

# **Analysis of developments in the fields of direct investment and M&A (Mergers and Acquisitions) - 2011 - Part II**

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## Glossary

### Terminology abbreviations

BIT	Bilateral Investment Treaty
CAGR	Compound annual growth rate
ECB	European Central Bank
FTT	Financial Transactions Tax
IMF	International Monetary Fund
M&A	Mergers and acquisitions
OECD	Organisation for Economic Cooperation and Economic Development
WACC	Weighted average cost of capital

### Member State abbreviations

AT	Austria	LV	Latvia
BE	Belgium	LT	Lithuania
BG	Bulgaria	LU	Luxembourg
CY	Cyprus	MT	Malta
CZ	Czech Republic	NL	Netherlands
DK	Denmark	PL	Poland
EE	Estonia	PT	Portugal
FI	Finland	RO	Romania
DE	Germany	SI	Slovenia
EL	Greece	SK	Slovakia
FR	France	ES	Spain
HU	Hungary	SE	Sweden
IE	Ireland	UK	United Kingdom
IT	Italy		

## Executive summary

- The present report presents the results of the work undertaken on the following three different special topics for this year's report, namely:
  - An analysis of the extent to which the existence of inward FDI screening mechanisms in the Member States affects the volume and quality of inward FDI from within and outside the EU27.
  - An analysis of the potential effects of a Tobin tax on FDI flows.
  - An estimation of the quantitative impact of the existence of bilateral investment treaties (BITs) on intra-EU FDI flows.

### Impact of screening on inward FDI flows

- An in-depth review of the current approach to inward FDI by Member States shows that formal screening of inward FDI is not used at all by the large majority of EU Member States.
- To investigate further the potential impact of various restrictions on inward FDI, the index of FDI restrictions developed by the OECD was used as an additional explanatory variable in a general model of FDI inflows. This model was estimated in panel over the period 2005-2009.
- The estimation results are consistent with the general findings from the literature on FDI flows. The estimation results also show that the coefficient of the OECD FDI restrictions index is not statistically significant in the models aiming to explain differences across Member States in inward intra-EU FDI and inward FDI from outside the EU.
- However, the model systematically over-predicts inflows (from both within the EU27 and outside the EU27) in a limited number of Member States (Denmark, Germany, Hungary, Italy, Latvia and Slovenia) and suggests that certain country-specific factors are at play, of which informal screening mechanisms may be one.
- This motivated an analysis of performance differences of acquired firms across the under-predicted and over-predicted groups of Member States. However, we found no statistically significant differences across groups in the average performance of acquired firms, in terms of growth in employment, turnover and income. This finding also held

when we broke out M&A FDI by origin (i.e., intra-EU / extra-EU). Overall, therefore, the evidence suggests that country-specific factors such as informal screening mechanisms do not appear to influence performance differences of the acquired firms considered.

### Potential effect of a Tobin tax on FDI

- As, so far, no wide-ranging financial transaction tax (FTT) covering many financial instruments has been implemented in the world, our analysis of the potential effect of a Tobin tax on FDI is theoretical.
- The analysis focuses on the impact of a FTT on FDI of non-financial corporations.
- It assumes a world-wide FTT of 0.1% on all equity and debts securities. Bank loans and retained earnings, important sources of funds for non-financial corporations, are exempt.
- The magnitude of the impact of the 0.1% FTT on the cost of the equity and debt sources of funds varies as it depends on the number of times the shares or debt securities issued by companies are traded. The more frequently the financial instrument is traded, the higher the total impact of the FTT.
- To quantify the likely impact, the assessment uses a model, based on the standard neo-classical economic theory, of a firm's investment sensitivity to changes in the cost of funds. It also assumes that the choice between investing abroad and at home is not affected by the FTT as the latter is implemented worldwide.
- Using this model, the analysis shows, that under a wide range of different assumptions, the impact of a 0.1% FTT on FDI is likely to be very small, less than 1%.

### Impact of bilateral investment treaties on inward FDI into EU27 Member States

- A gravity type FDI model was developed and estimated in panel form to quantify the impact of bilateral investment treaties (BITs) on bilateral FDI flows in the EU.
- Our empirical analysis, using a number of different econometric techniques, consistently shows that BITs do not have a statistically significant impact on bilateral FDI flows within the EU27.
- However, in line with the general findings from the literature, a number of other factors are found to be significant factors explaining differences in the levels of bilateral FDI flows between EU Member States. In particular:
  - bilateral FDI flows are much larger between two EU15 countries;
  - geographic distance has a negative impact and common borders may have a positive impact;

- the size of the originating economy does not have a statistically significant impact but the size of the receiving economy has a very significant and positive impact on the likelihood to receive FDI;
  - GDP per capita in the receiving country has a negative impact on FDI;
  - general levels of taxation appear to have a negative impact but corporate taxes have a much clearer negative impact on FDI flows;
  - low levels of corruption in the receiving country have a very significant and positive impact on FDI.
- 
- It may not be all that surprising that no a significant effect for BITs in the EU27 was found. This is likely to be the case because there are other mechanisms that work adequately to solve the commitment problem of non-expropriation of foreign investors for which BITs are useful in other circumstances.
  
  - In particular, there is a high level of institutional proximity within the EU27 countries in terms of, for example, rule of law and safety of private property from expropriation. This may be such that the additional contribution or stimulus to FDI brought about by a BIT is very low.
  
  - We note that our study has not looked at the impact of BITs between EU members and third countries. The results presented in the report should therefore not be interpreted as generally applicable to all BITs but rather to within EU-27 BITs only.



# 1 Introduction

The present study reports the results of the work undertaken on the following three different special topics for this year's report, namely:

- An analysis of the extent to which existence of inward FDI screening mechanisms in the Member States affects the volume and quality of inward FDI from within and outside the EU27.
- An analysis of the potential effects of a Tobin tax on outward EU FDI flows.
- An estimation of the quantitative impact of the existence of bilateral investment treaties (BITs) on intra-EU FDI flows.

## 2 Impact of screening mechanisms

### 2.1 Introduction

In this chapter we examine whether screening mechanisms of inward FDI exist in the 27 EU Member States and to what extent such mechanisms have an impact on the level of inward FDI flows.

The analysis involves a two-step approach. First, building on the existing literature, we estimate econometrically a number of models relating intra-EU FDI inflows to their main drivers, including possibly the existence of a screening mechanism. Next, we undertake a comparative analysis of the economic performance of domestic companies taken over by foreign companies from within or outside the EU, and examine to what extent inward FDI screening, formal or informal, has an impact on the comparative performance of companies subject to a foreign takeover.

### 2.2 Impact of existence of screening mechanisms on inward FDI into EU27 Member States

#### 2.2.1 Methodological approach

The present chapter is structured as follows:

1. Identification of the existing screening mechanisms and construction of a related index that can be used in econometric analysis
2. Review of the relevant literature to identify other economic variables that may affect FDI inflows
3. Review of the variables to be included in the econometric analysis
4. Regression analysis focusing on the impact of screening mechanisms on inward FDI activity
5. Key findings and conclusions.

Each of these steps is developed in turn.

## 2.2.2 Identification and assessment of the existing screening mechanisms

There exists no unique definition of inward FDI screening mechanisms.

For example, one could think of general registration requirements for companies as a screening mechanism as that would include some basic information about the owners, which in turn could be used for screening purposes.

However, we believe that opting for such a generic definition would be misleading because this requirement is the same across countries as well as over time, and therefore, of little use for econometric analysis. In addition, company registration requirements are generally the same for domestic and foreign companies in the EU.

A second possible option would be to identify various grants and financial incentives offered by Member States to certain activities or class of companies (e.g. SMEs) that could involve foreign-owned companies but those grants and incentives often do not discriminate between domestic and foreign companies. Moreover, when they are granted to foreign companies already established in the country, they do not affect the FDI decision that had been made at earlier stages.<sup>1</sup>

A less generic treatment of FDI screening mechanisms is provided by the analysis underlying the OECD FDI restrictiveness index.<sup>2</sup> This index was developed in 2003 and has been reviewed and updated a few times since then. In our subsequent analysis we will focus on FDI screening used in the context of this index (OECD index henceforth).

In developing this index, the OECD identified the following four types of measures that can be applied by the host country to limit or restrict the inflow of FDI:

- i. **restriction of foreign ownership**, including limits on the share of companies' equity capital that can be held by foreigners
- ii. **screening and approval procedures** to ensure, for example, that FDI in a certain sector leads to economic benefits of certain size
- iii. **constraints on foreign personnel and operation freedom**, including the requirement that nationals or residents must form a majority of the board of directors
- iv. **informal barriers**, including some regulatory practices.

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<sup>1</sup> See national investment promotion agencies (links to these agencies can be found at [http://www.fdi.net/dir/ipa\\_index.cfm](http://www.fdi.net/dir/ipa_index.cfm)) for more details on such grants, incentive, as well as further details of company registration.

<sup>2</sup> See <http://www.oecd.org/dataoecd/32/19/45563285.pdf> for the latest update on this index.

According to OECD's 2010 update of the index:

*“Screening mechanisms applicable only to foreign investors fulfil many functions and vary widely in their scope. At their most restrictive, they may apply economic needs, net economic benefit or national interest tests to both start-ups and acquisitions. But, in some cases, they are automatic and amount to little more than a pre-notification requirement for investors.”*

Information on this mechanism is collected by the OECD from its database on *National Treatment for Foreign-Controlled Enterprises* and from the *OECD Code of Liberalisation of Capital Movements* publication.

The database on *National Treatment for Foreign-Controlled Enterprises* collects information on all measures constituting exceptions to the National Treatment principle, defined as the commitment by individual countries to treat enterprises operating on their territories, but controlled by the nationals of another country, no less favourably than domestic enterprises in like situations.<sup>3</sup>

The OECD Code of Liberalisation of Capital Movements prescribes that OECD members should abolish between each other restrictions on movements of capital to the extent necessary for effective economic cooperation and the OECD records a series reservations by individual countries in relation to this code.<sup>4</sup>

**Table 1: Elements of screening index**

Screening activity <sup>(1)</sup>	Score of screening activity in screening index
Approval required for new FDI/acquisitions of < USD 100mn or if corresponding to < 50% of total equity	0.2
Approval required for new FDI/acquisitions above USD100mn or if corresponding to > 50% of total equity	0.1
Notification with discretionary element	0.025

Note: (1) Excludes reviews of foreign investment based solely on national security grounds

Source: *OECD FDI Restrictiveness Index: 2010 Update*

In the table overleaf, the information on FDI screening mechanisms collected from these two sources is compared across OECD member countries as well as with other measures limiting or restricting inward FDI flows.

To reflect the relative importance of indices, individual indices are scaled by the OECD to between 0 and:

<sup>3</sup> See National Treatment for Foreign-Controlled Enterprises – List of Measures Reported for Transparency 2010 (at <http://www.oecd.org/dataoecd/57/46/38273182.pdf>) and National Treatment for Foreign-Controlled Enterprises – Including Adhering Country Exceptions to National Treatment 2010 (at <http://www.oecd.org/dataoecd/32/21/1954854.pdf>).

<sup>4</sup> The Code is accessible online at <http://www.oecd.org/dataoecd/10/62/39664826.pdf>.

- a) 1 for the restriction of foreign ownership
- b) 0.2 for screening and approval procedures
- c) 0.1 for constraints on foreign personnel
- d) 0.05 for operation freedom.

The aggregate FDI restrictiveness index, defined as the sum of the 4 other indices, is capped at 1.<sup>5</sup>

The following table presents the value of the various indices for the EU Member States for which the OECD has computed these indices.

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<sup>5</sup> For more details on the methodology of the calculation of these indices see OECD FDI Restrictiveness Index: 2010 Update, OECD Working Papers on International Investment No 2010/3, at <http://www.oecd.org/dataoecd/32/19/45563285.pdf>.

Table 2: FDI Index Scores by Country and Type of Measure - 2010					
	Equity restrictions	Screening	Key personnel	Operational restrictions	Total FDI index -
Austria	0.058	0.009	0.000	0.009	0.076
Belgium	0.014	0.000	0.000	0.002	0.016
Czech Republic	0.049	0.000	0.000	0.006	0.055
Denmark	0.063	0.000	0.000	0.001	0.063
Estonia	0.052	0.000	0.000	0.046	0.098
Finland	0.019	0.000	0.000	0.021	0.040
France	0.038	0.000	0.001	0.014	0.053
Germany	0.020	0.000	0.000	0.004	0.025
Greece	0.032	0.002	0.002	0.024	0.059
Hungary	0.065	0.000	0.000	0.001	0.066
Ireland	0.035	0.000	0.000	0.024	0.059
Italy	0.69	0.000	0.000	0.004	0.073
Latvia	0.051	0.000	0.000	0.034	0.085
Lithuania	0.036	0.000	0.000	0.014	0.050
Luxembourg	0.003	0.000	0.000	0.000	0.004
Netherlands	0.003	0.000	0.000	0.001	0.004
Poland	0.058	0.000	0.000	0.053	0.111
Portugal	0.003	0.000	0.000	0.003	0.006
Romania	0.008	0.000	0.000	0.000	0.008
Slovak Republic	0.049	0.000	0.000	0.000	0.049
Slovenia	0.011	0.000	0.000	0.000	0.012
Spain	0.019	0.000	0.000	0.000	0.019
Sweden	0.028	0.027	0.000	0.001	0.057
United Kingdom	0.036	0.000	0.000	0.022	0.059

Source: OECD FDI Restrictiveness Index: 2010 Update, OECD Working Papers on International Investment No 2010/3

It can be seen from the table above that, according to the OECD, all but three EU Member States score 0 for screening, with Austria scoring 0.09, Greece scoring 0.002 and Sweden scoring 0.027. This implies that formal screening for FDI is not used widely by EU Member States to influence inward FDI flows.<sup>67</sup>

<sup>6</sup> Note that there is a variation in this screening index when other countries are also considered. For example, it takes a value 0.108 for Australia (another developed economy), 0.135 for China and 0.200 for Iceland and New Zealand.

A review of earlier publications by OECD on *National Treatment for Foreign-Controlled Enterprises* shows that the measures underlying the screening mechanisms scores in Table 2 have not changed considerably over the past 17 years.<sup>8</sup>

This does not mean that screening does not occur. However, this would take place through informal mechanisms which are not codified and transparent.

The data presented in the table imply that the OECD screening index will be of little use in an empirical analysis of the impact of the use of screening mechanisms on inward FDI flows as the index shows very little variation across EU Member States and practically no variation over time.<sup>9</sup>

Therefore, in order to use an economically more meaningful variable, the subsequent analysis uses the total FDI (restrictiveness) index (as shown in the most right-hand column of Table 2). The aim is to identify Member States for which the estimated model systematically overestimates inward FDI. Such systematic over-estimation would suggest that certain country-specific factors tend to hold back inward FDI, of which informal screening may be one.

### 2.2.3 A brief review of the literature on the determinants of FDI

The determinants of FDI flows have been studied extensively over the past 20 years.

While the relevant literature can be segmented in many different ways, one possible classification is whether the research focused on explaining bilateral FDI flows between country pairs or on FDI inflows into a certain country.

The first category of papers, i.e. the ones looking into bilateral FDI flows between country pairs, use gravity models to explain these FDI flows.<sup>10</sup> They find that, besides the traditional variables affecting FDI flows, such as GDP, population, distance between the two countries, unit labour

<sup>7</sup> A review of the web sites of the various national inward FDI promotion agencies and organisations yielded a similar result. It was not possible to identify formal screening mechanisms in the different Member States. Links to the various agencies and organisations can be found at [http://www.fdi.net/dir/ipa\\_index.cfm](http://www.fdi.net/dir/ipa_index.cfm).

<sup>8</sup> See <http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=OCDE/GD%2894%2954&docLanguage=En> for the publications 1994 edition and [http://books.google.com/books?id=hLPX9Xn1cjEC&printsec=frontcover&source=gbs\\_atb#v=onepage&q&f=false](http://books.google.com/books?id=hLPX9Xn1cjEC&printsec=frontcover&source=gbs_atb#v=onepage&q&f=false) for the 2005 edition.

<sup>9</sup> Alternatively, changes in one economic variable cannot be explained by changes in another economic variable if the second variable stays constant.

