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Innovation Drivers, Value Chains and the Geography of Multinational Firms in European Regions

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Abstract

This paper investigates the geography of multinational corporations' investments in the EU regions. The 'traditional' sources of location advantages (i.e. agglomeration economies, market access and labour market conditions) are considered together with innovation and socio-institutional drivers of investments, captured by means of regional "social filter" conditions. The introduction of a wider set of attraction factors makes is possible to empirically assess the different role played by such advantages in the location decision of investments at different stages of the value chain and disentangle the differential role of national vs. local and regional factors. The empirical analysis covers the EU-25 regions and suggests that regional-socio economic conditions are crucially important for an understanding of the location investment decisions in the most sophisticated knowledge-intensive stages of the value chain.

JEL Classification: F21, F23, O33, R12, R58
Keywords: Innovation, Multinationals, Systems of Innovation, Value Chains, Regions, European Union

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Table of Contents

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1. Introduction

In 2010 both at home and abroad, multinational corporations (MNCs) generated value added for approximately US$16 trillion, accounting for more than a quarter of world GDP (UNCTAD, 2011). Thus, it is hard to overstate the central and growing role that these companies play in the global, national and regional economies.

In virtually all countries policy makers make use of a variety of incentives and supporting schemes to attract foreign direct investments (FDI), considered sources of high-value employment, know-how and innovation capabilities (Mudambi and Mudambi, 2005; McCann and Mudambi, 2004). However, a wide body of empirical literature casts doubts on the positive contribution of MNCs towards their host economies: there is always the risk of a 'branch plant' syndrome whereby subsidiaries not embedded in the host economy develop limited local linkages and pursue subordinated manufacturing functions (Phelps et al., 2003; Phelps and Waley, 2004). In addition, the benefits of FDI and international technology transfer for the development of the host economies "…can only be delivered with parallel indigenous innovation efforts and the presence of modern institutional and governance structures and conducive innovation systems." (Fu et al., 2011: 1210).

If the synergies between host economies and foreign investments are crucially important for both MNCs and local actors, the literature has recently

suggested that different types of functions delocalised by MNCs intrinsically involve different degrees of local embeddedness and linkages (Jordaan, 2009). The delocalisation of progressively more complex functions has dramatically changed the attention that MNCs are paying to the characteristics of host economies. While in the 1990s MNCs would principally relocate outside their home countries the less knowledge-intensive activities (Dunning, 1996), this pattern has changed significantly in recent years. For instance, MNCs have moved away from single, self-contained in-house R&D centres in favour of more geographically dispersed and horizontally organized architectures of innovation activities: R&D units in foreign subsidiaries have progressively increased their competences also including high value research (Massini and Miozzo, 2010; OECD 2011; Schmitz and Strambach, 2009).

In this rapidly changing scenario, the analysis of the location determinants of MNCs investments should be broadened to take into account, on the one hand, a wider set of attraction factors and, on the other, the changing role of these factors in the location decision of investments at different stages of the value chain. For example, lower labour costs may attract manufacturing plants but not more sophisticated activities (such as R&D) that might be more responsive to 'soft' socio-institutional factors. Consequently, the preferences of MNCs for the location of their foreign activities are increasingly likely to vary according to the specific function that is being re-located outside their home countries.

The empirical literature has recently devoted substantial efforts in this direction and in fact there are a few quantitative analyses aimed at shedding light on how the various drivers traditionally identified in the literature – namely agglomeration economies, market access and labour market conditions - influence the location of the different functions composing MNC value chains (Alegria, 2007; Basile et al., 2008; Canals and Noguer, 2008;

Defever, 2006 and 2010). Nevertheless, these analyses focus on a narrow set of functions and location drivers, largely overlooking the emerging importance of knowledge and innovation factors. The role of 'soft' factors related to the innovation capacities of the host regions, as drivers of the MNCs location decisions have instead become the focus of qualitative in-depth case studies, though failing to ensure the same degree of generality achieved by more formal quantitative research (Cantwell and Iammarino, 2003).

This paper aims to fill this gap with a quantitative empirical analysis of the location determinants of different value chain functions, taking into account not only 'traditional' location advantage factors but also the existence of localised knowledge, innovation dynamics and well functioning systems of innovation (Crescenzi and Rodriguez-Pose, 2011; Pietrobelli and Rabellotti, 2011). The model of empirical analysis looks at the location determinants of 19,444 investment projects in the EU-25 regions over the 2003-2008 period. The disaggregation in different value chain stages relies upon the classification of business functions proposed by Sturgeon (2008), taking into account that different activities required to bring a product from conception, through production, to delivery to final consumers are not only characterized by different levels of value added but also by diverse relationships among the various actors involved, as well as by heterogeneous characteristics in terms of labour, technology, knowledge, capability and infrastructure requirements (Gereffi et al, 2005). In view of that, each investment project is classified according to a taxonomy in five value chain stages, assessing the relevance of different drivers for each type of investment. With regard to the socio-institutional drivers of investments location, these are captured by means of a regional "social filter", a composite indicator acting as a proxy for a set of economic, social, political and institutional features that make some regions "prone" and others "averse" to innovation and, as a consequence, more

attractive for foreign investments by MNCs (Crescenzi et al. 2007; Rodriguez-Pose and Crescenzi, 2008).

With a Nested Logit (NL) framework the decisions of MNCs to invest in different locations at different stages of their value chains are modelled upon the interaction between firm-specific and location-specific conditions, after controlling for traditional location factors. In particular, the empirical approach singles out the role of local innovative dynamism and systems of innovation conditions as drivers of new investments at different stages of the value chain. In addition, the analysis aims to shed light on the differential role of national and regional characteristics in driving MNCs location decisions. By testing the nested structure of the location decision processes, the model also tests for the importance of the national vs. regional economic and innovation characteristics.

The results provide strong support for the importance of 'soft' factors as also for the differentiation in terms of value chain stages for the analysis of the location decisions of multinational corporations. When considering the organization of the value chain, the national and the regional levels play different roles depending on the stage of the investment. Thus, the regional-level driving factors are stronger for manufacturing and R&D and lower for the location of headquarters and commercial functions.

The paper is organised as follows. In the next section, the relevant background literature is reviewed and the importance of socio-institutional drivers and value chains discussed with reference to the location decisions of MNCs. Section 3 introduces the model and the variables included in the empirical analysis. The database and some descriptive statistics are presented in Section 4. Section 5 discusses the empirical findings. Section 6 concludes with some policy implications.

2. The drivers of MNC investments

2.1 Traditional drivers

According to the Ownership-Location-Internationalisation (OLI) framework developed by Dunning (1977), the decision of a firm to undertake foreign activities and become a MNC is the result of the interaction of three different sets of advantages: firm-specific advantages stemming from resources owned (or controlled) by the firm (Ownership), the abatement of transaction costs associated with market interactions across countries (Internationalisation) and the availability of resources, networks and institutional structures in the host country (Location).

Following this analytical framework, very influential in the International Business (IB) literature, MNC location decisions are largely based upon the hierarchical ordering of their activities: headquarters and strategic activities tend to take place at home whereas mature, standardised and routine functions are relocated abroad. As stressed by McCann and Mudambi (2005), in this perspective the (increasing) importance of geographical sub-national factors (i.e. agglomeration processes, urbanisation, diversification/ specialisation patterns) is not taken into consideration and the regional (or sub-regional) locations within individual countries are almost completely overlooked.

With the dramatic expansion in the field of economic geography, the locational analysis of MNCs has become increasingly important for many scholars in the IB literature (Mucchieli and Mayer, 2004), as well as for regional economists and economic geographers (Head et al., 1995; Phelps, 1997).

In the regional economics literature the spatial perspective has become the centre of the analysis, although, the conceptualisation of MNCs' strategies

remains necessarily more stylised than in the IB literature. Head et al. (1995) opened up the way to a number of empirical analyses aimed at understanding the location determinants of MNCs. With an econometric model they test if industry-level agglomeration is a key driver of the location decisions of Japanese manufacturing investments in the US. Their results highlight the cumulative nature of location decisions of MNCs: previous investments in the same sector and/or from the same country of origin increase the probability of similar investments in the same area. This process of concentration is explained by inter-firm technological spillovers, the existence of a specialised labour market and the availability of intermediate inputs that are highly valued sources of competitive advantages according to (foreign) investors.

As predicted by the New Economic Geography, the agglomeration of firms also generates increased competition therefore favouring dispersion. Nevertheless, most of the empirical studies on the location choices by foreign investors support the dominance of agglomeration over dispersion forces. At the national level, Devereux and Griffith (1998) establish this conclusion while at a subnational level, Head et al. (1995, 1999), Guimarães et al. (2000), and Crozet et al. (2004) find the same result. Finally, Mayer and Mucchielli (1999) observe the same phenomenon for location decisions of Japanese firms in Europe at both a national and regional level.

Demand concentration is also a factor of attraction for MNCs: foreign firms tend not only to replicate the same location decisions of similar firms but also to be concentrated where local demand is higher, as shown by the analysis of the location decision of Japanese firms in the European regions (Head and Mayer 2004).

Labour market conditions are comprised among the determinants of MNC locational choices through the inclusion of wage levels and unemployment in empirical estimations. The evidence is somewhat inconclusive. Some studies

find a positive correlation between labour costs and FDI, as in Head et al. (1999) on Japanese investments in the US and in Guimarães et al. (2000) on Portugal, while others find no significant relationship (Woodward, 1992; Head and Mayer, 2004). In fact, wages may also reflect the availability of skilled workers and therefore higher wages may encourage the location of MNCs in higher value added functions. As concerns unemployment, this also has either a positive or a negative influence on the location choices of MNCs: a high unemployment rate may signal the existence of a large available workforce but also the lack of suitable workers and/or the existence of labour rigidities.

