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THE DETERMINANTS OF FOREIGN DIRECT INVESTMENT:
A *PANEL DATA STUDY FOR THE OECD COUNTRIES*

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Abstract

This study examines panel data evidence concerning empirical relevance between Foreign Direct Investment (FDI) attraction and its determinative effects. The main bulk of FDI is among the developed countries. Indeed, OECD countries has probably been the most potential group in undertaking FDI by caring out about 95% of the total outward FDI while, on average, 75% of the world FDI was directed into OECD countries. In this paper, we first present and analyse the theoretical/empirical findings on FDI, then we focus on assessing the relative significance of the factors that may attract FDI via a panel data regression analysis for a sample consisting of 20 OECD countries for 23 years (1975-1997). Our findings suggest that certain variables such as human capital and trade regime, as well as, the density of infrastructure appear to be robust under different specifications. Positive significance of the agglomeration factor is also observed, confirming the relevant theoretical propositions. However certain deferential variables, such as the governmental policy effect, could not be fully captured due to the statistical homogeneity of the sample.

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1. Introduction

Cross-border investment is considered to be one of the most striking features of the global economy. The determinants, the growth enhancing effects, the motivations towards the formation of FDI (*Foreign Direct Investment*), as well as, the undertaking and attraction policies, have been topics of intensive research in the last two decades. Foreign direct investment is broadly defined as capital flows resulting from the behavior of multinational companies (MNCs). Thus, factors that may affect the behavior of MNCs could also affect the magnitude and the direction of FDI. MNCs expand their activities abroad for a variety of reasons including, among others, the exploitation of economies of scale/scope; the use of specific advantages (Hymer, 1976); often due to a life-cycle pattern of their products or simply because their competitors are engaged in similar activities. On the other hand, governments are also engaged in a policy competition by altering key factors of their economic policies, such as domestic labour market conditions; corporate taxes; tariff barriers; subsides; privatization and regulatory regime polices, in order to enhance FDI activity in their countries.

Although the interest on the FDI effects was originated in the mid-fifties, when the first growth models appeared (Solow, 1956), the extent of multinational activities has significantly augmented over the past two decades, implying FDI as a desirable element for economic development, mostly because it is characterized by a combination of capital, technology, marketing[2], entrepreneurship and human resources management. Romer, (1993) also underlines the influential role of FDI in transferring such factors across countries and economic regions, and more specifically, he considers FDI as one of the contributory factors in the diffusion, dissemination of knowledge and assimilation of technologies and ideas. FDI often takes the form of capital flows from a parent company to its foreign affiliate, an activity that is considered to be (i) transferring technical factors from a region to another; (ii) substituting capital movement with labor mobility in host regions and (iii) capitalizing domestic markets and thus reducing or eliminating their imperfections. FDI can be either *inward* when foreigners purchase assets into the home economy or *outward* when home citizens purchase assets abroad. Among many analysts who tried to analyse the causality effects of FDI, Ethier (1986) suggests that uncertainty together with information may act as a stimulus for FDI.

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[2] Balasubramanyan et al.(1996)

Barrell and Pain (1997), tried to examine diachronically, the relative rise in the world trade share accounted by multinational enterprises (MNEs), and found that the aggregate stock of FDI as a percentage of the total estimated output in the OECD countries increased dramatically from 4.75% in 1975 to 10% in 1995.

In recent years, many nations lunched an *open door policy* towards FDI, in order to capture the growth enhancing effects of FDI on investment, employment, productivity and economic development in general. The approaches towards the formation of FDI activity differ between the US and the European countries and they are subsequently different even within the borders of the EU[3]. The European integration process and especially the Single Market Programme (SMP) has affected positively the intra-EU FDI, either directly with the removal of capital controls, or indirectly by increasing the level and growth of the overall economic activity. It is estimated that the European Internal Market has increased intra EU FDI stocks for the UK and Germany 8%-14% or around 0,5% of EU GDP at constant 1990 prices (EAG, 1996 and Barrel et al., 1997). The USA and Japanese inflows into the EU have also been higher, mostly with the form of opening subsidiaries in EU countries, in their attempt to overcome the external barriers of the European integration Progress. OECD countries has probably been the most potential group in undertaking FDI between 1980 and 1995, by caring out, on average, about 95% of the total outward FDI, while EU-15 had a share of about 44% in this period (Barrell and Pain, 1997). On the other hand, about 75% on average, of the world FDI was directed into OECD countries and about 15% in EU-15. Clearly, not only there is a rapid increase in FDI worldwide but also the main bulk of FDI is among the developed countries (Barrell et al., 1997).