<sup>10</sup> Gravity models assume that the FDI flows between two countries always depend on the GDP of the two countries as well as the distance between them – countries with larger GDP and that are closer to each other invest more capital into each others' economies.

costs, etc., some institutional factors, such as country risk (including institutional, legal and political risk), method of privatisation, can also affect bilateral FDI flows between country pairs.<sup>11</sup>

The second category of studies examines FDI flows at a more aggregate level by examining inward FDI flows for particular countries, without identifying the source country of the FDI. These studies find similar determinants for FDI flows as the ones in the gravity modelling group. In particular, both traditional variables, such as GDP, population, wage, inflation, openness to trade, share of service sector from the GDP, and institutional or transitional variables, such as property rights, bureaucracy, method of privatisation, corruption perception, are found to affect inward FDI flows.<sup>12</sup>

As the objective of the present research is to assess the impact of screening mechanisms of inward FDI, the focus should be on more aggregate FDI flows.

Two additional points are to be noted in relation to the reviewed economic literature. First, the focus is mostly on FDI flows into developing countries or if the focus is on Europe, on Central and Eastern European, or South European countries. There exists no recent literature analysing FDI inflows into Western European countries.

Second, to the best of our knowledge, no study has examined the impact of the host countries' screening mechanisms on the inflow of FDI.

Next, we describe the database used in our analysis.

### 2.2.4 The data

Based on the relevant economic literature, we developed a database containing both traditional and institutional measures that may impact FDI inflows in EU Member States.

In particular, we developed a database with a panel structure, covering 24 out of 27 Member States (there are 3 Member States, Bulgaria, Cyprus and Malta for which the OECD has not constructed the FDI restrictiveness index) as well as the years 2005-2009. The main reason for the time restriction was the availability of aggregate FDI inflow data from Eurostat.

We next provide a list of these variables and also indicate the source of the relevant data.

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<sup>11</sup> See, among others, Bos and de Laar (2004), Bevan and Estrin (2004), Carstensen and Toubal (2004) as well as Blonigen (2005).

<sup>12</sup> See, among others, Ali et al. (2010), Botric and Skuflic (2005) and Johnson (2006).

Table 3: Variables used in the various empirical models		
Variable	Content	Source
FDIEU	FDI inflow from the EU (€mil)	Eurostat
FDInonEU	FDI inflow from outside the EU (€mil)	Eurostat
GDP	Gross domestic product (€mil)	Eurostat
GDP def	GDP deflator (2000=100)	Eurostat
POP	Population	Eurostat
FDirestINDEX	OECDs FDI restrictiveness index (multiplied by 1000)	OECD, 2010 update, WP on International Investment 2010/3
EXP	Exports (€mil)	Eurostat
IMP	Imports (€mil)	Eurostat
OPEN	(Exports + Imports)/(2xGDP)	LE calculations
REGION	Dummy variable, 0 for Western Europe, 1 for Central and Eastern Europe	
RULELAW	Index variable capturing perception of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence (values between -0.16, 1.96).	World Bank, World Governance Indicators
REGULQUAL	Index variable capturing perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development (values between 0.19 and 1.86).	World Bank, World Governance Indicators
CONTRCORRUPT	Index variable capturing perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests (values between -0.20 and 2.47).	World Bank, World Governance Indicators
INTERNETPENET	Number of internet connections per 100 people	World Bank, World Development Indicators
PHONEPENET	Number of fixed phone lines per 100 people	World Bank, World Development Indicators
SERVICESRATIO	Ratio of services sector as compared to total GDP (multiplied by 100)	World Bank, World Development Indicators
ULC	Unit labour costs – ratio of compensation per employee (€) and GDP per employee (€)	DG for Economic and Financial Affairs, Ameco database
DUMMYT	Dummy for year T	
DUMMYI	Dummy for country I	

Source: London Economics

We now introduce our approach to the regression analysis.

### 2.2.5 Estimation methodology

The main objective of our analysis is to investigate the impact of national screening mechanisms on inward FDI flows to EU Member States. Accordingly, the estimation methodology chosen to evaluate this impact is strongly affected by the characteristics of the variables capturing these screening measures.

As we discussed in details in section 2.2.2, formal screening mechanisms are of minor importance or do not exist in EU Member States. This implies that any indicator developed for these mechanisms (as illustrated by the OECD analysis cited in the same section) would be of rather insignificant magnitude for EU Member States and any economic analysis based on such indices would lead to erroneous and hard-to-interpret results.

Therefore, we chose to focus instead on the OECD FDI restriction index that shows significant variation across Member States.

Note, however, that the OECD index presented and discussed in section 2.2.2 was calculated for the year 2010. While values for the same index are available for some earlier years, the methodology used has also changed in time, making comparisons in time quite problematic.

To address this issue we decided to hold the value of this index constant in time. One key justification for this choice is that the data underlying the screening component of this index have hardly changed over time.<sup>13</sup>

We estimate a panel model of the following form:

$$FDI_{it} = \alpha + \beta FDIrestINDEX_i + \gamma X_{it} + v_{it} \quad i=1,27 \quad T=2005-2009$$

Where  $X_{it}$  is a vector of explanatory variables (from the ones listed in section 2.2.4) and  $v_{it}$  is the error term.

The key point in choosing the appropriate estimation technique for this equation is that the cross-sectional values of the  $FDIrestINDEX$  variable do not change in time, ruling out the option of using a fixed effect estimator or a difference estimator.

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<sup>13</sup> We noted in section 2.2.2 that a review of earlier publications by OECD on National Treatment for Foreign-Controlled Enterprises shows that the country indices relating to the screening mechanisms scores in Table 2 have not changed considerably over the past 17 years.

Therefore, we use a random effect estimator. In order to correct for the possible autocorrelation in the error term of the estimated equation, we use a generalised version of this estimator that corrects for this autocorrelation.

We next present our estimation results.

### **2.2.6 Estimation results**

In this section we present our estimation results on the impact of national FDI restrictions on inward FDI. In particular, we will draw a distinction between inward FDI flows coming from inside and outside the EU27.

#### ***Inward FDI flows from the EU27***

A sequential approach was adopted for the estimation of the inward FDI model.

First, we estimated a linear model in which we only use the OECD FDI restriction index (as well as time dummies) on the right hand side as explanatory variables. This is model 1 in Tables 3 and 4.

Second, we introduced additional variables in order to check whether there are any factors that have a significant impact on inward FDI flows. Variables found to be insignificant across various specifications are subsequently left out. These are models 2 to 4 in Tables 3 and 4.

Third, we introduce interaction terms in the model to allow for interactions between variables, e.g. when the impact of a certain variable depends on the magnitude of another variable. . These are models 5 and 6 in Tables 3 and 4.

The estimation results are summarised in the table overleaf.

Table 4: Regression results for intra-EU inward FDI – 2005-2009<sup>(1)</sup>

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
FDIrestINDEX	-159.32 (-1.41)	-81.90 (-1.09)	-33.75 (-0.48)	-45.05 (-0.63)	-48.12 (-0.76)	-90.27 (-1.56)
GDP		0.0206 (5.77)	0.0168 (5.23)	0.0165 (4.97)	0.0370 (3.97)	0.0346 (3.74)
OPEN		26536.74 (2.99)	26495.62 (2.94)	25219.46 (2.50)	34146.27 (3.80)	26406.77 (3.49)
SERVICERATIO			807.58 (2.65)	903.75 (2.84)	676.02 (2.35)	828.01 (3.03)
ULC			50881.97 (1.26)	60616.74 (1.37)	60644.06 (1.59)	
INTERNETPEN				274.50 (1.33)		
RULELAW				-8399.76 (-1.32)		
GDP*OPEN					-0.0594 (-2.28)	0.0526 (-2.04)
DUMMY2006	-2.19 (-0.00)	-1349.62 (-0.36)	-522.05 (-0.14)	-1319.404 (-0.35)	-156.91 (-0.04)	-599.78 (-0.16)
DUMMY2007	3053.11 (0.76)	995.85 (0.25)	1880.32 (0.47)	141.47 (0.03)	2310.03 (0.57)	1818.062 (0.45)
DUMMY2008	-8658.41 (-2.12)	-11026.23 (-2.68)	-11895.6 (-2.91)	-14831.27 (-3.19)	-11105.91 (-2.70)	-10972.84 (-2.64)
DUMMY2009	-9152.46 (-2.22)	-9081.44 (-2.21)	-11965.14 (-2.87)	-15947.82 (-3.11)	-12158.85 (-2.92)	-11758.66 (-2.79)
R <sup>2</sup>	0.1080	0.4594	0.5387	0.5472	0.5680	0.5586

Notes: (1) 2005 is reference years. t-value in parentheses.

Source: London Economics

Model 1 regresses FDI on the OECD FDI restriction index only (and on year dummies). While it finds a negative coefficient for the restrictiveness variable (which is plausible as a lower level of restrictions has smaller blocking effect on inward FDI and results in higher FDI inflows), this coefficient is statistically insignificant. The latter result suggests that the impact of FDI restrictions applied by EU Member States on inward FDI flows from the EU is insignificant and does not explain differences in relative levels of intra-EU inward FDI flows.

It is interesting to note that the parameter for this measure of FDI restrictiveness remains statistically insignificant over all the other specifications, indicating that the initial finding of statistically insignificant impact is robust.

The other models do not add value in addressing the issue of the impact of FDI restrictiveness on inward FDI flows. Instead they provide a better specification for a model identifying the key determinants of inward FDI flows from the EU.

It can be seen from the table that GDP, openness (defined as the ratio of trade to GDP) and servicesratio (defined as the ratio of the service sector from total GDP) all have a significant impact on inward FDI flows.

In particular, a larger country, i.e. a country with larger GDP, attracts more inward FDI flows. Also, more open countries attract more FDI, *ceteris paribus*. Finally, the positive impact of the ratio of services from total GDP is consistent with a key finding of the literature, according to which a large fraction of FDI in current years has targeted the service sector.

It can also be seen that the year dummies for 2008 and 2009 have a statistically significant coefficient and their negative sign indicates that level of inward FDI flows from the EU were significantly lower in 2008 and 2009 than in 2005, the reference year in the regression.

Next, we also added unit labour costs to our model, as well as internet penetration (as a measure of the development of ICT in a country) and rule of law (as a measure for country's business climate), but the estimated coefficients of these variables are statistically insignificant.<sup>14</sup>

Finally, we considered interaction between variables. Model 5 and 6 identify a negative coefficient for the interaction between GDP and openness, indicating that the impact of openness on intra-EU inward FDI flows decreases as GDP increases.

Overall, we found that GDP, openness and the ratio of the service sector from total GDP are the key determinants of inward FDI flows from the EU and that formal measures of limits or restrictions to FDI flows have no significant impact on these flows.

One can add an additional point to the analysis at this stage. By looking at prediction errors of the final model (Model 6 in Table 4), we find that the model regularly (at least 4 times out of 5) underestimates actual inward FDI flows (predicted value is lower than actual value) for Finland, Poland, Romania and Sweden and overestimates it (predicted value is higher than actual value) for Denmark, Germany, Greece, Hungary, Italy, Latvia, Portugal and Slovenia.

This suggests that, in the countries of the latter group, there are some country-specific factors at play which result in the country attracting less FDI than one would have expected on the basis of

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<sup>14</sup> It is interesting to note that our findings do not change when we added variables on phone penetration instead of internet penetration, or at quality of regulation and control for corruption instead of rule of law.

the estimated model. Some of these effects may be related to informal screening processes that may apply in different form and guises. Obviously, other factors may be at play as well.

### ***Inward FDI flows from outside the EU***

In the analysis of the potential impact of restrictions on inward FDI flows from outside the EU, we followed the same sequential approach. We estimated first a linear model by regressing FDI on the OECD FDI restriction index (as well as time dummies) and then introducing additional variables and interaction terms to identify variables with a significant impact.

Our estimation results are summarised in the table below. They are very similar to those reported for intra-EU inward FDI flows.

<b>Table 5: Regression results for inward FDI from outside the EU, 2005-2009<sup>(1)</sup></b>						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
FDIrestINDEX	-117.36 (-1.18)	-25.29 (-0.34)	-34.74 (-0.47)	-36.07 (-0.47)	-49.22 (-0.76)	-49.37 (-0.85)
GDP		0.0147 (4.10)	0.0116 (3.43)	0.0115 (3.25)	0.0318 (3.62)	0.0318 (3.71)
OPEN		39146.87 (4.41)	32554.71 (3.51)	31863.8 (3.09)	40138.75 (4.52)	40114.8 (5.35)
SERVICESRATIO			682.73 (2.25)	652.98 (2.06)	585.08 (2.10)	585.5601 (2.24)
ULC			-15175.18 (-0.40)	-19958.22 (-0.48)	186.63 (0.01)	
INTERNETPEN				-36.98 (-0.19)		
RULELAW				2119.47 (0.35)		
GDP*OPEN					-0.0617 (-2.51)	-0.0617 (-2.57)
DUMMY2006	2541.522 (1.11)	1077.78 (0.48)	1521.28 (0.66)	1644.56 (0.68)	2112.55 (0.91)	2111.70 (0.91)
DUMMY2007	6084.53 (2.21)	4060.39 (1.49)	4542.67 (1.62)	4780.19 (1.53)	5211.07 (1.84)	5210.07 (1.86)
DUMMY2008	1350.59 (0.45)	-1193.43 (-0.40)	-1327.70 (-0.43)	-867.65 (-0.23)	-400.45 (-0.13)	-399.59 (-0.13)
DUMMY2009	3190.18 (1.59)	3720.67 (1.21)	2288.02 (0.71)	2874.67 (0.67)	1964.07 (0.61)	1965.73 (0.61)
R <sup>2</sup>	0.0610	0.4066	0.4871	0.4854	0.5552	0.5552

Notes: (1) 2005 is reference years. t-value in parentheses.

Source: London Economics

In particular, FDIrestINDEX, GDP, openness, servicesratio and GDP\*openness all retain their signs and significance levels (FDIresINDEX remain statistically insignificant). ULC, internetpenetration and rule of law remain statistically insignificant, with ULC and internet penetration changing signs in some scenarios. Finally, the year dummies are only occasionally statistically significant.

In relation to prediction error, the preferred model (Model 6 from Table 5) regularly (at least 4 times out of 5) underestimates actual inward FDI flows (predicted value is lower than actual value) for Finland, Poland, Romania, Sweden and the UK and overestimates it (predicted value is higher than actual value) for Belgium, Denmark, Estonia, France, Germany, Hungary, Ireland, Latvia, Italy, Slovakia, Slovenia and Spain.

### 2.2.7 Inward FDI from within and outside the EU

Overall, the preferred model:

- Under-estimates actual inward FDI flows (both from and outside of EU) in the case of Finland, Poland, Romania and Sweden, and,
- Over-estimates actual inward FDI for Denmark, Germany, Hungary, Italy, Latvia and Slovenia.

As the purpose of the analysis is to identify EU Member States for which the estimated inward FDI models systematically over-predict inward FDI, the list of countries above includes only Member States for which the models over-predict both intra-EU and extra-EU inward FDI.

## 2.3 Screening and quality of inward investment

### 2.3.1 Introduction

The previous section has clearly shown that formal screening of inward FDI is not used at all by the large majority of EU Member States and that the index of FDI restrictions developed by the OECD does not explain differences in inward FDI among EU Member States.

However, as already noted, the fact that the model systematically over-predicts inflows (from both within the EU27 and outside the EU27) in certain Member States (Denmark, Germany, Hungary, Italy, Latvia and Slovenia) suggests that certain country-specific factors are at play, of which informal screening mechanisms may be one.

Therefore, it is useful to investigate whether these country-specific factors have any impact on the quality of the investment. To do so, we compare the performance of firms located in this group of countries and which have been acquired by foreign firms with the performance of firms that have

been acquired and located in the group of countries for which the model systematically under-predicts inward FDI.

It should be noted that before proceeding to such a detailed analysis, we have rerun the analysis above using inward M&A flows rather than total inward FDI flows as dependent variable. The findings remain the same and, therefore, the detailed econometric results are not reported in the chapter.

