Do EU Member States Compete on Social Systems?*

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Abstract

This paper determines the impact of differences between 25 EU countries' labour market systems on the location of bilateral Foreign Direct Investment within the enlarged European Union. Using a standard location decision model through the use of a gravity equation, our empirical analysis is led in a two step process (selection/flow) with the Heckman's method. We find a negative impact of labour institutions and trade unions density on FDI while the centralisation of bargaining has a positive impact on FDI due to greater efficiency. The two-step estimation shows that source country characteristics influence the relocation decision but not the marginal investment.

1 Introduction

Deepening integration within the European Union increases the mobility of firms. While tax competition is a well-documented tool for attracting foreign direct investment (see, for instance, Ederveen and de Mooij (2003)), room for tax competition is progressively vanishing as tax rates converge downward. The case for social competition has been less scrutinised so far, partly due to measurement problems, partly because social systems are multidimensional. For instance, a reduction in employment protection can be partially offset by an increase in trade unions bargaining power as shown by Checci and Lucifora (2002). We actually observe in Figure 1 a simultaneous fall in employment protection legislation (EPL index constructed by the OECD) and a rise in the collective bargaining coverage (CBC) during the 1992-2004 period. Appendix 1 documents the simultaneous decrease in trade union membership and a rise in unions bargaining coverage on average in EU15 countries.

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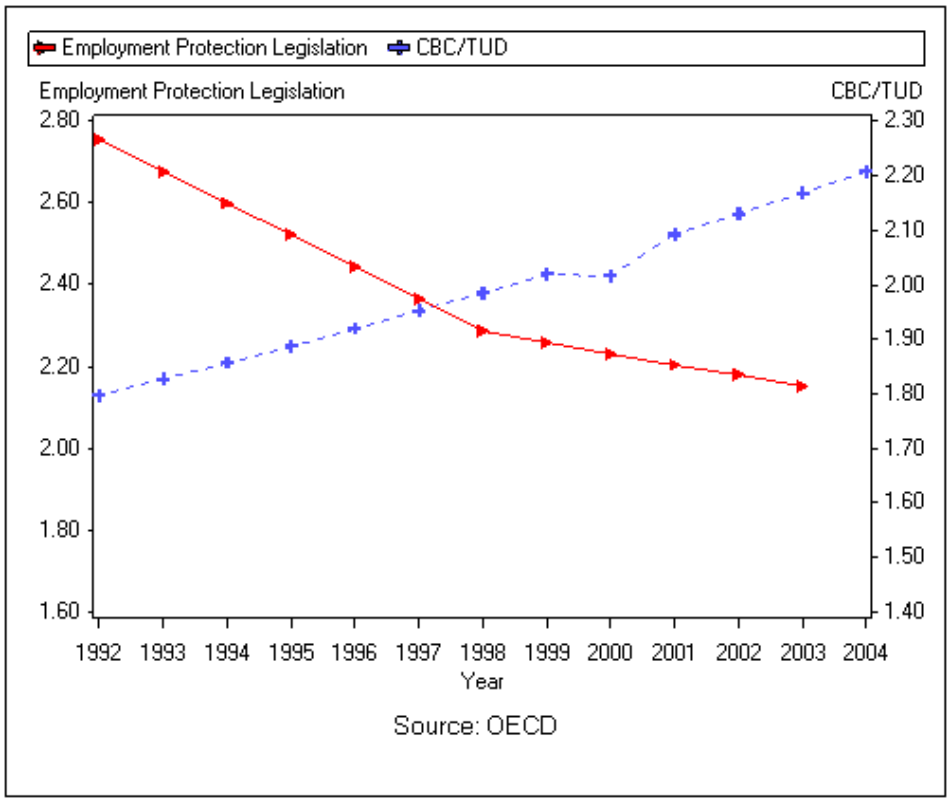
Figure 1 : Employment Protection Legislation
and Collective Bargaining Coverage relative to Trade Union Density
(CBC/TUD)



Although labour market regulation differentials are often considered as a major cause of relocating production prosesses, only few papers have focused on that particular matter, especially at the European level.

In this paper, we intend to measure the impact of social factors on FDI accross European Union member states.

Economic theory on investment location state that firms will move to places that allow them to maximise profit, through either lower costs or increased income, *caeteris paribus*. As far as labour is concerned, production costs can be influenced by two separate, but tightly linked, factors, that is, labour market regulation and unions bargaining power.

Labour market regulation and employment protection legislation refer to many specific features such as *hiring costs* and *hiring procedures*. They also cover *exit costs* that are made of *costs of closing activity* and *compensation costs to dismissed workers.* These costs are basically fixed costs.

In turn, *centralised barganing* and *coordination* have an impact on the wage level, hence they affect variable costs. Centralised bargaining and coordination

can also influence employment protection, whereas the reverse is not true. On this ground, both sets of indicators will be used.

The paper is organised as follows. Section 2 presents the existing literature on social competition and econometric methods. Section 3 describes the data used in the model. The econometric method is introduced in Section 4 and the results are interpreted in Section 5. The last section contains concluding remarks.

2 Existing literature

It is commonly agreed that rigid labour structures and strict regulation have a negative impact on profit. Indeed, such rigidities increase fixed costs, such as redundancy payments, or even prevent firms from adjusting their activity to market conditions.

Although "social competition" has been a concern specially since 2004 EU enlargement, few studies have been carried on this issue. Labour market regulation factors can have several forms, such as entry costs due to administrative procedures, search costs, or the strict regulation of temporary contracts. Most studies on FDI location include fixed entry costs but without differentiating them between possible locations. Besides, though exit costs may play an important role in attracting (discouraging) FDI, they are often left aside. This gap has been filled by Haaland et al. (2003). They explain the trade-off between labour market regulations and FDI, taking into account not only fixed entry costs and marginal costs but also exit costs. Their results confirm the general intuition that high worker protection - through lay-off rules - reduces profit and thus reduces inward FDI. These results are empirically tested by Javorcick and Spatareanu (2005) who analyse the impact of labour flexibility on inward FDI on European firm-level data. The outcome is that increasing labour market flexibility leads to larger FDI inflows.

The analysis of the impact of trade unions on wage benefits from a large body of literature since the mid 40's (see for instance Kaufman (2002) for a review). The impact of unionisation in terms of global firm performance has first been theoretically modelled by Clark (1984). He shows that the presence of strong unions has two contradictory effects.

