentials on FDI location is a source of concern both in the EU15 and the NEM. For EU15 countries, there is a fear that investment be diverted towards low-taxation, eastern European neighbors. There is also a concern in the NEM; during the transition period, they have experimented a strong inflow of foreign capital, as a result of both their rapid opening-up and the privatization process. Both processes are now going to an end, and the permanence of long-term foreign capital inflow is an important issue, in a context of strong current account deficits. The NEM could feel the temptation of attracting further FDI by tax incentives, as this is the only tool left once monetary policy is dedicated to entering the EMU, and fiscal policy is partly constrained by the Maastricht treaty.

This paper shows that FDI does react to tax differentials within the EU25. This is especially the case when an ex-post measure of taxation that accounts for all possible allowances and exemptions, is used to measure tax differentials.

This result is robust to the inclusion of other major determinants of FDI attraction, such as unit labor costs and/or the real exchange rate. While the impact of tax competition seems to be stronger within the EU15, further differentiating between positive and negative tax differentials seems to indicate that tax incentives are especially strong for FDI directed to the NEM. Finally, while statutory taxation fails to significantly explain the direction of FDI, taking into account statutory taxation in the close competitors leads to an interesting result. Indeed, a higher taxation in the competitors leads to an increase of FDI in the destination country. In that case, statutory tax differentials between the destination and origin countries impact FDI in the expected way (a higher taxation in the destination country reduces FDI). This result is true also for ex-post taxation. Interactions are therefore important as far as tax competition is concerned.

Hence the risk of a tough tax competition to attract FDI does exist in the European Union. This risk is however limited by the prominent importance of non-tax factors in the location of FDI.

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