Foreign Direct Investment and Growth: 
the role of regional territorial capital

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Abstract
This paper analyses the impact of FDI on the growth rates of European regions. In so doing, we discuss the role of different soft and hard components of the territorial capital in determining such an impact. In particular, we try to answer the following research questions: do different levels of agglomeration economies determine different levels of FDI-induced growth? Is social capital able to enhance the impact of FDI on regional economic growth rates? Does relational capital matter in the FDI-growth relationship? In order to achieve our research objectives, we analyse empirically the impact of different measures of FDI density on regional economic performance measured as real GVA growth rates. In order to mitigate possible endogeneity problems and control for non-linearities in such a relationship, we use a counterfactual framework. As expected, our findings indicate that FDI are able to affect economic growth, but the magnitude and the direction of such an effect may vary according to regions’ endowments of hard and soft territorial capital. This rich approach may help policy makers in designing FDI promotion policies that are effective also for the development of hosting regions.

JEL: F23; O18; O52
Keywords: FDI; regional development; Europe; propensity score matching.
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1. Introduction

The purpose of this paper is to disentangle the impact of foreign investments on the increasingly differentiated trajectories of regional growth. Recent developments in regional science show that growth determinants cannot be fully identified through deterministic cause-effect relationships, but need to take into account manifold relationships between economic agents, largely dependent on perceptions. Given that economic growth mainly depends on the ability of regions to take advantage of potential opportunities to sustain their competitiveness, the idea is that the latter largely depends on a complex combination of factors both formal and informal, soft and hard. These factors have been recently defined in the literature with the concept of territorial capital.

The traditional approach to discuss the relation between FDI and regional growth is based on theoretical arguments regarding the likely sources of knowledge and technological spillovers from foreign direct investment (FDI) to issues concerning the role these spillovers can play in fostering growth and development at regional level. Many policy makers and academics argue that FDI can have important positive effects on a host location’s development efforts, the main reason being that, in addition to the direct capital financing it supplies, FDI is also a valuable source of technology and know-how. Hence, the impact of FDI on growth is expected to be manifold. FDI may complement local investments and can add to local production capacity. Moreover, it can promote growth by stimulating productivity gains resulting from spillovers to local firms. While technology may widespread through several channels, FDI is one of the main mechanism through which host economies can gain access to advanced technologies as well as managerial knowledge and skills. This may help in relaxing human capital constraints and increasing development opportunities.

These arguments are very common in the literature based on country level evidence and do not consider that at sub-national level the FDI-growth relationship becomes more ambiguous. At the regional level, indeed, important local factors can undermine or reinforce the FDI-growth relationship, depending on the regional ability to fully exploit their economic potential. Local externalities, local assets, relational distance, local governance, cultural elements and values are all crucial elements in defining the flexibility and the catching up ability of regions in taking advantage of FDI spillovers and complementarities. Theoretical arguments motivating the potential of territorial capital for higher returns on investments are manifold and can be found in different strands of theoretical literature, such as the limited rationality theory (Malgrem,

These considerations suggest that FDI alone is not enough to generate a sustainable pattern of economic growth. There are factors that can magnify or inhibit the impact of FDI on growth, all other growth determinants held constant. In this paper, we argue that the extent to which a region would take advantage of FDI depends on the endowment and composition of its territorial capital. Do different levels of agglomeration economies determine different levels of FDI-induced growth? How social capital influences the impact of FDI on the process of economic growth at local level? Does relational capital matter in the FDI-growth relationship?

In order to provide an answer to these research questions, we start from a general assessment of the impact of FDI on economic growth; then, we try to identify those factors that cause FDI to have an enhanced effect on economic growth. In so doing, we consider different measures of FDI as well as those components of the territorial capital that may exert on impact on the transmission of FDI-induced spillovers to the local economy, such as agglomeration economies, and several components of social and relational territorial capital.

The rest of the paper is organized as follows. Section 2 discusses the theoretical foundations of this study. Section 3 is devoted to the presentation of territorial capital endowments of European regions and the empirical trends in FDI and growth in Europe, with a focus on the emerging themes from our database. Section 4 deals with the empirical issues, such as data sources and methodology, while section 5 comments on the results. Major conclusions and a summary of the findings are instead discussed in Section 6.

2. Theoretical background

The existing empirical literature on FDI has focused on three different aspects: i) why foreign firms invest abroad; ii) what drives inward FDI flows; iii) what the impacts on host economies are and whether they are positive or negative. Only the third aspect is of interest for the present study, given that we assume the European NUTS2 regions as territorial units.

Generally speaking, the literature acknowledges that FDI plays a relevant role in economic development processes of host economies through several channels, which go far beyond the increase in the local endowment of financial and physical capital. In the neoclassical growth models à la Solow (Solow, 1956) this implies that local economies switch to a higher growth path, but the growth rate remains constant in the long run. In endogenous growth models (Lucas, 1988; Romer, 1986), instead, the impact of FDI may be more relevant because of the presence of indirect effects which are able to potentially affect all variables.
included in the production function. Capital productivity improves because of the increase in the endowment of equipment and the number and variety of intermediates; labour productivity increases because of the acquisition of knowledge and managerial techniques coming from abroad; and total factor productivity may improve because of the transfer of new technologies. Consequently, growth rates may permanently increase, thus improving development prospects in the long run.