Given this major extend of FDI activity across OECD countries; we focus our paper into assessing the relative significance of the factors that may attract FDI into OECD countries. Indeed, this paper aims to explore the empirical evidence for FDI attraction and its determinative effects, by assessing and quantifying empirically these determinants for a data set that covers 20 OECD countries and runs from 1975 to 1997. Section 2, analyses the relevant theoretical background in order to sustain our study. Section 3, briefly reviews the literature on the determinants of FDI. Section 4, describes the data, as well as, the model specifications and outlines the empirical methodology. The analysis utilizes a panel-data study method in order to provide an extended specification of our empirical model and to

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[3] Indeed, there are major differences in the Institutional Framework for foreign investment promotion, in nominal and real macroeconomic measures, as well as, in the population distribution and in labour and capital mobility (see e.g. Pain & Young, 1996 and Raines et al. 1999).

evaluate more effectively the total average effect of determinative variables on FDI concentration. In Section 5, we discus our results. Finally, Section 6 concludes our paper.

2.Theoretical Background

The related literature can be broadly divided in two branches: the first one examines the impact of FDI in economic growth; while the second branch focuses on the determinants of FDI.

Let us, first, start with the growth effects of FDI. According to this branch of research, it is important to investigate the precise nature of the relationship between FDI and economic growth; the preconditions for FDI to promote growth and the identification of the mechanisms through which growth can be achieved. One of the first approaches is the *Neoclassical Growth Th*eory. Solow (1956) attempted to express a growth model into a simple production function and to explore "key" variables that could provide steady growth rates. In his models, he captures variables determining FDI in growth rates. On the other hand, within the *Endogenous Growth Theory,* FDI flows may contribute either directly or indirectly into the economic growth of an economy. Wang (1990) discerns the effects of FDI activity into *direct* positive home-country effects, by stepping up production and transferring knowledge to local suppliers and *indirect* effects by upgrading the quality of their workforce. FDI is considered to be the major source of economic growth for the less developed countries (Balasubramanyam et al., 1996) while relative similarities are also observed in EU. Indeed, FDI inflows have contributed to the EU economic growth since foreign affiliates exhibit relative greater propensity to undertake R&D expenditures and the relative higher productivity while undertaking investment in EU than in their domestic market (Barrel et al., 1997). Moreover, Barrel et al. (1997), using a model of labour-augmenting technical progress, estimates for the period 1972-1995, that around 30% of the growth of the British FDI manufacturing productivity is attributed to the FDI inflows. Blomstrom and Kokko (1996) argue that there are evidence suggesting the enhancing effects of FDI on host country's employment and output rates and a significant potential spillover-effect towards local firms in host regions. Girma and Wakelin (2002) examining whether productivity spillovers from FDI activity occur in the UK economy, found that positive spillovers from MNCs occur to domestic firms in the same sector and region as the foreign affiliates. Moreover, their findings suggest that domestic firms may gain more from these spillovers if the technology gap they have from foreign firms is low. Other studies have also found that FDI affects recipient country's economic growth through new inputs (Feenstra & Markusen, 1994), through new

technologies and the subsequent spillovers to domestic firms (Krugman, 1979) and through knowledge transfers (de Mello and Sinclair, 1995). The advent of endogenous growth theory (Romer, 1990, Barro & Sala-i-Martin, 1995) has enabled research into channels through which FDI can be expected to promote growth in the long run.