First, the classical result shows that it tends to increase wages through bargaining power and thus reduces profits. Second, unions' strength could increase productivity, counter-balancing the negative wage effect through an increase in job security and reduction in turnover. Clark concludes that net effect is ambiguous. The impact of labour regulation through higher wages is not unanimously assessed in the empirical. Javorcik and Spatareanu (2005) and Mejean and Patureau (2006) emphasize the purchasing power and the demand effect of a high wage leading to higher inward FDI. Moreover, the negative effect of high

wage can be offset by other factors, such as productivity, or incentives provided by destination-country-government, such as subsidies (Haaparanta, 1995). As we apply our model to European member states, we assume that governments are not allowed to distort competition and thus, do not use direct incentives for inward FDI.

Second, the presence of unions and job security can lead to an improvement in the production process through a reduction in turnover. Moreover a high degree of centralisation and coordination can make wage bargaining more efficient than semi-centralised bargaining (Calmfors and Driffil (1988)). Under such conditions the presence of unions allows firms to increase profit. Lee (2003) empirically shows that high employment protection legislation reduces inward FDI, while centralisation and coordination have a positive effect on FDI.

Recently, Munch (2003) modeled firm location in the presence of unions using an economic geography model with agglomeration forces. He shows that in the absence of trade costs, the country with the weakest trade unions will attract all firms. Intermediate situations appear with increasing trade costs.

In this paper, we bring new empirical evidence on social competition by estimating the impact of various labour market institutions on bilateral FDI within a gravity procedure. We explicitely distinguish variables that impact on fixed costs from variables that impact on marginal costs through the use of the Heckman Method.

3 Model

We consider a representative firm producing a single good in a two period process. At time 0 the firm has to choose a location for its investment, that is invest either at home the source-country (i) or abroad in the destination country (j). However, when investing abroad, the firm must take into account the entry cost, which is made of variable per-employee (e_d) cost and a fixed cost (E_j) linked to administrative procedure. The firm must also include probable exit costs that might happen at time 1. Here, the motives for stopping activity are exogenous to the firm and are due to sectoral shocks. The probability that the market collapses is given by ρ. The exit cost includes per-employee lay-off payment (c_j) and a fixed exit cost (C_j). We allow for different entry and exit costs between possible destination countries.

3.1 Investment location

We consider a techonology of the Cobb Douglas type with constant return to scale. Technology is firm specific and equal across countries for a given firm.

$$F(K, L) = K^{\alpha} L^{1-\alpha}; \tag{1}$$

where K is the capital input, and L is the labour input. The firm will choose to locate (i.e. invest) where it has the greatest return on investment. If the firm invests in country i (its own country), expected profit at home will be:

$$\pi_i^e = \frac{F(K,L) - w_i L - rK}{1+\delta}; \tag{2}$$

where r is the cost of capital, w is the unit labour cost and δ is the discount rate as we focus on end-period profit, capital is perfectly mobile and return on capital equals across countries. If the firm chooses to locate abroad it will not only face production costs but entry and probable exit cost as well:

$$\pi_j^e = \frac{F(K,L) - w_j L - rK}{1+\delta} - e_j.L - E_j - \frac{(1-\rho)(c_j.L + C_j)}{1+\delta}; \tag{3}$$

where e_j is the hiring cost per employee in the destination country, E_j is the fixed entry cost, c_j is the exit cost per employee and C_j the fixed exit cost. The firm will choose the location (source i or destination j) that maximises total profit. The firm will locate abroad if expected profit in the destination country is greater than expected profits in the source country:

$$\begin{aligned} \pi_j^e &> \pi_i^e; \\ L\left[\frac{w_i}{1+\delta} - \mu\right] &> E_j + \frac{(1-\rho)}{1+\delta} C_j; \\ \text{with } \mu &= \frac{w_j + c_j(1-\rho)}{1+\delta} + e_j \end{aligned} \tag{4}$$

The gain realised thanks to lower variable cost (given by a positive sign of the right-hand-side in 4must cover the fixed costs linked to activity relocation. We see that the location decision depends not only on variable costs but fixed costs as well.

3.2 Marginal investment

We now consider firms investment behaviour once it is located in the destination country. Deriving (3) with respect to L and K leads to optimal quantities of capital and labour input and give the profit at equilibrium :

$$\pi^*_{j,0} = \mu^{(\frac{\alpha}{\alpha-1})} K \left(\frac{1-\alpha}{1+\delta}\right)^{1/\alpha} \left[\left[\frac{K}{L}\left(\frac{r}{\alpha}\right)^{1/(\alpha-1)}\right]^{\alpha}(1-\alpha)^{1-\alpha} - 1\right] \quad (5)$$
$$- \left(\frac{1}{\alpha}\right)^{1/(\alpha-1)} r^{\alpha/(\alpha-1)} - E_j - C_j \frac{(1-\rho)}{(1+\delta)};$$

$$\text{with} \quad : \quad \frac{\delta \pi^e_{j,0}}{\delta \mu} < 0;$$

$$\text{if:} \quad \left[\frac{K}{L}\left(\frac{r}{\alpha}\right)^{1/(\alpha-1)}\right]^{\alpha}(1-\alpha)^{1-\alpha} > 1.$$

Once the firm has decided to invest in a given location, the amount of investment will be chosen with respect to the operational profit and the marginal cost. At time 1 if the sum of marginal cost λ as decreased since the previous period, $\lambda < \mu$, the profit becomes:

$$\pi^*_{j,1} = \lambda^{(\frac{\alpha}{\alpha-1})} K \left(\frac{1-\alpha}{1+\delta}\right)^{1/\alpha} \left[\left[\frac{K}{L}\left(\frac{r}{\alpha}\right)^{1/(\alpha-1)}\right]^{\alpha}(1-\alpha)^{1-\alpha} - 1\right] \quad (6)$$
$$- \left(\frac{1}{\alpha}\right)^{1/(\alpha-1)} r^{\alpha/(\alpha-1)} - E_j - C_j \frac{(1-\rho)}{(1+\delta)};$$

and the profit differential d between time 0 and time 1 will be:

$$d = \left(\lambda^{(\frac{\alpha}{\alpha-1})} - \mu^{(\frac{\alpha}{\alpha-1})}\right) K \left(\frac{1-\alpha}{1+\delta}\right)^{1/\alpha} \quad (7)$$
$$\times \left[\left[\frac{K}{L}\left(\frac{r}{\alpha}\right)^{1/(\alpha-1)}\right]^{\alpha}(1-\alpha)^{1-\alpha} - 1\right]$$

$$d > 0; \qquad \text{if:} \ \left[\frac{K}{L}\left(\frac{r}{\alpha}\right)^{1/(\alpha-1)}\right]^{\alpha}(1-\alpha)^{1-\alpha} > 1.$$

(7) shows that marginal investment depends on marginal costs only and that fixed costs are no longer invloved.