These indirect effects that benefit the host economies, called more properly spillovers, arise since multinational firms cannot completely internalize the benefits of knowledge and technologies which are at the base of their competitive advantage (Kokko, 1994; Markusen, 1995). The intensity of these spillovers may vary according to their nature intra- or inter-sectoral. While multinational firms try to avoid intra-sectoral spillovers because they benefit their direct competitors, they may produce inter-sectoral spillovers since they benefit suppliers and clients (Kugler, 2006). Another important indirect effect arising from the presence of multinational firms is export spillover, which affects local firms’ export decisions (Girma et al., 2004; Kneller and Pisu, 2007).

The literature suggests that FDI affects host economies through different channels both direct, such as the composition, competition and employment effects, and indirect, such as spillovers (Barba Navaretti and Venables, 2004). The transmission of the latter may occur through imitation processes, labour force training, pro-competitive effects, and input-output linkages (Blomstrom and Kokko, 1998). Regardless of the channel chosen, the impact of FDI on growth is far from being automatic; rather, it depends on the degree of complementarity and substitutability between foreign and domestic capitals (De Mello, 1999), the degree of development of the host economies (Johnson, 2006; Carkovic and Levine, 2005; Blonigen and Wang, 2005), the capacity of the host economy to absorb new technologies and knowledge brought by foreign firms (Borensztein et al., 1998), the degree of openness of the host economies (Balasubramanyam et al., 1996), the degree of embeddedness of foreign firms in the local economies (Markusen and Venables, 1999; Rodriguez-Clare, 1996) and other host economies’ characteristics, such as the quality of the institutions and, generally speaking, the business environment (Olofsdotter, 1998; Blomstrom and Kokko, 2003; Xu, 2000).

Despite the plethora of FDI-growth studies, the relationship between FDI and growth is still not clear, since many of these works are based on aggregate data on FDI, which do not allow either to distinguish between different types of FDI (vertical vs. horizontal; greenfield vs. other forms of FDI), which is potentially important (Beugelsdijk et al., 2008) or to consider host economies at a finer geographical disaggregation (sub-national levels). Consequently, it is implicitly assumed that, on the one hand, different types of FDI have the same impact on economic growth rates, and, on the other hand, that the impact of FDI on economic growth is constant across space.
However, from the literature one can logically deduce the opposite: different types of FDI affect growth in different ways because the nature of the investment partly determines the way FDI affects growth. For examples, the impact on employment and production capacity will be higher in the presence of greenfield FDI than in the presence of mergers and acquisitions of existing local firms, though the creation of spillovers may be the same (Krugman, 2000; Wang and Wong, 2009). Moreover, horizontal FDI may create more spillovers because of their relatively more intensive use of capital in local economies, while Vertical FDI has a higher impact on local labour demand (Beugelsdijk et al., 2008) and generates inter-sectoral spillovers. Finally, with few exceptions, most studies focus on FDI in manufacturing, while ignoring either finer disaggregation within the manufacturing sector or FDI in services.¹

When the FDI-growth relationship is considered at sub-national level, ambiguities increase even more. Generally speaking, Mullen and Williams (2005) argue that the impact of FDI on growth is not affected by the dimension of the geographical unit taken into consideration, while Girma and Wakelin (2001) claim for a regional dimension of FDI for several reasons. First of all, the effects of FDI-related spillovers are expected to be localized. Secondly, it is not clear whether laggard regions are able to benefit from the presence of foreign firms: a foreign investment increases local capital accumulation, but the host economy might not possess the capacity to absorb the knowledge and the technology incorporated in such an investment (Findlay, 1978; Blomstrom and Kokko, 1998). Other ambiguities relate to the expected transfer of superior technology from foreign to domestic firms, based on the assumption that foreign firms are by definition technologically superior to domestic firms (Markusen, 1995). But, what happens when foreign firms undertake an investment in a technologically advanced region in order to exploit its knowledge (Dunning, 1999; Cantwell, 1989)?

In conclusion, there remains a clear need to quantify the impact of FDI on regional economic performance. This paper addresses these issues in the context of the European Union. In so doing, we will not only augment the existing evidence on the impact of FDI on EU regions’ performance, which is quite scarce, at least in our knowledge, but also try to overcome some of the ambiguities that still plague the literature.² More specifically, our study aims at uncovering whether the complexity of the FDI-growth relationship depends on the substantial heterogeneity in regional identities. Such identities encompass both soft and hard resources of local economies, that constitute the building blocks of the so called “territorial capital”.

² Studies examining the regional dimension of FDI generally deal with location choice rather than the impact on growth and productivity. Exceptions include Figlio and Blonigen (2000), Leichenko and Ericson (1997), Bode and Nunnekamp (2010), Bode et al. (2009) and Mullen and Williams (2005). All of them refer to the experience of US State. As for Europe is concerned, the existing works concentrate on specific countries or groups of them, mainly located in Central and Eastern Europe (Girma and Wakelin, 2007; Driffield, 2006; Nicolini and Resmini, 2011).
“It is now recognized that each area has a specific capital – its ‘territorial capital’ – that is distinct from that of other areas and is determined by many factors [...]. These factors may include the area’s geographical location, size, factor of production endowment, climate, traditions, natural resources, quality of life or the agglomeration economies provided by its cities, but may also include its business incubators and industrial districts or other business networks that reduce transaction costs. Other factors may be “untraded interdependencies” such as understandings, customs and informal rules that enable economic actors to work together under conditions of uncertainty, or the solidarity, mutual assistance and co-opting of ideas that often develop in clusters of small and medium-sized enterprises working in the same sector (social capital). Lastly, according to Marshall, there is an intangible factor, ‘something in the air’, called the ‘environment’ and which is the outcome of a combination of institutions, rules, practices, producers, researchers and policy makers, that make certain creativity and innovation possible. This ‘territorial capital’ generates a higher return for specific kinds of investments than for others, since they are better suited to the area and use its assets and potential more effectively” (OECD, 2001, p.15).