## 2.4 Performance differences of acquired firms across Member States

The present section compares the performance of firms in terms of growth of turnover, employment and operating income (as a proportion of turnover). The focus is on the compound annual growth rate (CAGR) of these three variables in the first year, second year and fifth year following the acquisition by or merger with a foreign entity.

Thus, for acquisitions or mergers which occurred in 2005, the comparative analysis focuses on firms' performances in 2006, 2007, and 2010. The table below presents for each M&A year, the corresponding years which will be covered in the analysis.

Year of M&A activity	M&A year +1	M&A year +2	M&A year +5
2005	2006	2007	2010
2006	2007	2008	--
2007	2008	2009	--
2008	2009	2010	--
2009	2010	--	--

EU Member States are grouped into 3 different sets.

- The first set comprises the Member States whose actual inward FDI is well below the predicted inward FDI (*the 'over-predicted' group*)
- The second set comprises the Member States whose actual inward FDI is about equal to the predicted inward FDI
- The third set comprises the Member States whose actual inward FDI is well above the predicted inward FDI (*the 'under-predicted' group*)

Of particular interest is the average difference between the performance of M&A targets from the under-predicted group (from Finland, Poland, Romania and Sweden) and that of the M&A targets from the over-predicted group (from Germany, Denmark, Hungary, Italy, Latvia and Slovenia).

All cross-border deals (i.e., completed mergers or acquisitions) across all sectors are considered with the exception of M&A targets in the financial intermediation and insurance sectors.<sup>15</sup> Deal data from the Zephyr database is linked with financial information on M&A targets from the Amadeus database.<sup>16</sup> This yields a sample for which summary statistics are reported in Table 7.

<b>Table 7: Summary statistics of sample of cross-border deals characteristics by Member State, 2005-2009</b>			
<b>Country</b>	<b>Number of deals / M&amp;A targets (#)</b>	<b>Total deal value (€m)</b>	<b>Proportion of non-EU deals</b>
<i>Under-predicted group</i>			
Finland	152	2,190	70.4%
Poland	140	6,632	82.9%
Romania	119	2,459	68.1%
Sweden	318	27,132	59.4%
<i>Over-predicted group</i>			
Denmark	234	13,320	59.8%
Germany	769	36,597	53.3%
Hungary	62	3,042	79.0%
Italy	277	31,314	63.5%
Latvia	54	123	81.5%
Slovenia	15	55	53.3%
<b>TOTAL/AVERAGE</b>	<b>2,140</b>	<b>122,863</b>	<b>61.7%</b>

Note: Member States whose actual inward FDI is well below predicted inward FDI (over-predicted group) and Member States whose actual inward FDI is well above the predicted inward FDI (the 'under-predicted' group).

Source: Zephyr and Amadeus

#### 2.4.1 Performance differences of acquired firms across under-predicted and over-predicted groups

Member States in the under-predicted and over-predicted groups are identified on the basis of how close predicted inward FDI was to actual inward FDI.

Informal investment screening processes additional to those captured by the OECD FDI restriction index and/or other factors in the over-predicted group of Member States may result in actual FDI being below predicted FDI. Meanwhile, the opposite may be true of Member States in the under-predicted group.

<sup>15</sup> The motivation for the exclusion of the financial intermediation and insurance sectors is that the impact of the financial crisis on these sectors would hinder inferences regarding investment screening mechanisms on the basis of comparisons of M&A targets from the under-predicted and over-predicted groups.

<sup>16</sup> Both databases are published by Bureau Van Dijk.

Given the above, the motivation for analysing acquired firm performance differences across Member States in the under-predicted and over-predicted groups, is to determine whether differences in informal investment screening processes may have had an influence on the quality of mergers and acquisitions.

In general, there are very few statistically significant differences in average acquired firm performance across Member States in the under- and over-predicted groups. This is consistent with the notion that differences in informal investment screening processes did not have an influence on the quality of mergers and acquisitions that took place.

From an economic standpoint, however, mean differences in acquired firm performance across Member States in the under- and over-predicted groups are of a meaningful size. For instance, one year post deal, firms in the under-predicted group outperformed firms in the over-predicted group, showing higher annualised growth rates in turnover (6.3% higher), employment (4.2% higher) and marginally, operating income as a proportion of turnover (0.5% higher).

This suggests that, if Member States in the over-predicted group are in that group due to their undertaking of greater informal investment screening and this has an influence on average acquired firm performance, there is an indication that these processes may be detrimental to the quality of mergers and acquisitions taking place. However, other factors could also be the cause of these results.

The performance gap between acquired firms in the under-predicted and over-predicted groups persisted over longer time horizons as well. On average, acquired firms in the under-predicted group maintained growth rates in turnover and employment above that of their counterparts in the over-predicted group. Two years post deal, differences in annualised growth rates in turnover and employment were sustained at 4.6% and 3.0%, respectively. And, while performance differences eroded five years post deal, differences in annualised growth rates in turnover and employment were sustained at approximately 3%.

A pattern in the behaviour of operating income as a proportion of turnover was less apparent. One year post deal, both groups of firms were growing at a similar rate (firms in the under-predicted group grew somewhat faster, at 0.5%). Two years post deal, firms in the over-predicted group grew 4.1% faster than firms in the under-predicted group. But, five years post deal, this difference was reversed, with firms in the under-predicted group growing 11.6% faster than firms in the over-predicted group.

It should be re-iterated that while the point estimates may be economically meaningful, they are not statistically significant.

These observations are reflected in data in Annex A1.1.

## 2.4.2 Performance of acquired firms across Member States

In this section we break out the performance of acquired firms by Member States in order to investigate differences across under-predicted and over-predicted groups in more detail, and specifically to assess whether the results of the previous section reflect a varied set of Member State experiences.

Table 8 shows the compound annual growth rate of various measures of acquired firm performance – operating income/turnover, turnover and employment – 2 years post deal, by Member State.

Member States in both the under-predicted group and over-predicted group show some variation in each of the performance measures. Interestingly, acquired firms in Poland and Romania posted substantially higher operating income/turnover growth figures than other Member States.

However, aside from this, there are no clear patterns suggesting that the results in the section above are driven by a particular Member State or group of Member States.

Table 8: Performance of acquired firms across Member States, 2 years post deal, CAGR			
Member State	Operating income/turnover	Turnover	Employment
<i>Under-predicted group</i>			
Finland	4.90%	7.80%	7.90%
Poland	15.60%	2.20%	3.90%
Romania	21.90%	12.70%	-4.60%
Sweden	8.50%	5.30%	-0.10%
<i>Over-predicted group</i>			
Denmark	4.70%	-0.50%	-1.60%
Germany	8.40%	3.20%	12.90%
Hungary	5.40%	4.80%	-18.40%
Italy	4.60%	6.40%	6.50%
Latvia	5.00%	-7.40%	22.80%
Slovenia	1.10%	3.40%	43.80%

Source: London Economics

Complete information on acquired firm performance, reflecting 1 year post deal, 2 years post deal and 5 years post deal data, can be found in Annex A1.2.

## 2.4.3 Performance differences of acquired firms by origin of acquirer

This section presents results on mean performance differences of acquired firms in the under- and over-predicted groups by origin of acquirer, i.e., cross border intra-EU versus cross-border extra-EU.

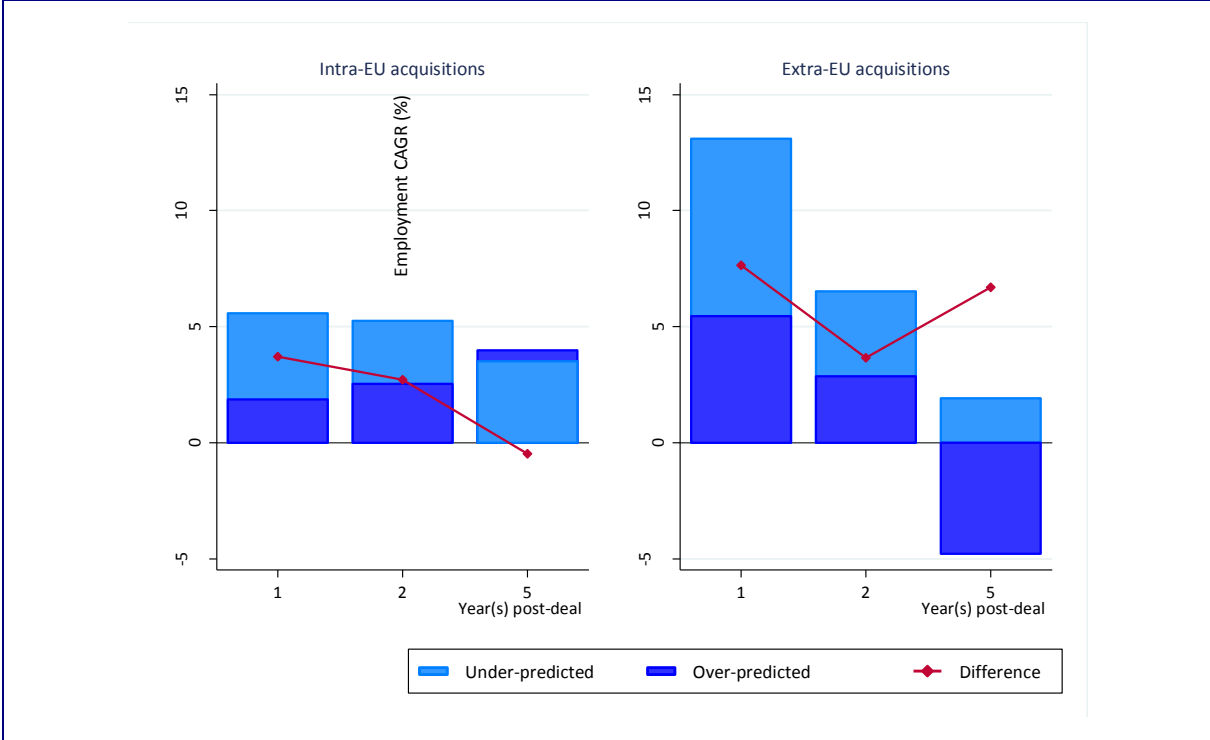
The results for employment and turnover growth provide a consistent picture, as shown in Figure 1 and Figure 2, particularly as indicated by the line tracing differences in growth over different time-horizons.

The first observation is that the positive difference between growth in employment and turnover of intra-EU acquired firms in the under- versus over-predicted groups erodes over time. And, in the case of turnover growth, this reverses such that acquired firms in the over-predicted group outperform those in the under-predicted group five years post deal.

This observation could indicate that it takes time for the impact of informal investment screening mechanisms to be borne out in firm performance.

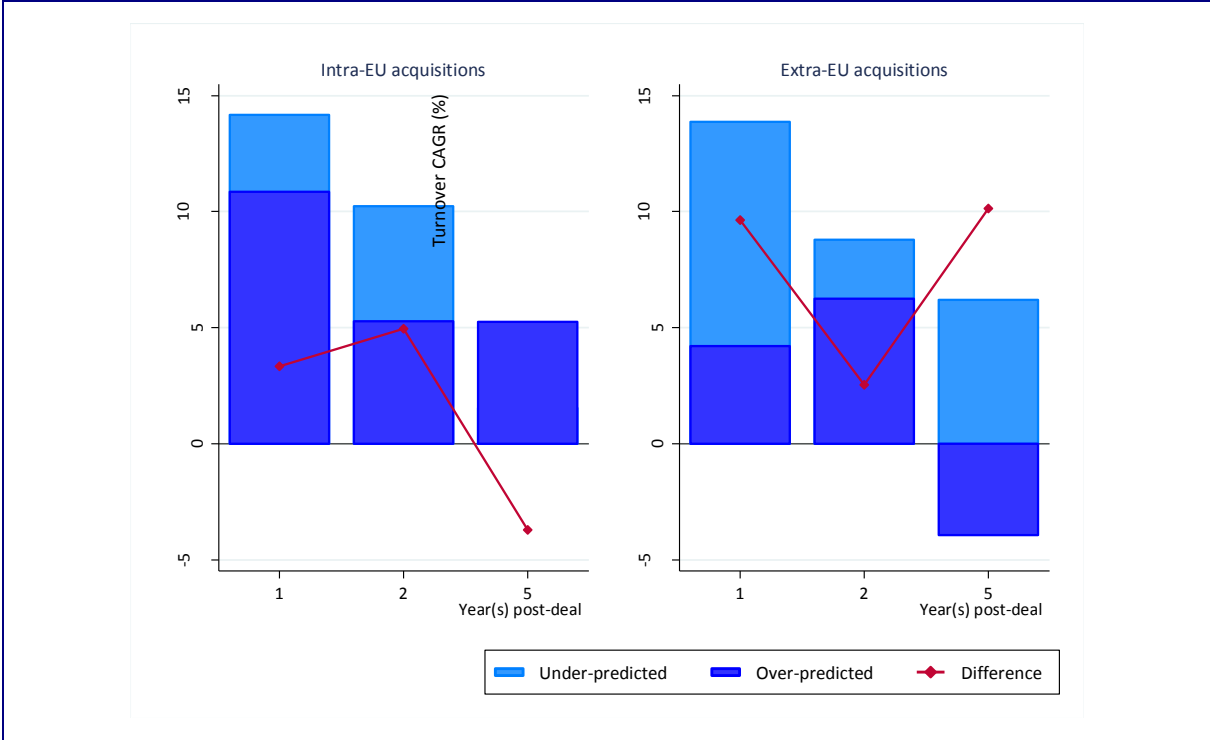
However, the second observation is that this does not apply to extra-EU acquired firms. Initial differences in performance one year post deal remain five years post deal (with a blip two years post deal).

**Figure 1: Employment generation differences of acquired firms, by group and origin of acquirer, CAGR (%)**



Source: London Economics

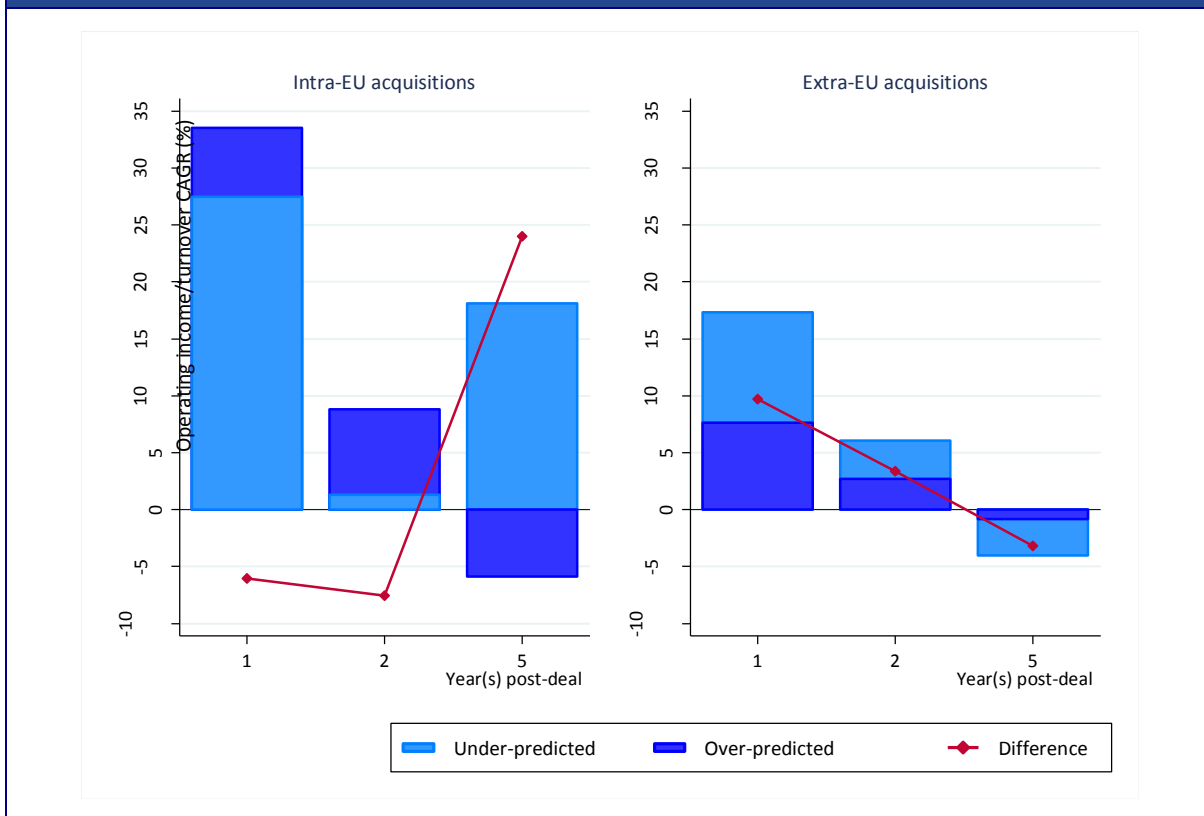
**Figure 2: Turnover growth differences of acquired firms, by group and origin of acquirer, CAGR (%)**



Source: London Economics

In contrast, Figure 3, which relates to income growth, provides the opposite picture.