The second branch of literature on FDI, attempts to illustrate the basic set of determinants controlling the motivations for cross-border investment. Early evidence expressed by Mundell (1957) attempt to explain FDI in terms of relative factor endowments and relative factor costs. Mundell (1957) concludes that in the presence of barriers to trade and migration, as well as, with the existence of large differences between capital-rich and capital-poor countries, the incentive for capital flows is greater. The geographical distribution of new investments, however, suggests that FDI does not target only low GDP-level and low-wage countries. According to IMF, the intra-EU FDI flows account for 4.5% of EU GDP in 1995, evidence suggesting that more additional explanatory variables affecting FDI should be incorporated in a general equilibrium model. Within this framework many researchers incorporated additional variables that are assumed to affect cross-boarder investment decisions, such as, the market size; domestic labour market conditions; cultural and language differences, exchange rate stability; as well as, governmental and geographical indicators. Recent empirical studies stress the role of corporate restructuring and macroeconomic evaluation of FDI cash-flows and analyze factors such as, financial incentives, and political instability. Ex- Posterior theories consider more complicated aspects of the matter and have pointed out the importance of product differentiation; the existence of imperfect competition or trade costs and economies of scale in investment choice; the capacity of the domestic market share from indigenous firms, educational variables and the role of human capital accumulation (Krugman, (1991), Krugman and Venables (1995), Benhabib and Speigel (1994)). Cheng & Kwan (2000) argue that none of the educational variables expressed as percentage of population with primary high education, has positive significant effect on FDI. Other studies attempt to analyze the role of governmental policies, trade regimes and financial market capacity in taking FDI decisions. Also, empirical studies suggest several measures that a government should take in order to attract FDI including tariffs (Barnes and Davidson, 1994), taxes, subsidiaries (Rains and Brown, 1999), regulatory regime and revitalization policy (Curwen, 1997). Others, suggest that unit labour cost may be a significant factor (see e.g. Barrell and Pain, 1999a) suggesting that 1% increase in the relative unit labor cost in USA could result in 0.89% increase in FDI inflow in EU.

3. The Determinants of FDI

The purpose of this section is to provide a brief survey of the possible locational variables, identified, here, as potential factors in influencing foreign investment decision, assuming a priori homogenous economic consideration. The most intrinsic characteristics in order to define FDI is to analyze its determinants, such as the market size; market growth; economic development; agglomeration; urbanization; human capital; labor costs; governmental and integration policies etc. Each of the above factors determines the applicability of investing abroad.

At this point we find it necessary to mention that the well-documented relationship between FDI and growth is an interactive process. Not only FDI promotes output levels in the host economy but also the level of economic development, as a determinant, plays a significant role in attracting FDI. Theoretical and empirical evidence consider two mechanisms playing an important role in attracting FDI: (a) the *market size* and (b) the *level of economic development*.

The former permits economies of scale exploitation and standard production factor specialization, resulting in cost minimisation and market growth, consequently, improving the total supply side (services and inputs) in the host economy. Bhasin et al (1994) followed by Morrissey and Rai (1995), claims that the size of the domestic market, as well as, growth prospects of recipient economy are highly taken into consideration when foreign investors relocate production in the host country. The later argue that international agreements on trade and investment also affect the volume and direction of FDI flows. Jeon (1992) and Wang & Swain (1995) use profitability rates as a sensor for growth level and consequently, as an explanatory variable for FDI, concluding that there exist statistical segnificance and positive linkage between the two measures. Agarwal (1980) points out that FDI is considered to be a function of output or sales of foreign firms in the host country. This is usually approximated by the size of market –either the absolute, captured by the level of GDP (Bandera and White, 1968), or the relative, expressed by the growth rate of GDP[4]- of the host country. In the meanwhile other researchers used both measures to show that level of development and market capacity play a decisive role in attracting and positioning FDI (Wang and Swain, 1995.

The second mechanism in attracting FDI inflows concerns the stage of economic development and the so-called Investment Development Path (IDP) of the recipient country (Barrell & Pain, 1998). A well-developed existing market infrastructure is expected to support

FDI decisions (De Menil, 1999). Major studies encounter and measure IDP rates using GDP per capita proxies. For instance Agarwal (1990) and Mainardi (1992) emphasise the level importance and growth prospectus of the real per capita GNP per se and the role of real GDP growth in taking investment decisions in a region. Head & Ries (1996), Cheng & Kwan (1999), use infrastructure factors, proxied by road constructions (km/km2 of land mass), and additionally the regional income as potential variables for FDI attraction.