The role of territorial capital is increasingly recognized in its importance for the effectiveness of regional policies and is inspiring the reform of European regional policies towards a more placed-based approach, that started after the publication of the well known Barca Report (Barca, 2009). Theoretical arguments sustaining the importance of a cognitive approach vis-à-vis regional development are manifold: from the theory of limited rationality (Malmgren, 1961; Simon, 1972) to contract theory (Williamson, 2002) and the cognitive approach to district theory (Camagni, 1991; Storper, 1995).


3.1. The general trend

A widespread wave of globalization affected world economy since the beginning of the past decade, with FDI playing a major role as a way of internationalizing economic activity. Despite the slowdown caused by the recent crisis, the importance of worldwide economic integration as a fuel for sustained growth has been recognized by all international organizations, with the European Commission stating the importance of reinforcing the single market and ease investment procedures as a major stimulus for growth (Europe 2020 Agenda). Indeed, multinational enterprises (MNEs) play a leading role in shaping and driving cross-border integration through the transfer of production facilities, functions and or technology across space (Baldwin and Martin, 1999; OECD, 2007).

A recent report on the progress of the EU towards the Europe 2020 Agenda shows that the EU is the largest provider and recipient of FDI in the world, with intra-EU investments increasing rapidly (Hamilton and Quinlan, 2011). These trends have been reinforced by the liberalization of new markets, especially in the services sectors, the reduction of capital movement restraints, and the creation of a friendly environment
for Foreign Direct Investment (FDI), especially in the services sectors. Despite the cyclical character of FDI flows and their dependence from economic fundamentals, inward FDI stocks in the EU have increased exponentially since the 1980s, reaching their peak in 2007, with more than 7,000 billions of USD and a percentage of world stocks of about 45%. In particular Intra-EU FDI, that represents around 62% of total FDI, have increased markedly, resulting in significant economic gains: 2.1% of EU GDP over the period 1992-2006 (500 Euros per head) and 2.75 million jobs.

Despite that, a positive and linear relationship between foreign direct investments and regional growth rates does not seem to emerge in Europe. As it is shown in Figure 1, the regions with the largest concentration of foreign firms are not necessarily those with the highest gross value added growth rates. Moreover, the relationship between FDI and GVA growth rates is far from being linear.

Figure 1. The FDI-growth relationship in Europe

The recent literature in regional science (see Camagni, 2008, for a comprehensive discussion) suggests that deterministic cause-effect relationships cannot explain the complexity and diversification of present regional development patterns. The competitiveness of each region, in fact, largely depends on a multifaceted combination of factors both formal and informal, soft and hard, which encompass to the territorial capital, as discussed in the previous section: “Each Region has a specific ‘territorial capital’ that is distinct and generates a higher return for specific kinds of investments than for others. Territorial

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3 See UNCTAD, *World Investment Reports*, various issues for an in-depth analysis of FDI flows and stocks at European and world levels.

4 EUROPE 2020, Background Information for the Informal European Council, 11 February 2010
development policies should first and foremost help areas to develop their territorial capital” (European Commission-DG Regio, 2005, quoted from Camagni, 2008).

Following Van Schaik (2002), Capello et al. (2011), and Caragliu and Nijkamp (2012) we measure social capital using results of the European Values Study\(^5\). Needless to say, we do not consider all possible elements of the territorial capital, but only those that we believe can crucially affect the ability of regions to take advantage of FDI for local development. The spatial distribution of these factors is quite uneven, as it will be shown in what follows.

In more detail, we consider four different elements of the territorial capital. The first concerns the agglomeration of the economic activity within a common area. Firms might concentrate geographically for a number of reasons. First of all, spatial agglomeration makes the transmission of knowledge spillovers, including both technical and informal knowledge, easier. Secondly, it provides a denser market for specialized skills, and greater opportunity for the development of specialized inputs and services, i.e., forward and backward linkages. Agglomeration may arise among firms belonging to the same industry or between firms belonging to different industries (Fujita et al., 1999). In the first case each region may be specialized in a particular sector of the economic activity, while in the second case we can observe a spatial concentration of the economic activity only in specific regions.

Then we consider social capital, which relates to several basic dimensions of social life (Putnam, 1993 and 2000). Generally speaking, it can be defined as the ensemble of norms and values that are at the basis of inter-personal interactions, institutions that embed them and the social cohesion of a territory. We concentrate on two components of social capital (Van Schaik, 2002): trustworthiness (or generalized morality) and relational capital (or the inverse of interpersonal distance). As said before, in order to obtain a quantitative measure for each region’s endowment of both types of social capital we exploit the EVS database.

Generalized morality is related to the concept of trustworthiness (see Platteau, 2000 and Tabellini, 2010) and characterize societies where rules of good conduct apply to all social situations, making citizens more reluctant to free-ride on others. We measure generalized morality aggregating answers to the following three questions of the EVS:

“According to you, how many of your compatriots do the following?

- Claiming state benefits to which they are not entitled

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\(^5\) The European Values Study (EVS) is a large-scale, cross-sectional, and longitudinal survey research project on basic human values, initiated by the European Values Systems Study Group in the late seventies. The EVS questionnaire was developed to measure basic value orientations in important domains of life such as religion and morality, socioeconomic life, politics, work, leisure time, family, marriage, and sexuality. We focus in particular on results of the 1999/2000 wave of the survey, which included all European countries, except for Norway and Switzerland, Albania and parts of former Yugoslavia.
- Cheating on tax if they have the chance
- Paying cash for services to avoid taxes”

Regional means to the three above mentioned questions are computed and then aggregated in a unique index using a Principal Components Analysis (PCA). The first factor explains 44 per cent of total variance and thus represents a good summary indicator of trustworthiness. Results are mapped in Figure 2 below.