These analyses of MNCs location decisions, focusing on agglomeration, market potential and labour market conditions, have been enhanced by some contributions with a regional focus. Crozet et al. (2004), among others, in investigating the determinants of French MNCs find that market size, agglomeration forces and labour costs play a significant role, while investment incentives and European Commission structural funds have little impact. Instead in Basile et al. (2008), structural funds and cohesion policy play a significant role in attracting MNCs towards EU peripheral regions. Moreover, their analysis confirms the role of agglomeration economies as a major determinant of MNCs' location decisions for all investors.

Another recent stream of the literature extends the analysis on the determinants of MNC location by taking into account the increasing fragmentation of value chains. The location decision in MNCs is no longer confined to production plants but also increasingly involves service functions, extending from technology sourcing and R&D, to distribution and marketing. One of the first studies to econometrically test the determinants of the location of different stages of the firm's value chain, Defever (2006), introduced a distinction between two forms of agglomeration: the sectoral agglomeration

of activities belonging to the same sector and the functional agglomeration of activities belonging to the same function but not to the same sector. In his empirical analysis of non-European MNCs in EU countries, the author finds that functional aspects have more influence upon the location of service activities than sectoral aspects, thus corroborating a model developed by Duranton and Puga (2005) in an urban economics framework. Moreover, Defever concludes that firms locate different stages of their value chain near to each other in order to save on coordination costs and benefit from complementarities. Related activities concentrate in the same country and this is the case of R&D activities and production plants, which tend to co-locate. In a more recent work, Defever (2010) undertakes an econometric test of firms' location decisions of different activities at the regional level and finds that they are largely dependant on the geography of prior investments because firms tend to reinvest in the same region as before. However, nearby production plants are only important for the location of new production plants. For service activities, the physical distance to other functions, including production plants, does not seem to play any significant role.

A regional level analysis - at the level of NUTS3 areas - for the UK is presented in Alegria (2007), who studies the determinants of MNCs location choices and finds that functional agglomeration is a relevant factor in explaining the location decisions of foreign investments. Moreover the relevance and significance of the same location determinants vary depending on the characteristics of the investment, as suggested by Jordaan (2008) by looking at the case of Mexico.

Another analysis considering location determinants of the different functions composing the MNC value chain is presented in Basile et al., (2008), who test a negative binomial additive model to analyse FDIs in NUTS2 European regions and highlight a 'spatial multiplier effect' in manufacturing FDIs. They

find that investments in production plants are attracted to a region not only by its market size but also by the market potential of all other regions, which decreases with distance. On the contrary, FDIs in business activities services are exclusively affected by the market conditions of the regions where they are located.

In this paper, we contribute towards this expanding stream of literature with an empirical analysis of the regional and national location determinants of MNCs in the European Union, by including socio-institutional factors among the drivers of MNCs' investments and by introducing a functional disaggregation derived from value chain analysis.

2.2. The location of different value chain stages and the differentiated importance of local socio-institutional factors

The idea of the value chain captures a sequence of related and dependent activities that are needed to bring a product or a service from conception, through the different phases of production, and delivery to final consumers and after-sales services, and finally to disposal or recycling. Thus, value chains are complex entities where manufacturing is only one of several value-added links in the chain (Gereffi, 1999). The focus of value chain analysis is on the value added at each link and on the ongoing relationships between the various actors involved in the chain. The MNCs represent one of the different possible patterns of governance envisaged in value-chain literature: the case of the integration of the different stages within the boundaries of one firm.

The various stages of a value chain differ in relation to the multiple factors involved, such as: - the complexity of information and knowledge transfer required to undertake specific activities; the extent to which information and knowledge can be codified, and the requirements and skills in terms of local

capabilities (Gereffi et al., 2005). From the MNC's point of view the key question is what activities and capabilities should be kept at the headquarters and where the other activities should be relocated taking due account of the differences represented by the foregoing factors.

A quantitative analysis of the determinants of MNCs' location choices for investments at different stages of their value chain requires a classification of the business functions of the subsidiaries in relation to their position in the value chain. The classification proposed by Sturgeon (2008), based on a list of value chain stages and their definitions (adapted from a similar list developed for the Mass Layoff Survey conducted by the US Bureau of Labor Statistics) offers a parsimonious yet comprehensive list of generic functions that all business establishments must either do, or have done elsewhere. Given that these functions are generic, they can be applied to any workplace or firm, whether or not their main output is a physical good or a service. The stages identified differentiate between core stages, which include the five functions of strategic management, product development, marketing and sales, operations, procurement, logistics and distribution, on the one hand, and support stages, which include corporate governance, human resource management, technology and process development, firms infrastructure, customer and after-sale service, on the other. The classification developed by Sturgeon is flexible enough to be applied to MNC activities located across industries and countries. In Section 4, we explain in detail how Sturgeon's classification can be practically applied to reclassify the investment activities provided by the fDi Markets database.

The different characteristics of the value chain stages influence the location decision of MNCs' investments in a specific country or region. It can be expected that the 'traditional' location drivers identified by the existing literature will play a very different role in different value chain stages. For

example, investments in the manufacturing stage may be attracted by the availability of low-paid unskilled labour, while investments in the R&D stage require highly qualified people.

Conversely, "soft" location drivers - such as the characteristics of the innovation system, which are rarely taken into account in most empirical quantitative analyses so far – can be expected to play a major role in the location of more sophisticated functions such as R&D, headquarters or business services (Alcacer and Chung 2007; OECD 2011). The operational translation of the concepts of national and regional systems of innovation, all potentially relevant for MNC location decisions, is a difficult task and the related empirical analyses have been fundamentally qualitative because the territorially embedded networks, the social economic structures and the institutions are intrinsically unique and thus hard to compare across different systems (Cantwell and Iammarino, 2003).

However, if these concepts have to be assessed as drivers for MNC location decisions, their operationalisation needs to be relatively homogenous across territories, in the same way as MNCs compare the features of various alternative locations. This process is significantly constrained by data availability: in particular when looking at large cross-sections of countries (such as the EU25) or/and at sub national units (such as EU NUTS2 regions) comparable statistical information for a sufficiently long time-span is hard to come by. As a consequence, in a cross-country and cross-regional comparative perspective the differences between the various (national and regional) systems of innovation and their performance are captured by means of the so-called 'social filter', translated into a set of quantitative indicators (Crescenzi et al., 2007).

For this purpose, our analysis considers the set of conditions that render some courses of actions easier than others (Morgan, 2004), making innovation prone

interactions and institutions more likely in certain localities than in others. Regions show differentiated capabilities to translate indigenous innovative activity into innovation and economic growth depending on there being different "social filters": the interaction of a complex set of economic, social, political and institutional features that makes some regions prone and others averse to innovation (Crescenzi and Rodriguez-Pose, 2009). In other words, through the 'social filter' concept we aim at capturing and including in the empirical analysis of MNCs location choices, the combination "of innovative and conservative components, that is, elements that favour or deter the development of successful regional innovation systems" (Rodríguez-Pose, 1999: 82) in every space. This set of structural conditions proxy the socio-economic pre-conditions for the development of a successful system of innovation. The empirical definition of the features that make a region prone to innovation is very complex due to the inherently dynamic nature of the innovation system concept. However, a growing body of empirical literature has shown that the structural pre-conditions proxied by the 'social filter' do act as key predictors of regional innovative performance (Crescenzi et al. 2007, Rodriguez-Pose and Crescenzi 2008). The regions where the optimal combination of the social filter components is in place show not only a remarkably higher potential to translate their innovative efforts (as proxied by R&D expenditure) into new knowledge but also a better absorptive capacity of knowledge spillovers. Social filter conditions - as proxies for the system of innovation conditions – are therefore likely to be fundamental sources of locational advantages for MNC, attracting their investments, and they are therefore incorporated in the following empirical analysis.

3. The empirical strategy

3.1. The model

In most empirical literature on the location decisions of multinational corporations the choice between multiple location alternatives is modelled by means of Conditional Logit Models (CLM). However, the CLM crucially relies on the assumption of Independence of Irrelevant Alternatives (IIA), i.e. adding another alternative or changing the characteristics of one of the alternatives does not affect the relative odds for any other two alternatives (Cameron and Trivedi, 1998 & 2005). This assumption is clearly unrealistic when dealing with the location choice of MNCs among different regions, given that country level characteristics may also play an important role in this process, making the regions belonging to one specific country intrinsically more 'appealing' than those located in another country. Therefore, the Nested Logit Model (NLM) (McFadden 1984), which relaxes the IIA assumption and adopts a hierarchical structure, specifies a more realistic analytical framework for the location decision of MNCs.

In the NLM, the homoschedasticity assumption of the CLM is relaxed by grouping the alternatives (in this paper the EU NUTS1/2 regions) into subgroups (their respective countries), therefore allowing the variance to differ across groups while maintaining the IIA within the groups (Green 2003). In other words, the choice process can be conceived as involving two simultaneous decisions: choosing a country i among I (1…,i,…ni) – i.e. the set of possible countries - and selecting a specific region J (1…,j,…ni) in the chosen i country. Although simultaneous, these decisions are based on a heterogeneous set of characteristics: given their dissimilar national characteristics (from tax systems to institutional conditions) regions in different countries cannot be considered – ceteris paribus in terms of their local conditions –perfect substitutes.

An investment located in region j belonging to country i yields a profit:

$$\pi_{ij} = V_{ij} + \varepsilon_{ij} \quad [1]$$

Where V_{ij} is a function of the observable characteristics of location J:

$$V_{ij} = \beta X_{ij} + \gamma Y_i \quad [2]$$

Some location characteristics vary across both countries and regions (X_{ij}), while other characteristics only vary across countries (Y_i). β and γ are the coefficients to be estimated and εij is the unobservable component of the location advantage of region j.