Another important supply condition, that is considered to be promoting labour-intensive and export-oriented FDI, is the *human capital* both in terms of quality and availability. In this the capital stock created by investing over and above the depreciated capital, expands the productivity potentials of a firm or a country and enables FDI growth enhancing effects (De Mello, 1997). This, however, presupposes a minimum human-capital efficiency level and assumes that further training is attainable. However, empirical literature concerning the impact of educational level on inbound FDI appears to be counter-intuitive. Cheng & Kwan (2000), for example, argue that none of the education variables (expressed as percentage of population with primarily and high education) has a positive and significant effect on FDI, while Cheng & Zhao (1995) report similar results. Guntlach, (1995) argues that the poor explanatory power of human capital accumulation is attributed to the fact that education creates externalities and spillover effects in production, which are hard to capture using standard set of variables. More explanatory power can be achieved by identifying the role of human capital augmentation, rather than human capital accumulation, which may be poor explanatory variable in growth models because the crucial role of educational variables is difficult to be captured in using standard growth accounting.

Recent literature puts forward *agglomeration effects* as a significant factor of attracting FDI. Venables, (1996a) argues that agglomeration economies arise from the presence of other firms, other industries, as well as from the availability of skilled labour force. Empirical evidence evaluating agglomeration effects is limited though, partly because of data limitations and difficulties in obtaining definite statistical specifications. Wheeler & Mody (1992) found that the US FDI is attracted by the size of the total inward investment. Head et al (1995) using plant-level data argue that the locational FDI attraction in a sector is mostly determined by the location of existing firms in that industry. Barrell and Pain (1999a) point out that the FDI in Europe is attracted by agglomerations proxied by market size and a 5-year moving average of stock manufacturing patterns, among other determinants such as

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[4] Goldberg (1972) and Petrochilos (1989).

relative costs, technology and integration. Finally, Braunerhjelm and Svensson (1998) show that FDI is highly sensitive in agglomeration patterns.

Governmental policies could also be important determinants of FDI flows since governments consider FDI flows as means to fight unemployment and to enhance national growth rates. Governmental policies can take a variety of forms such as tariffs, taxes, subsidies, regulatory regime and privatisation policy. For instance a relative increase in tariffs or taxes rates in the host country is expected to raise the cost of investment, resulting in eliminated profitability rates. Cheng & Kwan (2000) having examined empirical evidence on governmental capabilities and recourses found that governments are major catalysts for economic restructuring and location attraction of inward FDI. Indeed, when the Chinese government launched an *open door policy*, China has emerged as the second largest recipient in the world (after US) since 1993. Morrisey and Rai (1995) point out the *institutional features* of the recipient economy and the degree of *political intervention* as a catalyst for economic restructuring and hence as a potential determinant of FDI.

Another possible determinant in attracting FDI inflows is the *liberal degree of trade regime*. Although there exist obvious difficulties in measuring the above factor, a general positive relationship between a liberal trade regime and FDI, is anticipated. In EU, UK's success in attracting FDI inflows, was founded in three key factors: a) the *liberalization of foreign owner regulation*, b) the *privatisation* programme in traditionally state activities (telecommunication, railways, electricity, water), c) the *financial deregulation*, the "Big Bang" in 1986, (Raines et al., 1999). Bhagwati, (1978) argues that FDI is captivated by countries that implement export promotion than those promoting import substitution policy. Milner and Pentecost (1996) proxy the *trade regime* as the ratio of exports to sales and sales concentration ratio and report that both variables are found to contribute positively to FDI. Wang & Swain (1995) examine the case of export-oriented FDI and find positive influence on inbound FDI. Recently, the inherent disadvantage of closed economies is outweighed by the launch of special Export Processing Zones. Cheng & Kwan (2000), for example, found that the Chinese Economic Zones exert a positive and significant influence on attracting FDI.