**Figure 3: Income growth differences of acquired firms, by group and origin of acquirer, CAGR (%)**



Note: Income refers to operating income.

Source: London Economics

Overall, Member States were grouped according to whether the estimation results in the previous section over-predicted or under-predicted actual M&A FDI. If differences between predicted and actual M&A FDI were due to informal investment screening mechanisms, it may be that there are more informal investment screening mechanisms in Member States in the over-predicted group and less in Member States in the under-predicted group. However, this is not necessarily the case and other factors could be at play.

Nevertheless, the possibility of differences in informal investment screening mechanisms between Member States in the under-predicted and over-predicted groups motivated the comparison of average acquired firm performance.

The main finding in this section was that no clear picture emerges in regard to performance differences of acquired firms in the under- and over-predicted groups by origin of acquirer. This was illustrated in the figures above.

## 2.5 Conclusions

Formal screening of inward FDI is not used at all by the large majority of EU Member States. To investigate further the potential impact of various restrictions on inward FDI, the index of FDI restrictions developed by the OECD was used as an additional explanatory variable in a general model of FDI inflows. This model was estimated in panel over the period 2005-2009 and the estimation results are consistent with the general findings from the literature on FDI flows. The estimation results also show that the coefficient of the OECD FDI restrictions index is not statistically significant in the models aiming to explain differences, across Member States, in inward intra-EU FDI and inward FDI from outside the EU.

However, as already noted, the fact that the model systematically over-predicts inflows (from both within the EU27 and outside the EU27) in certain Member States (Denmark, Germany, Hungary, Italy, Latvia and Slovenia) suggests that certain country-specific factors are at play, of which informal screening mechanisms may be one.

This motivated the analysis of performance differences of acquired firms across the under-predicted and over-predicted groups of Member States. Broadly, we found no statistically significant differences across the groups in the average performance of acquired firms, in terms of growth in employment, turnover and income. This finding also held when we broke out M&A FDI by origin (i.e., intra-EU / extra-EU). Overall, therefore, the evidence suggests that country-specific factors such as informal screening mechanisms do not influence performance differences of acquired firms.

## **Annex 1 Performance differences of acquired firms across Member States**

This section presents summary statistics of performance differences of acquired firms across Member States and is the basis of the analysis in Section 2.4.

Section A1.1 describes performance differences of acquired firms across under-predicted and over-predicted groups.

Section A1.2 breaks out the performance of acquired firms by Member State.

And, section A1.3 describes performance differences of acquired firms across under-predicted and over-predicted groups, by the origin of acquirer (EU and non-EU).

## A1.1 Performance differences of acquired firms across under-predicted and over-predicted groups

**Table 9: Comparisons of CAGR of turnover of M&A targets in under-predicted and over-predicted groups of Member States, by deal year (%)**

Deal year	Turnover																				
	1 year post deal							2 years post deal							5 years post deal						
	$N_u$	$\mu_u$	$N_o$	$\mu_o$	$\mu_u - \mu_o$	SE	t	$N_u$	$\mu_u$	$N_o$	$\mu_o$	$\mu_u - \mu_o$	SE	t	$N_u$	$\mu_u$	$N_o$	$\mu_o$	$\mu_u - \mu_o$	SE	t
2005	73	19	73	19	-1	10	-0.08	65	16	65	10	6	4	1.53	31	3	26	1	2	4	0.60
2006	74	26	89	9	17	8	2.23	66	16	80	6	10	5	2.10							
2007	93	12	106	15	-3	6	-0.60	92	6	92	4	2	4	0.54							
2008	74	2	86	-1	3	6	0.53	40	2	28	1	1	6	0.13							
2009	21	13	23	-3	16	8	1.94														

Note: Statistics referring to the under-predicted group indicated by subscript u, Statistics referring to the over-predicted group indicated by subscript o, N (number of observations),  $\mu$  (sample mean), SE (standard error), t (t-statistic for mean comparison test with unequal variances).

Source: London Economics

**Table 10: Comparisons of CAGR in employment of M&A targets in under-predicted and over-predicted groups of Member States, by deal year (%)**

Deal year	Employment																				
	1 year post deal							2 years post deal							5 years post deal						
	$N_u$	$\mu_u$	$N_o$	$\mu_o$	$\mu_u - \mu_o$	SE	t	$N_u$	$\mu_u$	$N_o$	$\mu_o$	$\mu_u - \mu_o$	SE	t	$N_u$	$\mu_u$	$N_o$	$\mu_o$	$\mu_u - \mu_o$	SE	t
2005	71	10.5	47	4.5	6.1	3.7	1.62	63	9.4	42	3.2	6.2	3.0	2.06	25	2.9	19	-0.2	3.1	3.9	0.80
2006	66	11.7	59	-0.3	12.0	4.7	2.55	55	7.2	54	-0.9	8.1	4.4	1.84							
2007	77	10.0	112	6.1	4.0	4.7	0.84	78	5.7	101	3.1	2.6	2.9	0.91							
2008	65	6.5	87	6.2	0.3	6.6	0.05	29	0.5	36	5.4	-4.9	5.7	-0.86							
2009	17	0.6	23	2.2	-1.5	6.6	-0.23														

Note: Statistics referring to the under-predicted group indicated by subscript u, Statistics referring to the over-predicted group indicated by subscript o, N (number of observations),  $\mu$  (sample mean), SE (standard error), t (t-statistic for mean comparison test with unequal variances).

Source: London Economics

**Table 11: Comparisons of CAGR of operating income of M&A targets in under-predicted and over-predicted groups of Member States, by deal year (%)**

Deal year	Operating income / turnover																				
	1 year post deal							2 years post deal							5 years post deal						
	N <sub>u</sub>	μ <sub>u</sub>	N <sub>o</sub>	μ <sub>o</sub>	μ <sub>u</sub> -μ <sub>o</sub>	SE	t	N <sub>u</sub>	μ <sub>u</sub>	N <sub>o</sub>	μ <sub>o</sub>	μ <sub>u</sub> -μ <sub>o</sub>	SE	t	N <sub>u</sub>	μ <sub>u</sub>	N <sub>o</sub>	μ <sub>o</sub>	μ <sub>u</sub> -μ <sub>o</sub>	SE	t
2005	50	58.8	54	14.5	44.3	27.9	1.59	44	5.9	43	7.1	-3.7	10.4	-0.36	17	7.7	15	-3.9	11.6	9.5	1.21
2006	50	29.0	47	25.0	4.0	24.7	0.16	45	-2.2	44	16.1	-10.2	15.8	-0.64							
2007	67	6.6	61	31.3	-24.7	16.9	-1.46	62	2.6	50	8.6	-10.8	8.2	-1.33							
2008	46	27.1	45	26.4	0.7	25.3	0.03	29	0.0	19	-5.9	8.5	12.3	0.69							
2009	14	-3.3	16	18.3	-21.5	20.6	-1.05														

Note: Statistics referring to the under-predicted group indicated by subscript u, Statistics referring to the over-predicted group indicated by subscript o, N (number of observations), μ (sample mean), SE (standard error), t (t-statistic for mean comparison test with unequal variances).

Source: London Economics

## A1.2 Performance of acquired firms by Member State

Table 12: Performance of acquired firms by Member State, mean CAGR (%)									
Member State	Turnover			Employment			Operating income / turnover		
	1 year post deal	2 years post deal	5 years post deal	1 year post deal	2 years post deal	5 years post deal	1 year post deal	2 years post deal	5 years post deal
<i>Under-predicted group</i>									
Finland	7.10%	4.90%	-0.60%	6.50%	7.80%	-2.10%	14.60%	7.90%	16.10%
Poland	15.80%	15.60%	8.30%	3.70%	2.20%	5.80%	13.30%	3.90%	3.50%
Romania	22.80%	21.90%	0.00%	15.00%	12.70%	0.00%	31.70%	-4.60%	0.00%
Sweden	15.20%	8.50%	6.50%	10.10%	5.30%	5.80%	37.60%	-0.10%	-3.40%
<i>Over-predicted group</i>									
Denmark	2.80%	4.70%	0.00%	0.20%	-0.50%	0.00%	22.40%	-1.60%	0.00%
Germany	11.70%	8.40%	-7.00%	4.90%	3.20%	-4.20%	20.70%	12.90%	13.50%
Hungary	1.60%	5.40%	0.00%	-4.10%	4.80%	0.00%	15.40%	-18.40%	0.00%
Italy	10.40%	4.60%	3.40%	9.50%	6.40%	3.80%	25.40%	6.50%	-7.60%
Latvia	14.80%	5.00%	0.00%	2.60%	-7.40%	0.00%	32.40%	22.80%	0.00%
Slovenia	3.50%	1.10%	0.20%	1.50%	3.40%	-4.80%	67.10%	43.80%	6.10%

## A1.3 Performance differences of acquired firms across under-predicted and over-predicted groups by origin of acquirer (EU or non-EU)

### A1.3.1 EU acquirers

**Table 13: Comparisons of CAGR of turnover of M&A targets in under-predicted and over-predicted groups of Member States, by deal year for EU acquirers (%)**

Deal year	Turnover																				
	1 year post deal							2 years post deal							5 years post deal						
	N <sub>u</sub>	μ <sub>u</sub>	N <sub>o</sub>	μ <sub>o</sub>	μ <sub>u</sub> -μ <sub>o</sub>	SE	t	N <sub>u</sub>	μ <sub>u</sub>	N <sub>o</sub>	μ <sub>o</sub>	μ <sub>u</sub> -μ <sub>o</sub>	SE	t	N <sub>u</sub>	μ <sub>u</sub>	N <sub>o</sub>	μ <sub>o</sub>	μ <sub>u</sub> -μ <sub>o</sub>	SE	t
2005	53	21.3	45	26.5	-5.2	15.5	-0.33	47	18.2	39	12.7	5.5	5.2	1.07	20	1.5	14	5.2	-3.7	4.9	-0.76
2006	50	29.2	47	13.4	15.9	10.9	1.45	44	17.3	37	8.3	8.9	6.6	1.36							
2007	56	6.2	70	13.1	-6.9	4.6	-1.49	57	2.9	60	4.7	-1.9	3.9	-0.49							
2008	59	0.7	51	-2.1	2.8	7.6	0.37	33	2.6	17	-4.6	7.2	6.8	1.05							
2009	11	13.3	13	3.4	10.0	11.3	0.89														

Note: Statistics referring to the under-predicted group indicated by subscript u, Statistics referring to the over-predicted group indicated by subscript o, N (number of observations), μ (sample mean), SE (standard error), t (t-statistic for mean comparison test with unequal variances).

Source: London Economics

**Table 14: Comparisons of CAGR in employment of M&A targets in under-predicted and over-predicted groups of Member States, by deal year for EU acquirers (%)**

Deal year	Employment																				
	1 year post deal							2 years post deal							5 years post deal						
	N <sub>u</sub>	μ <sub>u</sub>	N <sub>o</sub>	μ <sub>o</sub>	μ <sub>u</sub> -μ <sub>o</sub>	SE	t	N <sub>u</sub>	μ <sub>u</sub>	N <sub>o</sub>	μ <sub>o</sub>	μ <sub>u</sub> -μ <sub>o</sub>	SE	t	N <sub>u</sub>	μ <sub>u</sub>	N <sub>o</sub>	μ <sub>o</sub>	μ <sub>u</sub> -μ <sub>o</sub>	SE	t
2005	51	9.7	29	7.0	2.7	4.5	0.60	44	8.8	25	5.4	3.4	3.9	0.88	16	3.5	10	4.0	-0.5	4.9	-0.10
2006	44	13.0	33	-3.1	16.0	7.0	2.30	35	7.9	25	-1.2	9.2	6.5	1.41							
2007	46	6.6	75	5.5	1.0	5.1	0.20	47	3.9	67	3.8	0.0	3.5	0.01							
2008	51	1.9	44	-2.6	4.4	5.0	0.89	24	0.4	22	2.2	-1.8	6.2	-0.29							
2009	9	-3.2	16	2.5	-5.7	9.0	-0.63														

Note: Statistics referring to the under-predicted group indicated by subscript u, Statistics referring to the over-predicted group indicated by subscript o, N (number of observations), μ (sample mean), SE (standard error), t (t-statistic for mean comparison test with unequal variances).

Source: London Economics

**Table 15: Comparisons of CAGR of operating income of M&A targets in under-predicted and over-predicted groups of Member States, by deal year for EU acquirers (%)**

Deal year	Operating income / turnover																				
	1 year post deal							2 years post deal							5 years post deal						
	N <sub>u</sub>	μ <sub>u</sub>	N <sub>o</sub>	μ <sub>o</sub>	μ <sub>u</sub> -μ <sub>o</sub>	SE	t	N <sub>u</sub>	μ <sub>u</sub>	N <sub>o</sub>	μ <sub>o</sub>	μ <sub>u</sub> -μ <sub>o</sub>	SE	t	N <sub>u</sub>	μ <sub>u</sub>	N <sub>o</sub>	μ <sub>o</sub>	μ <sub>u</sub> -μ <sub>o</sub>	SE	t
2005	37	70.8	34	4.6	66.2	35.0	1.89	32	6.4	23	-4.2	10.6	9.4	1.13	9	18.1	9	-5.9	24.0	14.3	1.68
2006	36	25.6	25	50.0	-24.4	32.9	-0.74	32	5.4	22	30.3	-24.9	27.9	-0.89							
2007	45	1.9	42	44.5	-42.7	22.8	-1.87	37	-4.6	34	9.7	-14.4	10.9	-1.31							
2008	36	24.8	25	34.8	-10.0	31.8	-0.32	23	-2.0	13	-0.5	-1.5	15.3	-0.10							
2009	8	14.4	10	33.8	-19.4	30.4	-0.64														

Note: Statistics referring to the under-predicted group indicated by subscript u, Statistics referring to the over-predicted group indicated by subscript o, N (number of observations), μ (sample mean), SE (standard error), t (t-statistic for mean comparison test with unequal variances).

Source: London Economics

## A1.3.2 Non-EU acquirers

Table 16: Comparisons of CAGR of turnover of M&amp;A targets in under-predicted and over-predicted groups of Member States, by deal year for non-EU acquirers (%)

Deal year	Turnover																				
	1 year post deal							2 years post deal							5 years post deal						
	N <sub>u</sub>	μ <sub>u</sub>	N <sub>o</sub>	μ <sub>o</sub>	μ <sub>u</sub> -μ <sub>o</sub>	SE	t	N <sub>u</sub>	μ <sub>u</sub>	N <sub>o</sub>	μ <sub>o</sub>	μ <sub>u</sub> -μ <sub>o</sub>	SE	t	N <sub>u</sub>	μ <sub>u</sub>	N <sub>o</sub>	μ <sub>o</sub>	μ <sub>u</sub> -μ <sub>o</sub>	SE	t
2005	20	11.1	28	7.9	3.2	6.8	0.47	18	9.9	26	6.6	3.3	3.5	0.95	11	6.2	12	-3.9	10.1	5.0	2.04
2006	24	19.8	42	4.9	14.9	7.7	1.93	22	13.4	43	4.5	8.9	6.2	1.44							
2007	37	19.8	36	18.7	1.1	13.1	0.08	35	12.3	32	3.6	8.7	8.1	1.06							
2008	15	5.8	35	-0.1	5.9	9.0	0.66	7	-0.5	11	10.3	-10.7	11.4	-0.94							
2009	10	12.8	10	-10.3	23.1	11.8	1.95														

Note: Statistics referring to the under-predicted group indicated by subscript u, Statistics referring to the over-predicted group indicated by subscript o, N (number of observations), μ (sample mean), SE (standard error), t (t-statistic for mean comparison test with unequal variances).