From this expression for the potential profitability of each location, McFadden (1984) shows that if the distribution of εit is given by a multivariate extreme value with parameter σ, then the probability of choosing region j is:

$$P_{ij} = P_{j/i} P_i \quad [3]$$

Where P_i is the probability of choosing country i depending on the characteristics of the country and on those of all its regions:

$$P_i = \frac{e^{\gamma Y_i + \sigma_i I_i}}{\sum_{m=1}^{l} e^{\gamma Y_m + \sigma_m I_m}} \quad [4]$$

with $I_i = \ln(\sum_{ki} e^{\beta x_{ik}})$ which is the 'inclusive value' for country i (i.e. the maximum utility expected from choosing country i depending on the characteristics of all its regions).

While $P_{j/i}$ is the probability of choosing region j conditioned by the choice of country i. This depends on the characteristics of the n_i regions belonging to country i:

$$P_{j/i} = \frac{e^{\beta X_{ij}}}{\sum_{k=1}^{n_i} e^{\beta X_{ik}}} \qquad [5]$$

As a result from [3],[4] and [5]:

$$P_{ij} = P_{j/i} P_i = \frac{e^{\beta X_{ij}}}{e^{I_i}} \left(\frac{e^{\gamma Y_i + \sigma_i I_i}}{\sum_{m=1}^{l} e^{\gamma Y_m + \sigma_m I_m}} \right) \qquad [6]$$

The coefficient of the inclusive value σ measures the strength of the nested structure of the location process of the investments. When σ=1 the NLM collapses into a CLM (i.e. regions are all equivalent options for MNCs, irrespective of the country they belong to, suggesting complete independence in the location decisions with no nested structure). If instead, σ=0 the upper nest (the country level decision) is the only relevant decision in the location choice, as all regions within the destination country are all perfect substitutes. As a consequence, by testing the nested structure of the investment decision we are able to shed light on the relative importance of national vs. regional conditions for MNCs choices.

The model of empirical analysis is specified in Equation [6] and expresses the probability of a certain region being chosen as a destination of a foreign investment (dependent variable) as a function of a set of regional characteristics (that remain the same for all investments: such as the regional unemployment rate) and region-investment specific characteristics (i.e. regional characteristics that vary with the specific investment under analysis, such as the number of regional investments in the same sector as the new investment). All country-level observable and unobservable characteristics (from corporate tax policies to business climate and institutional conditions[1])

[1] Quantitative information on all these potentially relevant dimensions is not available at the regional level. In addition, within the European Union, the degree of national level heterogeneity

are controlled for by the national 'nested' structure of the model. Conversely, the regional 'drivers' for MNCs' investments (explanatory variables) are explicitly 'modelled' and are described in details in the next section.

3.2. Explanatory variables

The explanatory variables included in the econometric model belong to the following categories (Table A.1 in the Appendix provides detailed information about variable definitions and data sources):

a) *Market size and labour market indicators*. A first set of explanatory variables makes reference to the 'standard' proxies for market size and labour market conditions that are customary in the literature on the location decisions of MNCs, as seen in Section 2.1. The existing literature points out that location decisions are very sensitive to market size, as proxied by local *GDP* (Head and Mayer 2004; Py and Hatem 2009) and 'favourable' labour market conditions in terms of the excess of labour supply over demand (or 'degree of saturation of labour market'), as proxied by local *unemployment rate* (Py and Hatem 2009). Unfortunately, due to data availability constraints, the regional-level focus of the present empirical analysis precludes direct a control on the 'labour costs/wages' differential across regions, although in EU countries a large part of these differences is accounted for by the 'national' fixed effect included in our specification. [2] Besides, to control for the quality of the local supply of labour, we introduce a proxy for *human capital accumulation* (% of people with tertiary education attainment).

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that can be captured with quantitative indicators remains very limited. Qualitative differences in terms of national-level attractiveness are prevalent and better captured when explicitly treated – as in this paper – as unobservable factors common to all the regions belonging to the same country (conceptually equivalent to 'country' fixed effects in location choices).

[2] Similarly, in the European Union social charges and corporate tax rates tend to be regulated by central governments, thus in our empirical analysis also being captured by country-level fixed effects.

b) Regional Agglomeration of Foreign Investments. In order to capture the impact of the agglomeration of foreign investments in the regional economy and their different nature, the final specification of the model includes (in line with Mariotti and Piscitello 1995; Guimaraes et al. 2000; Head and Mayer 2004) a number of proxies aimed at catching the tendency of foreign investments to 'cluster' in a limited set of locations. The impact of pre-existing investments on the location of MNCs is captured by means of the *total number of pre-existing foreign investments in the region*. However, substantial qualitative and quantitative evidence suggests that the location choices of MNCs tend to be influenced by specific characteristics of pre-existing investments. In particular, given the objectives of this paper, the model aims at disentangling the 'attractiveness' of the total number of pre-existing investments (a proxy for the 'general' attractiveness of the area to MNCs) from the impact of those in the same sector as the new investment (captured by the *number of investments in the same sector of activity as the new investment'* and/or at the same stage of the value chain (*number of investments at the same VC stage*). These characteristics are associated with the region-investment pair and are complemented by additional proxies following the same logic and aimed at better disentangling the sectoral from the VC stage agglomeration effects (*number of regional investments in the same VC stage BUT in a different sector* and *number of regional investment in the same SECTOR but at a different VC stage*).

c) *Indicators of innovation*. This paper is aimed at capturing the impact of location drivers that have a direct impact upon the spatial organisation of different value chain stages after controlling for the factors driving the 'general' location behaviour of MNCs. As a consequence the model includes two proxies for the innovative dynamism of the local economy (*R&D investments as a share of regional GDP* and *Patent Intensity*) aimed at capturing the extent to which MNCs can benefit from localised knowledge spillovers from indigenous firms (Mariotti et al. 2010; McCann and Mudambi 2005).

These proxies are particularly important in order to test for the potentially differentiated responsiveness of VC stages to local conditions: do the innovative activities of local firms attract external investments on top of 'traditional' industrial agglomeration forces? Is this effect homogeneous across value chain stages or is this relevant only for the most sophisticated functions? And more importantly: are more sophisticated investments attracted by an innovative local context or do MNCs tend to avoid co-location with knowledge-generation activities of potential rivals (Cantwell and Santagelo 1999).

d) *Socio-Economic Conditions: the Social Filter index and its components*. As discussed in the previous section, local innovative dynamism can exert a potentially ambiguous effect on the location decisions of MNCs, depending on the extent to which foreign subsidiaries are embedded in local systems of innovation (Cantwell and Iammarino 2003). This additional set of explanatory variables is aimed at testing whether favourable systemic conditions (irrespective of the magnitude of local innovative dynamism) can play a more direct role in the location of the most 'sophisticated' stages of the value chain by shaping the receptiveness of the local environment. Our empirical analysis relies on the 'Social Filter Index' (Crescenzi et al. 2007; Crescenzi and Rodríguez-Pose 2011), which is an indicator based on a number of characteristics of the local economy selected as proxies for the 'structural pre-conditions', to establish fully functional systems of innovation (Rodríguez-Pose and Crescenzi 2008), although constrained by the limited availability of regional data. The Social Filter Index approach focuses on three main aspects of the social structure: educational achievement (Lundvall 1992; Malecki 1997); the productive employment of human resources (Gordon 2001) and the demographic structure and dynamism (Rodríguez-Pose 1999). Structural variables for each dimension (Table A-1) are combined by means of Principal Component Analysis (PCA), on the basis of the scores presented in Table A-

2.1 in Appendix. The use of the 'Social Filter Index' makes it possible to capture the simultaneous combination of such factors in a parsimonious fashion for regional 'profiling', identifying broad regularities in 'innovation-prone' regions across a large number of alternative possible locations for MNCs' investments (Crescenzi and Rodríguez-Pose 2009).

4. Data on MNCs' investments

Data on FDI come from *fDi Markets*, an online database maintained by *fDi Intelligence*, a specialist division of the Financial Times, which monitors cross border greenfield investments covering all sectors and countries worldwide since 2003. Each entry is a project, i.e. the investment has not been completed yet, but the database is carefully updated each year in order to check whether projects have been 'completed' or not, and, if not, they are deleted from the database. In the period 2003-2008, the database included around 72,000 worldwide projects creating new jobs and investments with no minimum investment amount required. Our empirical analysis is based on the 19,444 projects undertaken by MNCs from the entire world into the EU25 countries.

The accuracy and robustness of the information reported in *fDi Markets* has been checked using different methodologies. The flows of investments reported in this database have been compared with UNCTAD information on FDI flows at the country level, showing a correlation of 54% over the time-span considered in the analysis. In addition, in order to test the robustness of the distribution of new investments across regions, the information reported in *fDi Markets* has been compared with data on new investments reported by the *Euromonitor* database, which provides information about FDI in Europe. The comparison between the two independently collected and organised databases shows a 75% correlation in the number of investments reported at

the NUTS2 level and this correlation is robust enough for the inclusion of year dummy variables and regional fixed effects. These crosschecks, based on the different independent data sources, confirm the reliability of the *fDi Markets* database on the spatial distribution of FDI.

Table 1 presents the distribution of the investment projects by country of destination showing that the top four countries in Europe are the UK, France, Germany and Spain followed by some Eastern European countries, which recently joined the EU: Poland, Hungary and Czech Republic. For each project, the database contains detailed information on the investor (name and state/country of origin), the destination area (country, state and city), and other relevant information such as the value of the investment, the year and the number of jobs created. Additionally, information is available on the sector and on the main activity undertaken.