3.3 Fixed versus marginal costs and the use of Heckman's method

As already mentioned, and as modelled in sections 3.1 and 3.2, some social determinants of FDI influence marginal costs (i.e. wage) , such as unions bargaining power, while other determinants act as fixed (entry or exit) costs, such as hiring costs or dismissal costs through heavy hiring and firing procedures.

This distinction between fixed and marginal costs has been highlighted by Razin et al. (2004, 2005). The idea is that some variables may impact on the decision to invest, whereas other determinants may influence the amount invested. Razin, Rubinstein and Sadka (2004) propose to use the Heckman methodology. Compared to a traditional TOBIT method, the Heckman methodology allows to tackle two issues. First, this procedure disagregates the location decision from the flow decision and thus determines the parameters involved in each decision process. While the TOBIT model postulates that regression coefficients are the same in the selection and the flow equation, the Heckman two-step procedure allows for different values of slopes between the two equations. Indeed, we find that same variables do not have the same impact in each step. Second, the Heckman's model sorts out the problem of correlation between selection equation residuals and flow equation residuals that emerges in the presence of a selection bias (Heckman, 1979).

4 Empirical assumptions

4.1 The time-series specification of the gravity equation

The gravity equation is usually estimated on trade, using cross-sectional data. Still, a number of analyses have estimated the gravity model on panel data - i.e. adding the times-series dimension to the cross-sectional one. The use of panel data allows controlling for heterogeneity between both capital importers and capital exporters through the use of individual effects.

Using country*time it and jt fixed effects (where i is the source country and j the host country) would allow to control for each country time-variant feature while explanatory exogenous variables would be of the ijt form (i.e. differential variables between i and j at time t). Howerver, our aim is to assess the impact of host country characteristics on FDI flows. Moreover, given that labour market variables are mainly indexes calculated on a short scale, differentiated variables would lead to zero values. Then, in our analysis of labour market variables, we use, i, r and t fixed effects where r is a regional fixed effect. The region can be either the EU15 or new member states. Introducing regional fixed effects is a way to account for unobserverd heterogeneity of host countries when it is not possible to introduce one fixed effect for each host, due to collinearity with social institutions.

4.2 Data description

4.2.1 FDI data

FDI data are taken from Eurostat investment database for the period 1992 - 2004. We use the logarithm of net bilateral FDI flows expressed in constant Euros. Given the non-exhaustivity of the data provided we do not have a 25(sources)*24(hosts)*13(years) dataset. We have no information concerning the motives of missing values. However they concern mainly Eastern European countries for the period 1992 and 1998 during which Eastern Europe FDI inflows were somehow negligible. Nevertheless, we check for selection bias through the use of Heckman's method.

The total number of observations is 7,800. Among these, FDI flows can be either positive, nil, not available or negative. The number of nil values is 816, while not available data are 4,675. Finally, there are 441 negative FDI flows values. For the purpose of this study, and the two-step model, we need to transform the dependent variable as follows. For the selection equation (which is a standard Probit model) we transform the continuous flow variable into a binary indicator taking the value of 1 if an FDI relation exists for a given pair of countries. Concerning the meaning of negative values we refer to Razin et al. (2004) and we normalise them to zero for the selection equation, meaning that a negative flow is considered as a non-location decision. As a result we observe an investment flow in the flow equation only if the flow is positive in the dataset.[1].

4.2.2 Social data

Three sources of labour market indicators are successively used to assess the impact of social regulation on FDI.

We first use indicators from Doingbusiness, which is a database provided by the World Bank Group, covering various costs of implementing business. Here we use data concerning *hiring and firing costs*. These indicators are given as indices for year 2005 and are time invariant. As these data have no time variance, we cannot introduce destination country fixed effect j when using Doingbusiness data. Moreover, data for Malta, Cyprus and Luxembourg are missing.

Second, we use data from the Fraser Institute which provides indices for *hiring and firing practices* defined as the degree to which hiring & firing are determined by contract. This dataset also provides indexes for the degree of *centralisation of wage bargaining*. All indices given by the Fraser Institute have a time dimension and values are given for years 1990, 1995, 2000, 2001, 2002 and 2003 but some years are not available for Malta, Cyprus and Luxembroug. We interpolate data between 1990 and 1995 and between 1995 and 2000. Finally,

[1] Same transformation is used in Razin et al. (2004).

we linearly estimate values for 2004, then we can use the sample for the whole period.

Finally our study includes social data from the OECD Employment Outlook database. These are the most commonly used data on labour market institutions. We use three Employment Protection Legislation indicators (EPL) and two indicators of trade unions features. The first is the index of regular employment protection (EPL regular). The second is an index of the regulation of collective dismissals (EPL collective). The third EPL index is an overall index of employment protection (EPL synthetic). We also use the *Trade Union Density* (TUD), which is the percentage of unionised workers, and the *Collective Bargaining Coverage* (CBC), which represents the percentage of workers covered by trade unions bargaining. OECD data have time dimension and are given for years 1992, 1998 and 2003. Again we interpolate the data between available year in order to increase our sample.[2].

4.2.3 Control variables

We use Growth Domestic Product (GDP) as a proxy of the market size. There are no GDP data for Greece and data are partially missing for Sweden and Slovakia. There are 6,877 observations for *GDP*, in PPP Euros at constant prices (source: World Bank, WDI). Although, GDP is not the best measure for market potential, it proves to be successful in proxying it (Head and Mayer (2004)).

The variable DISTANCE is defined as the log of geodesic distance. Data are available for all pairs of countries. The CONTIGUITY variable is a dummy for each pair of countries taking the value of 1 if the two countries share common borders. These variables are taken from the CEPII's website.

Although tax competition is not our main concern here, we include a tax indicator in our specifications as the dependent variable (FDI) is led by afer-tax profit. The level of taxation is given by the implicit tax rate (ITR) defined as the total revenue from the corporate income tax normalised by GDP (Source: OECD). Although the ITR is constructed ex-post, it is prefered to the statutory or the effective tax rate due to lower correlation with other variables. As ITR data is available only from 1997 and for 16 countries including 4 new member states, we have 3330 observations available concerning taxation. Taxation has a negative impact on profit made in the host country, thus we expect tax rates to have a negative impact on inward FDI.