Figure 2. The Social Capital: generalized morality

Generalized morality result higher in north western European regions than in south eastern ones. More specifically, trustworthiness is higher in Scandinavian countries, Benelux, most British and French regions and some regions of Germany. It is lower in most regions of new European member states, Italy and Greece. High generalized morality can lower contractual costs, information costs and transaction costs associated mainly to weak enforcement of legal systems and lack of information about foreign markets and different social institutions. For the same reasons, high generalized morality can also decrease uncertainty and risk associated with MNEs operations abroad. The effect of FDI on growth in an environment where generalized morality is low, however, can be ambiguous: some scholars argue that high corruption can facilitate transactions in countries with excessive regulation, speeding up procedures that would otherwise occur with more difficulty, if at all (see Cuervo-Cazurra, 2006). If this is true, under specific circumstances and where misguided regulation prevent competition, the contribution of foreign investments to local economies might be higher in regions where generalized morality is lower.

Another important informal component of territorial capital is relational capital, i.e. the system of bilateral and multilateral relations built by local economic actors among each others. This capital represent the inverse of interpersonal distance between economic actors in the region and it is very important to reduce
uncertainty in economic relationships and to facilitate the diffusion of information. Following Van Schaik (2002), Capello et al. (2011), and Caragliu and Nijkamp (2012), we measured relational capital as participation in civil society, broadly defined, i.e. clubs and voluntary associations (sport, cultural, communal), religious communities, as well as unpaid voluntary work and social activities with friends and colleagues. Applying the same procedure described above, in this case the PCA allows us to build a single factor explaining relation capital, which explains 49 per cent of the total variance of the underlying elements. Results are mapped in Figure 3 below.

Generally speaking, interpersonal distance is higher in the peripheries than in the continental Europe. In particular, willingness to cooperate seems to be high in some regions of Italy, Greece, Germany, Benelux, United Kingdom and Scandinavian countries, while it is very low in Romania, Bulgaria, Spain, France and most some Italian and Greek regions.

Figure 3. The Social Capital: relational capital

As highlighted by Capello et al. (2011) the variables we consider, by fostering socio-economic interactions and mutual understanding, may magnify the effects of knowledge spillovers and transform knowledge accumulation into productivity and growth. Here our aim is to introduce their framework in the context of possible technological spillovers between multinational firms and regional economic environment. We would expect, thus, and enhanced effect of FDI on growth in regions where relational capital endowments are higher.

The last component of territorial capital that we consider is more specific to the openness of the region towards external and diverse contributions, both in terms of other regions, of other European countries
and of production factors coming from abroad. In particular it measures the degree of cultural closeness of a region along four dimensions: the concerns with foreigners, the lack of confidence in big companies and the importance of national identity with respect to European identity. Indeed, we build this last index aggregating the answers to the following 4 questions:

- “Do you trust other people in your country? [1=trust completely – 5=not trust at all]”
- “How much confidence do you have in major companies? [1=a great deal – 5=none at all]”
- “Are you concerned with immigrants? [1=none at all – 5=very much]”
- “National Identity_ A Some people say: If the European member states were truly to be united, this would mean the end of their national, historical and cultural identities. Their national economic interests would also be sacrificed. B Others say: Only a truly united Europe can protect its states’ national, historical and cultural identities and their national economic interests from the challenges of the superpowers [1=A – 7=B]”

Following the same procedure described above we collapse answers to these four questions in 1 index that explains 49 per cent of the total variance and we call it Closed Social Capital. Results are presented in Figure 4 below.

**Figure 3. The Closed Social Capital**

Closed Social Capital seems to be particularly high in Austria, Italy, Czech Republic, Latvia some regions of UK, Germany and Spain, while it is quite low in Scandinavian countries, Benelux, France and some Eastern European regions. High Closed Social Capital can prevent the region to take full advantage of possible
spillovers from FDIs because it can isolate foreign multinationals and avoid its integration in the local economy.

All these hard and soft components of territorial capital make identities of EU regions very heterogeneous and suggest the idea that the ability of the regions to take advantage of FDI spillovers might be very different along all these axis territorial capital is measured on.

4. Empirics: methodological issues and implementation

When analyzing the relationship between foreign investments and regional economic growth several methodological issues have to be taken into consideration. First of all, it is not possible to define a priori the direction of causality: do foreign investors identify more dynamic regions as best destinations of their capital flows because they anticipate higher future profits, or does regional growth depend directly on the contribution of foreign investors? The best answer is probably that both mechanisms are acting contemporaneously and reinforce one another. For this reason, simple OLS regressions explaining regional growth in terms of FDI would most likely lead to inconsistent results due to reverse causality bias. This source of endogeneity should be partially mitigated by the regional perspective, given that foreign investors locating in any of the European regions are more likely to be interested in the whole EU market rather than in the local one, which is surely too small for their profit objectives.

Apart from this endogeneity-related aspect, two other issues are relevant in our context. First of all, though growth theory provides well-established suggestions for the estimation of growth relationships (Islam, 2003), it is *ex ante* unclear which functional form is more appropriate for the effects of FDI. Since, as stated by the theory, FDI may affect simultaneously each element of the production function, there may be nonlinearities and interactions which may lead to biased estimates if not accounted for. Secondly, there may be a selection bias. In order to estimate the impact of FDI on regional growth rates properly, we should know the difference between regions’ growth rates with and without FDI. Clearly, we cannot observe both growth rates for the same region at the same time and taking the average growth rate of regions without FDI as an approximation may not be advisable since regions with and without FDI may differ in many aspects, other than the presence of FDI. As discussed above, one of this aspect refers to territorial capital endowments.