Exploiting the information available about the destination area of each investment, the dataset has been geocoded with three different geolocators: the ESRI ArcGis embedded geolocator tool (based on a world gazetteer sourced by CIESIN), the Yahoo! geocoder and the Google geocoder. On the basis of the coordinates obtained, each investment has been allocated to a European NUTS region by spatially matching (a spatial join tool in ESRI ArcGis) the geographical point originating from the geocoding process with the shape file of NUTS2 regions provided by Eurostat-GISCO. The interest of the paper lies in the spatial units that can better 'self-contain' the functional interactions between MNC subsidiaries and the 'local' economy. Still subject to the constraint of data availability, the administrative/politically relevant units have been selected. The empirical analysis is based on NUTS2 regions for Austria, Czech Republic, Finland, France, Greece, Hungary, Italy, Netherlands, Portugal, Slovakia and Spain and on NUTS1 regions for UK, Belgium and Germany in order to maximise the homogeneity of the spatial

units of analysis and capture the relevant administrative units in each country. Therefore, the dependent variable is the number of inward projects of investment in the region *j* belonging to the country *i* in the year *t*, as a proxy for foreign direct investment flows.

Moreover, according to the value chain classification proposed by Sturgeon (2008) and discussed in Section 2.2, all the projects included in the database have been reclassified in the following 5 stages: Headquarters (HQ), Innovative Activities (INNO), Commercial Activities (SALES), Manufacturing Activities (MAN), Logistic and Distribution (LOG&DIST). Table 2 presents a detailed description of the classification used in the paper and Table 3 reports the frequency of the 5 categories in which the investments have been classified. In the empirical analysis disaggregated by VC stages, the dependent variable is the number of inward projects of investment in each of the 5 stages in the region *j* belonging to the country *i* in the year *t*.

Table 1: Number of investments in the EU25 by countries of destination

Country of Destination	Number of new investments	% of total
UK	3312	15.06
France	2459	11.18
Germany	1887	8.58
Spain	1492	6.78
Poland	1358	6.17
Hungary	1250	5.68
Czech Re	915	4.16
Ireland	880	4.00
Italy	766	3.48
Belgium	750	3.41
Netherlands	633	2.88
Sweden	623	2.83
Slovakia	582	2.65
Austria	480	2.18
Latvia	346	1.57
Denmark	344	1.56
Lithuania	293	1.33
Portugal	275	1.25
Estonia	261	1.19
Greece	172	0.78
Slovenia	136	0.62
Finland	102	0.46
Luxembourg	59	0.27
Cyprus	56	0.25
Malta	13	0.06
Total EU-25	***19444***	***88.39***
Romania	1647	7.49
Bulgaria	906	4.12
Total EU-27	**21997**	**100.00**

Source: Authors' elaboration on fDi Markets data, 2003-2008

Table 2: Definitions of the value chain stages

Sturgeon (2008)		*fDi Markets* classification	Classification adopted in the paper
Classification	**Description**		
Core GVC stages			
Headquarters	Strategic activities	Headquarters	**HQ**
R&D	Activities associated with bringing a new product or service to market, including research, design and engineering.	R&D; Design, Development and Testing	**INNO**
Sales and Marketing	Including activities to inform buyers including promotion, advertising, telemarketing, selling, and retail management.	Sales, Marketing and Supports; Retail; Technical Support Centres; Maintenance and Servicing	**SALES**
Manufacturing	Activities that transform inputs into final output, either goods or services.	Manufacturing; Construction; Extraction	**MAN**
Logistic and Distribution	Activities associated with obtaining and storing inputs, storing and transporting finished products to customers.	Logistic, Distribution and Transportation	**LOG&DIST**
Support GVC stages			
Business Services	Including legal, finance, public affairs and government relations, accounting..	Business Services and Shared Service Centres	**HQ**
Human Resource Management	Including recruiting, hiring, training, compensating and dismissing personnel.	Education & Training	**INNO**
Technical Services	Activities related to maintenance, automation, design/redesign of equipment, hardware, software, procedures and technical knowledge.		
Firm Infrastructure	Activities related to IT systems and electricity.	Electricity; ICT & Internet Infrastructures	**MAN**
Customer and After-Sale Services	Including support services to customers; after sale services.	Customer Contact Centres; Recycling.	**SALES**

Source: adapted from Sturgeon (2008)

Table 3: Value chain stages: Frequency

	N° of investments	%
HQ	3407	17.5
INNO (R&D)	1161 (473)	6.0 (2.4)
SALES	7004	36.0
MAN	6124	31.5
LOG & DIST	1748	9.0
TOTAL	19444	100

Source: Authors' elaboration on fDi Markets data, 2003-2008

5. Empirical results

This section presents the results of the estimation of the Nested Logit model outlined in Section 3.1. In the first sub-section (5.1), we assess the role of the 'traditional' drivers of MNCs investments and the 'social filter' variables, considered complementary explanations for the observed geography of foreign investments in the EU regions. Three sets of proxies are progressively included into the model: a) 'traditional' economic factors (i.e. level of economic development and labour market conditions); b) agglomeration economies (i.e. total pre-existing investments and sectoral clustering of investments); c) knowledge assets and 'social filter' drivers (i.e. regional patent intensity, R&D efforts, human capital endowment and 'social filter' proxies). In the following sub-section (5.2), the importance of regional level drivers is assessed in comparison with national level factors. Then (in 5.3), we introduce the disaggregation by value chain stage into the analysis in order to assess the impact of other foreign investments at the same VC stage, after controlling for all other relevant drivers. Finally in 5.4, the 'social filter' conditions are re-assessed to shed new light on their relative importance for investments in the different stages of the value chain. Following Spies (2010), all the explanatory variables are introduced in the regressions with a one-year lag in order to minimise the impact of simultaneity between the investment decision and the local economic conditions. In addition, in order to resolve the

problem of different accounting units, explanatory variables are generally expressed, for each region, as a percentage of the respective GDP or population. When interpreting the results it is important to bear in mind that this is an exploratory analysis of the geography of MNC investments. As a consequence, in what follows the focus is mainly on the sign and significance of coefficients, rather than on the size of specific point estimates. In addition the results should not be interpreted in terms of causality relations. The value of the Log-Likelihood is reported at the bottom of each regression table together with the LR test statistic for the significance of the nested structure, confirming the validity of the proposed specification. The 'country-level' nest structure is also particularly important in order to control for the 'unobserved' factors that regions belonging to the same country have in common, such as 'macro' institutional framework, rule of law, tax rates, fiscal regimes.[3]

5.1. 'Traditional' economic factors, agglomeration and 'social filter' conditions as drivers of MNCs investment decisions.

Table 4 shows the results of the impact of 'traditional' economic factors, agglomeration and 'social filter' conditions on the regional probability of attracting MNCs investments. Here our attention focuses on the regional level parameters (reported in the upper part of the table) while Inclusive Value (IV) parameters (in the lower part of the table) are discussed in the next sub-section.

[3] As a robustness check the key specifications of the model have been re-estimated by explicitly including some controls for these factors in the country-level equation. Regional-level results remain qualitatively unchanged. Unfortunately, regional-level data for these dimensions are not available for the regions of the EU-25 and/or for the time-span covered by the analysis.

Table 4: 'Traditional' location factors, dependent Variable: Location Choice

Variables	(1)	(2)	(3)	(4)	(5)	(6)
GDP per Capita	3.22e-05***	3.09e-05***	4.45e-06***	8.85e-07***	6.02e-07*	5.67e-07
	(1.39e-06)	(1.31e-06)	(4.72e-07)	(3.03e-07)	(3.26e-07)	(1.32e-06)
Unemployment	-.00476	-.00145	.00140**	.000255	.00227***	.0307***
	(.00327)	(.00298)	(.000627)	(.000435)	(.000518)	(.00321)
Total Regional GDP (Abs.)	1.13e-07***	9.93e-08***				
	(2.92e-09)	(2.78e-09)				
Total Investment in the Region	.00225***	.000303***	.00171***	.00101***	.00108***	.00189***
	(9.20e-05)	(.000110)	(6.75e-05)	(5.21e-05)	(9.66e-05)	(8.94e-05)
No. of Investments SAME Sector		.0109***	.00890***	.00924***	.00943***	.00990***
		(.000332)	(.000226)	(.000210)	(.000218)	(.000304)
Patent Intensity				.000157***	.000159***	.000491***
				(1.99e-05)	(2.69e-05)	(6.00e-05)
% Total R&D Expenditure					.0372***	
					(.00516)	
% Young (Aged 15-24)						-.179
						(.726)
Agricultural Share						-7.155
						(6.315)
% Tertiary Education						.586***
						(.161)
IV Parameters						
Austria	.517***	.415***	.0857***	.0535***	.0852***	.372***
	(.0421)	(.0408)	(.00501)	(.00387)	(.00806)	(.0256)
Belgium	1.192***	1.116***	.209***	.156***	.150***	.661***
	(.0479)	(.0440)	(.0185)	(.0160)	(.0168)	(.0517)
Czech Republic	1.218***	1.109***	.140***	.0856***	.115***	.602***
	(.0333)	(.0324)	(.0112)	(.00573)	(.0141)	(.0312)
Germany	.768***	.702***	.248***	.216***	.213***	.578***
	(.0143)	(.0137)	(.0162)	(.0171)	(.0175)	(.0188)
Spain	.885***	.846***	.170***	.139***	.153***	.731***
	(.0215)	(.0201)	(.00673)	(.00652)	(.0107)	(.0231)
Finland	.332***	.170***	.0674***	.0417***	.0521***	.264***
	(.0401)	(.0135)	(.00844)	(.00516)	(.00749)	(.0237)
France	.908***	.832***	.422***	.397***	.398***	.720***
	(.0151)	(.0143)	(.0109)	(.0105)	(.0139)	(.0155)
Greece	.350***	.231***	.0561***	.0356***	.0389***	.513***
	(.0350)	(.0176)	(.00555)	(.00394)	(.00503)	(.0314)
Hungary	1.221***	1.112***	.163***	.0942***	.101***	.585***
	(.0439)	(.0425)	(.0168)	(.00758)	(.0109)	(.0409)
Italy	.581***	.386***	.130***	.108***	.104***	.341***
	(.0218)	(.0142)	(.00594)	(.00585)	(.00691)	(.0208)
Netherlands	.516***	.401***	.116***	.0923***	.105***	.216***
	(.0402)	(.0401)	(.00666)	(.00574)	(.00795)	(.0157)
Poland	1.103***	1.017***	.310***	.103***	.145***	1.067***
	(.0224)	(.0213)	(.0276)	(.00597)	(.0387)	(.0266)
Portugal	.923***	.795***	.0527***	-.469***	-.357***	.771***
	(.0596)	(.0590)	(.00393)	(.0406)	(.0324)	(.0353)
Slovakia	1.618***	1.576***	.140***	.0739***	.0734***	.748***
	(.067)	(.005)	(.0298)	(.00798)	(.00781)	(.0487)
UK	.981***	.954***	.628***	.595***	.603***	.881***
	(.0171)	(.0159)	(.00998)	(.00946)	(.0119)	(.0169)
Log likelihood	-48887.128	-48322.447	-48664.52	-48483.138	-48479.428	-48624.8
LR test (IIA)	1781.99***	1898.32***	2797.66***	3011.95***	2682.01***	1321.24***
Observations	1527635	1527635	1527635	1527635	1527635	1527635