On the public spending side, FDI may be attracted by public investments in multiple fields such as education or communication infrastructures, wich raises

[2] Note: As a robustness check, we estimated non-interpolated variables. The results were qualitatively the same as with the original variables but the use of interpolated variables reduces estimators' standard deviation.

capital return. We control for the provision of public good through the annual public Growth Fixed Capital Formation (GFCF) normalised to GDP.

Finally, in our estimations we control for the cost of labour. The data we use are *Unit Labour Costs* (ULC) from Eurostat and OECD. Labour cost is calculated as the total cost of labour during a year divided by the number of hours worked, in PPP Euros. It thus includes not only salary but compensations, training, employer and employee social contribution as well. One could think that as the specifications already include labour market characteristics such as trade union density, we already control for the wage effect. In our estimations, we make sure that unit labour costs are not correlated to labour market variables.

5 Econometric methodology and results

5.1 Baseline specification of the gravity equation

We first use a simple OLS specification of the gravity model, where zeros and missing values are either included or excluded. By doing so we assume that values are missing randomly and that there is no selection bias. Moreover, negative and missing values are normalised to zero. We include a source country dummy i, a regional dummy r for the host country, and a time effects t. The estimation has the following form:

$$\log FDI_{ijt} = \beta_1 TAX_{jt} + \beta_2 ULC_{jt} + \beta_3 GDP_{jt} + \beta_4 \log DIST_{ij} + \beta_5 CONTIG_{ij} + \beta_6 GFCF_{jt} + \beta_7 GDP_{it} + \beta_8 ULC_{it} + \gamma_i + \delta_r + \varphi_t + \eta_{ijt} \tag{8}$$

where FDI_{ijt} is the FDI flow from country i to country j at time t, TAXjt is the host country implicit tax rate, ULCjt is the host country unit labour cost, GDPjt is the host country real GDP, DISTij is the distance between to countries main cities, CONTIGij is a dummy variable indicating if country i and j have common borders and GFCFjt is the host country public investment ratio, GDPit is the source country real GDP and ULCit is the source country unit labour cost.

Table 1: *Baseline - using i, r and t fixed effects*

	OLS Including zeros			OLS Excluding zeros		
	Coef	Std err.	p-values	Coef	Std err.	p-values
Int	99.927	15.320	<.001	30.008	31.110	.334
$DIST_{ij}$	-1.232	.109	<.001	-1.683	.140	<.001
$CONTIG_{ij}$	.135	.173	.435	.504	.216	.019
GDP_{jt}	-7.491	1.141	<.001	.576	2.642	.827
ITR_{jt}	-.014	.012	.268	-.010	.021	.627
ULC_{jt}	-.221	.075	.003	-.333	.111	.002
$GFCF_{jt}$	.623	.139	<.001	-.023	.246	.923
GDP_{it}	-.773	.764	.311	-.554	1.148	.629
ULC_{it}	.161	.049	.001	-.148	.072	.040
	$R^2 = 0.47$			$R^2 = 0.57$		

Table 1 reports the results for the OLS estimation. Our interest is, not only to carry out unbiased estimation but also to separate the effect of exogenous variables on either the selection or the flow equation. We know that a selection bias can emerge from a dataset including zeros and missing values (Heckman, 1979). Therefore, we estimate the same model using both TOBIT and Heckman's method. The latter is a two-step procedure including a discrete-choice selection equation and a linear flow equation. This allows to estimate (1) knowing that we effectively observe FDI_{ijt} if $FDI_{ijt} > 0$.

Table 2: *Baseline - TOBIT using i, r and t fixed effects*

	Coef	Std err.	p-value
Int	-85.699	25.966	.001
$DIST_{ij}$	-3.590	.289	<.001
$CONTIG_{ij}$	-.788	.415	.057
GDP_{jt}	6.050	1.260	<.001
ITR_{jt}	.007	.029	.807
ULC_{jt}	-.153	.032	<.001
$GFCF_{jt}$	.860	.165	<.001
GDP_{it}	3.631	2.142	.090
ULC_{it}	.413	.137	.002

Table 3: *Baseline - Heckman - using i, r and t fixed effects*

	Selection			Flow		
	Coef	Std err.	p-value	Coef	Std err.	p-value
Int	-8.069	6.125	.187	17.701	12.100	.143
$DIST_{ij}$	-.875	.077	<.001	-1.491	.184	<.001
$CONTIG_{ij}$	-.269	.116	.021	-.038	.192	.840
GDP_{jt}	1.435	.313	<.001	2.250	.746	.002
ITR_{jt}	.012	.006	.062	.020	.014	.160
ULC_{jt}	-.021	.006	<.001	.073	.012	<.001
$GFCF_{jt}$	.137	.042	.001	.329	.074	<.001
GDP_{it}	.961	.567	.089	-.185	1.123	.868
ULC_{it}	.108	.036	.002	-.139	.069	.043
	Rho = -.026			Std err. = .161	p-value = .868	

Table 2 and 3 show that when taking into account the possible bias that arises with missing values, estimators are more significant. Unit labour costs have a negative impact on inward FDI while they have a positive impact on outward FDI (selection equation). The destination country implicit tax rate has the same positive ambiguous effect. A higher GDP as a positive impact on both inward and outward FDI. We find a positive impact of the labour costs in the flow equation. The coefficient *Rho* appearing in the bottom line of Table 3 is the correlation coefficient between the residuals of the selection equation and the residuals of the flow equation. Here, residuals of the two equation are not correlated.

5.2 Introducing Labour market indicators

We now focus on the core issue of this analysis, this is the impact of labour market characteristics on FDI. Most labour market indicators have little time variance and appear insignificant when using destination country fixed effects j. In order to tackle this issue, we substitute a regional effect r to the fixed effect j, which indicates whether the destination country is a new member state (NMS) or part of the EU15. We thus run the baseline model presented in Table 4 including each labour market indicator successively.

When implementing Heckman's method, we use regional slopes for the destination ULC paramater (ULC EU15 and ULC NMS) in the flow equation. The motivation for the choice of the form of ULCit and ULCjt is the following. The Tobit model shows that labour cost has a negative impact on investment. However we want to check the possible "demand effect" linked to high labour costs highlighted by Javorcik and Spatreanu (2005). Preliminary results, show that undifferentieted ULCjt slopes in the flow equation, in Table 3, exhibits a positive sign that confirms the demand effect. When using separate slope for ULCjt in the flow equation we verify that this positve relation is true whatever

the region of the host country. Results in table 4 show that the impact of labour cost on the marginal investment when investing in a western European country is positive, while negative when investing in an Eastern European country.