Source: London Economics

**Table 17: Comparisons of CAGR in employment of M&A targets in under-predicted and over-predicted groups of Member States, by deal year for non-EU acquirers (%)**

Deal year	Employment																				
	1 year post deal							2 years post deal							5 years post deal						
	N <sub>u</sub>	μ <sub>u</sub>	N <sub>o</sub>	μ <sub>o</sub>	μ <sub>u</sub> -μ <sub>o</sub>	SE	t	N <sub>u</sub>	μ <sub>u</sub>	N <sub>o</sub>	μ <sub>o</sub>	μ <sub>u</sub> -μ <sub>o</sub>	SE	t	N <sub>u</sub>	μ <sub>u</sub>	N <sub>o</sub>	μ <sub>o</sub>	μ <sub>u</sub> -μ <sub>o</sub>	SE	t
2005	20	12.7	18	0.4	12.3	7.6	1.62	19	10.8	17	0.0	10.8	5.4	2.00	9	1.9	9	-4.8	6.7	5.9	1.15
2006	22	9.2	26	3.1	6.1	4.4	1.38	20	5.9	29	-0.6	6.5	5.3	1.24							
2007	31	15.2	37	7.2	8.1	9.1	0.89	31	8.4	34	1.6	6.8	4.8	1.42							
2008	14	23.4	43	15.2	8.2	16.6	0.50	5	1.0	14	10.4	-9.4	8.9	-1.06							
2009	8	4.9	7	1.4	3.5	8.6	0.41														

Note: Statistics referring to the under-predicted group indicated by subscript u, Statistics referring to the over-predicted group indicated by subscript o, N (number of observations), μ (sample mean), SE (standard error), t (t-statistic for mean comparison test with unequal variances).

Source: London Economics

**Table 18: Comparisons of CAGR of operating income of M&A targets in under-predicted and over-predicted groups of Member States, by deal year for non-EU acquirers (%)**

Deal year	Operating income / turnover																				
	1 year post deal							2 years post deal							5 years post deal						
	N <sub>u</sub>	μ <sub>u</sub>	N <sub>o</sub>	μ <sub>o</sub>	μ <sub>u</sub> -μ <sub>o</sub>	SE	t	N <sub>u</sub>	μ <sub>u</sub>	N <sub>o</sub>	μ <sub>o</sub>	μ <sub>u</sub> -μ <sub>o</sub>	SE	t	N <sub>u</sub>	μ <sub>u</sub>	N <sub>o</sub>	μ <sub>o</sub>	μ <sub>u</sub> -μ <sub>o</sub>	SE	t
2005	13	24.5	20	31.4	-6.8	35.3	-0.19	12	-4.5	20	20.2	-24.7	20.1	-1.23	8	-4.0	6	-0.8	-3.2	12.1	-0.26
2006	14	37.5	22	-3.4	40.9	54.7	0.75	13	7.1	22	1.9	5.2	16.6	0.31	0						
2007	22	16.3	19	1.9	14.3	18.8	0.76	25	1.4	16	6.3	-4.9	11.5	-0.43	0						
2008	10	35.2	20	15.8	19.4	48.8	0.40	6	20.2	6	-17.7	37.9	24.4	1.55	0						
2009	6	-26.8	6	-7.6	-19.2	14.9	-1.29														

Note: Statistics referring to the under-predicted group indicated by subscript u, Statistics referring to the over-predicted group indicated by subscript o, N (number of observations), μ (sample mean), SE (standard error), t (t-statistic for mean comparison test with unequal variances).

Source: London Economics

## 3 FDI and a financial transaction tax

### 3.1 Introduction

The present chapter discusses the likely impact of the introduction of a financial transaction tax (FTT) on outward FDI. It is largely a theoretical exercise as a full-fledged FTT, covering all financial sector transactions, has not been implemented in the world. However, as the information provided in the table overleaf shows, a number of partial FTTs do exist at the present time.

In September 2011, the European Commission put forward a proposal for a FTT on the exchange of shares and bonds which would be taxed at a rate of 0.1% and on derivative contracts which would be taxed at a rate of 0.01% (European Commission, 2011).

For the purpose of the present analysis, it is assumed that the FTT is introduced world-wide. Thus, in our discussion below, the impact of a FTT on outward FDI will not depend on funding arbitrage opportunities arising from the partial introduction of a FTT.

It should also be noted that the analysis is a partial equilibrium analysis which focuses only on FDI. It implicitly assumes that the long-run equilibrium (steady state) of the economies is not affected by the introduction of a FTT.

To investigate the impact of a FTT on the steady state of the European and world economy would require the use of general equilibrium model, an exercise well beyond the scope of the present study.

**Table 19: Selected financial transactions taxes and levies currently used by various countries**

Country	Capital Levy	Equity	Bonds/Loans	Forex	Options	Futures	Capital inflow
Argentina	na	Federal stamp duty on share transfers abolished 2001	Provincial stamp tax, usually at 1%, may affect bonds and debentures.	na	na	na	na
Australia	na	State-level taxes may apply to shares	State-level taxes may apply to loans and bonds.	na	na	na	na
Brazil	na	1.5% tax on equity issued abroad as depository receipts (reduced from 3% 2008)	1.5% tax on loans (reduced from 3% in 2008).	0.38% on forex; 5.28% on short-term forex (<90 days).	na	na	2% tax on capital inflows to stock and bond markets since 2009
Canada	na	na	na	na	na	na	na
China	na	0.1% of principal	na	na	na	na	na
Chile			0.1-1.2% tax on bond issuance				
France	5% of capital contributions not subject to VAT	15-30 bps tax abolished 1/1/2008	na	na	na	na	na
Germany	na	na	na	na	na	na	na
Hong Kong	na	10 basis points	na	na	na	na	na
India	na	0.25% on stock price; 0.025% on intraday transactions; local stamp taxes may also apply	Local stamp duties may apply		0.017% on premium; 0.125% on strike	0.017% of delivery price	na
Indonesia	na	0.1% on value of shares; local stamp duties may also apply.	Local stamp duties may apply	na	na	na	na
Italy	Euro 168 flat fee on share issuance; 3% on business purchases	0.01-0.14% of shares traded off exchange.	0.25-2% on loan principal	na	na	na	na
Japan	Registration tax of 0.4% on mergers and trusts.	na	na	na	na	na	na
Mexico	na	na	na	na	na	na	na
Russia	Capital duty of 0.2% of value of new		Capital duty of 0.2% of value of new				

	share issues, but not upon formation or IPO of company		bond issues, but not upon formation or IPO of company				
Saudi Arabia	na	na	na	na	na	na	na
Singapore	na	20 basis points	na	na	na	na	na
South Africa	na	0.25% of value; new share issues excluded.	na	na	na	na	na
South Korea	0.1-0.4% tax on capital formation	0.5% on value of shares in corporations or partnerships	na	na	na	na	na
Switzerland	1% on share issuance in excess of CHF 1 mn.	15 bps on domestic shares; 30 bps on foreign shares.	6-12 bps on bond issuance				
Taiwan		30 basis points	10 basis points on corporate bond principal		10-60 basis points on premiums.	Up to 0.025 basis points on interest rate futures; up to 6 basis points on stock index and other futures	
Turkey	Stock issuance charge 0.2%	Initial charge for obtaining stock market quote: 0.1%; annual maintenance charge 0.025%	0.6-0.75% bond issuance charge	0.1% tax on foreign exchange transactions by financial institutions eliminated 2008	na	na	
UK	na	Stamp duty 0.5% on secondary sales of shares and trusts holding shares.	na	na	50 bps on strike price, if executed.	50 bps on delivery price	na
US	na	SEC fees on stock trading: 0.0013%; NY state tax: \$0.05 per share up to \$350 per trade.	na	na	na	na	na

Source: Matheson (2011)

## 3.2 Development of a theoretical model for assessing the impact of a FTT on outward FDI

The key building blocks of the model are three, namely:

- The relationship between outward FDI and domestic capital formation
- The relationship between domestic capital formation and the costs of funds to companies
- The relationship between the costs of funds to companies and the financial transactions tax.

While the second relationship has been studied extensively in the academic literature, there exist almost no studies on the relationship between outward FDI and domestic investment by companies. Moreover, as far as we are aware, there exists no literature examining in detail the impact of a financial transactions tax on the cost of funds to companies, probably because the concept of a broad-scale financial transactions tax has not yet been operationalised.

Most of the academic literature on FDI focuses on the factors explaining FDI inflows at a macroeconomic level, but very few studies focus on the determinants to invest abroad from a firm's perspective.

One such study by Barrell and Pain (1996) relates the desired level of FDI stock by US multinational corporations to total demand in the home and host country, the ratio of the cost of funds in the home and host country, the ratio of wages in the home country and host country, the change in effective exchange rate, the level of profits in the source country and the combined level of exports in the two countries. The authors find that an increase in the user cost of capital in the home country will lead to an increase in FDI as production is shifted abroad. According to Barrell and Pain(1996), this particular result stands in sharp contrast with previous studies showing that a rise in home country interest rates reduces FDI as firms resort to foreign currency borrowing in the host country.

Unfortunately, the results of the Barrell and Pain study and the various previous studies are not useful for the analysis of the impact of a FTT on FDI as the FTT would apply globally and would not result in a change of relative interest rates or user cost of capital.

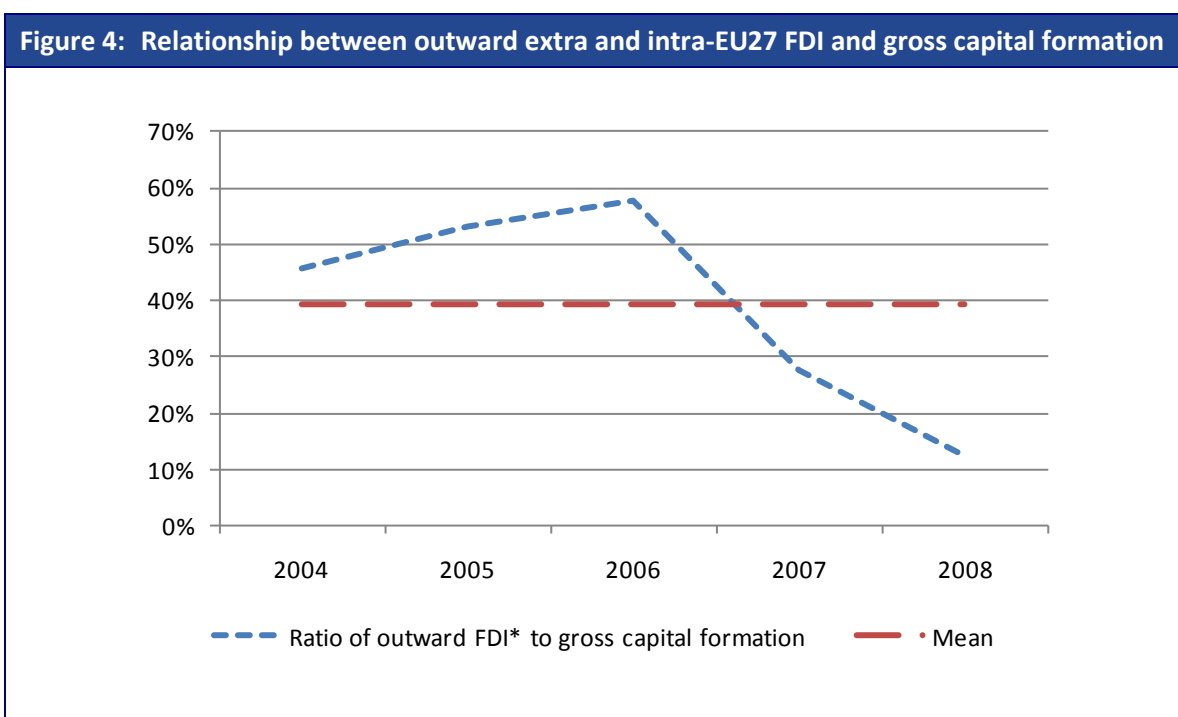
For the purpose of the analysis of the impact of the FTT, one has to focus on the absolute level of the cost of funds and not the relative funds. This is the reason why the analysis below focuses on the total investment that a firm would undertake under different cost of funds scenarios and the split between investment at home and abroad is assumed to be driven by factors other than the cost of funds (as the latter is assumed to change by the same amount everywhere in the world).

Below, we discuss and model each of these three key building blocks and in the next section we compute potential impacts under different assumptions for key parameter inputs. The analysis focuses on non-financial corporations as it is highly unlikely that the investment behaviour of financial institutions in recent years is representative of their long-term behaviour.

### 3.2.1 Relationship between gross capital formation and outward FDI (intra and extra-EU27) by non-financial corporations

Figure 4 below shows that, on average over the period 2005-2008 (the only years for which data on gross capital formation by non-financial corporations and outward extra- and intra-EU27 FDI exist), non-financial corporations from the EU-27 invested 39 cents outside their home country (i.e. in other EU Member States and outside the EU) for each €1 they invested in their home country.

The figure also shows that the ratio of outward FDI to gross domestic capital formation varied markedly over this short period, from almost 58% in 2006, the last year before the onset of the financial crisis, to 13% in 2008, during the financial crisis.



Note: FDI and gross capital formation are at current prices. Data on gross capital formation of non-financial corporations are from the European accounts produced by Eurostat while outward FDI of non-financial corporations is defined as total extra and intra-EU27 outward FDI minus outward extra- and intra EU27 FDI by Financial intermediation, except insurance and pension funding.

Source: London Economics calculations using Eurostat data

Obviously, many factors influence the relationship between outward FDI and domestic gross capital formation but there exists scant evidence on the nature of these factors and their quantitative impact.

As already noted, there exist no studies which examine the choice between domestic gross capital formation and outward FDI by European non-financial corporations. The analysis of the impact of the FDI is undertaken relative to a situation with no FTT and none of the other determinants of outward FDI relative to domestic gross capital formation changes as a result of the introduction of the FTT. Therefore, we assume, as a starting point in the quantitative analysis, that a change of €1 in gross capital formation by non-financial corporations will result in a fixed change ( $\theta$ ) in outward FDI (extra- and intra-EU27) by EU27 non-financial corporations with  $\theta$  taking a value of €0.39, the mean value of the ratio of outward FDI to gross capital formation over the 2004-2008 period.

$$(1) \text{ Outward FDI by EU27 non-financial corporations} = \alpha + \beta(X) * \text{Gross capital formation by non-financial corporations in the EU27}$$

Where  $\beta(X)$  is a function of the various factors driving outward FDI relative to domestic gross investment

$$(2) \beta(X) = \theta \text{ for the purpose of the analysis.}$$

Thus,

$$(3) \Delta \text{ Outward FDI by EU27 non-financial corporations} = \theta * \Delta \text{ Gross capital formation by non-financial corporations in the EU27}$$

The next section turns to the relationship between domestic gross capital formation and the user cost of capital.

### 3.2.2 Relationship between domestic capital formation and the user cost of capital to companies

Standard economic theory postulates that gross capital formation depends on the output-capital ratio and the user cost of capital (see Box 1).

The mathematical derivation of the relationship between gross capital formation and the user cost of capital in Box 1 shows that the impact on gross capital formation of a change in the user cost of capital depends on the elasticity of substitution between capital and labour (and other variable factors of production) and the speed of adjustment of the capital stock to its desired level.

There is no consensus in the economic literature on the size of the elasticity of substitution. For example, Klump et al. (2004) show that European studies have found an elasticity of substitution ranging from 0.20 to 2.00 with the majority of findings clustering in a range of about .50 to 1.50.

That is why in the scenario quantification of the impact of the FTT on FDI, we will use 2 different values for sigma in Box 2<sup>17</sup>, namely 0.75 and 0.90.

There is also no consensus in the literature on the speed of adjustment of the capital stock to its desired level following a change to one of the factors affecting its level. Therefore, we will again assume two different speeds of adjustment values, namely 0.25 and 0.50. A value of 0.25 implies a slow speed of adjustment as, every period, the gap between the desired capital stock level and the actual level is reduced by 25%. In contrast, with a speed of adjustment of 0.50, the gap between desired capital stock and actual capital stock is reduced very quickly. In fact, the gap is closed by 50% in the first period.