New political factors have been clearly emerged due to global economic trends such as *economic integration* among conjucted nations and *trade liberalization* all around the world. Recent studies[5] report evidence that the Single Market Programme (SMP) among the EU countries promoted the level of investment rates within member states. De Menil (1998)

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[5] Arrowsmith et al. (1997) and Pain (1997)

states that the EU involves increases in the flow of information and capital, which in turn increase FDI flows.

Pain & Lansbury (1997) report ambiguous results concerning the *labour market reforms* in UK, which although having reduced the total labour costs, they did not succeed on promoting the anticipated FDI attraction. More specifically UK performed poorly in attracting FDI from those sectors where innovations were growing most rapidly. Cheng & Kwan (2000) report that wage costs have negative effects on FDI, contrary to Chen (1996), who found that labour compensations do not have any influence on FDI and to Head and Ries (1996), who outcome a completely neutral impact of wages.

4. Data and Methodology

In this section we will try to empirically assess the determinants of FDI for the OECD countries. The panel data set used for this analysis covers 20 OECD countries[6] and runs from 1975-1997. The database has been built using a number of different sources. The main source was the World Bank CD-Rom: World Development Indicators (1999), while data from the IFS-IMF (various issues) were used for the construction of the FDI over GDP ratio and data from other national sources (in companion with the World Bank CD-Rom) were used for the construction of the physical infrastructure proxies. All values used in the analysis are expressed in US dollars in real terms. The scope of the model, although being formulated at a relatively aggregated level, is to consider the diverse range of influences on decision making in investing abroad.

Since both cross-section and time-series data are available, we estimate equations, which take the following form:

$$y_{it} = \mu_i + \gamma x_{it} + \varepsilon_{it} \qquad (1)$$

where the pair of terms (*i, t*) expresses the transversal and temporal aspects of the per country panel data, *y* and *x* are respectively the dependent variable and the matrix of explanatory variables, and μ_i is a parameter specific to each country[7]. The latter parameter (which varies only across countries and not over time) is introduced to take account of unmeasured features specific to the countries concerned. The set of independent variables is measured prior to the investment decision. This approach allows overcoming the problem of endogeneity when examining macroeconomic flows (Baltagi, 1995)**.**

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[6] Austria, Denmark, Finland, France, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Great Britain, Australia, Japan, South Korea, New Zealand, Canada, Unites States
[7] In fact, we estimate (1) under different assumptions about the structure of our panel data model. The constant is specific to each country only under the fixed and random effects methods.

In the light of the previous analysis in Section 2 above, and in order to assess the influence of the variables described, a foreign investment equation may be built up in the following linear form:

$$(FDI/Y)_{i,t} = \mu_i + \beta_1\, GY_{i,t-1} + \beta_2\, y_{i,t-1} + \beta_3\, (FDI/Y)_{i,t-1} +$$

$$\beta_4\, Gexp_{i,t-1} + \beta_5\, h_{i,t-1} + \beta_6\, Open_{i,t-1} + \beta_7\, Road_{i,t-1} + \beta_8\, Rail_{i,t-1} + \varepsilon_{it} \qquad (2)$$

where $(FDI/Y)_{i,t}$ denotes the share of FDI to GDP for each country; so obviously Y is real GDP, GY denotes real GDP growth and y is GDP per capita (both introduced as indicators showing the level of development, the size of the market, and the growth potential of each country), lagged share of FDI is introduced to take into consideration the existence of agglomeration effects. Moreover, the implications of this variable are not only confined to agglomerations but also signal the absorbing capability of a host country. We expect a positive influence of this variable. The role of policy measures is captured by *Gexp*, which denotes government expenditures.[8] The Openness of the economy (trade regime) is captured by the variable named *Open,* which is defined as the ratio of trade flows (exports plus imports) over GDP (macroeconomic variables that are expected to have effect on the location of FDI). Next, we consider the set of skills possessed by the workers in the economy, i.e. we include human capital proxies in our equations. Hence, *h* denotes the level of human capital measured as the ratio of pupils enrolled on secondary education over the total active population (aged between 15-65). Finally, *road* (percentage of roads paved) and *rail* (railway network proxy) are variables measuring the physical infrastructure of each country. To our knowledge these variables have not been used before when studying the determinants of FDI using longitudinal data. The scope of these variables is to assess the role played by the quality and the concentration of infrastructure. These variables can also signal the level of development and the population distribution of the host country. In principle, an extensive network promotes trade within the country and helps a foreign investor to gain access to separate or different markets at the lowest cost.