Standard errors in parentheses; *** p<.01, ** p<.05, * p<.1

In the first equation (Column 1) the role of traditional drivers is assessed. The results for this 'base-line' specification are largely in line with the existing literature on the determinants of MNCs investments. MNCs prefer more developed 'core' regions (i.e. those with relatively higher GDP per capita as in Head and Mayer 2004), but not necessarily those where the supply of labour is relatively more abundant and potentially cheaper (i.e. those with a higher level of unemployment). In fact, the level of regional unemployment has a negative but statistically non-significant impact on the probability of choosing a region as destination of new foreign investments (in line with Disdier and Mayer 2004[4]).

Two agglomeration proxies exert a strong influence on the location of investments, as shown by their positive and highly significant coefficient: a) the absolute size of the local economy (proxied by the total regional GDP as in Crescenzi et al. 2007) and b) the cumulative number of pre-existing foreign investments in the region. This confirms the expected role of agglomeration economies and the cumulative nature of investment location choices (Guimaraes et al. 2000; Head and Mayer, 2004; Spies, 2010).

The sectoral dimension of agglomeration economies is explored in Column 2 where the cumulative number of pre-existing investments in one sector attracts further investments in the same sector (the coefficient is positive and highly significant), even after controlling for the impact of total foreign investments in all sectors.[5] This evidence is in line with the results of Guimaraes et al. (2000) and both terms remain positive and significant in all the subsequent specifications of the model.

[4] "A high unemployment rate might be a deterrent to FDI if it signals imperfections in the labour market, but it could also attract investors if it means that a large pool of workers is available locally." (Disdier and Mayer 2004, p.290)

[5] We have also estimated the equation replacing 'Total investments in the region' with 'Total investments in all other sectors in the region' (i.e. excluding from the computation of the indicator the number of the investments in the same sector of the investment whose location is being modelled), obtaining very similar results.

In Column 3 the robustness of the results for the specification with regional economic conditions and agglomeration is tested by dropping 'Total regional GDP', which may affect the estimation of some coefficients due to multicollinearity with both 'economic conditions' and 'agglomeration of investments' proxies. After dropping this variable, the estimated coefficients remain unchanged except for the unemployment rate that becomes positive and significant at 5% level. This suggests that, after controlling for other characteristics, MNCs prefer areas where the labour supply is stronger than demand with, in principle, lower salaries, confirming a potential multicollinearity problem. Consequently, the robustness of the previous results is generally confirmed and 'Total Regional GDP' is not included in subsequent regressions.

In Column 4 we introduce some knowledge indicators. The distance from the technological frontier (proxied by the patent intensity as customary in the technological catch-up literature as in Fagerberg 1994) is an important predictor of MNCs investments: the closer the regional technological infrastructure to the frontier the higher the attractiveness of the regional economy for foreign investments. In this sense, agglomeration and knowledge assets indicators point in the same direction: by choosing technologically stronger areas, foreign investments tend to reinforce existing technological advantages rather than contributing to 'catching-up' in weaker peripheral regions. However, and in line with the existing literature on regional innovation (Pike et al. 2006 and 2007), Column 5 shows that the regional innovative efforts (proxied by the percentage of Regional GDP devoted to R&D expenditure) can open new windows of opportunity for foreign investments. Ceteris paribus, higher investments in R&D increase the probability of attracting MNCs into the local economy (the coefficient is highly statistically significant and positive).

Given that the regional capability to counterbalance the pre-existing patterns of technological accumulation does not only depend on local R&D efforts, we also include in the empirical analysis other aspects contributing to the regional innovation system such as some of the proxies included in the 'Social Filter Index'. As discussed in Section 2.2, they are the structural pre-conditions for a well functioning regional system of innovation and in Column 6 they are introduced separately, while in the subsequent specifications, discussed in the next sub-sections, they are summarized by means of the 'Social Filter Index' in order to minimise potential multicollinearity between individual indicators. [6] Among the socio-economic variables introduced into the model, neither the demographic dynamism (proxied by the share of young people over total population) nor the specialisation in low technology, low skilled sectors (proxied by the share of the labour force in agriculture) affect MNCs investment decisions. Human capital endowment, the most important component of the Social Filter, is the only variable exerting a positive and highly significant impact on the probability to attract new investments.

5.2. Regional vs. national-level drivers

Turning to the analysis of the Inclusive Value (IV), or dissimilarity, parameters (in the lower part of Table 4), which gauges the level of independence of the alternatives in each nest/country with respect to the unobserved portions of utility, we find that a higher parameter suggests greater independence (less correlation) as between the alternatives (regions) in the same nest (country), implying a stronger role for the regional drivers as

[6] Not all 'social filter' components can be included in the same regression due to their high collinearity with other terms. As in Crescenzi et al. (2007) and Rodriguez-Pose and Crescenzi (2008) these variables are combined in one single indicator by means of Principal Component Analysis (see Appendix A-2) that makes it possible to 'summarize' a high percentage of their variance/information excluding multicollinearity problems.

opposed to the national common factors. As discussed in Section 3.1, these national common factors account for the impact of different institutional conditions, business climate, political factors at the country level that remain hard to capture explicitly by means of quantitative indicators. The Random Utility model restricts dissimilarity parameters to a range between 0 and 1 and values outside this range mean that while the model is mathematically correct, the fitted model is inconsistent with the random-utility theory (Cameron and Trivedi 2009). In the case of our results, the fitted model in general behaves well, with dissimilarity parameters mostly within the 0-1 ranges in the large majority of the specifications. The LR test statistic firmly rejects the null hypothesis that all the inclusive values are equal to 1 (i.e. the Nested Logit model reduces to the Conditional Logit Model), confirming the validity of the proposed nested structure.

In general, regions belonging to the same country are closer substitutes for foreign investors than regions of other countries, confirming the general relevance of the country level in investment decisions, notwithstanding the undergoing process of economic and political integration within the EU. Nevertheless, it is important to point out that the relevance of the country level varies significantly depending on the different factors included in the second-level (regional) equation, as shown by the different values of the dissimilarity parameters in the different specifications of the model. By looking at these parameters in Columns 1 and 2 where, in addition to the traditional economic factors (that are included in all specifications) the importance of the agglomeration economies is controlled for by means of the absolute size of the regional economy, it appears that – with a few exceptions – dissimilarity parameters tend to be close to 1. Even if national characteristics are certainly relevant (Basile et al. 2009), regions in the same country are not 'good' substitutes when MNCs search for 'absolute' market size. This pattern is particularly strong in those countries where the concentration of the

economic activities in a few regions is stronger (i.e. Spain, France and the 'new' members of the EU). Conversely, when controlling only for the agglomeration of pre-existing foreign investments as in Column 3, country-level 'similarities' between regions belonging to the same country become stronger. The same is true for the distance from the technological frontier and for R&D efforts (knowledge assets indicators): *ceteris paribus* regions in the same country are closer substitutes than regions with similar characteristics in a different country, suggesting that country common factors exert a significant influence in the location decision.

The picture changes again when human capital is introduced into the model (Column 6): the dissimilarity parameters for all countries increase significantly, meaning that highly specialized human capital is concentrated in specific 'hotspots' in the EU and that country level considerations are less relevant in this regard.

5.3. Value chain stages and agglomeration economies

The previous sub-sections have shown that the agglomeration of pre-existing foreign investments is an important predictor for additional new investments. Both the total number of foreign investments and their concentration in the same sector of the new investment exert a positive influence on the probability of MNCs choosing the same investment location. In Table 5, we include in our empirical analysis a further dimension in order to take into account how the location decision of MNCs subsidiaries is influenced by an agglomeration effect at the level of VC stages. Therefore, we address the following question: do foreign investments at a certain VC stage attract other investments at a similar stage, irrespective of their sector and after controlling for other relevant local characteristics?

