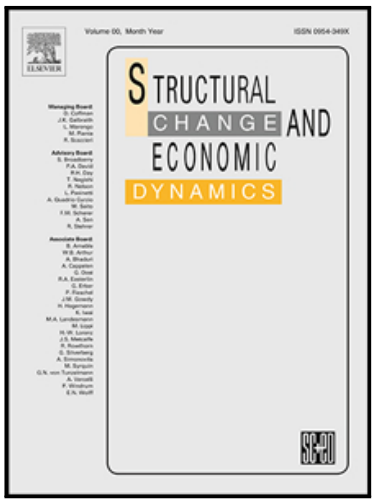


# Regional Social Context and FDI. An Empirical Investigation on Chinese acquisitions in Europe

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Highlights

- We analyse whether social context elements affect Chinese FDI location in the EU
- Spatial allocation of FDI is affected by various dimensions of the social context
- Social context grasps effects not directly related with innovation or knowledge
- Heterogeneous effects arise when considering technological differences in sectors
- Policymakers should consider backlash of social policies and FDI initiatives

# Regional Social Context and FDI. An Empirical Investigation on Chinese acquisitions in Europe

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## Abstract

European regions are characterized by different economic, technical and social conditions. Such differences might also explain the different strength of European regions in attracting foreign direct investments (FDI). Following recent strands of literature, in this paper we try to identify whether the presence of regional differences in the social context, once considering a set of regional characteristics related to the economic structure and innovative endowments, affects the location of multinational enteprises. To do so, we develop an empirical model using data on Chinese brownfield investments towards European regions. Our results confirm that social context overall matters in location choices, even if heterogeneous effects arise when taking into account technological differences in target sectors. Our evidence is useful in increasing the awareness of policy-makers and of the academic debate on the necessity to consider possible spillover and backlash effects both of social policies and of FDI attraction initiatives.

**Keywords:** social context; Europe; regions; Chinese FDI; industrial policy

## 1. Introduction

European regions are characterized by different economic, technical and social conditions, defining heterogeneous degrees of competitiveness of places. The differences in contextual conditions might also explain the different strength of European regions in attracting foreign direct investments (FDI from now on).

Indeed, while competitiveness is a multidimensional concept, its economic component has typically gained a predominant role in the literature in defining the extent to which a country, a region, or a city can be considered competitive. Recently, the necessity to expand the boundaries of competitiveness to human well-being and social development has been emphasized, along with the need to go beyond the economic logic (Giovanni and Useche, 2019). To nurture the social context in order to boost the attractiveness of places (Ahmed, 2012) might become crucial also when foreign investors are considered.

In this regard, we analyse the nexus between social context, as a fundamental determinant of the attractiveness of places, and FDI.

To the best of our knowledge, the social context-FDI nexus has been mainly studied considering the impact of the latter on the first (Alfaro et al., 2004; Sun, 2002, and many more). However, some contributions in the literature (Crescenzi and Rodriguez-Pose, 2011; Elfakhani and Mackie, 2015; Majocchi and Presutti, 2009) suggest that social conditions may directly or indirectly affect the location choices of foreign investors. In line with these studies, we develop an empirical model using data on Chinese brownfield investments (cross-border M&As) towards European regions. Our aim is to try to identify whether the presence of regional differences in the social context, once considering a set of regional characteristics related to the economic structure and innovative endowments, affects the location of Chinese firms.

Compared to previous studies, our paper has two main elements of innovation. First, we build two composite indicators to examine the impact of two different possible dimensions of the social context. In particular, one focuses on the educational attainment of the population, while the other encompasses other aspects of standards of living, on the basis of available data at regional level in Europe. These two aspects might, in fact, exert different effects on territorial attractiveness. Second, we explore the possible heterogeneity in such effects according to the technological intensity of the FDI target sectors. It seems to us reasonable to assume that multinational companies operating in different technological domains are not equally sensitive to social drivers.