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[8] Unfortunately due to data unavailability, we cannot include more variables measuring the effects of government policies such as financial incentives or wage effects.

5. Empirical Results

We consider equation (2) by using three different methods (namely common constant, fixed and random effects), in order to test our data sample under different specific-country characteristics estimations. The panel consists of 20 countries, and runs for a time span of 22 years (we miss one observation due to the lags introduced in the equation). The total number of observations is 440, which is sufficient to produce robust estimates. Note also that T and N are sufficiently large and of the same magnitude. The estimated results are summarised in Table 2.

Column 2 presents the results under the assumption that there are no differences between the economies, which is not implausible since our sample consists of a homogeneous group of countries. An important finding is the positive and significant effect of *human capital*. This is consistent with the findings reported by Cheng & Wang (2000) and Cheng & Zhao (1995) who adopted the same approach for human capital. Despite the inconclusiveness of previous empirical studies concerning the role played by human capital as described above, and summarized in Table 1, our results suggest that an economy with high fraction of skilled workers is likely to be much more productive and more desirable on behalf of foreign investors.

The catalytic role played by the *growth prospects* of the recipient economy clearly emerges lending support to the theory and empirical evidence outlined above (see for example Agarwal, 1980 and Mainardi, 1992). Indeed our estimates reveal that investors are influenced by the degree of development and the market size, in terms of GDP per capita and GDP growth. Looking at the Table 2, both coefficients are found to be positively related to the inbound FDI flows and statistically significant at conventional levels. Foreign investors will invest in a country where the perceived profitability of their projects is secured and the signals transmitted by the GDP are good indicators for doing so.

The potential role played by the *agglomeration effects* turn out be positive and highly significant showing that past experience is very important for the increase of the share of FDI among countries. This implies that the impact of the previous stock of investment creates positive externalities, which is indicative of the present condition and the future prospects of the host country. The US FDI, for example, is attracted by the size of the total inward investment (Wheeler and Mody, 1992) or the location of the firms is influenced by the location of other firms, which invested previously (Head et al, 1995). Our results are also in line with Barrell and Pain (1997,1999b) who using panel data but different proxies (the

fraction of national GDP and the ratio of host country R&D stock) report that agglomerations exhibit positive and significant impact on attracting more investment.

A *liberal trade regime* is positively and significantly associated with the FDI inflows, suggesting that, all things being equal, investors are more likely to invest in the countries which have been opened up to the outside world (Milner and Pentecost 1996). The role of trade is frequently taken into consideration, but it commonly agreed that there are other channels for the diffusion of knowledge and the associated gains in output realised through FDI. It should be noticed here that previous evidence viewing trade as a growth determinant, claims that the role of openness to trade per se is inadequate and does not fully account for the post-war growth in East Asia for example. The experience of Greece is equally illustrative as it shows that trade liberalisation, while necessary is not a sufficient condition for large-scale FDI inflows[9]. In our study, however, viewing the trade regime from a different perspective, it clearly appears to be a major determinant of the pattern of stocks of FDI. Summarising, in the case of OECD countries and after controlling for macroeconomic effects the *impact of trade* is consistent with the evidence discussed in Section 2.

The role of *governmental expenditures* although has a positive effect on attracting FDI it is not significant. One possible explanation is that the expenditures per se are not a major determinant within OECD countries framework. These countries have attained a certain level of development and the share of governmental expenditures does not significantly fluctuate. Therefore, the incremental governmental expenditure will have a little effect on the probability of inducing a foreign investor to undertake an investment. In our case, it seems that public expenditure does not significantly affect the international cost competitiveness of each country.