Table 5: Sector vs. Value Chain agglomeration processes, dependent Variable: Location Choice

Variables	(1)	(2)
Patent Intensity	.000225	.000187***
	(.000160)	*(3.13e-05)*
Social Filter	.151***	.00948**
	(.0229)	*(.00474)*
Unemployment	-.000263	.00105
	(.00506)	*(.000881)*
GDP per Capita	3.69e-06	-7.36e-07
	(3.51e-06)	*(6.75e-07)*
Number of Investments SAME sector DIFFERENT VC stage	.0179***	
	(.00134)	
Number of Investments SAME VC stage DIFFERENT Sector	.0127***	
	(.000620)	
Number of Investments SAME VC stage		.00577***
		(.000357)
Number of Investments SAME Sector		.0141***
		(.000546)
Total Investment in the Region	-.000709	-.000303*
	(.000540)	(.000171)
IV Parameters		
Austria	.812***	.0725***
	(.0599)	*(.00802)*
Belgium	1.244***	.128***
	(.0854)	*(.0145)*
Czech Republic	1.146***	.116***
	(.0516)	*(.0116)*
Germany	.803***	.254***
	(.0258)	*(.0365)*
Spain	.784***	.158***
	(.0351)	*(.0112)*
Finland	.222***	.0440***
	(.0417)	*(.00820)*
France	.873***	.388***
	(.0271)	*(.0173)*
Greece	.483***	.0561***
	(.0859)	*(.00777)*
Hungary	1.135***	.196***
	(.0654)	*(.0181)*
Italy	.795***	.163***
	(.0519)	*(.0120)*
Netherlands	.614***	.110***
	(.0565)	*(.0105)*
Poland	1.045***	.139***
	(.0348)	*(.0129)*
Portugal	.870***	.0831***
	(.0887)	*(.0116)*
Slovakia	1.473***	.116***
	(.0291)	*(.0133)*
UK	1.000***	.667***
	(.0270)	*(.0148)*
Log likelihood	-20912.061	-20571.733
LR test (IIA)	576.96***	1221.16***
Observations	640589	640589

Standard errors in parentheses; *** p<.01, ** p<.05, * p<.1

In order to answer this question disentangling the impact of VC agglomeration economies from sectoral agglomeration factors, two sets of explanatory variables are introduced into the model: (i) the cumulative number of pre-existing investments in the same sector but at a different VC stage as well as at the same VC stage but in a different sector (Column 1) and (ii) the total number of investments in the same sector and at the same VC stage respectively (Column 2).

The two sets of indicators point to the same direction: both sectoral and VC agglomeration are relevant drivers for MNCs investment decisions, making the total number of pre-existing investments not significant. This result indicates that the location decisions are driven by at least two reasons: (i) the search for "vertical" interactions when investments are attracted by the presence of other investments in the same sector but in other VC stages and (ii) "horizontal" spillovers, such as labour market specialization and supply of specialised services and infrastructures, when they agglomerate on the basis of the same VC stage notwithstanding the sector.

5.4. Value chains and 'social filter' conditions

What local characteristics affect different stages of the investments? In Table 6 the complete specification of the model developed so far is re-estimated separately for investments at each different VC stage. As in the previous sub-sections, the model includes proxies for 'traditional' economic location factors (GDP per capita and unemployment rate), knowledge assets (patent intensity) and the Social Filter Index. Agglomeration economies are proxied by means of three different indicators: the stock of pre-existing investments, the number of investments in the same sector and the number of pre-existing investments at the same VC stage.

Table 6: Innovation, Socio-economic and 'traditional' location factors by Value Chain Stage, dependent Variable: Location Choice

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Value Chain Stage	ALL	HQ	INNO	R&D	SALES	MAN	LOG & DIST
Variables							
Patent Intensity	.000187***	.000415***	.000166	.00647**	.000227***	.000159	8.25e-05
	(3.13e-05)	*(.000104)*	*(.000845)*	*(.00323)*	*(5.02e-05)*	*(9.74e-05)*	*(.000272)*
Social Filter	.00948**	-.00287	-.0682	1.099**	.0109	-.00830	-.0270
	(.00474)	*(.0202)*	*(.0766)*	*(.536)*	*(.00804)*	*(.0169)*	*(.0415)*
Unemployment	.00105	-.00502	-.0363	-.0311	.000125	.00502*	-.0103
	(.000881)	*(.00760)*	*(.0251)*	*(.0904)*	*(.00151)*	*(.00274)*	*(.00803)*
GDP per Capita	-7.36e-07	1.59e-05***	1.48e-05	-.000175*	-6.68e-07	1.70e-09	-3.67e-06
	(6.75e-07)	*(4.92e-06)*	*(1.19e-05)*	*(9.31e-05)*	*(1.10e-06)*	*(2.49e-06)*	*(4.15e-06)*
No of Investments SAME VC stage	.00577***	.00718***	.132***	.400***	.00765***	.0172***	.0591***
	(.000357)	*(.00203)*	*(.0211)*	*(.119)*	*(.000510)*	*(.00156)*	*(.0154)*
No of Investments SAME Sector	.0141***	.00864***	.0178***	.0652***	.00852***	.0881***	.0202***
	(.000546)	*(.00160)*	*(.00439)*	*(.0200)*	*(.000707)*	*(.00562)*	*(.00408)*
Total Investment in the Region	-.000303*	.000716	-.00658**	-.0296***	-.00161***	-.00604***	-.00193
	(.000171)	(.00109)	(.00275)	(.0109)	(.000347)	(.000830)	(.00126)
IV Parameters							
Austria	.0725***	.0996***	.332***	2.972**	.0985***	.121***	.149**
	(.00802)	*(.0258)*	*(.101)*	*(1.197)*	*(.0147)*	*(.0199)*	*(.0689)*
Belgium	.128***	.359***	1.303***	4.814***	.104***	.418***	.879***
	(.0145)	*(.105)*	*(.374)*	*(1.547)*	*(.0199)*	*(.0589)*	*(.230)*
CzechRep	.116***	.109***	.852***	2.688**	.0852***	.521***	.362***
	(.0116)	*(.0326)*	*(.302)*	*(1.244)*	*(.0121)*	*(.0491)*	*(.103)*
Germany	.254***	.363***	.737***	1.913***	.213***	.392***	.603***
	(.0365)	*(.101)*	*(.109)*	*(.620)*	*(.0312)*	*(.0561)*	*(.191)*
Spain	.158***	.109***	.588***	1.372***	.193***	.356***	.517***
	(.0112)	*(.0267)*	*(.111)*	*(.465)*	*(.0182)*	*(.0379)*	*(.148)*
Finland	.0440***	.143***	.561	1.589	.0496***	.0279*	.00333
	(.00820)	*(.0529)*	*(.377)*	*(1.515)*	*(.0150)*	*(.0150)*	*(0)*
France	.388***	.363***	.842***	2.491***	.388***	.547***	.599***
	(.0173)	*(.0393)*	*(.127)*	*(.741)*	*(.0212)*	*(.0372)*	*(.162)*
Greece	.0561***	.145***	-2.557	.288	.0635***	.0846***	-1.291*
	(.00777)	*(.0516)*	*(2.879)*	*(6.242)*	*(.0117)*	*(.0271)*	*(.691)*
Hungary	.196***	.0563	-3.586	-.359	.0433***	.536***	.0891***
	(.0181)	*(.0427)*	*(9.878)*	*(29.13)*	*(.0117)*	*(.0434)*	*(.0332)*
Italy	.163***	.231***	.318	3.589***	.185***	.150***	.127***
	(.0120)	*(.0586)*	*(.234)*	*(1.334)*	*(.0187)*	*(.0263)*	*(.0480)*
Netherlands	.110***	.139***	.0909	2.143**	.109***	.164***	.502**
	(.0105)	*(.0312)*	*(.210)*	*(.887)*	*(.0151)*	*(.0309)*	*(.222)*
Poland	.139***	.0514***	.812***	2.450**	.0675***	.544***	.530***
	(.0129)	*(.0168)*	*(.269)*	*(.996)*	*(.00823)*	*(.0361)*	*(.202)*
Portugal	.0831***	.0631***	.714*	3.669**	-.452***	.154***	.220*
	(.0116)	*(.0221)*	*(.427)*	*(1.769)*	*(.0945)*	*(.0339)*	*(.133)*
Slovakia	.116***	.0971**	.971	3.499*	.0927***	.477***	.259
	(.0133)	*(.0429)*	*(.856)*	*(1.808)*	*(.0231)*	*(.0571)*	*(1.092)*
UK	.667***	.775***	.993***	2.079***	.696***	.601***	.815***
	(.0148)	*(.0352)*	*(.132)*	*(.665)*	*(.0215)*	*(.0433)*	*(.151)*
Log likelihood	-20571.733	-2336.694	-1103.301	-534.9055	-692.7265	-7152.058	-2271.0157
LR test (IIA)	1221.16***	222.09***	79.34***	43.74***	506.68***	283.31***	71.74***
Observations	640589	84888	36058	18123	229559	220575	69509

Standard errors in parentheses; *** p<.01, ** p<.05, * p<.1

Column 1 shows the estimation results for all investments and is used as a benchmark for comparison with the results disaggregated by VC stage (Table 5) and presented in the subsequent columns from Headquarters in Column 2 to Logistics and Distribution in Column 7. In the general model in Column 1, foreign investments are not very sensitive to local economic conditions and in fact local labour market conditions are not robust drivers for investment location while the level of economic development is also generally a weak predictor after controlling for the agglomeration processes. Headquarters are the only VC stage 'attracted', ceteris paribus, by high regional GDP per capita levels (Column 2). In fact, the specific functions pursued at this stage of the value chain require concentration in wealthy core urban areas that offer high accessibility through both 'hard' and 'soft' infrastructures, proximity to financial 'hot spots' and those amenities that some literature has shown to be of crucial importance for higher-level managerial staff (Florida 2002; Rossi-Hansberg et al. 2009). The selection of very specific 'core' locations is further accentuated by the strong path-dependency of investment decisions in terms of both GVC stages and sectors. What matters for the location of headquarters is not the clustering of other foreign investments per se but the concentration of investments at the same stage of the VC and/or in the same sector of activity. These are the most relevant drivers for this VC stage with the only addition of patent intensity, as patents are often filed at the HQ level, while Social Filter conditions are not significant. Finally, the analysis of the dissimilarity parameters in the lower part of the Table (Column 2) reveals that the location of headquarters follows mainly a country-level logic (parameters close to zero for all countries) with a strongly hierarchical spatial structure.