These considerations bring us to choose a counterfactual framework. This framework allows to estimate the effect of FDI – the treatment – on economic growth – the outcome – controlling for the presence of several regions’ socio-economic characteristics, which may affect either foreign firms location choice or regional growth patterns – the so called confounding factors. Such approach is particularly useful in the

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6 The existence of a reciprocal relationship between FDI and growth is confirmed by Choe (2003) and Chowdhury and Mavrotas (2006), while Feridun and Sissoko (2006) find that, according to Singapore’s experience, it is growth to determine FDI. An opposite result has been found by Zhang (2003) and partially by Chowdhury and Mavrotas (2006).
context of this paper because it allows us to identify non parametrically the change in the outcome due to
the treatment effect, without imposing a specific functional form to the FDI-growth relation. Moreover, the
treatment effect estimation method can be applied even though the treatment is not randomized, as in our
case, provided that some specific assumptions hold.

In more detail, let \( i = 1, \ldots, N (\equiv N_T + N_U) \) index regions, where \( N_T \) and \( N_U \) are number of treated and
untreated regions, respectively. Also, let \( T_i \) be a binary variable that indicates exposure of region \( i \) to
treatment, so that \( T_i = 1 \) if the \( i \)-th region hosts foreign firms and \( T_i = 0 \) otherwise. Finally, variables \( Y_{1i} \)
and \( Y_{0i} \) identify potential outcomes with and without treatment, respectively. Potential outcomes refer to
gross regional GVA growth rates and, therefore, \( Y_{1i} - Y_{0i} \) is the treatment effect for the \( i \)-th region, i.e. the
impact of FDI on regional growth rates. Depending on the value of \( T_i \), one of the two potential outcomes is
realized and observed.

In order to identify the average effect of the treatment, a comparison of average outcomes between
treated and untreated regions does not work, since this difference may be contaminated by the effects of
other variables that are correlated either with the treatment, \( T_i \), or with the potential outcomes, \( Y_{0i} \) and
\( Y_{1i} \). These confounders may create a correlation between \( T_i \) and the outcomes, which can be eliminated by
randomization. In the absence of the latter, the following assumptions may help in estimated the average
treatment effect provided that all confounders are observed:

1. **Stable Unit Treatment Value.** This assumption requires that the distribution of the outcome of the \( i \)-
th region is independent of the treatment status of the \( j \)-th region, conditional on the vector of
confounders, \( X_i \) (Rubin, 1980; Imai and van Dijk, 2004). This implies, first of all, that no interactions
or general equilibrium effects take place among units; and, secondly, that the outcomes are
independent of the treatment status conditional on \( X_i \), i.e. \( Y_{1i} \perp \!\!\!\perp T_i \mid X_i \) and \( Y_{0i} \perp \!\!\!\perp T_i \mid X_i \). This is often
referred to as Conditional independence assumption.

2. **Common Support:** \( 0 < \Pr(T_i = 1 \mid X_i) < 1 \). This assumption ensures that there is sufficient variation in
the two groups, excluding situations of perfect predictability of the treatment status given \( X_i \), and
ensuring that there exist both treated and untreated regions with the same \( X_i \) (Heckman et al.,
1999).

In the literature, the typical goal is the estimation of the of the average effect on the treated (ATT), which
assume the following form:

\[
ATT = E(Y_{1i} \mid X_i, T_i = 1) - E(Y_{0i} \mid X_i, T_i = 1) = E(Y_{1i} \mid X_i, T_i = 1) - E(Y_{0i} \mid X_i)
\]  \( (1) \)
In our case, $E(Y_{1,i} | T=1)$ is observed and represents the GDP growth rate of region $i$ in presence of FDI, while $E(Y_{0,i} | T=1)$ is the potential GDP growth rate of region $i$ in absence of FDI. It is not observed, but under assumption 1 can be approximated with $E(Y_{0,i} | X_i, T=0)$.

The implementation of this methodology occurs by steps. The necessary ones, are describe in what follows.

1. **Selection process.** The first concerns in the estimation of regions’ propensity to receive the treatment, i.e. FDI of a given type. This propensity has been generated from a selection model (a probit regression) using predictors of the treatment, which suggests that the treatment is determined via selection on observables. All potential confounders have been used in this step. We consider as treated regions those which get an amount of FDI per inhabitant higher than the 6th decile of FDI penetration distribution.

2. **Matching process.** Matching process allows to identify treated and untreated regions which are as similar as possible in all relevant predictors. The main problem in this phase is that matching estimators are not consistent if the match is performed on more than one continuous covariate (Abadie and Imbens, 2006). In order to solve this problem, it is possible to use propensity score techniques (Rosembaum and Rubin, 1983), which summarize all covariates in a scalar function. This approach, however, implies the choice of a specific functional form for the scalar function and no consistent estimator is available for related standard errors (Abadie and Imbens, 2008), which makes inference difficult to discuss. In order to overcome this disadvantage we will use the Abadie and Imbens (2011) bias-adjusted estimator to derive the ATT. This technique combines matching with regression adjustment techniques, using a polynomial function of the covariates to remove large-sample bias.\(^7\)

3. **Estimation of the treatment effect.** We estimate the ATT using a Nearest Single Neighbor Matching, which allows each observation to be used as match more than once. The results of this step are discussed in the next section.