The paper is structured as follows: next section includes the relevant theoretical background and literature contribution on FDI pulling factors and the role of the social context. In section 3, data and methodology are described, while section 4 presents and discusses the results of the empirical analysis. The paper concludes with some final remarks and policy implications in section 5.

## 2. Theoretical background

From a theoretical perspective, the paper is grounded on the literature on the FDI catalyst factors[1].

While studies typically refer to country level characteristics for FDI attraction (Narula and Wakelin, 1998), growing attention is associated to the features of regions, to their capacity to attract FDI and to the possibility that the location choices of MNEs are influenced by local factors (Crescenzi and Iammarino, 2017). The regional level has been studied especially in the case of the location choice of MNEs in Europe (see Basile et al., 2006, 2008; Defever, 2006, 2012; Head and Mayer, 2004), with attention to the Eastern European countries and transition economies (Stack et al., 2017).

The spatial distribution of inward FDI is ruled by a complex set of elements, often interacting among themselves (Casi and Resmini, 2014). Nevertheless, understanding FDI dynamics and attraction factors becomes crucial given the positive role that, under specific circumstances, foreign capital injections have proven to have for recipient economies (Lehnert et al., 2013; Alfaro et al., 2004 and 2010). Indeed, this is a fundamental step for the development of attraction policies.

A first set of variables that have been studied as "pull in" factors for foreign investors include the macroeconomic conditions of the host country (Castellani et al., 2016). Among these, the overall macroeconomic stability of the host country, along with its general conditions in terms of corruption, political stability and quality of legislation (Durham, 2004; Blomstrom et al., 1992; Dellis et al., 2017), or

[1] For a systematic literature review on empirical studies on FDI determinants and effects please refer to Kechagia and Metaxas (2018).

institutions more in general (among others, see: Buchanan et al, 2012; Borin et al., 2014; Peres et al., 2018; Hayat, 2019). In the location decision of foreign companies, however, these aspects mainly operate at national level.

Other elements, instead, have been evaluated both at national and regional level. Among these, market size, approximated in many studies by GDP (Chowdhury and Mavrotas, 2006; Kok and Ersoy, 2009; Zhang, 2002), or purchasing power, captured by per-capita GDP (see, among others, Ford and Strange, 1999; Birsan and Buiga, 2009; Alshamsi et al., 2015). Further investigations have focused also on the structure of the productive sector, including variable such as the number of firms in a host territory (Basile et al., 2008), their average dimension (Arauzo-Carod et al., 2010) or the size of the manufacturing sector (Miller and Eden, 2006; Zeng and Xu, 2019).

FDI has also proved to be sensitive to the presence of agglomeration externalities. Their role is confirmed by the literature (Arauzo-Carod et al., 2010; Bernardini Papalia and Bertarelli, 2009), which is also abundant for the European Union regions case (Basile et al., 2008; Cantwell and Piscitello, 2005; Crescenzi and Rodrìguez-Pose, 2011). Agglomeration effects in the location choices of MNEs are also associated with the presence of previous investments by firms from the same home country (Basile et al., 2008) and by previous FDI in general (Barry et al., 2003). This seems to be particularly relevant for the Chinese OFDI: prior investments from Chinese firms tend to reduce information costs and favours sharing processes on local practices and resources (Crescenzi et al., 2016), thus decreasing business uncertainties (He, 2002). Given that the oversea experience of Chinese firms is relatively recent (the government started to push national companies towards foreign markets after China's accession to WTO in 2001, but until 2005 the Chinese investments abroad remained rather marginal, especially in Europe), the knowledge of their managers about the legal, cultural, social and economic environment of the host location might be scarce (Gao, 2017). Therefore, the possibility to interact with other Chinese investors might help overcoming such gaps more rapidly and effectively.