A partially different story concerns investments in innovative functions associated with bringing new products or services to the market (Column 3). When looking at these investments, two patterns are immediately apparent. First, the only relevant drivers are agglomeration forces in terms of sector and

VC stage with a – not highly significant – negative impact of 'generalised' clustering of foreign investments. Innovative activities are strongly attracted by the 'local buzz' (Storper and Venables 2004) generated by the concentration of other similar activities but may suffer from congestion effects due to general clustering dynamics. Second, the sharp increase in the dissimilarity parameters clearly shows that the regional-level is crucially important for activities at this stage of the value chain. Therefore, the location decision of innovative foreign investments is mainly based on localized regional assets and processes.

However, given the complexity of the functions pursued at this stage of the value chain, the model is re-estimated for R&D investments alone (Column 4), in order to separate their location behaviours from that of all other innovative activities (in line with the approach of OECD 2011). Agglomeration patterns remain unchanged as for other innovative activities. However, what clearly emerges is the role also played by the Social Filter conditions, and not only that of localised (market and non-market mediated) knowledge flows (Mariotti et al. 2010; Jaffe 1989; Zucker et al. 1998), as proxied by the innovative output (patent intensity) that of course matters for R&D activities. Thus, R&D foreign investments are highly responsive to a favourable regional system of innovation conditions. The Social Filter conditions selectively attract investments at this specific stage of the value chain (Crescenzi et al. 2007; Crescenzi and Rodriguez-Pose 2009). The dissimilarity parameters for all countries (and the decrease in the value of the LR test statistic) again confirm the importance of regional-level dynamics for investments in R&D.

The location selection of Sales and Marketing investments (Column 5) reflects a logic that is somehow in-between the two preceding stages: it shares with HQ and INNO investments the sensitivity to both VC and sectoral agglomeration patterns; with HQ it shares the importance of patent intensity

and the non-responsiveness to Social Filter conditions however - as in INNO and differently from HQ – SALES investments are not influenced by regional GDP per capita. Sales and marketing activities need to remain linked to both innovative activities (positive impact of local patenting) due to the complex feedback mechanisms that link product and process innovation to business functions directly interacting with final consumer and with other firms pursuing similar functions (positive impact of the number of pre-existing firms) with an increasing externalised component of *ad hoc* services pursued by specialised companies. These inter-firm dynamics seem to prevail over local demand conditions, with GDP per capita not significant for this function. Sales and Marketing units can serve distant markets but do need localised interactions with other firms in the same function and sector. The low values of the dissimilarity parameters for all countries suggest that this VC stage seems to be organised with a national-level business logic, similar to that applied for Headquarters.

Instead, the drivers of 'Manufacturing' investments are very different (MAN – Column 6). When compared to foreign investments in general (Column 1), the rate of unemployment exerts a positive and significant impact on their location. Notwithstanding the rigidity of the EU salary structure (in particular at the regional level), labour market conditions become relevant only for this specific VC stage: comparatively higher unemployment with potentially lower salaries and less competition on the demand side of the labour market – *ceteris paribus* –attract manufacturing investments. Foreign investments in manufacturing seem to respond to 'traditional' cost-advantage factors unlike other VC stages, suggesting that policies aimed at facilitating these investments should be carefully designed in order to avoid a 'race to the bottom' outcome and/or zero-sum territorial competition between regions (Cheshire and Gordon, 1998). This is particularly important if we consider that for this VC stage, regional factors play a significant role: as revealed by

the dissimilarity parameters their influence is less significant vis à vis 'innovation' and 'R&D' investments (both showing higher parameters) but localised factors still play a significantly more relevant role than they do for Headquarters or Sales and Marketing. Thus, the location decisions of 'Manufacturing' investments appear to be the result of a complex interaction between regional and national factors.

Finally, Logistic and Distribution investments (Column 7) follow a co-location logic driven by the intrinsic technical factors of these activities: logistic and distribution facilities pursue a 'service' role with respect to other business functions (and in particular manufacturing) in the same sector of activity with an in-depth integration with their operations and a consequently positive impact of the number of pre-existing investments in the same sector. In addition, several logistic and distribution firms tend to 'cluster' in the same set of national 'hubs' (positive impact of other investments in the same GVC stage). These dynamics might also explain why the total agglomeration of investments does not exert a negative influence on the location probability at this VC stage, while at the same time VC and sectoral agglomeration forces are particularly important.

6. Concluding remarks

The location strategies of multinational corporations investing in the EU are influenced by the characteristics of local innovation systems and by the organization of their value chains, spanning across different countries. The 'traditional' sources of location advantage (i.e. market size and labour market characteristics) have only a limited effect upon these decisions but they do complement the search for other factors such as localised (tacit) knowledge, specialised skilled labour and well-functioning innovation systems. The

importance of these latter factors depends upon the value-chain stage where investment is taking place.

The empirical analysis presented in this paper offers some original findings for the understanding of the geography of Multinational Firms. First, the usefulness of a disaggregated analysis by value chain stage to investigate the drivers of MNC location decisions is fully borne out by the results. Second, 'soft' socio-institutional factors have emerged as an important component of the MNC location decisions, especially as concerns the most sophisticated stages of the value chain. Third, in the discussion as to whether national or sub-national characteristics can better explain the MNCs' investment location decisions, the analysis reveals that common country-level factors exert a significant influence on the location decision of MNCs in Europe, although regional factors are significantly more important when human capital is introduced into the model. Thus, regions with highly specialized human capital represent a factor of attraction for foreign investments. Fourth, when considering the different VC stages, the national and the regional levels play different roles: the regional level driving factors are stronger for manufacturing and R&D and lower for HQ. It follows that local governments should cease trying to attract headquarters, as their location decision depends on national dynamics as well as on the concentration of wealth and economic activities.

Instead, regional features can influence investments in all innovative functions associated with bringing new products or services to the market: regional/local policies have a larger role to play than macro-national policies for this purpose. Similarly, investments in the location of R&D functions are influenced by the existence of adequate local conditions in terms of human capital and innovation-prone circumstances. These results call for active regional-level policies aimed at attracting investments in this value chain

stage. In short, regions appear to play a crucially important role for knowledge assets and systems of innovation, as they are likely to attract different stages of the value chains, insofar as they make different levels of contribution towards value generation.

We should also point out some of the paper's limitations. Even if regional characteristics are introduced in the empirical analysis with a one-year-lag to minimise the impact of the potential simultaneity between local conditions and foreign investments[7], the results should be interpreted as descriptive of the geography of MNCs' investments in Europe, without any presumption of causality (i.e. in terms of the potential causal impact of the change of local conditions on FDI attraction). A further limitation refers to the characteristics of the dataset, which albeit robust vis à vis other datasets, is limited to greenfield investments with no information on other kinds of foreign direct investments, such as mergers and acquisitions. In addition, on the basis of the information included in the dataset it is impossible to include any 'parent company' controls for repeated investments by a given parent company in different locations. Investments by the same parent company are certainly not independent but, given the complex ownership structure of MNCs, it is impossible to capture these linkages. Finally, the role of active policies for the attraction of FDI towards specific countries and regions is only indirectly captured by the number of pre-existing foreign investments in the same region: the lack of systematic multi-country data on these policies prevents their inclusion in any EU-level analysis. The possibility to address (at least some of) these limitations remains in our agenda for future research. Besides, future research plans include taking the origin of MNCs into account, and paying special attention to MNCs from emerging countries in order to determine if their location strategies differ from those of MNCs based in advanced economies.

[7] FDI are influenced by local characteristics, but in turn they impact upon these conditions.

References

Alcacer J. and Chung W. (2007), Location Strategies and Knowledge Spillovers, Management Science, 53(5), 760-776

Alegria R. (2007), The Location of Multinational Firms in the UK: Sectoral and Functional Agglomeration, paper presented at ERSA: Paris.

Basile R., Castellani D. and Zanfei A. (2008), Location Choices of Multinational Firms in Europe: the Role of EU Cohesion Policy. Journal of International Economics, 74, 328-340.

Basile R., Castellani D. and Zanfei A. (2009), National boundaries and the location of multinational firms in Europe. Papers in Regional Science, 88, 733-748.

Cameron A.C., Trivedi P.K. (1998), Regression Analysis of Count Data, Econometric Society Monograph No.30, Cambridge University Press.

Cameron A.C., Trivedi P.K (2008) Microeconometrics using STATA, Stata Press.

Cantwell J., Iammarino S. (2003) multinational corporations and European Regional Systems of Innovation, London: Routledge.

Canals, C and Noguer, N (2008) The determinants of cross-border investment: A value-chain analysis, Moneta y Credito Revista de Economia, 239-291.

Cantwell, J. and Santangelo, G. D., (1999) The frontier of international technology networks: sourcing abroad the most highly tacit capabilities, Information Economics and Policy, 11(1), 101-123.