One of the two *infrastructure indicators*, *rail* is significant while the insignificance of *road* can be explained by the fact that most of the OECD countries are highly developed and the percentage of roads paved are not that much different among them. This is along the lines suggested by Head et. al (1996) and Cheng & Kwan (1999, 2000) using panel data from Chinese regions, point out the positive role played by good *infrastructure* (roads). The latter study, however, reports that the coefficient estimates were insignificant, and even with the wrong sign in the case of railways (km/km^2 of landmass).

The above results, however, do not take into account the *specific unmeasured features* of each country. Thus, we proceed by estimating equation (2) introducing the methods of

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[9] In Greece, the share of manufacturing FDI relative to GNP remained low and stagnant over the whole period (see, e.g. U.N., 2002)

fixed and random effects. Firstly, we estimate a fixed-effects model that will capture all temporally constant country-level effects. Secondly, we estimate a random-effects model. These estimates are then compared to the previously estimated coefficients using the Hausman test (for a comprehensive analysis of those methods see Baltagi, 1995).

The fixed effects method suggests that only the level of development and the agglomeration effect are significant on the determination of the location of FDI, while the random effects is consistent with the results of the common constant method analysed before. In order to choose among the fixed effects and random effects estimator, econometric theory suggests performing a Hausman (1978) type test of no correlation between the μ_i and the regressors. The tests gave an χ^2 value of 3.78 which is distributed with $\chi^2(8)$ under the null and it is not significant suggesting that the GLS estimators of the random effects method are the preferred ones.

The random-effects method reports the same results of the common constant method analysed before, with the exception of real GDP growth, as our first method revealed sustaining the robustness of our initial estimates. The results do not dramatically change both in terms of the quantitative impact of the coefficients and the size of their corresponding significance. In the light of this specification, there is evidence that the rise in *GDP* per capital increases the absorbing capabilities of the recipient economy. The dominant effect of this factor has been extensively investigated in the literature and our findings confirm that it is of great magnitude in the case of determinants of FDI. The coefficient on the *trade regime* still remains positive and significant reinforcing its robustness. Similarly, several studies have pointed out to the importance of a liberal trade regime compared to a closed economy regime. Sianesi (1995) using Southeast Asian data examines the role of protectionism as a proxy for trade regime and report that it is negatively correlated with FDI inflows. Pfaffermayr (1994) argues that there is a positive association between FDI inflows and volume of trade among countries and finds that a foreign investor would invest in a country that has strong trade connections. Others using manufacturing data argue that the openness to trade plays a positive and significant role as a destination for companies. To our knowledge the openness to trade is not explicitly taken into account as determinant of FDI and, hence, the associated empirical evidence is limited. Based on the discussion regarding the trade regime and the patterns of FDI our approach shed some light on the previously neglected aspects of FDI.

Both variables regarding the *infrastructure* are rendered positive and highly significant suggesting that improving stocks of infrastructural capital increase the attractiveness of a country as a platform for multinational investment. An extensive *network*, apart from the

blatant consequences in market growth, also signals the quality level of the host country. It is likely that a large-scale improvement of the physical infrastructure would have been facilitated by the Economic Union's regional and financial aid. Since the vast majority of our sample countries are linked to EU, the positive effect of these variables indirectly reflects the crucial effect of Single European Market or other similar programmes of other Integrated Unions on the pattern of FDI. The robustness of the *education variables* serving as proxies for labour quality is still evident. Neither the sign nor the significance of the as proxies or labour quality is abolished revealing the strong effect of a skilled labour force. This effect suggests that a highly educated and trained labour force is likely not only to attract labour-intensive investments but also to instigate better performance of the foreign firm and larger labour productivity. Furthermore, since much of the foreign industry is located in high-technology manufacturing sectors the fraction of skilled labour force becomes crucial for the patterns of FDI inflows. The *governmental expenditures* retain their positive sign yet seem not to exert a significantly positive influence on the FDI inflows. *Budget constraints* and the fact the global economy fluctuated during the period involved in our sample coupled with the mature stage at which our sample countries have arrived may account for the insignificance of this specific variable. Barrell and Pain (1997) argue that tighter domestic *financial conditions* are linked to lower level of foreign investment. Wang and Swain (1995) argue that domestic expenditures exert positive influence but their total impact does not appear robust such as the foreign demand variables such as level of development and size. Finally, the impact of *agglomerations* and its subsequent implications on the attractiveness of a country coupled with the recent shifts to maturing products (information technology, emerging technologies) and a potential for bringing in more R&D activity in the area of new products, remains relatively large and significant. By boosting agglomerations, the previously undertaken FDI is likely to instigate new techniques, process and products stimulating larger inbound foreign investment.