Availability of innovation can also explain the location choice: FDI can be seen as "an option to maintain access to innovations resident in the host country" (Peng and Wang, 2000, p. 79). The relationship between FDI and the host country's level of technology has been largely studied, especially in the case of R&D-oriented FDI (for a review, see Le Bas and Sierra, 2002). On one side, some multinationals move to foreign countries in order to exploit the technological advantage they developed in their home countries (Kuemmerle, 1999). In other cases, MNEs, especially those coming from developing territories, go abroad to acquire knowledge from high-level technology countries (Kuemmerle, 1998; Pearce and Papanastassiou, 1999). Those two motivations can sometimes be mixed (Le Bas and Sierra, 2002).

Remaining in the analysis of innovation as a determinant of FDI attraction, the existence of local innovation networks has been proven as a key factor explaining foreign subsidiaries' technological capability, therefore FDI seems attracted into regions that can offer external technological economies (Holm and Fratocchi, 1998; Birkinshaw and Ridderstrale 1999; Pearce and Papanastassiou, 1999; Yamin and Otto, 2004). With specific reference to emerging Asian economies, Palit and Nawani (2007) find that the level of domestic technological capabilities and quality of IT-based communication facilities is relevant in explaining the pattern of FDI inflows.

In the overall framework of the analyses of the factors that might affect attractiveness of places, and that can be used as a lever to promote FDI, little attention has been played to the social context.

Among the few available contributions, Crescenzi et al. (2014; 2015), while studying the location strategies of multinationals from emerging countries in the EU Regions, explicitly include a proxy for the socioeconomic profile affecting the innovative capacity of regions, that they call "social filter". The basic idea is that "social filter" conditions can act as proxies for the system of innovation of places and might be a fundamental element influencing locational choice for MNCs. The social filter index is based on educational achievements and on the productive employment of human resources[2]. The authors find out that the index exert a positive and significant effect, even if only for intra-EU investments, and therefore, it might offer a locational advantage for firms, especially for those engaged in the most complex stages of the value chain (Crescenzi et al., 2014).

In a broad sense, social factors can contribute to increase the competitiveness of territories and to define their level of attraction. Saint Louis is an emblematic case in this regard. Investing on art, culture, education and quality of life, the city has been able to transform from one of the most dangerous, polluted and economically depressed are in the US in the mid-1990s, to one of the top five biotechnology hubs in the world only a few years later. The investment in the upgrading of the social conditions of the territory has increased the creativity and innovative capacity of the city, favouring the attraction of biotechnology FDI (including the giant group Monsanto) (Sacco and Pedrini, 2003; Tranel, 2007).

While studying the case of India, Sathe and Handley-Schachler (2006) also find out that social variables have a "measurable effect" on FDI flows. In the same direction go Majocchi and Presutti (2009), reporting the results of polls carried out annually by the consulting firm Ernst & Young (2007). The surveys, directed to a representative panel of international decision makers, regard the perceived attractiveness of Europe as a location for foreign investments. The interviews confirm that aspects related to the quality of life are strong determinants in the investment decisions of managers. More recent editions of the same report (Ernst & Young, 2017 and 2020) continue to highlight the importance of factors such as quality of life and innovative environment.

When taking into account the social sphere, a specific reasoning has to be devoted to the role of unemployment as a possible pull or push factor for FDI. High levels of unemployment might represent an advantage for foreign firms, thanks to the availability of local labour force and the possibility to hire people at low wages (Blanchard, 2011). Nevertheless, high unemployment rates might also be perceived by foreign investors as a symptom of fragility and instability of the country and, therefore, end in discouraging investments (Brozen, 1958). However, undoubtedly, unemployment also represents an important dimension of the social sustainability of a territory and may heavily influence its quality of life, for example by affecting the overall health conditions of the population (Urbanos-Garrido et al., 2015). This is particularly true for long-term unemployment (see, among others, Nichols et al., 2013; Pojola, 2001 and Jin et al., 1995). When it comes to affect young people, long-term unemployment can become a severe impediment to social integration, and therefore it is signalled also by the European Union as a relevant aspect to be taken into account (Kieselbach, 2003). For these reasons, elements related to unemployment and social exclusion of youth have been considered as relevant components of the European Pillars of Social Rights.[3] The incapacity of a society to guarantee opportunities for new generations or to allow unemployed to rapidly find an occupation likely translates into what we might

[2] The first dimension corresponds to human capital accumulation both in the regional population and among employed people, while the second is measured by the percentage of the labour force employed in agriculture and the long-term component of unemployment. See Crescenzi et al. (2015)

[3] https://ec.europa.eu/eurostat/web/european-pillar-of-social-rights.

call social stagnation, with possible impacts also on the economic potential of a territory, which might decrease its attractiveness.