Concerning the ULCit variable, again results are very interesting. High source-country labour cost seems to encourage activity relocation (in selection equation) in order to reduce costs, while high source-country labour cost reduces marginal FDI. This result is based on the assumption that investment is linked to global profit for the group. Brainard and Riker (1997) also find that an increase in source-host labour cost differential reduces investment outflows due to reducing global profit. Moreover, in the presence of vertical investment source-country activity and host-country activity are complementary. Thus an increase in costs at home reduces activity in both the source and the host country.

Table 4: *Baseline - Heckman - using i, r and t fixed effects and separate slopes for ULCjt in the flow equation*

	Selection			Flow		
	Coef	Std err.	p-value	Coef	Std err.	p-value
Int	-24.154	6.844	<.001	25.790	14.801	.081
$DIST_{ij}$	-.837	.077	<.001	-1.420	.185	<.001
$CONTIG_{ij}$	-.256	.117	.029	.013	.192	.945
GDP_{jt}	1.438	.313	<.001	-.496	.983	.613
ITR_{jt}	-.004	.007	.601	.050	.015	.001
ULC_{jt}	-.045	.008	<.001			
$ULCEU15_{jt}$				.078	.023	<.001
$ULCNMS_{jt}$				-1.609	.631	.010
$GFCF_{jt}$	.177	.044	<.001	.293	.080	<.001
GDP_{it}	.943	.567	.096	-.066	1.115	.951
ULC_{it}	.107	.036	.003	-.139	.068	.043
	Rho = -.040			Std err. = .169	p-value = .809	

We implement the Heckman two-step procedure to estimate (1) using the same variables in the selection and the flow equation exept for the Unit Labour Cost variable, which has a unique slope in the selection equation, and regional slopes in the flow equation.

$$\log FDI_{ijt} = \beta_1 TAX_{jt} + \beta_{2,r} ULC_{jt} + \beta_3 \log DIST_{ij} + \beta_4 GFCF_{jt} + \beta_5 GDP_{it} + \beta_6 ULC_{it} + \beta_7 SOC_{jt} + \gamma_i + \delta_r + \varphi_t + \eta_{ijt} \tag{9}$$

Variables are defined as in (8). Equation (9) includes the SOCjt variables which refer to labour market regulations. Given the high level of correlation between labour market variables, we run separate estimations for each social variable.

5.2.1 Doingbusiness indicators

The results are given in Table 5 and 6 (see appendix 4). We find that high hiring costs have a negative impact on the selection decision but are not significant in determining the flow of investment. By contrast, firing costs are significant in both equations but appear positive in the selection one. The firms that decide to relocate their activity abroad are more concerned by starting activity costs than closing activity costs, hence, hiring costs have greater impact in the selection equation. However, these results may not be fully reliable since the data used are time-constant and may cover other time-invariant characteristics. Moreover, the index used for the whole period is the index given for the year 2005 and might not be representative of the 1992-2004 period.

The results for control variables are stable compared to the baseline models (Table 3 and 4). We find a negative impact of distance and the contiguity indicator was dropped from the estimations due to high negative correlation with distance. Origin-country GDP happen to be significant only in the selection equation, which is consistent with Razin et al.(2005) results.

The results concerning the host country labour cost is of particular interest. During the selection process, investment location is negatively influenced by the wage level, whereas in the flow equation we find a positive impact of the labour cost in western Europe countries and negative (or insignificant) in eastern Europe. This gives us a good insight on the type of investment and is in line with empirical findings concerning both the horizontal type of investment in western Europe (Braconier, Ekholm (1999)) and the purchasing power given by higher wage (Javorcik, Spatareanu (2005)).

Concerning the use of Heckman's method, we see that we are able to catch different impacts on either the flow or the selection equation. No correlation appears between the residuals of the selection and the flow equation, which means that there is no selection bias. However, the TOBIT estimation would not allow us to catch differences in coefficient between the two steps and would then be inefficient.

5.2.2 OECD indicators

Unlike Doingbusiness indexes, these data change over time and might prove more accurate for the exercise. Tables 7 and 8 (appendix 5) show the effect of Trade Union Density (TUD) and Collective Bargaining Coverage (CBC) on FDI. We see that countries with highly unionised labour force are less attractive for investors as shown by Munch (2003). Concerning collective bargaining coverage, the results are less precise as there are no data are available for new member states. We thus drop the regional dummy. Despite the reduction in the sample size, we observe a negative impact of CBC on the marginal investment.

Employment protection legislation indicators (EPL) (Tables 9, 10 and 11) affect FDI negatively, except the protection of regular employment which appears with a positive sign in the selection equation. This particular result could

be the only sign of the productivity effect of employment protection, but it is not confirmed by the effect of the synthetic index in Table 11.

Again, we see through these estimations that the specification remains stable. Source-country GDP has greater influence in the selection than in the flow decision. In the flow equations, NEM's ULC slope appears to be insignificant, contrasting with the previous set of estimations where it was negative.

5.2.3 Fraser indicators

Finally, Tables 12 and 13 show the impact of Fraser indicators - centralisation and hiring & firing costs - on FDI. First we see that investment reacts positively to bargaining centralisation. Second, we also observe a positive relation between the hiring & firing index and marginal investment. Note that the definition of Fraser's *Hiring and Firing index* is not the same as Doingbusiness *hiring and firing cost*. Here, the more hiring and firing pratices are determined by contract, the more the firm can choose its management of hiring and lay-off processes. Hence, the positive impact of the Fraser variable is not inconsistent with the negative impact of the Doingbusiness one.

6 Interpretation

Considering the choice to implement a two-step procedure, we see that no selection bias appear in most estimations. In this sense, the Heckman method is of no particular interest. But with this procedure, we explicitly highlight the fact that certain variables have a significant impact on the location of investment while they have none in determining the level of investment. In such a case, the TOBIT method proves inefficient. In particular we show that source-country features have a greater significance in the location decision, while host-country characteristics influence marginal investment.

Based on OECD and Fraser data (which have time variance), we find that strong labour market institutions, such as employment protection legislation, have a negative impact on FDI. Employement protection affects negatively the profit function of the firm through both fixed and marginal costs as we find that coefficients take negative values in both the selection and the flow equation. EPL prevents firms to adjust freely to product market condition. There is no evidence in our estimations of a positive impact of employment protection or trade union density on labour productivity. Clark (1984) suggests that the presence of trade unions could increase productivity through job security, reduction in turnover or motivation. The productivity effect could be high enough to counterbalance the cost effect. The present results show that the productivity is not large enough to compensate the cost effect due to sub-optimal wage setting and fixed exit costs linked to employment protection.