The next section focuses on the relationship between the cost of debt and equity and the user cost of capital.

#### Box 1: Derivation of the relationship between changes in gross capital formation and changes in the user cost of capital

The starting point for the derivation of the gross capital formation equation is the production function of the firm. For the present analysis, a CES (constant elasticity of substitution) is assumed. Thus,

$$(A) \quad Q = (aK^\sigma + bL^\sigma)^{1/\sigma}$$

where Q = output, K = is the capital stock, L = labour and other variable inputs

Under profit maximizing conditions, the following optimality condition holds

$$(B) \quad a(Q/K^*)^{1-\sigma} = CC$$

where CC is the cost of capital and  $K^*$  is the desired stock of capital

Under the assumption that, in each period, the firm does not adjust instantaneously to the desired capital stock K, a simple partial adjustment between actual and desired capital implies the following relationship

$$(C) \quad \Delta \ln(K) = \eta + \lambda * [\ln(Q/K) - (1/(1-\sigma)) * \ln(CC)]$$

Using the following approximation

$$(D) \quad \ln(GCF) \approx \Delta \ln(K)$$

where  $\ln(GCF) (\approx \Delta \ln(K))$  is gross capital formation,  $\lambda$  is the speed of adjustment of the capital stock to its desired level (ranging from 0 to 1) and  $(1/(1-\sigma))$  is the long-run elasticity of capital to the cost of capital

Thus,

<sup>17</sup> The elasticity of substitution is the expression  $(1/(1-\sigma))$  in Box 2.

**Box 1: Derivation of the relationship between changes in gross capital formation and changes in the user cost of capital**

$$(E) \quad \Delta \ln \text{GCF} = -\lambda * ((1/(1-\sigma)) * \Delta \ln \text{CC})$$

In other words, a 1% increase in the cost of capital, ceteris paribus, will reduce gross capital formation by  $\lambda * ((1/(1-\sigma))\%$ .

Note: The discussion in the box draws heavily on Gilchrist et al (2007).

### 3.2.3 Relationship between the user cost of capital and the cost of funds faced by non-financial corporation

A key driver of the user cost of capital, besides the price of the capital good and output, and the depreciation rate is the cost of the funds for the firm. In the simple neo-classical model, the cost of funds is represented by a single variable, an interest rate (see Box 2).

**Box 2: Definition of the user cost of capital and the weighted average cost of capital**

In the neo-classical user-cost framework, the cost of purchasing a physical asset depends not only on the cost of financing  $r$ , but also on the price of the capital good ( $P_K$ ) relative to the price of the output ( $P_Q$ ), the depreciation rate of the capital good ( $\delta$ ), the corporate tax rate  $\tau$ , the appreciation in value of the capital good (APP) and a variable capturing possible tax credit incentives (TI)

$$(A) \quad CC = (P_K/P_Q) * ((1-\tau)*r + \delta - APP) *(TI)$$

Or,

$$(B) \quad \ln CC = \ln((P_K/P_Q)) + \ln((1-\tau)*r + \delta - APP) + \ln(TI)$$

Moreover, a change in the interest rate, *ceteris paribus*, will result in the following change in the cost of capital:

$$(C) \quad \Delta \ln CC = \ln((1-\tau)*\Delta r)$$

So far, the model used a single interest rate to represent the cost of funds.

However, as was noted above, non-financial corporations can potentially access a range of funding sources. That is why, in the analysis of the impact of a FTT on outward FDI, the single  $r$  variable in the equation above is replaced by a weighted average cost of capital (WACC).

$$(D) \quad WACC = a * r_D * (1-\tau) + (1-a) * C_E$$

Where  $a$  is the share of debt,  $r_D$  is the interest rate on debt and  $C_E$  is the cost of equity. Debt can be further decomposed into loans from financial institutions (L) and the issuance of debt securities (DS). Similar equity can be decomposed into retained earnings (RE) and the issuance on new equity (NE). Thus,

$$(E) \quad WACC = (a_1 * r_L + a_2 * r_{DS}) * (1-\tau) + a_3 * C_{RE} + (1-a_1-a_2-a_3) * C_{NE}$$

The cost of capital equation is often simplified by assuming that the opportunity cost of retained earnings is equal to the cost of new equity. However, for the analysis of the impact of the FTT on the gross capital formation and outward FDI, it would be inappropriate to make such an assumption as the FTT would increase the cost of new issuance of equity but not the cost of retained earnings.

And

$$(F) \quad \Delta WACC = (a_1 * \Delta r_L + a_2 * \Delta r_{DS}) * (1-\tau) + (1-a_1-a_2-a_3) * \Delta C_{NE}$$

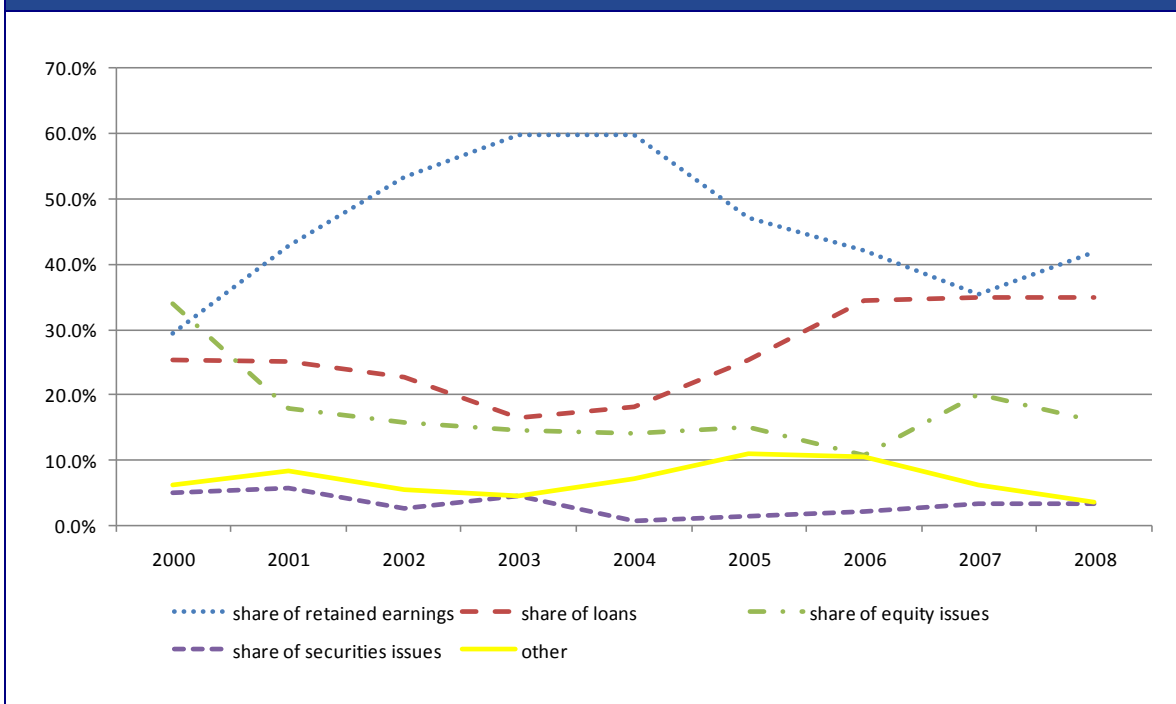
Substituting equation (F) into equation (C) yields the following equation for the change of the user cost of capital

$$(G) \quad \Delta \ln CC = \ln((a_1 * \Delta r_L + a_2 * \Delta r_{DS}) * (1-\tau) + (1-a_1-a_2-a_3) * \Delta C_{NE})$$

However, in the real world, non-financial corporations can primarily rely on four different types of funds to finance their investments in non-financial and financial assets, namely retained earnings, equity issues, loans and issues of debt securities.

As shown by Figure 5, retained earnings are by far the largest source of funds for new physical and financial investments in the EU27. Loans are the second most important source of funds and equity issues the third most important. Issues of debt securities are the least important source of funds.

**Figure 5: Composition of funds available for gross capital formation and acquisition of financial assets by non-financial corporations in the EU27 - 2000-2008**



Note: Other includes trade credit (accounts payable) and insurance technical reserves.

Source: London Economics using data from the Eurostat European Accounts

For the purpose of assessing the impact of the FTT on outward FDI by non-financial corporations from the EU27, the average shares of retained earnings, loans, equity issues and debt issues combined with other sources of funds will be used (see Table 20 below).

**Table 20: Average share of funds available for gross capital formation and acquisition of financial assets by non-financial corporations in the EU27 – 2000-2008**

Source of funds	Share
share of retained earnings	45.7%
share of loans	26.4%
share of equity issues	17.5%
share of securities issues + other	10.3%

Note: Other includes trade credit (accounts payable) and insurance technical reserves.

Source: London Economics using data from the Eurostat European Accounts

### 3.2.4 Model to estimates the potential impacts of a FTT on outward FDI

Substituting equation (G) from Box 2 into equation (D) from Box 1, and then substituting the resulting expression into equation 3 and using the average shares for the different types of funds

shown above yields the following equation which can be used to assess the impact of a FTT on outward FDI by non-financial corporations in the EU27.

$$(4) \Delta \ln \text{ Outward FDI by EU27 non-financial corporations} = -\theta * \lambda * \left( \frac{1}{1-\sigma} * \ln(0.264 * \Delta r_L + 0.103 * \Delta r_{DS}) \right) (1-\tau) + 0.175 * \Delta C_{NE}$$

Where  $\theta$  is the ratio of outward FDI to gross capital formation of non-financial corporations,  $\lambda$  is the speed of adjustment of the actual capital stock to the desired capital stock,  $1/(1-\sigma)$  is the elasticity of substitution between capital and labour and other variable factors of production,  $\Delta r_L$  is the increase in the rate on loans due to the FTT,  $\Delta r_{DS}$  is the increase in the rate on debt securities due to the FTT,  $\Delta C_{NE}$  is the increase in the cost of new equity issues caused by the FTT.

### 3.2.5 Impacts of a FTT on the costs of the various sources of funds

Before discussing in greater detail the impact of a FTT on the costs of the various sources of funds, it is important to note that the total impact of a FTT on a financial instrument that is traded is greater than the additional cost arising when the security is issued or traded for the first time. This is due to the fact that the security may be traded a number of times over its life and each trade will be subject to the FTT.

Take for example a debt security issued at €100 and a rate of 5%. In the absence of a FTT and changes in interest rate, the security can be traded a number of times and each time the buyer is willing to pay €100 for the security (abstracting from transactions costs).

Let's assume now that a FTT of ½ percentage point is imposed. If the security is sold only once at the end of the first year, for an investor to achieve the same return of 5% as before the introduction of the FTT, the security would have to be sold initially at a yield of 5.05%. Such a yield would generate an interest payment of €5 and €0.5 to pay for the FTT.

Now let's assume that the second investor also sells the security at the end of a one-year holding period. In order to ensure that the FTT can be met and the security pays €5 in interest payments, the yield would have had to be further increased in order to hold the second investor whole. This implies that the initial increase in the yield would have to be even higher than the 5 basis points.

As Matheson (2011) demonstrates, the reduction in value of the security (the inverse of the increase in required yield for a security paying a fixed coupon) can be approximated by the following complex expression:

$$(5) \Delta \text{ value of a security} = 1 - \frac{(1 - e^{-RN})}{(1 - (1-T)e^{-RN})}$$

Where  $R$  is the discount rate minus the growth rate of dividends (in the case of a fixed coupon or dividend,  $R$  is simply equal to the discount rate),  $T$  is an ad valorem FTT rate and  $N$  is the holding period.

As shown in the table below from Matheson (2011), the reduction in the value of a security as a result of the introduction of a FTT:

- grows with the level of the tax, albeit at a decreasing rate
- decreases with the length of the holding period of the security (i.e., the less frequently the security is traded, the smaller the reduction in value)
- decreases with the discount rate (i.e., the higher the discount rate, the smaller the reduction in value).

**Table 21: Percentage reduction in the value of a security as a result of the introduction of a FTT**

tax rate in basis points	Average holding period in years							
	0.1	0.25	0.53	1	2	3	3.7	10
1	3.2%	1.3%	0.7%	0.3%	0.2%	0.1%	0.1%	0.0%
5	14.3%	6.2%	3.2%	1.6%	0.8%	0.4%	0.4%	0.1%
10	25%	11.7%	6.2%	3.2%	1.6%	0.8%	0.8%	0.3%
25	45.4%	24.9%	14.2%	7.6%	3.9%	2.1%	2.1%	0.7%
50	62.5%	39.9%	24.9%	14.1%	7.5%	4.1%	4.1%	1.4%

Note: Discount rate minus dividend growth rate is 0.03.

Source: Matheson (2011)

The corresponding increases in the cost of funds are shown in the table below.

**Table 22: Increase in the cost of funds, in basis points, caused by the introduction of a FTT**

tax rate in basis points	Average holding period in years							
	0.1	0.25	0.53	1	2	3	3.7	10
1	10	4	2	1	1	0	0	0
5	50	20	10	5	3	2	1	1
10	100	40	20	10	5	3	3	1
25	250	100	50	25	13	8	7	3
50	500	200	100	50	25	17	14	5

Source: Matheson (2011)

The table above shows very clearly that the frequency of trading in a security has a major impact on the yield impact of the introduction of a FTT.

### **Level of the rate of the FTT**

In the subsequent assessment of the impact of the introduction of a FTT, we will report results for a FTT tax of 10 basis point (0.1%), the rate proposed by the EC in its recent proposal. Obviously the model which we have developed to generate a quantitative estimate can be run with different values.

### **Base of the FTT**

The next question which arises in the assessment of a FTT is the definition of the tax base. In line with the EC's proposal, in the analysis below, it is assumed that the FTT is levied only on exchanges of debt securities and equity. Bank loans are exempt from the FTT.

Retained earnings are also a source of funds which is exempt from the FTT as their use does not involve a financial transaction.

### **Frequency of trading**

Corporate debt securities are not very frequently traded in Europe after an initial flurry of trading activity related to placement of the debt. Therefore, we assume that, on average, corporate debt securities are traded once every 2 years. At a FTT of 1 basis point, the impact on the yield of such securities is 1 basis point. This is the impact on yields of existing securities.

The impact on the cost of new issues of securities is the sum of the tax that would need to be paid at issue plus the impact arising from future trades. Thus, the total cost impact on new issues of corporate debt securities would be 2 basis points with a FTT rate of 1 basis point.

Finally with regards to equity, we assume that equity is traded frequently and the average holding period is a quarter of a year. Thus, the total cost of a 1 basis point FTT (issuance and holding combined) would be 5 basis points.

Overall, the changes in the cost of the different types of funds are small and will not have much of an impact on gross capital formation or FDI. The fact that bank loans and retained earnings are such a major source of funds reinforces this conclusion.

### **Increases in the weighted average cost of capital**

Based on the assumption of a 10 basis points FTT on bonds and equity, the weighted average cost of capital (WACC) would increase by 9.7 basis points under such a FTT. The overall impact on the

WACC is less than the FTT because two important funds sources, namely bank loans and retained earnings, are exempt from the tax.

### 3.2.6 Impact on outward FDI by EU27 non-financial corporations

Based on the model derived earlier (equation (4)), the estimated impact of a FTT on the WAAC of non-financial corporations in the EU27, and the assumption that the ratio of outward FDI to gross capital formation is 0.39, the table below shows the impact on outward investment of non-financial corporations of a FTT of 0.1% under 2 different assumptions for a) the elasticity of substitution between the capital stock and labour (and other variable inputs) and b) the elasticity of substitution.

The impact of a FTT of 10 basis points is very small – the estimates of the impact of a FTT on the level of FDI range from less than 0.5% to about 1% and are not very sensitive to changes in assumptions (see table below).

Table 23: Impact of a FTT on outward FDI by EU27 non-financial corporations (% change)			
		Value for $\sigma$	
FTT (level in basis points)	speed of adjustment of actual capital stock to desired stock	0.75	0.90
10	0.25	<1%	0%
10	0.50	<1%	0%

## 3.3 Conclusions

The analysis focuses on the impact of a FTT on FDI of non-financial corporations. It assumes a world-wide FTT of 0.1% on equity and debt securities. Bank loans and retained earnings, important sources of funds for non-financial corporations, are exempt.