More recently, also de Carvalho et al. (2020) have recalled the need to consider the relationship between social progress and the competitiveness of places, recommending further studies to assess "how can social aspects influence the competitive dynamics" of countries. In our paper, we intend to follow up this invitation by specifically looking to the role of the social context, thus focusing on the following research question: *to which extent spatial allocation of FDI at regional level is affected by various dimensions of the social context?*

To this purpose, we introduce in the analysis two social-related indices: one representing a broad social dimension related to quality of life and social dynamism, and the second approximating education and professional training of the population. To represent these dimensions we have chosen to use composite indicators instead of including the single components, giving the intertwining contribution that they give to shape the social conditions of a territory. Indeed, as already highlighted by Crescenzi et al. 2014, it is the context per se that generates a specific background nourished by a mix of conditions. Such variables in isolation might not have the strength to influence any FDI decision.

## 3. Data and methodology

### *3.1. Database and first descriptive evidences*

Based on the theoretical background described in the previous paragraph, we wish to focus our empirical analysis on the nexus between the social context of regions and FDI attractiveness.

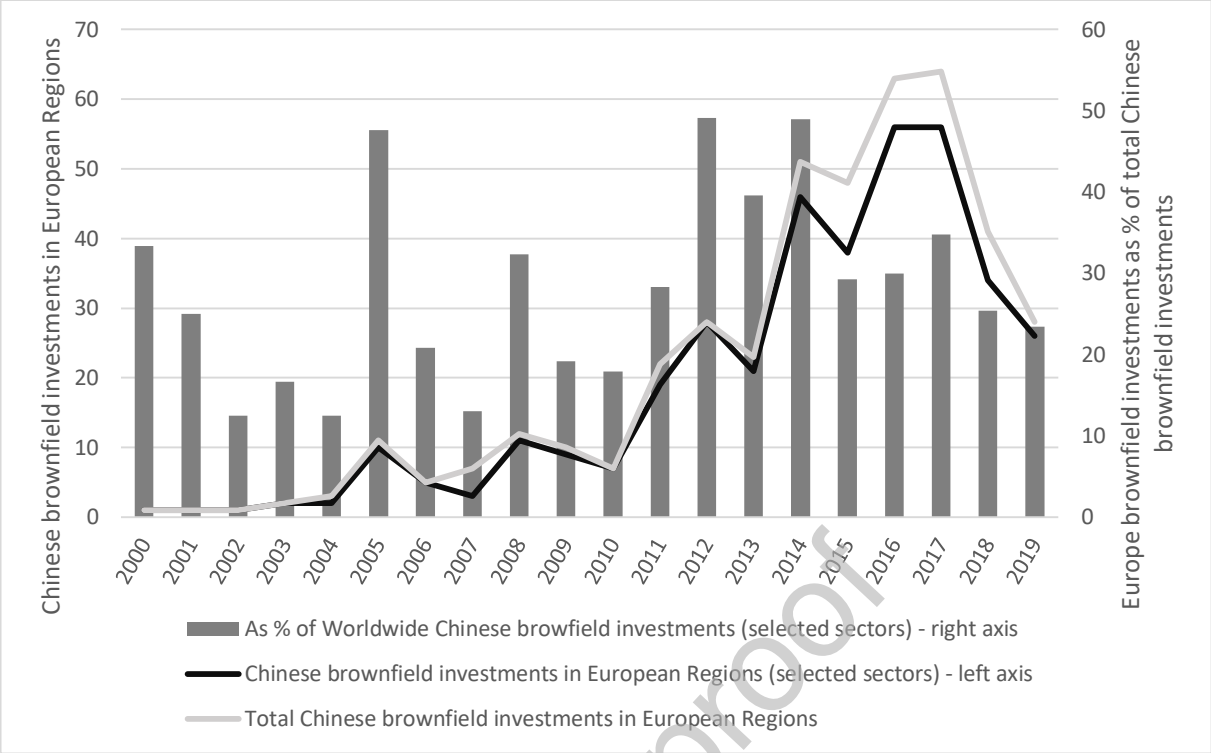
Our study uses a novel dataset, built up by merging different data sources. The first data collection refers to the number of Chinese FDI to Europe. We limit our analysis to brownfield investments. These play a strategic role in Chinese outward oriented strategies, since they potentially allow investors to access external assets (Deng, 2009; Gao, 2017; Alon et al., 2020). Greenfield investments represented around 30% of deals at world level in 2019 (Scissor, 2020) and, also in Western markets, brownfield OFDI have become the preferential mode of entry of Chinese firms, especially after the global financial crisis (Alon et al., 2011; Spigarelli et al., 2015). Recent data show that, in the last decade, 60% of Chinese deals in the continent were represented by mergers and acquisitions, corresponding to 95% of total value (Kratz et al., 2020).