In implementing this methodology on a pooled sample of EU regions, the following set of variables have been used:\(^8\)

- **Treatment**: n. of new foreign firms per million of inhabitants established in each EU27 region (NUTSII level) during the periods 2001-2003 and 2005-07. We used different measures for FDI, from total number of FDI to more disaggregated penetration variables, which distinguish between sectors of economic activity (manufacturing vs. services) and origin of the foreign investors inside or outside Europe;

\(^7\) See Abadie et al. (2004) for a discussion of the STATA implementation of the estimation.

\(^8\) See Appendix 2 for a detailed explanation of each explanatory variable and source of data.

- **Confounders**: This vector includes the number of new foreign firms established in the region in the previous period (2001-2003), the GVA growth rate of the previous period and the initial level of GVA, a proxy for the settlement structure of each region, regional market accessibility, credit access, \(^{10}\) labour cost and the quality of human capital. We also included a dummy that identifies EU12 regions and a set of variables to control for the quality of the institutions: government efficiency, rule of law and control of corruption. Since regions’ attractiveness is not independent of country relative attractiveness (Casi and Resmini, 2010), we interact labour cost, human capital endowment and FDI agglomeration variables with specific country dummies in order to take into account this potential country effect.\(^{11}\)

4. Results

Table 2 below presents the estimates of the average treatment effect on the treated obtained with the above defined matching techniques. The coefficients reported in Table 2 can be interpreted as the FDI growth premium that benefits regions with a high concentration of FDI. The first row refers to the pooled sample of all EU regions, while the second and third rows refer to the sub-sample of Western and Central and Eastern EU regions, respectively. Columns, instead, concern different types of treatments.

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<th>Total FDI</th>
<th>manufacturing</th>
<th>services</th>
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<td>Total sig.</td>
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<td>all regions</td>
<td>0.93 ***</td>
<td>-1.42</td>
<td>0.61 *</td>
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<td>EU15 regions</td>
<td>-6.71 **</td>
<td>-1.4 *</td>
<td>-6.8 **</td>
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<tr>
<td>EU12 regions</td>
<td>3.03 **</td>
<td>-4.78 ***</td>
<td>-1.18 *</td>
</tr>
<tr>
<td>intra-EU FDI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>all regions</td>
<td>1.06 ***</td>
<td>-0.91</td>
<td>1.77 ***</td>
</tr>
<tr>
<td>EU15 regions</td>
<td>-2.39 *</td>
<td>-0.77</td>
<td>-5.99 **</td>
</tr>
<tr>
<td>EU12 regions</td>
<td>-2.69 **</td>
<td>-5.64 ***</td>
<td>-3.24</td>
</tr>
<tr>
<td>extra-EU FDI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>all regions</td>
<td>1.77 ***</td>
<td>-0.35 *</td>
<td>0.86</td>
</tr>
<tr>
<td>EU15 regions</td>
<td>-2.18 ***</td>
<td>-0.64 ***</td>
<td>-4.16 ***</td>
</tr>
<tr>
<td>EU12 regions</td>
<td>0.11</td>
<td>3.7 ***</td>
<td>-2.95 **</td>
</tr>
</tbody>
</table>

\(^9\) The set of confounder variables is the result of a compromise between the need for taking into account all relevant variables in order not to bias results (Rubin and Thomas, 1996) and the importance of parsimony in order to avoid support problem and ensure efficiency (Bryson et al., 2002).

\(^{10}\) Credit access is measured at country level.

\(^{11}\) These variables have been inspired by the literature on FDI determinants. See among many others Barba Navaretti and Venables (2004), Markusen (1995), Helpman (1984), and Bloningen, (2005).
On average, these results confirm that FDI can enhance economic growth at regional level. In particular, we found that both intra and extra-Europe FDI are able to positively affect growth processes, though the effect generated by intra-Europe FDI is weaker than that of the extra-EU FDI. The growth premium, however, arises in presence of FDI in services only, while the impact of FDI in manufacturing on growth, when significant, turns out to be negative, with one notable exception: extra-EU FDI flowing into Central and Eastern European regions. FDI in Western European regions, instead, seem to reduce growth opportunities regardless of either the origin of foreign firms or their sectoral affiliation. As far as Eastern regions are concerned, the general impact of FDI remains positive, but it is difficult to understand the exact source of this extra-growth bonus. Regions may be so different one of each other that the impact of FDI becomes nil.

We use the endowments of different components of territorial capital to identify groups of homogeneous regions. We first consider hard components, i.e. agglomeration forces. As explained above, we model both regional specialization and sectoral concentration. Although preliminary, the results, shown in Table 2, are encouraging and help us in better understanding the FDI-growth nexus.