By constrast, we find that centralisation of wage bargaining has a positive influence on expected profits. Although it seems that with a high degree of centralisation, the firm loses all bargaining power in the negociation process, it appears that highly centralised wage setting is efficient which is consistent with Calmfors and Driffill (1988) who find that highly centralised or highly decentralised bargaining processes lead to lower wages in order to reduce unemployment.

Again, thanks to the two-step model, we are able to highlight interesting effects of labour cost. While labour cost has a negative impact on the location decision (first step) the effect on the marginal investment is slightly different. When separating slopes of EU15 countries and NMS countries, we find that labour costs in western European countries have a positive impact on marginal FDI while the same variable has a negative or insignificant impact in eastern European countries. This evidence finds support in two separate works. First, Braconier and Ekholm (1999) show from Swedish firm data that Eastern European countries host mainly vertical investments motivated by production cost reduction. In such a framework the negative impact of labour cost is obvious. They also show that firms investing in western European countries search for markets through horizontal investment. In this particular case, the effect of labour cost is not clear. Second, according to Javorcik and Spatareanu (2005) high labour costs and thus high wage can increase demand and increase firms profit. In the case of horizontal investment firms relocate in order to reach demand and our findings are consistent with the theory.

The source-country labour costs as a particular impact on either investment location or marginal investment. Although, high unit labour costs encourages investment to relocate abroad in a cost-cut step, it reduces firms global profit, when reducing profit at home, and thus reduces investment capacity and marginal investment outflows.

Finally, we find a positive impact of the implicit corporate tax rate in all our estimations. This result, which contrasts with the negative impact found in the literature (de Mooij and Ederveen, 2003, 2005), may be related to our measure of corporate taxation. Indeed, the ITR may be endogenous to FDI. We leave this point to further research.

7 Conclusion

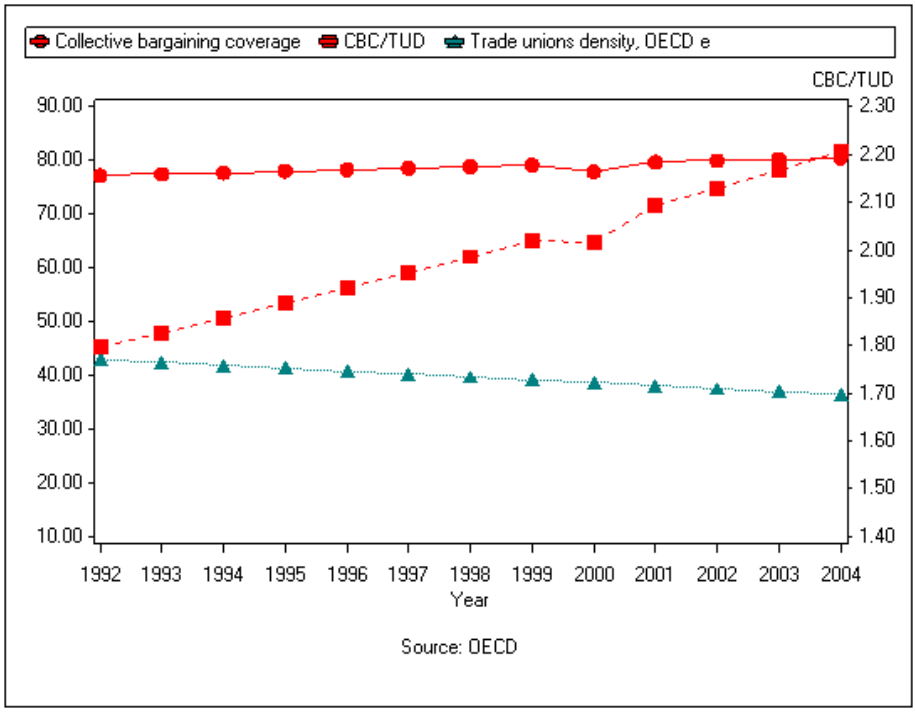
Troughout this study we show that labour market institutions and trade union strength reduce both the probability of attracting FDI and the amount of FDI received. For instance, an increase of the mean EPL synthetic index by the value of the standard deviation reduces the amount of investment by 30%, while an increase in the percentage of workers covered by collective bargaining by 10

pecentage points reduces inward investmant by 32% *ceteris paribus*. Such results are consistent with the profit maximising objective of the investing firm and tend to support the theoretical literature. We find no evidence of the positive impact of labour protection or unionisation on investment through gains in productivity.

With the use of Heckman two-step estimation we are able to disaggregate the relocation of investment from the marginal investment and to distinguish variables involved in each step.

8 Appendix

Appendix 1: *Collective Bargaining Coverage (CBC), Trade Union Density (TUD) and CBC/TUD (right-hand scale)*



Appendix 2: *List of countries*

EU15	Country	*NMS*	Country
AT	Austria	CY	Cyprus
BE	Belgium	CZ	Czech Republic
DE	Germany	EE	Estonia
DK	Denmark	HU	Hungary
ES	Spain	LT	Lithuania
FI	Finland	LV	Latvia
FR	France	MT	Malta
GR	Greece	PL	Poland
IE	Ireland	SI	Slovenia
IT	Italy	SK	Slovakia
LU	Luxembourg		
NL	Netherlands		
PT	Portugal		
SE	Sweden		
UK	United Kingdom		

Appendix 3: Labour market *data description*

Data	*Data description*	*Year available*	*Source*
Hiring cost	Hiring cost as a percentage of salary	2005	Doingbusiness
Firing Cost	Firing cost as a percentage of salary	2005	Doingbusiness
Hiring and firing practices	To what extent hiring and firing is determined by contract	1995, 2000-2003	Fraser
Centralisation	Degree of centralisation of collective bargaining	1995, 2000-2003	Fraser
EPL regular	Protection of regular employment	1992, 1995, 2003	OECD, Employment outlook
EPL collective	Regulation of collective dismissal	1992, 1995, 2003	OECD, Employment outlook
EPL synthetic	Global employment protection index	1992, 1995, 2003	OECD, Employment outlook
TUD	Percentage of workers member of a trade union	1992, 1995, 2003	OECD, Employment outlook
CBC	Percentage of workers covered by unions bargaining	1992, 1995, 2003	OECD, Employment outlook

Appendix 4: *Doingbusiness estimations*

Table 5: *Impact of Hiring Cost (Doingbusiness)*
Heckman's method using i, r and t fixed effects