Cheshire, P. C. and Gordon, I. R. (1998) Territorial Competition: Some Lessons for Policy. The Annals of Regional Science, Vol. 32, No. 3, 321-346

Crescenzi R. and Rodríguez-Pose A.(2011) "Innovation and regional growth in the European Union", Springer-Verlag, Berlin and New York

Crescenzi R. and Rodríguez-Pose A.(2009) "Systems of innovation and regional growth in the EU: endogenous vs. external innovative efforts and socioeconomic conditions" in Fratesi U. and Senn L. (eds) "Growth and innovation of competitive regions", Springer-Verlag, 167-192, 2009.

Crescenzi, R., Rodríguez-Pose A. and Storper M. (2007) "The territorial dynamics of innovation: a Europe-United States Comparative Analysis", The Journal of Economic Geography, 7, 6: 673-709.

Crozet M., Mayer T. and Mucchielli J.L. (2004)", "How do firms agglomerate? A study of FDI in France", Regional Science and Urban Economics, 34, 1, 27-54.

Defever, D. (2006) Functional fragmentation and the location of multinationals firms in the enlarged Europe. Regional Science and Urban Economics, 36, 658-677.

Defever D. (2010), The Spatial Organization of Multinational Firms, CEP Discussion Paper, 1029, London: London School of Economics.

Devereux M.P. and Griffith R. (1998) "Taxes and the location of production: evidence from a panel of US multinationals", Journal of Public Economics, 78, 3: 335-367.

Disdier, A. C. and T. Mayer, (2004) How different is Eastern Europe? Structure and determinants of location choices by French firms in Eastern and Western Europe. Journal of Comparative Economics 32(2): 280-296.

Dunning J. H., (1977) Trade, location of economic activity and the multinational enterprise: a search for an eclectic approach, in B. Ohlin, P.O. Hesselborn and P.M. Wijkman (eds.), The international allocation of economic activity, London, Macmillan: 19-51.

Dunning J.H., (1996) The geographical sources of competitiveness, Transnational Corporations 5(3), 1-30.

Duranton and Puga (2005) From sectoral to functional urban specialisation, Journal of Urban Economics, 57, 2: 343–370.

Fagerberg J. (1994) Technology and International Differences in Growth Rates, Journal of Economic Literature, 32(3), 1147-1175.

Florida, R. (2002) The Economic Geography of Talent, Annals of the American Association of Geographers 92 (4), 743-755.

Fu X., Pietrobelli C., Soete L., 2011, "The Role of Foreign Technology and Indigenous Innovation in the Emerging Economies: Technological Change and Catching-up", World Development Vol.39, Issue 7, pp.1204-12.

Gereffi G. (1999), "International trade and industrial upgrading in the apparel commodity chain", Journal of International Economics, 48: 37-70.

Gereffi G., Humphrey J. and Sturgeon T., 2005, "The governance of global value chains", Review of International Political Economy, 12 (1): 78-104.

Gordon I.R. (2001) Unemployment and spatial labour markets: strong adjustment and persistent concentration in R. Martin and P. Morrison (eds.) Geographies of Labour Market Inequality, Routledge, London.

Green W.H. (2003) Econometric Analysis. Prentice Hall, Upper Saddle River

Guimarães P. Figueiredo O. and Woodward D. (2000), "Agglomeration and the Location of Foreign Direct Investment in Portugal", Journal of Urban Economics, 47, 1: 115-135.

Jaffe A. B. (1989) Real Effects of Academic Research, American Economic Review, 79, 957-970.

Jordaan, J.A. (2008) State characteristics and the locational choice of foreign direct investment: Evidence from regional FDI in Mexico 1989-2006. Growth and Change, 39(3), 389-413.

Jordaan J.A. (2009) Foreign Direct Investment, Agglomeration and Externalities, Ashgate, Farnham

Head, K. and Mayer T. (2004). "Market potential and the location of Japanese investments in the European Union." Review of Economics and Statistics 86, 4: 949-972.

Head, C.K., Ries J.C. and D. L. Swenson (1995). "Agglomeration benefits and location choice: Evidence from Japanese manufacturing investment in the United States." Journal of International Economics 38, 3-4: 223-247.

Head, C.K., J.C. Ries and D. L. Swenson (1999) "Attracting foreign manufacturing: Investment promotion and agglomeration", Regional Science and Urban Economics, 29, 197-218.

Lundvall B.Å. (1992) National systems of innovation: Towards a theory of innovation and interactive learning. Pinter, London.

Malecki E. (1997) Technology and Economic Development: The Dynamics of Local, Regional and National Competitiveness, 2nd edition Addison Wesley Longman, London.

Massini S., Miozzo M. (2010) Outsourcing and Offshoring of Knowledge-intensive Business Services: Implication for Innovation, in Gallouj F. (ed.), The Handbook of Innovation and Services: A Multi-disciplinary Perspective, 469-497, Cheltenham: Edward Elgar.

Mariotti, S., Piscitello, L. (1995) Information costs and location of FDIs within the host country: empirical evidence from Italy. Journal of International Business Studies, 26: 815–841.

Mariotti. S., Piscitello, L. Elia, S., (2010) Spatial agglomeration of multinational enterprises: the role of information externalities and knowledge spillovers, Journal of Economic Geography, 10 (4): 519-538

Mayer, T. and Mucchielli, J-L. (1999), La localisation `a l' étranger des entreprises multinationales: Une approche d'économie géographique hierarchisée appliquée aux entreprises Japonaises en Europe, Économie et Statistique 6/7 (326-327), 159–176,

McCann, P. and R. Mudambi, (2004) The location behaviour of the multinational enterprise: Some analytical issues, Growth and Change, 35, 4: 491-524.

McCann, P. and R. Mudambi, (2005) Analytical differences in the economies of geography: the case of the multinational firm. Environment and Planning A, 37: 1857-1876.

McFadden, D. L. (1984). Econometric analysis of qualitative response models. In: Griliches, Zvi, Intriligator, Michael D. (Eds.), Handbook of Econometrics, Vol.2. Amsterdam, Elsevier/North-Holland: 1396-1457.

Morgan K. (2004) The exaggerated death of geography: learning, proximity and territorial innovation systems, Journal of Economic Geography, 4, 3-21

Mucchieli J. L.,Mayer T. (eds) 2004, Multinational Firms'Location and the New Economic Geography, Cheltenham: Edward Elgar.

Mudambi R. and Mudambi S. M. (2005) Multinational enterprise knowledge flows: the effect of government inward investment policy, Management International Review, 45, 2, 155–178.

OECD, (2011) Attractiveness for Innovation: Location Factors for International Development, OECD Publishing, Paris.

Phelps N A, (1997), Multinationals and European Integration: Trade, Investment and Regional Development, Jessica Kingsley, London

Phelps N. A., MacKinnon D., Stone I. and Braidford P. (2003) Embedding the multinationals? Institutions and the development of overseas manufacturing affiliates in Wales and North East England, Regional Studies 37, 1, 27–40.

Phelps N. A., Waley P. (2004), Capital Versus the Districts: A Tale of One Multinational Company's Attempt to Disembed Itself, Economic Geography, 80, 2, 191-215.

Pietrobelli C., Rabellotti R., 2011, "Global Value Chains Meet Innovation Systems: Are There Learning Opportunities for Developing Countries?", World Development, 39, 7: 1261-69.

Pietrobelli C. and Rabellotti R. (2007) Upgrading to Compete. Clusters and Value Chains in Latin America, Cambridge Ma.: Harvard University Press.

Pike A., A. Rodriguez-Pose and J. Tomaney (2006) Local and regional development. London: Routledge

Pike A., Rodríguez-Pose and Tomaney J. (2007) What Kind of Local and Regional Development and for Whom? Regional Studies, 41(9), 1253 – 1269.

Py L. and Hantem F. (2009) Internationalisation et Localisation des Services: une Analyse Sectorielle et Fonctionelle Appliquee aux Firmes Multinationales en Europe, Economie et Statistique, 426, 67-95

Rodríguez-Pose A. (1999) Innovation prone and innovation averse societies. Economic performance in Europe, Growth and Change 30, 75-105.

Rodríguez-Pose, A. and Crescenzi R. (2008) "R&D, spillovers, innovation systems and the genesis of regional growth in Europe" Regional Studies, 42, 1: 51-68.

Rossi-Hansberg, E., Sarte, P-D., Owens R. (2009) Firm Fragmentation And Urban Patterns, International Economic Review, Vol. 50, No. 1

Schmitz H., Strambach S. (2009) The organisational decomposition of innovation and global distribution of innovative activities: insights and research agenda, International Journal of Technological Learning, Innovation and Development, 2, 4, 231-249.

Spies J. (2010) Network and border effects: Where do foreign multinationals locate in Germany?, Regional Science and Urban Economics, 40, 20-32

Storper M. and Venables A.J. (2004) Buzz: face-to-face contact and the urban economy, Journal of Economic Geography 4, 351-370.

Sturgeon, T.J. (2008) Mapping integrative trade: conceptualising and measuring global value chains, International Journal of Technological Learning, Innovation and Development, 1, 3: 237-257

UNCTAD (2011), World Investment Report, UNCTAD, Geneva.

Winkelmann R. (2008) Econometric Analysis of Count Data, Springer (5th ed.).

Woodward D. (1992) Locational determinants of Japanese manufacturing start-ups in the United States, Southern Economic Journal, 58, 261-273.

Zucker L. G., Darby M. R. and Armstrong J. (1998) Geographically Localized Knowledge: Spillovers or Markets?, Economic Inquiry, 36(1): 65-86.

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