Data on the completed Chinese brownfield investment to Europe were extracted from the Zephyr-Bureau Van Dijk database. It provides detailed information about cross-border M&A – including year of completion, type of deal, and data about the location of the acquired firm. We have collected all cross-border M&A events from 2000 up to 2019. The initial dataset included 542 M&As from Chinese firms to Europe.[4] We then assigned each event to a NUTS2-level recipient region, using the information about the location of the target firm retrieved from Zephyr. After some data cleaning, including the removal of the deals with no identifiable target region, we were left with 375 events across 111 European NUTS-2 regions in 14 countries[5].

[4] We have selected the investments related to the productive filière, broadly intended. We report the list of sectors in table A1 in the Appendix.

[5] Countries are Austria (8 events), Belgium (4), Germany (110), Denmark (9), Greece (1), Spain (18), Finland (10), France (35), Ireland (5), Italy (59), Netherlands (28), Portugal (4), Sweden (11), and UK (73).

Figure 1 – Temporal trend of Chinese brownfield FDI to Europe




Source: authors' elaboration on Zephyr-Bureau Van Dijk data

Figure 1 reports the temporal distribution of all Chinese brownfield FDI related to the whole filière of production (i.e. manufacturing FDI and all FDI in services related to production) (from now on Chinese FDI) in Europe, as well as some comparison with the total Chinese FDI in Europe and FDI worldwide. According to the Zephyr database, the events we include in our sample represent the large majority of brownfield FDI in terms of sector definition, ranging from 78% to 99% of the total between 2000 and 2019. In terms of evolution, a specific dynamic emerges while comparing the trend before and after 2010. Before 2010, the weight of the Chinese investment in Europe on total Chinese investment in the same sectors varies widely, ranging from about 13 percent in 2004 to 57 percent in 2005. After 2010, and especially from 2011 on, the year-to-year range of variation shrinks, and the weight of European FDI on the total is always above 20 percent. Most relevantly, we observe that before 2010 very small numbers of investments – lower that 10 per year – are realized in the European regions[6]. After the global crisis, however, the annual number radically increases. Such growth can be explained in the light of two political and economic dynamics. On one hand, the evolution of Chinese "Go Global" strategy, which has accelerated, in the context of the 11th and 12th Five year Plan, the push of Chinese firms to search for investment opportunities abroad. On the other hand, there has been a raising demand for capital in the aftermath of the sovereign debt and political crisis in Europe between 2009 and 2012, which increased the bargaining power of foreign investors, especially from China, and therefore their capacity to enter the European economy (Meunier, 2014; UNCTAD, 2010; 2011; 2012;