	Selection			Flow		
	Coef	Std. err.	p-values	Coef	Std err.	p-values
$DIST_{ij}$	-.796	.078	<.001	-1.302	.185	<.001
ITR_{jt}	.001	.006	.960	.039	.017	.020
ULC_{jt}	-.001	.006	.884			
$ULCEU15_{jt}$				.075	.013	<.001
$ULCNMS_{jt}$				-1.671	.458	<.001
$GFCF_{jt}$	.269	.045	<.001	.337	.086	<.001
GDP_{it}	.999	.575	.082	-.103	1.116	.926
ULC_{it}	.108	.036	.002	-.147	.069	.033
$HiringCost_{jt}$	-.022	.002	<.001	-.005	.005	.266
	Rho = -.123		Std err. = .183		p-value = 0.502	

Table 6: *Impact of Firing Cost (Doingbusiness)*
Heckman's method using i, r and t fixed effects

	Selection			Flow		
	Coef	Std err.	p-values	Coef	Std err.	p-values
$DIST_{ij}$	-.873	.077	<.001	-1.354	.189	<.001
ITR_{jt}	.016	.006	.014	.014	.015	.338
ULC_{jt}	-.003	.009	.705			
$ULCEU15_{jt}$				-.021	.027	.437
$ULCNMS_{jt}$				-2.005	.429	<.001
$GFCF_{jt}$	.173	.044	<.001	.142	.081	.080
GDP_{it}	.966	.566	.088	.047	1.052	.964
ULC_{it}	.109	.036	.002	-.131	.065	.043
$FiringCost_{jt}$	.008	.003	.005	-.033	.005	<.001
	Rho = -.044		Std err. = .194		p-value = 0.821	

Appendix 5: *OECD estimations*

Table 7: *Impact of Trade Union Density (OECD)*
Heckman's method using i, r and t fixed effects

	Selection			Flow		
	Coef	Std err.	p-values	Coef	Std err.	p-values
$DIST_{ij}$	-.738	.087	<.001	-1.381	.176	<.001
ITR_{jt}	.028	.009	.008	.059	.017	<.001
ULC_{jt}	-.008	.007	.002			
$ULCEU15_{jt}$				.076	.012	<.001
$ULCNMS_{jt}$				3.048	3.204	.341
$GFCF_{jt}$	.049	.049	.210	.112	.074	.132
GDP_{it}	1.137	.595	.056	-.232	1.092	.831
ULC_{it}	.123	.037	.001	-.157	.066	.018
$T.U.D._{jt}$	.010			-.017	.003	<.001
	Rho = -.045		Std err. = .184		p-value = 0.805	

Table 8: *Impact of Collective Bargaining Coverage (OECD)*
Heckman's method using i and t fixed effects

	Selection			Flow		
	Coef	Std err.	p-values	Coef	Std err.	p-values
$DIST_{ij}$	-.766	.089	<.001	-1.012	.244	<.001
ITR_{jt}	.026	.009	.044	-.019	.017	.021
ULC_{jt}	-.021	.007	.004	.138	.013	<.001
$GFCF_{jt}$	.092	.051	.072	.760	.087	<.001
GDP_{it}	1.308	.601	.029	-.760	1.095	.487
ULC_{it}	.117	.037	.001	-.197	.069	.004
$C.B.C._{it}$	-.001	.001	.852	-.039	.002	<.001
	Rho = -.490		Std err. = .273		p-value = .073	

Table 9: *Impact of Protection of Regular Employment (OECD)*
Heckman's method using i, r and t fixed effects

	Selection			Flow		
	Coef	Std err.	p-values	Coef	Std err.	p-values
$DIST_{ij}$	-.751	.087	<.001	-1.808	.165	<.001
ITR_{jt}	.030	.009	.029	.041	.016	.013
ULC_{jt}	-.015	.007	.023			
$ULCEU15_{jt}$				.027	.012	.025
$ULCNMS_{jt}$				.323	3.072	.916
$GFCF_{jt}$	-.121	.072	.095	.938	.095	<.001
GDP_{it}	1.222	.591	.038	-.103	1.064	.922
ULC_{it}	.121	.037	.001	-.148	.064	.022
$EPL\ regular_{jt}$	.247	.060	<.001	-.895	.091	<.001
	Rho = -.324		Std err. = .152		p-value = .033	

Table 10: *Impact of Regulation of collective dismissal (OECD)*
Heckman's method using i, r and t fixed effects

	Selection			Flow		
	Coef	Std err.	p-values	Coef	Std err.	p-values
$DIST_{ij}$	-1.251	.137	<.001	-1.366	.194	<.001
ITR_{jt}	.037	.012	.003	.017	.019	.815
ULC_{jt}	-.054	.010	<.001			
$ULCEU15_{jt}$				.049	.015	.001
$ULCNMS_{jt}$				2.691	3.149	.392
$GFCF_{jt}$	-.085	.071	.230	.315	.081	<.001
GDP_{it}	1.133	1.199	.345	-.557	1..654	.735
ULC_{it}	.323	.070	<.001	-.310	.099	.001
$EPL\ collective_{jt}$	-.489	.053	<.001	-.365	.095	<.001
	Rho = -.057		Std err. = .194		p-value = .767	

Table 11: Employment protection *synthetic index (OECD)*
Heckman's method using i, r and t fixed effects

	Selection			Flow		
	Coef	Std err.	p-values	Coef	Std err.	p-values
$DIST_{ij}$	-.667	.087	<.001	-.685	.171	<.001
ITR_{jt}	.014	.009	.106	.009	.018	.603
ULC_{jt}	-.019	.006	.004			
$ULCEU15_{jt}$				.081	.013	<.001
$ULCNMS_{jt}$				.0990	2.979	.739
$GFCF_{jt}$	.415	.064	<.001	.517	.125	<.001
GDP_{it}	1.255	.588	.032	-1.214	1.169	.299
ULC_{it}	.117	.037	.001	-.283	.072	<.001
$EPL\ Synthetic_{jt}$	-.431	.054	<.001	-.436	.121	<.001
	Rho = -.772		Std err. = .060		p-value = <.001	