The magnitude of the impact of the 0.1% FTT on the cost of the equity and debt sources of funds varies, however, as it depends on the number of times the shares or debt securities issued by companies are traded.–The more frequently the financial instruments are traded, the higher the total impact of the FTT.

Using the standard neo-classical model to derive a firm's investment sensitivity to changes in the cost of funds, and assuming the choice between investing abroad and at home is not affected by the FTT, as the latter is implemented worldwide, the analysis shows under a range of different assumptions that the impact of a 0.1% FTT on FDI is likely to be very small, less than 1%..

The analysis above assumed that the FTT would be introduced world-wide. If the FTT were to be introduced only in the EU, the impact on outward EU FDI will depend on whether the funding for

the FDI is sourced from outside the EU or within the EU. In the case of outside-EU sourcing, the impact on FDI will be nil. In the case of within-EU sourcing of funds, the impact will be the same as described above and any mix of outside-EU and inside-EU sourcing will yield an impact somewhere in between the two extremes of no impact and an impact of less than 1%.

## 4 Empirical analysis of the impact of bilateral investment treaties on intra-EU FDI flows

The objective of this special study is to estimate econometrically the impact, if any, of intra-EU Bilateral Investment Treaties (BITs) on intra-EU FDI flows.

### 4.1 Literature review

The increasingly significant role of FDI in the growth dynamics of countries has created much research interest among scholars. There is therefore a large number of studies investigating both theoretically and empirically the determinants of FDI. A strand of this literature looks at the contribution of bilateral treaties to explaining cross sectional and time series variation in FDI flows.

This section starts by defining BITs and then looks at how others have modelled the impact of BITs on FDI and the mechanisms through which these impacts may operate. Finally, we summarise previous empirical results.

#### 4.1.1 What is a BIT

The general purpose of bilateral investment treaties is the promotion and protection of investments from one country to another country. The central element of a BIT is the assurance it gives foreign investors regarding their property rights. Common clauses include “national treatment” (terms no less favourable than those that apply to domestic investors) and “most-favoured-nation treatment” (terms no less favourable than those that apply to investors from third countries) and cover typically issues such as free transfers of funds, adequate and effective compensation in the case of expropriation, full protection and security of investments, and the nature of dispute settlement mechanisms.

#### 4.1.2 Modelling the impact of BITs

FDI is in part a substitute to trade. A firm in country X that has reached a certain maturity in its home market can expand its revenue by exporting its products to country Y or initiating its own production in country y. The first flow is external trade, the second is FDI. As such, FDI and trade are likely to have a number of common determinants including ‘gravity-type’ variables (essentially, size of the two economies and distance between them), variables measuring the preference for production abroad such as taxation regime and labour costs in the destination country, propensity of the originating country to invest, and the existence of bilateral investment treaties.

We summarise below potentially important determinants of FDI.

Table 24: Determinants of FDI	
Variable	Expected effect
Low labour costs	Low labour costs in the receiving country would be expected to have a positive impact on FDI. But labour costs can be a very broadly defined term. Companies in different sectors would be particularly concerned about the availability and cost of adequate labour force for that sector. A wage level that is very low for the overall economy may actually have a negative effect on FDI because it will imply a domestic market with relatively weak demand.
Economic openness	The degree of openness of an economy would be expected to have a positive effect on FDI by creating the conditions for lower trade costs and increasing confidence for foreign investors.
Skilled labour base	Having a supply of skilled labour maybe more important in particular sectors so the effects may be difficult to generalise for any type of FDI.
Low taxes	This would be expected to significantly encourage FDI particularly if taxes are low on corporate profits; some countries have additional incentives with particularly lower taxes on foreign capital.
Political risk	Political risk is likely to have a negative impact on FDI because instability increases the risk to foreign investors of expropriation. Indeed it would be in an environment of some political risk and instability that a bilateral investment treaty would be likely to have the most impact in encouraging FDI.
Large domestic market	A large domestic market would be expected to encourage FDI although as mentioned above there is a tension between wide availability of low cost labour and an internal market where demand is strong.
Fast growing economy	Growth is often what foreign investors are seeking most keenly. The expectation of fast growth should therefore encourage FDI. It is difficult to measure 'expectation of growth' in the data but researchers will often use growth in the last few years as a proxy for these expectations.
Undervalued exchange rate	FDI in an undervalued currency area would at the entry point benefit from low cost of local assets but would ex post signify lower value for repatriation of profits. The overall effect is likely to be negative if the undervaluation is expected to continue into the medium term.
Distance and transport costs	Distance between origin and receiving countries would make FDI a preferred substitute to trade, the same being true for high transport costs. However, geographic proximity often means cultural proximity and the countries having more information about each other and potentially a higher level of trust for investors. Thus the effect of proximity on FDI may well be positive.
Infrastructure and rule of law	Poor infrastructure and unreliable rule of law are likely to discourage FDI.
Bilateral investment treaties	BITs are expected to encourage FDI but the effect is likely to be large only if fewer other 'competing countries' are also signatories to similar treaties. In addition, a country would be expected to benefit particularly from a BIT if it has otherwise weak enforcement of property rights.

It is on the basis of the effects described in the table above that we selected the explanatory variables for our econometric model, as discussed below.

### 4.1.3 Main empirical results in previous research

Countries resort to two sets of measures to attract greater FDI inflows: (i) unilateral, non-binding changes in FDI-related regulations, most of which amount to a more favourable treatment of FDI, and (ii) bilateral (as well as multilateral) treaties in which countries commit themselves in a legally binding way to grant foreign investors various rights that reduce uncertainty with respect to entry and exit conditions, post-entry operations and dispute settlement mechanisms.

Several previous studies have looked at the effect of unilateral measures.

- Gastanaga et al. (1998) examine the effects of various policy measures on FDI flows, including the role of investment regulations and find that less restrictive capital controls are typically associated with higher FDI inflows.
- Asiedu and Lien (2004) refer to the same source, but consider three types of controls (exchange rate controls, controls on capital account transactions, and controls with regard to export proceeds), all of which are found to be statistically significant.
- Pica and Rodríguez Mora (2005) construct a measure of “regulatory distance” which is found to be negatively related to bilateral FDI flows.
- Desai et al. (2006) focus on restrictions on capital repatriation and profit remittances (a variation on the IMF’s measure of capital controls). When using this more specific measure, the negative effects of capital controls on FDI by US-based companies become stronger.

The relationship between foreign investors and government of the receiving country is complicated by issues such as commitment problems. However there are other mechanisms that can be used to overcome them. Repeated interactions, reputation effects, and use of financial mechanisms such as up-front subsidies (Doyle and van Wijnbergen (1994), Janeba (2002)) are all means to reduce the commitment issues. There are also alternative legal mechanisms which in some cases may be close substitutes for BITs as a means of protection from expropriation. For example, US firms may stipulate in their contracts with host governments that disputes be referred to US commercial courts (Pistor, 2002).

Finally, firms may purchase political risk insurance that is offered by private firms, source governments, host governments, and the Multilateral Investment Guarantee Agency of the World Bank group. Thus, the investment-promoting impact of BITs will depend on how efficient they are in comparison to a variety of alternative means of reducing transaction costs between investors and host governments.

The picture painted by the empirical results of studies of the impact of BITs on FDI is an ambiguous one.

- Hallward-Driemeier (2003), for example, finds little evidence that BITs have stimulated FDI flows from OECD countries to developing host countries. When positive impacts are

found, these are generally for flows into developing countries. Fewer studies have looked at the impact of BITs on FDI flows among more similar countries.

- Berger et al (2010) offer a particularly detailed assessment of the impact of different elements within a particular BIT. Their data covers flows into developing countries. They find a positive effect of BITs on FDI and that this effect is not sensitive to the particular provisions of different BITs.
- Coupé et al (2005) study the impact on FDI of both BITs and Bilateral Tax Treaties. The data used covers FDI flows into transition economies. They find evidence that BITs have a positive effect on FDI (contrary to tax treaties).
- Aisbett (2008) explicitly models and empirically accounts for the endogeneity of BIT adoption as well as for a signalling effect from BITs. BITs may be the result of a history of FDI inflows. If this is the case then BITs are an endogenous variable to the determination of FDI flows and the assumed exogeneity will cause biases estimated coefficients. After the corrections, Aisbett finds no robust evidence of causality between BITs and investment flows. This paper starkly shows the importance of accounting for the endogeneity of investment liberalisation policies in assessing their impact on FDI.

## 4.2 Model

The framework of the econometric analysis herein is that of the gravity model. The original gravity model specification was developed by Tinbergen (1962) and Pöyhönen (1963) and it was used to analyze trade flows between countries. More recently, gravity models have been applied to analyze bilateral FDI by Shatz (2003), Mutti and Grubert (2004), Martin and Rey (2004), and Portes and Rey (2005). None of these models, however, have included BITs as an explanatory factor for FDI.

The theoretical underpinning of the gravity model for trade or FDI flows is sparsely dealt with in the literature. One prominent study is by Bergstrand and Egger (2007) who attempt to formalise the intuitive notion that the level of bilateral resource flows will positively depend on the size of source/destination countries (usually represented by GDP, population size, land area or combinations of these) and negatively on measures of distance/transportation costs.

An important motivation for the application of gravity models to FDI flows is the fact that it allows for the inclusion of physical measures of the distance between the source and host country as explanatory variables. Distance indeed appears to play an important role for the present analysis as a number of previous studies have showed that intra-EU FDI is heavily dominated by flows between neighbouring Member States.

Usually, the gravity equation in a panel regression takes the following form:

$$\ln(\text{FDI}_{ijt}) = \alpha_{it} + \alpha_{jt} + \alpha_{ijt} + \alpha_{ij} + \beta_1 \ln(\text{GDP}_{it}) + \beta_2 \ln(\text{GDP}_{jt}) + \beta_3 \ln(\text{DIST}_{ij}) + \varepsilon_{ijt}$$

where  $FDI_{ijt}$  – FDI flows from country  $i$  to country  $j$  (inflows to country  $j$ ) in period  $t$

$GDP_{it}$ - GDP of country  $i$  in period  $t$

$DIST_{ij}$ - distance between the capitals of countries  $i$  and  $j$

$\alpha_{ijt}$ - explanatory variables that vary with  $i, j$  and  $t$ . (e.g. treaty dummy,)

$\alpha_{ij}$ - variables that do not change over the sample period but can vary across individuals (or in this case country pairs). Examples are common border, distance and common language.

$\alpha_{it}$ - characteristics of country  $i$  that may or may not change over time

$\alpha_{jt}$ - characteristics of country  $j$  that may or may not change over time

The three dimensional (host, source, year) nature of the Eurostat FDI data allows us to construct three sets of controls for the adoption of BITs: host-year dummies, source-year dummies, and host-source (i.e. country-pair) time trends. Host-year dummies mean that there is a separate dummy variable for all but one host country and every year. Source-year dummies are analogously defined. The motivation for including these variables is to control for any unobserved or imperfectly observed features of the investment climate in host or source in each year. In particular, these dummies control for changes in exchange rates, changes in host domestic policies toward FDI, changes in host expropriation probability, elections, etc. Thus host-year dummies in particular address the concern that the coefficient on BIT ratification is driven by the omission of changes in host country investment climate which lead to an increase in both FDI flows and BIT participation. Country-year dummies have also been recently recommended in the context of trade gravity models by Baldwin and Taglioni (2006).

### 4.3 Estimation challenges

#### **Possible endogeneity bias**

Several authors have noted the possible endogenous relationship between investment flows and the presence of BITs. This would make it difficult to disentangle causation from correlation: do investors choose to invest in certain countries as a result of BITs, or are BITs signed among countries already exchanging large investment flows?

One way to tackle endogeneity is to use instrumental variables estimation. Successful implementation of this approach hinges on the availability of instruments with the necessary

properties. An instrumental variable needs to be correlated with the explanatory variable that we want to instrument for but not with the dependent variable.

As such, we require variables that relate to the probability that two countries conclude a treaty but are not directly related to the volumes of FDI between these two countries. In other words, we require variables that help to explain a country's likelihood to sign treaties but whose levels are not themselves affected by FDI.

An example would be a general disposition to sign treaties which could be measured by the existence of a large number of treaties in other areas or with other countries (not directly related with the bilateral FDI flow in question). Such an example is the sum of currently in force treaties signed by the receiving country.

In addition to looking at the number of outside treaties a host country has, we also look at the sum of outside treaties a host and a home country have. A pair of countries is more likely to conclude an agreement when both countries, not just the host country, have the habit of signing such agreements. This instrument reflects the overall propensity of the country-pair to sign this type of treaties.

Another example could be a measure of institutional stability and political integration with the outside world. Institutional stability could be proxied by internationally available measures and perhaps similar proxies could be found for political integration.

However, we need to be careful that the measures of political integration that we use is not be correlated with FDI. This will in general be quite difficult.

### ***Omitted variables bias***

Treaties often come into effect alongside a number of other domestic and international economic instruments. To the extent that simultaneous initiatives, such as reforms in domestic investment and taxation codes, have an impact on investment flows, they would have to be taken into account.

BITs can vary markedly in their substantive provisions. So perhaps the different outcomes are partially a result of not controlling for such variation in content. For instance, one would expect that BITs with market access provisions have a greater impact on investment flows than BITs only covering the post-establishment phase.

The omitted variables impact differently on the available estimators for panel data. We take account of this possibility when discussion the preferred econometric specifications in Section 5.

### ***Data quality problems***

Bilateral FDI data are inherently poor, whether measured as flows or stocks. This makes any econometric evaluation of the determinants of FDI a difficult task.

BITs are likely to be more important in certain sectors than others. Historical experience – as well as recent developments in parts of Latin America – shows that resource extraction sectors are particularly prone to discriminatory, or even predatory, government interference. Accordingly, natural resource investors may take more notice of BITs than investors in less politicized sectors. The importance of BITs for the investors' decision-making process is also likely to depend on the size of the investment. This may particularly be the case for BITs, as their enforcement mechanism can involve significant arbitration costs for the investor should it come to a dispute with the host state, which may make the treaties ineffective for small investors.

On the other hand, very large multinationals can often rely on diplomatic protection by their home state and are moreover able to bargain for investor-state contracts with similar or greater legal guarantees than those provided in BITs. In turn, this implies that, if BITs are important in the pre-establishment phase of foreign investment decisions, it would mostly be for medium-scale investors. Unfortunately, however, these hypotheses are inherently difficult to test using international investment data, which are not provided at an appropriately disaggregated level.

## 4.4 Data

### 4.4.1 Description of the variables

The table below provides a description of the variables used in the regression model and respective data sources.