[6] The virtually non-existence of Chinese brownfield investment to Europe before 2011 is well documented in many official and academic sources. Many of these use alternative data sources, and/or measure FDI in value instead of number of events, which adds robustness to our descriptive results on such trend. For example, the briefing issued in May 2017 by Gisela Grieger for the European Parliamentary Research Service (Grieger, 2017), using data from Merics, records very low values of FDI transactions to EU up to 2010, and then a rise from 2010 and 2013 on. Greenfield being the preferred mode of entry into Europe by Chinese firms till 2010 is widely reported by the literature (as for example von Keller and Zhou, 2003; UNCTAD, 2006; Gugler and Boie, 2008; Kittilaksanawong et al., 2014). Later, after the financial crisis, acquisition became the privileged mode of entry (see, among others, Alon et al., 2011).

The Economist, 2010). Given that the phenomenon under scrutiny assumes a certain relevance only from 2010 on, we exclude the previous years from our analysis.

The following step of our empirical work has been to match the brownfield FDI information with various economic and innovation variables on European NUTS-2 level regions retrieved from Eurostat and the European Innovation Scoreboard. After cleaning and controlling for mismatched or missing information, we obtained an unbalanced panel of 249 NUTS-2 level regions, belonging to 19 countries[7], in the 2010-2018 period. The final dataset is obtained by merging this set of data with the one on the 223 FDI events realized in the same time-span.

n on Zephyr-Bureau Van Dijk data

What we observe is that few countries have a leading role as attracting hubs for Chinese capital, such as Germany, the UK, Italy and France. Within these countries, Chinese FDI are relatively widespread across the majority of NUTS2 units. Indeed, a polarization around specific regions seems to emerge, in particular in France and Italy. In other countries such as Spain, Eastern and Northern Europe the distribution of FDI inflows seems to be more heterogeneous across regions than in the more established FDI-attracting countries.

### *3.2. Empirical modelling*

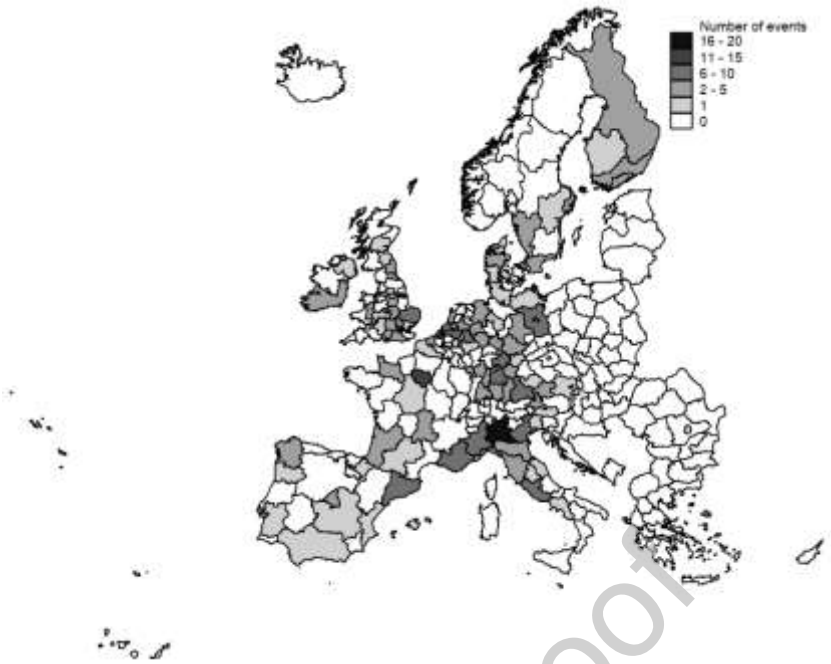
The previous descriptive evidence highlights the heterogeneous distribution of Chinese FDI across countries, but also and especially across regions. Our empirical investigation studies, therefore, the relation between Chinese FDI and potential attractiveness factors at regional level. In particular, we are interested in investigating the role of the social context in affecting the investment allocation of Chinese FDI.

reports the spatial distribution of the Chinese investments across Europe in the selected sectors (hereinafter generically referred to as Chinese investments in Europe) at the end of the period we consider (2018).