Appendix 6: *Fraser estimation*

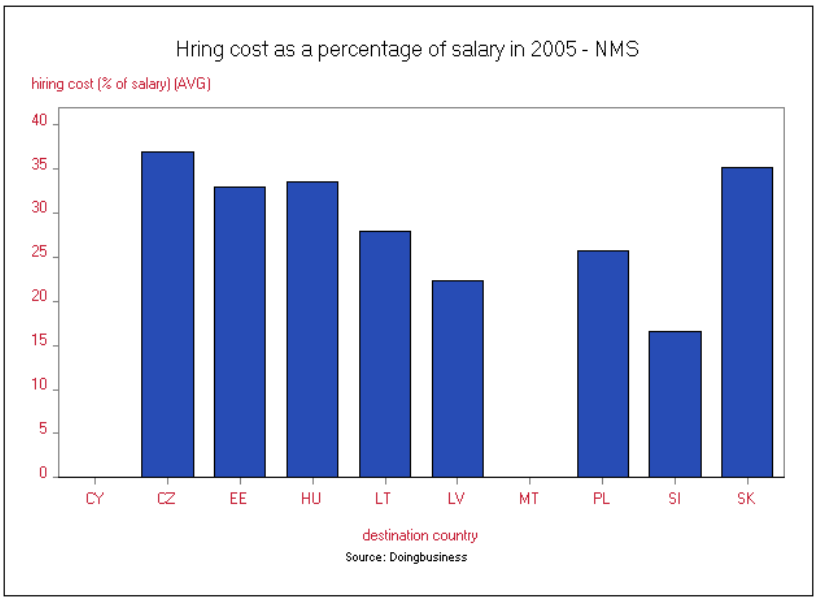
Table 12: *Impact of union centralisation (Fraser)*
Heckman's method using i, r and t fixed effects

	Selection			Flow		
	Coef	Std err.	p-values	Coef	Std err.	p-values
$DIST_{ij}$	.816	.080	<.001	-1.483	.179	<.001
ITR_{jt}	.016	.007	.035	-.001	-.016	.972
ULC_{jt}	-.019	.006	.003			
$ULCEU15_{jt}$				.102	.012	<.001
$ULCNMS_{jt}$				-.862	.486	.076
$GFCF_{jt}$	.124	.046	.007	.566	.074	<.001
GDP_{it}	1.229	.575	.032	.005	1.056	.996
ULC_{it}	.108	.036	.002	-.178	.064	.005
$Centralisation_{jt}$	.058	.024	.015	.428	.035	<.001
	Rho = -.067		Std err. = .191		p-value = .726	

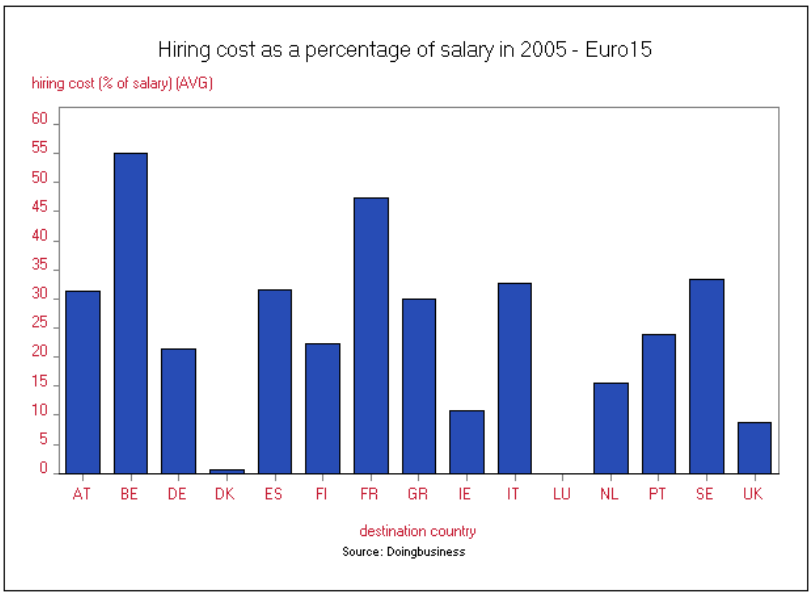
Table 13: *Impact of Hiring and Firing practices (Fraser)*
Heckman's method using i, r and t fixed effects

	Selection			Flow		
	Coef	Std err.	p-values	Coef	Std err.	p-values
$DIST_{ij}$	-.818	.081	<.001	-1.432	.193	<.001
ITR_{jt}	.018	.008	.019	.024	.018	.179
ULC_{jt}	-.022	.006	<.001			
$ULCEU15_{jt}$				.081	.013	<.001
$ULCNMS_{jt}$				-1.875	.510	<.001
$GFCF_{jt}$	.095	.052	.066	.502	.096	<.001
GDP_{it}	1.227	.574	.032	.206	1.125	.854
ULC_{it}	.107	.036	.003	-.164	.068	.016
$HiringFiring_{jt}$	-.012	.023	.575	.133	.044	.002
	Rho = -.012		Std err. = .194		p-value = .949	

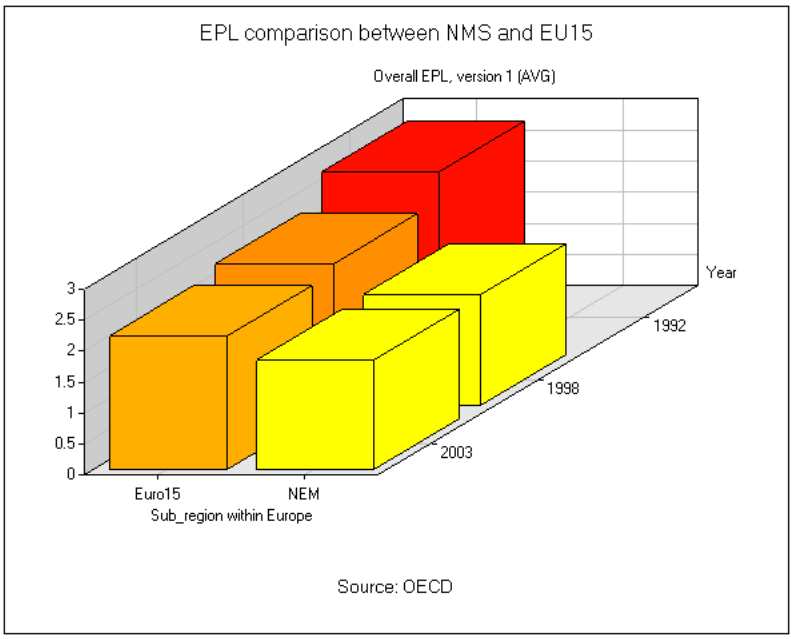
Appendix 7: *Hiring costs NMS*



Appendix 8: *Hiring costs EU15*



Appendix 9: *EPL comparison*



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