6. Conclusions

Despite data limitations, the findings regarding the patterns of inbound FDI in OECD countries offer a potential empirical framework. The significant explanatory factors consist of: a more highly *educated and trained workforce*, large-scale investment in the *physical infrastructure*, partly facilitated by the authorities of the corresponding Economic Union in most cases; the *level of development* and *market size* as well as the *openness to trade* and the *spillover effects*. All these factors are expected to enhance the attractiveness of host countries,

representing an additional growth dynamic. Our findings are broadly consistent with the results obtained in the literature on the location of FDI in the US, China and Europe. Adopting a different econometric approach, as far, as the determinants of FDI are concerned and utilising panel data techniques, our main result is that variables such as *human capital* and *trade regime*, as well as, the *density of infrastructure* appear to be robust under the different specifications. In addition, our study confirms the significant role played by the newly emerged factor concerning the *agglomerations* and contributes to the limited empirical evidence on this area. Given this framework an extension towards including variables dealing with *labour costs* and *political factors* will shed more insights into the dynamics of FDI. *New technologies* and trends may arrive through the dissemination of knowledge transmitted by international trade and foreign investment.

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Table 1: Determinants of FDI – Summarised		
Determinant	Possible Proxy Variable	Effect
Market Size, Market Growth,	GDP, GDP Growth Rate	+ + +
Level of development	GDP per Capita, GDP per Capita Growth Rate	+ +
Urbanisation	%age of Urban Population	+
Human Capital	Secondary School Enrolment Ratio	+/-
Agglomerations	FDI Lagged One Period Number of Firms in the Region GDP	+ + +
Economic Integration	Member of Economic-Political Union	+
Governments, Trade Regime	(Exports + Imports) / GDP FDI as a fraction of GDP Infrastructure (Roads)	+ + +
Labour Costs	Wages and Salaries	-
Exchange Rate Variability	Absolute / Relative Change in Real Exchange Rate	+/ -
Political Instability	Foreign Debt as a Fraction of GDP	
Interaction Between The Foreign Investor and the Domestic Firms	R&D Marketing process	+/ - +/-

Table 2: The Determinants of FDI – Empirical Evidence from a Panel of OECD Countries			
Dependent Variable: $(FDI/Y)_{i,t}$			
Sample: 1976 – 1997; T=22; N=20; Total panel observations: 440			
Variable	**Common Constant**	**Fixed Effects**	**Random Effects**
Constant	-0.151 (-0.180)	- -	-0.027 (-0.046)
$GY_{i,t-1}$	3.126 (2.261)*	4.132 (2.810)*	1.938 (1.500)
$y_{i,t-1}$	0.254 (3.387)*	0.244 (1.586)	0.164 (2.886)*
$(FDI/Y)_{i,t-1}$	0.673 (17.16)*	0.528 (11.50)*	0.831 (27.75)*
$Gexp_{i,t-1}$	0.004 (0.793)	0.005 (0.893)	0.002 (0.465)
$h_{i,t-1}$	16.63 (3.554)*	8.896 (1.109)	12.66 (4.111)*
$Open_{i,t-1}$	0.579 (3.760)*	0.972 (1.538)	0.334 (3.927)*
$Road_{i,t-1}$	0.002 (1.486)	0.004 (0.426)	0.002 (2.314)*
$Rail_{i,t-1}$	0.146 (3.138)*	0.126 (0.712)	0.092 (3.323)*
R-squared	0.618	0.653	0.575
Adj. R-squared	0.609	0.629	0.566
D-W Stat.	2.176	2.172	1.906

Values of t-statistics in parenthesis
* denotes statistical significance at the 95% level.