Table 2. ATT: the role of agglomeration forces

<table>
<thead>
<tr>
<th></th>
<th>total sig.</th>
<th>manufacturing sig.</th>
<th>services sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total FDI</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>all regions</td>
<td>0.93 ***</td>
<td>-1.42</td>
<td>0.61</td>
</tr>
<tr>
<td>rich regions (GDPpc&gt;75%EUmean)</td>
<td>10.37 *</td>
<td>-2.38</td>
<td>-4.05</td>
</tr>
<tr>
<td>poor regions</td>
<td>1.83 **</td>
<td>-2.64 **</td>
<td>2.08 ***</td>
</tr>
<tr>
<td>same specialization</td>
<td>-</td>
<td>1.87 ***</td>
<td>-1.81 ***</td>
</tr>
<tr>
<td>different specialization</td>
<td>-</td>
<td>-2.18</td>
<td>6.29 *</td>
</tr>
<tr>
<td><strong>Intra-EU FDI</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>all regions</td>
<td>1.06 ***</td>
<td>-0.91</td>
<td>1.77 ***</td>
</tr>
<tr>
<td>rich regions (GDPpc&gt;75%EUmean)</td>
<td>4.03 **</td>
<td>33.81 **</td>
<td>-24.9 **</td>
</tr>
<tr>
<td>poor regions</td>
<td>1.35 **</td>
<td>-0.79</td>
<td>1.88 **</td>
</tr>
<tr>
<td>same specialization</td>
<td>-</td>
<td>1.39 ***</td>
<td>-3.04 ***</td>
</tr>
<tr>
<td>different specialization</td>
<td>-</td>
<td>1.02 **</td>
<td>9.77 *</td>
</tr>
<tr>
<td><strong>Extra-EU FDI</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>all regions</td>
<td>1.77 ***</td>
<td>-0.35 *</td>
<td>0.86</td>
</tr>
<tr>
<td>rich regions (GDPpc&gt;75%EUmean)</td>
<td>7.71 **</td>
<td>-1.48 **</td>
<td>10.64 ***</td>
</tr>
<tr>
<td>poor regions</td>
<td>2.61 ***</td>
<td>0.29</td>
<td>2.29 ***</td>
</tr>
<tr>
<td>same specialization</td>
<td>-</td>
<td>-0.02</td>
<td>-0.09</td>
</tr>
<tr>
<td>different specialization</td>
<td>-</td>
<td>-0.06</td>
<td>4.7 *</td>
</tr>
</tbody>
</table>

***, **, * indicate significance at 1, 5 and 10 percent level, respectively. Bootstrap SE.

Agglomeration economies, in fact, seem to differentiate the growth enhancing effect of FDI in several way. First of all, FDI in manufacturing sectors is able to further boost economic growth rates in regions specialized in manufacturing activities, suggesting that intra-sectoral spillovers are more important than
inter-sectoral spillovers for economic growth. The opposite occurs in services sectors, where the FDI-induced growth effect arises because of inter-sectoral spillovers. These effects seem to be driven by intra-EU foreign firms, while extra-EU FDI does not add any additional growth either to specialized or non-specialized regions, with the exception of FDI in services, whose effect on economic growth is however very weak. Secondly, it is worth noticing that, on average, FDI in services is more conducive for growth than FDI in manufacturing, as indicated by the magnitude of the corresponding coefficients. Finally, the impact of FDI on growth in peripheral regions is driven mainly but not exclusively by FDI in manufacturing, while in core regions, where economic activities is more concentrated and diversified, the FDI-growth bonus depends only on the presence of FDI in services.

As far as the soft components of territorial capital are concerned, they act as “absorptive” effect in several circumstances, as it is shown in Table 3.

At aggregate level, two results are worth noticing. First of all, FDI in services seems to be more sensitive to the endowment of territorial capital than FDI in manufacturing: the higher the relational capital and the more open the social capital, the higher is the FDI-induced growth effect. Secondly, FDI in manufacturing hampers economic growth in regions with a low endowment of either relational capital or open social capital.

The role of generalized morality deserves a special consideration. According to our results, the FDI-induced growth effect is positive with low trustworthiness and negative with high generalized morality, a finding that might seem counterintuitive. However, as mentioned above, this result can be linked to the role of corruption in investment decisions (see Cuervo-Cazurra, 2006). Indeed, part of the literature that highlights the possibility that, under specific circumstances and where misguided regulation prevent competition, the contribution of foreign investments to local economies might be higher in regions where corruption allows to overcome bureaucratic inefficiencies, making it easier doing business. Of course corruption should not be encouraged, since it affects negatively the societies in many other relevant aspects which go far beyond the economic impact.

By distinguishing between intra- and extra-EU FDI, we cannot further improve our results. Generally speaking, the results indicate that territorial capital affects more the growth effect of extra-EU FDI rather than the growth effect of intra-EU FDI. Moreover, they confirm on the one hand, the enhancing effect of open social capital on the FDI-induced growth effect and, on the other hand, the ambiguous impact of perceived corruption on the capacity of regions to take advantage of FDI. Results deserve further robustness checks and deeper analysis.
Table 3. ATT. The role of social capital

<table>
<thead>
<tr>
<th></th>
<th>total sig.</th>
<th>manufacturing sig.</th>
<th>services sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total FDI</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>generalized morality</td>
<td></td>
<td></td>
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</tr>
<tr>
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<tr>
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<td>-2.67</td>
<td>7.61 **</td>
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<tr>
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<td>-5.62 ***</td>
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<tr>
<td>high</td>
<td>-1.57</td>
<td>-6.05 ***</td>
<td>-4.77</td>
</tr>
<tr>
<td>low</td>
<td>-0.76</td>
<td>-0.04</td>
<td>2.04 ***</td>
</tr>
<tr>
<td><strong>intra-EU FDI</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>generalized morality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>high</td>
<td>3.49 ***</td>
<td>-4.87 **</td>
<td>-11.16 ***</td>
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<tr>
<td>low</td>
<td>-0.49 *</td>
<td>0.39</td>
<td>-0.36</td>
</tr>
<tr>
<td>relational capital</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>high</td>
<td>-1.47 **</td>
<td>-0.55</td>
<td>0.91 *</td>
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<tr>
<td>low</td>
<td>0.48</td>
<td>1.57 ***</td>
<td>0.56</td>
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<tr>
<td>high</td>
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<td>17.92</td>
</tr>
<tr>
<td>low</td>
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<td>0.38</td>
<td>0.41</td>
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<tr>
<td><strong>extra-EU FDI</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>generalized morality</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>high</td>
<td>-0.5 ***</td>
<td>-7.97 **</td>
<td>-10.87 ***</td>
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<tr>
<td>low</td>
<td>1.93 **</td>
<td>2.26 ***</td>
<td>2.02 ***</td>
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<tr>
<td>relational capital</td>
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<td></td>
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<tr>
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<td>1.45 ***</td>
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<td>0.18</td>
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<tr>
<td>low</td>
<td>1.18 ***</td>
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<td>-0.04</td>
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<td></td>
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<tr>
<td>high</td>
<td>-0.32</td>
<td>-2.51</td>
<td>-6.09 ***</td>
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<tr>
<td>low</td>
<td>1.81 ***</td>
<td>1.09 ***</td>
<td>1.2 **</td>
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</tbody>
</table>