Variable	description
fdi_in	<p>This is our dependent variable; it is the bilateral FDI flow in a given year from the originator country to the destination country. Data on bilateral FDI flows is from the Eurostat. As mentioned above, some authors take the natural log of the dependent variable, but in our case we use data from Eurostat and these data include a high percentage of negative entries. We therefore use FDI flows in their original units. We include flows among EU countries only.</p> <p>Eurostat FDI statistics record separately:</p> <ol style="list-style-type: none"> <li>1) Inward FDI (or FDI in the reporting economy), namely investment by foreigners in enterprises resident in the reporting economy.</li> <li>2) Outward FDI (or FDI abroad), namely investment by residents entities in affiliated enterprises abroad.</li> </ol> <p>We use only inward flows (the symmetric flows do not always agree in the data, this being a well recognised problem with FDI statistics; our discussion with one Eurostat FDI data expert suggested the use of inward FDI flows as potentially most reliable).</p>
BIT	<p>This is a dummy variable that takes the value 1 for a given country pair in a given year of a BIT with a date prior to that year exists. BIT year data is taken from UNCTAD.<sup>18</sup></p>
eu15	<p>This is a dummy variable that takes the value 1 when both countries in a country pair are part of the group of countries commonly denominated EU15 (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom)</p>
geo_dist	<p>This is the geodesic distance between the respective capitals of the two countries. It is calculated using latitude and longitude information taken from Eurostat.</p>
border	<p>This is a dummy variable that takes value 1 if the countries in the country pair share a common border and zero otherwise.</p>
lgdp_a	<p>This is the logarithm of the GDP in the originator country. From Eurostat. This variable and the one below are typical 'gravity' variables and are motivated both by the empirical trade literature and by recent theoretical FDI work by Helpman, Melitz and Yeaple (2004).</p>
lgdp_b	<p>This is the logarithm of the GDP in the destination country. From Eurostat.</p>
gdpcap_b	<p>This is the GDP per capita in the destination country. From Eurostat.</p>

<sup>18</sup> <http://www.unctaddxi.org>

Table 25: Description of the data	
Variable	description
taxrate_b	This is the economy wide tax rate in the destination country. Data from Eurostat.
inv_a	This is the economy wide investment per year in the originator country. Data from Eurostat.
fdi_gdp_a	This is the weight of FDI over GDP in the originator country. It is a measure of propensity to FDI in a given country. Data from Eurostat. This control is suggested by Carr, Markusen and Maskus (2001) although they use share of trade in GDP for originator and destination countries (their model investigates trade flows rather than FDI flows).
fdi_stock	This is the stock of bilateral FDI from the originator to the destination country in a given year. Data from Eurostat.
corptax	This is the average rate of corporate tax in the destination country. Data is from the European Commission. <sup>19</sup>
low_corrupt	This is an index of corruption constructed by Transparency International. <sup>20</sup> Higher values imply lower corruption.
gdp_b_gr	GDP growth in the destination country. Data from Eurostat.
gdp_b_3gr	GDP growth in the destination country summed over previous three years. Data from Eurostat

Source: London Economics

#### 4.4.2 Summary statistics of the data

We have a panel composed of EU27 country pairs and data for each year from 1998 to 2009. This is a short panel (large number of individuals (country pairs) over a relatively short period of time.

There is adequate variation in our main variable of interest, BIT. In 1998 about 36% of the sample has already a BIT in place. This percentage rises steadily to reach 52% in 2009.

The data for FDI flows shows extreme volatility. In particular, the maximum and minimum values can be very far apart with the minimum in each year generally being a very large negative number. The yearly average also evolves over time in an apparently random way registering large increase in some years and large decreases in others. This gives rise to a concern about the quality of these data and a number of cleaning strategies were attempted.

<sup>19</sup> [http://ec.europa.eu/taxation\\_customs/taxation/gen\\_info/economic\\_analysis/tax\\_structures/index\\_en.htm](http://ec.europa.eu/taxation_customs/taxation/gen_info/economic_analysis/tax_structures/index_en.htm)

<sup>20</sup> [http://www.transparency.org/policy\\_research/surveys\\_indices/cpi/2008/regional\\_highlights\\_factsheets](http://www.transparency.org/policy_research/surveys_indices/cpi/2008/regional_highlights_factsheets)

**Table 26: Sample means (per year)**

year	lgdp_b	fdi_in	gdp_b_gr	BIT	corptax	fdi_gdp_a
1998	11.26	519.7	3.92	0.36	25.02	4.39
1999	11.32	704.9	3.48	0.39	24.62	5.42
2000	11.42	1,156.7	4.71	0.41	24.34	7.12
2001	11.48	381.1	3.01	0.45	23.12	3.96
2002	11.55	441.4	2.98	0.46	21.50	3.55
2003	11.59	278.2	2.98	0.48	19.96	3.80
2004	11.65	329.4	4.20	0.50	19.25	3.16
2005	11.74	523.6	4.02	0.51	20.78	4.25
2006	11.82	450.6	5.01	0.51	21.03	5.25
2007	11.93	845.0	4.91	0.52	22.63	6.25
2008	11.98	552.0	1.40	0.52	20.76	3.95
2009	11.90	209.7	-5.65	0.52	18.34	2.97

Source: London Economics

#### 4.4.3 Autocorrelation in the dependent variable

We made a check for autocorrelation of the dependent variable and found that even at lag 1 the correlation is quite low. This confirms our visual impression of huge variation in the dependent variable.

**Table 27: Correlation among dependent variable and its lags**

year	fdi_in	L1. fdi_in	L2. fdi_in	L3. fdi_in	L4. fdi_in
fdi_in	1				
L1. fdi_in	0.2225	1			
L2. fdi_in	0.1637	0.1807	1		
L3. fdi_in	0.1579	0.1963	0.1068	1	
L4. fdi_in	0.1029	0.1573	0.1376	0.1021	1

Source: London Economics

#### 4.4.4 Endogeneity of BITs

One problem that several authors note is the potential endogeneity of the BITs. The concern is that BITs tend to happen among country pairs that have already seen significant bilateral FDI flows. If BITs are endogenous the estimates of the coefficients of interest are likely to be biased.

We checked this by looking at the correlation between BITs and lagged FDI flows.

**Table 28: Correlation among dependent variable and its lags**

year	bit	L1. fdi_in	L2. fdi_in	L3. fdi_in	L4. fdi_in
bit	1				
L1. fdi_in	-0.1101	1			
L2. fdi_in	-0.0845	0.1807	1		
L3. fdi_in	-0.0725	0.1965	0.107	1	
L4. fdi_in	-0.0735	0.1575	0.1378	0.1023	1

Source: London Economics

We find that the level of autocorrelation is very low. We are therefore not particularly concerned with endogeneity of BITs.

## 4.5 Estimation and results

As already noted above, we adopt the gravity model as used frequently in the literature to analyse bilateral trade flows and bilateral FDI flows to assess the impact of BITs on intra-EU FDI flows. The coefficient of interest is the coefficient on the BIT dummy variable. This will provide a quantitative estimate of the impact of BITs on bilateral inward FDI flows in the EU27.

Our data constitutes a panel of country pairs over years. The panel form makes use of the across years variation to help explain the cross sectional differences. Panels are particularly susceptible to unobserved heterogeneity. In our case, if we omit variables that help explain why particular country pairs sign BITs and others do not, the result will be biased coefficients for the variable BIT.

### 4.5.1 Alternative estimators

We use a number of different econometric approaches in our analysis. These are detailed below.

The fixed effects estimator (FE) (or the within estimator) omits all the variables that are time invariant. The FE estimator regresses the differences to time-averaged variables. So it takes into account that a particular country pair may have lower or higher values of bilateral FDI for reasons other than those included in the variation over time of the explanatory variables. It relies on variations within a country-pair rather than between country-pairs. It assumes that the coefficients of interest are constant across country-pairs and that from country-pair to country-pair only the 'intercept' of the model changes.

The between estimator (BE) corresponds to a regression that uses the average values over time of each country-pair. It relies on the variation between country-pairs.

The random effects estimator (RE) is the GLS estimator. It is a combination of the fixed effects and the between estimators.

Which of these estimators would we expect to be most adequate? The random effects estimator is efficient but may be inconsistent if there is correlation between unobserved effects and the explanatory variables. The fixed effects approach remains consistent under that scenario.

The last four models are estimated with random effects pooled feasible GLS (PFGLS) estimators with AR(2) errors and cluster-robust standard errors. The pooled estimator (PFGLS) is more flexible

than the feasible GLS (FGLS) because it does not require that serial correlation of the errors be the same at all lags as the FGLS does. (Pooled is also sometimes called 'population-averaged')

#### **4.5.2 Results**

The table below presents our first set of results. We report BE, RE and FE estimators and then four different models with pooled feasible GLS (PFGLS) regression.

Table 29: Estimation Results 1of FDI gravity model using different estimators

Variable	BE	RE	FE	PFGLS1	PFGLS2	PFGLS3	PFGLS4
bit	-42.4	-31.4	-51.7	-300.1*	-166.3	-286.8*	-66.7
eu15	89.1	129.5	(omitted)	445.3***	434.3***	79.8	211.9
geo_dist	-9.5	-9.8	(omitted)	-51.8***	-49.1***	-22.6*	-15.4
border	-9.9	83.6	(omitted)	-104.3	-57.0	-166.6	-44.8
lgdp_a	28.8	-13.1	126.3	-46.0	-90.9	16.2	-4.3
lgdp_b	209.3**	128.8	358.6	215.0***	503.7***	197.6***	221.7**
gdpcap_b	-0.012	-0.013	-0.057	-0.003	-0.048***	-0.019	-0.021
taxrate_b	1,058.9	1,821.9	8,668.9	-4,291.3	-7,050.4**	39.8	1,743.1
inv_a	0.002*	0.002	0.012	0.005***	0.006***	0.002	0.001
fdi_gdp_a	68.3***	59.4***	73.8***	125.8***	105.8***	98.8**	65.6***
fdi_stock	0.066***	0.077***	0.069			0.068***	0.070***
corptax	7.1	3.3	8.5		-23.3**		-0.3
low_corrupt	87.6	49	(omitted)	67.1	248.8***	83.7	85
gdp_b_gr	58.2	12.4	25.1	23.3*	13.5	32.7**	9.9
gdp_b_3gr	30.8	5.5	-18.8	-3.2	0.5	-5.7	11.1
_cons	-4,034.8***	-1,968.3*	-6,856.5	-1,493.2	-4,119.2***	-2,559.5**	-3,084.2**
N obs	3,875	3,875	3,875	4,208	3,166	3,651	2,736
r2_a	0.482		0.039				
Wald chi2							
legend:	* p<.1 ** p<.05 *** p<.01						

Source: London Economics

While there is some variation across models, the impact of BITs on FDI inflows to the destination country is mostly not statistically significant and always negative.

The eu15 dummy (which takes a value of 1 only when both countries are EU15 countries) has a very large positive effect in some of the regressions. BITs that had been signed prior to our first sample year could be disproportionately prevalent in the EU15 countries as these Member States might have signed such treaties at an earlier stage. This motivated the inclusion of the eu15 variable and also the construction of a variable combining eu15 with BIT signatories. This variable would take the value 1 when either both countries were EU15 countries or they were parties to a BIT between them. This variable was included in a number of regressions but the coefficient was not statistically significant and remained negative.

We also note from the table above that eu15 is probably highly correlated with fdi\_stock. This variable represents the stock in the beginning of each period of the bilateral FDI stock in the destination country. When this variable is included, it picks up a lot of the variation. Yearly flows are larger or smaller as the initial stock is larger or smaller. This is a bit of a misleading relationship though because what we really are interested is what made those stocks higher in the first place.

Table 30: Removing FDI stock as an explanatory variable		
Variable	BE	BE2
bit	-42.4	-119.6
eu15	89.1	386.4**
geo_dist	-9.5	-35.9***
border	-9.9	395.7**
lgdp_a	28.8	4.4
lgdp_b	209.3**	520.4***
gdpcap_b	-0.012	-0.05***
taxrate_b	1,058.9	-1,860
inv_a	0.002*	0.004***
fdi_gdp_a	68.3***	63.0***
fdi_stock	0.066***	
corptax	7.1	-34.2***
low_corrupt	87.6	250.0***
gdp_b_gr	58.2	43.3
gdp_b_3gr	30.8	25.3
_cons	-4,034.8***	-6,098.3***
N obs	3,875	4,354
r2_a	0.48	0.32
legend:	* p<.1 ** p<.05 *** p<.01	

Source: Calculations by London Economics

As one can see from the table above the removal of fdi\_stock as an explanatory variable has a dramatic effect on the coefficients of the other variables. The effect of BITs remains statistically insignificant.

We interpret this as an indication that fdi\_stock should be dropped. The variables that become significant appear with the expected signs. As expected, when both countries are EU15 countries they have larger bilateral FDI flows.

When the geographic distance is larger the countries have lower bilateral FDI. This, as discussed earlier, can be explained by more distant countries having less in common in a number of dimensions and so are less inclined to do business together. Having a common border has a positive impact on FDI flows for probably the same type of reasons.

The gravity-type variables representing the logarithm of GDP in each of the countries do not both have the expected positive effect. The GDP of the originating country is statistically insignificant and the GDP of the destination country has a strong positive impact.

GDP per capita in the destination country has a negative effect. This is reasonable if we take into account that GDP captures the effect of size of the market in the destination country while GDP per capita may be taken as proxy for costs and thus negatively affect the competitiveness of investments in the destination country.

The propensity to invest and the propensity to invest abroad by the originator country (inv\_a and fdi\_gdp\_a) are both significantly positive predictors of FDI flows.

As for taxation we have a very interesting result. While general tax levels in the destination country have no significant impact, corporate taxes have a significant deterrent effect on FDI flows.

Finally, a good level of confidence in the safety of investments, business transparency and institutional advancement, proxied by the corruption indicator, translates into significantly higher FDI flows.

**Table 31: Estimation Results 2of FDI gravity model using different estimators**

Variable	BE2	RE2	RE2NT	FE2	PFGLS	PFGLSNT
bit	-119.6	-124.3	-246.9**	-138.1	-166.3	-300.1*
eu15	386.4**	472.2***	425.9**	(omitted)	434.3***	445.3***
geo_dist	-35.9***	-43.7***	-44.1***	(omitted)	-49.1***	-51.8***
border	395.7**	262.4*	223	(omitted)	-57	-104.3
lgdp_a	4.3	-59.7	-36.9	-233.1	-90.9	-46
lgdp_b	520.4***	414.7***	180.3***	159.2	503.7***	215.0***
gdpcap_b	-0.048***	-0.036***	0	0.002	-0.048***	-0.003
taxrate_b	-1,855	-4,613.9*	-3,678	3,858	-7,050.4**	-4,291
inv_a	0.004***	0.006***	0.005***	0.017***	0.006***	0.005***
fdi_gdp_a	63.0***	82.5***	92.9***	74.2***	105.8***	125.8***
corptax	-34.2***	-22.4***		5.6	-23.3**	
low_corrupt	250.0***	185.8***	54.2	(omitted)	248.8***	67.1
gdp_b_gr	43.3	4.2	12.6	29.3	13.5	23.3*
gdp_b_3gr	25.2	4.3	1.1	-18.7	0.5	-3.2
_cons	-6,098.3***	-3,580.6***	-1,328.5	-792.4	-4,119.2***	-1,493.2
N obs	4354	4354	5767	4354	3166	4208
r2_a	0.321			-0.112		
Wald chi2		450.9			82.7	
legend:	* p<.1 ** p<.05 *** p<.01					

Source: Calculations by London Economics

We repeated the regressions for a slightly modified group of models. We have dropped the FDI stock variable and we have looked at the 4 different estimators plus two variants on the RE and on the PFGLS models – with and without the inclusion of the corporate tax variable – RE2NT and PFGLSNT.

When we remove the corporate tax variable, we observe a change in the statistical significance of the low corruption indicator. This may be because corporate taxation is higher in countries with lower corruption. So, if the model does not include an explicit corporate taxation variable, low corruption does not have a positive effect because its effect is mingled with the negative impact of high corporate taxes. We therefore believe that the model with corporate taxes is to be preferred.

## 4.6 Conclusions

In conclusion, we find evidence that BITs do not have an impact on bilateral FDI flows within the EU27. We have discussed a number of alternative econometric specifications and interpreted the estimates obtained in each case. In no case have we been able to find a statistically significant positive impact of BITs on FDI flows. Rather, the estimated coefficients are not statistically significant and negative.

Subject to the quality of the data, we therefore conclude that BITs do not have an impact on bilateral FDI flows within the EU27.

We find additionally that a number of variables have a significant impact on bilateral FDI flows with the EU:

- bilateral FDI flows are much larger between two EU15 countries;
- geographic distance has a negative impact, common borders may have a positive impact;
- the size of the originating economy does not have a statistically significant impact but the size of the receiving economy has a very significant and positive impact on the likelihood to receive FDI;
- GDP per capita in the receiving country has a negative impact on FDI;
- general levels of taxation have appear to have a negative impact but corporate taxes have a much clearer negative impact on FDI flows;
- low levels of corruption in the receiving country have a very significant and positive impact on FDI.

It may not be all that surprising that we do not find a significant effect for BITs in Europe. This is likely to be the case because there are other mechanisms that work adequately to solve the commitment problem of non-expropriation of foreign investors for which BITs are useful.

In particular, there is a high level of institutional proximity within the EU27 countries in terms of, for example, the rule of law and the safety of private property from expropriation. This may be such that the additional contribution or stimulus to FDI brought about by a BIT is very low.

We note that our study has not looked at the impact of BITs between EU members and third countries. The results herein should therefore not be interpreted as generally applicable to all BITs but rather to within EU-27 BITs only.

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