***, **, * indicate significance at 1, 5 and 10 percent level, respectively. Bootstrap SE.

4. Conclusions

The aim of this paper is to evaluate the growth effect of FDI at the regional level, introducing the idea that development patterns can be very heterogeneous depending on the variety of European regional identities. The latter are measured along different axis: both soft and hard elements of territorial capital are taken into consideration. Preliminary results confirm that, generally speaking, FDI can enhance economic growth at the regional level, but they also suggest that this relationship is far from being a deterministic cause-effect link. Indeed, the impact of FDI is constrained by several regions’ socio-economic characteristics, which all together represent their territorial capital, and by the investment characteristics that we proxied by considering intra- and extra-EU FDI as well as manufacturing and services FDI. In particular our findings show that local returns of FDI are boosted by high relational capital and open social capital. Moreover, we found that the growth enhancing effect of FDI is stronger in the services sectors than in manufacturing.
References


Barca F., “AN AGENDA FOR A REFORMED COHESION POLICY. A place-based approach to meeting European Union challenges and expectations.”, Independent Report prepared at the request of Danuta Hübner, Commissioner for Regional Policy, 2009


Appendix 1: Representativeness of the sample

This paper exploits a new database, FDIRegio, which has been built up starting from Amadeus database. It consists of company accounts reported to national statistical offices concerning 11 million public and private companies in 41 European countries. For each company Amadeus provides the year of incorporation, the country/region and the ownership structure by nationality. The data also include the region where the firms were founded, as well as the sector of activity. Firms newly created during the 2005-07 period whose percentage of assets owned by non-residents was at least 10% have been considered as foreign. Then they were aggregated in each European NUTS2 region by sector and by origin within or outside Europe. The overall sample includes 264 NUTS2 regions and 25 NACE1 manufacturing and service sectors. A limitation of these data for studying the geographical patterns of foreign firms is that they include either plant or firms level information. This can potentially bias the location of FDI in favour of regions and/or countries where headquarters tend to locate. An advantage of this approach is instead represented by the fact that the regional distribution of foreign firms is directly observed and not indirectly derived from a "regionalization of national data. This top-down approach, in fact, is based on the simplifying assumption that the sensitivity of foreign firms to employment data—or whatever it is used to regionalize patterns of FDI—is constant across foreign firms, regardless the internationalization strategy they pursue (efficiency, market and resource seeking FDI), the country of origin and the role foreign affiliates can play within the group (productive vs. research units).

In order to have an idea of the degree of inclusiveness of the dataset, we compared official (UNCTAD) data on inward FDI flows at country level with the total number of foreign firms extracted from Amadeus following the criteria described above. Figure A1 shows the results. It is worth noticing that the correlation between the two measures of FDI flows is quite high. Thus, by considering number of foreign firms instead of values of FDI we do not introduce any significant distortion in the patterns of FDI, though foreign investments in some destination countries have a relative importance that is different in terms of number of firms with respect to the value of FDI inflows.

Table A1. Official inflows of FDI (millions of USD) vs. newly established foreign firms (2005-07)

![Graph showing inflows of FDI and number of foreign firms](image)

Pearson correlation coefficient: 0.626; p-value>0.000.
### Appendix 2. Definition of variables and respective sources

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>DESCRIPTION</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour Cost</td>
<td>Average annual labour cost: salaries and wages in 2000 and 2004 (excluding apprentices and trainees). Data source: Eurostat</td>
<td></td>
</tr>
<tr>
<td>Market Accessibility</td>
<td>Weighted average of GDP of all European regions j other than i. The weights are the reciprocal of the time distances between the respective capitals. Reference year: 2004. Data source: Eurostat and DGRegio</td>
<td></td>
</tr>
<tr>
<td>Professionals and Scientists</td>
<td>ISCO-88/2 employment share on total regional employment (three-year average) Reference years: 1999-2001 and 2002-2004. Data provided by DGRegio</td>
<td></td>
</tr>
<tr>
<td>Credit Access</td>
<td>Dummy variable that equals one if credit access is above European average. Credit access is proxied by loans to non financial corporations as a % of GDP and it is measured at national level. Reference years: 2001-2003 and 2005-2007. Source: ECB, Eurostat.</td>
<td></td>
</tr>
<tr>
<td>Mega</td>
<td>Dummy that equals 1 if the region host a mega-city. Source: own calculation.</td>
<td></td>
</tr>
<tr>
<td>Eu12</td>
<td>Dummy variable that equals 1 if the region belongs to member states belonging to the EU since the 2004 enlargement.</td>
<td></td>
</tr>
</tbody>
</table>