[7] The selected regions belong to the following countries: Austria, Belgium, Czech Republic, Germany, Denmark, Estonia, Greece, Spain, Finland, France, Slovenia, Hungary, Italy, Lithuania, Luxembourg, the Netherlands, Poland, Portugal, Romania, Sweden, and the United Kingdom. The panel is unbalanced, given the differentiated availability of Eurostat data across time and territories.

Figure 2 - Cumulative Chinese FDI in European regions - 2018

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In our main models, the dependent variable is the number of new Chinese FDI in region *i* in year *t* (*CHINESE_FDI*). However, the drivers of FDI might change accordingly to the type of sector or the part of the value chain the FDI is targeting (Crescenzi et al., 2014). We explore this possible heterogeneity of the effects by looking at the technological level of the target sector, and split the Chinese FDI sample according to whether they are directed towards high-tech or medium high-tech sectors (*CHINESE_FDI_HT*) or low-tech and medium low-tech sectors (*CHINESE_FDI_LT).* To split the sample, we used Eurostat classification of technology intensity.[8] Next to the main models, therefore, we perform a subgroup analysis using the *CHINESE_FDI_HT* and *CHINESE_FDI_LT* as dependent variables. Table 1 presents summary statistics of the dependent variables.

Table 1 – Summary statistics the dependent variables

| Variable | N | Mean | St. Dev. | Min | Max |
|---|---|---|---|---|---|
| *CHINESE_FDI* | 1,512 | 0.147 | 0.463 | 0 | 4 |

[8] https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:High-tech_classification_of_manufacturing_industries

| | | | | | |
|---|---|---|---|---|---|
| *CHINESE_FDI_HT* | 1,512 | 0.089 | 0.345 | 0 | 3 |
| *CHINESE_FDI_LT* | 1,512 | 0.104 | 0.406 | 0 | 4 |

*CHINESE_FDI* – as well as *CHINESE_FDI_HT* and *CHINESE_FDI_LT* - is a count variable with a skewed distribution and potential conditional overdispersion. Henceforth, it is better modelled via negative binomial techniques (Hilbe, 2011; Long and Freese, 2014).[9] We add regional clustered standard error to allow for correlation of observations related to the same region. [10] The model therefore is as follows:

$$E(Y_{i,t}) = \exp(\boldsymbol{Social}'_{i,t}\boldsymbol{\beta_S} + \boldsymbol{X}'_{i,t}\boldsymbol{\beta_X})$$

Where $\boldsymbol{Y_{i,t}}$ is the dependent variable (either *CHINESE_FDI*, *CHINESE_FDI_HT* or *CHINESE_FDI_LT*), $\boldsymbol{Social_{i,t}}$ is a vector including our variables of interest related to the social sphere, and $\boldsymbol{X_{i,t}}$ is a vector of controls encompassing innovation, market structure and economic performance variables.

### *3.3.1.* Main variables of interest – *Social*

To study the effect of the social dimension (***Social***), we have focused on several variables related to quality of life at large, looking both at the main tools developed by European institutions to analyse the social sphere and at the consolidated literature on the topic. We have henceforth built up two variables. Both are composite indicators, which aim at measuring different dimensions of the social sphere.[11]

[9] A number of studies on FDI drivers models FDI localization through choice models. Therefore, they use methods such as mixed logit or nested logit (see Crescenzi et al. 2014; Basile et al., 2008). These models, however, work the best with larger number of cases – indeed, Crescenzi et al., 2014 includes over 19,000 events, while Basile et al., 2008 is based upon more than 5,500 events. In our case, applying a nested model with a reduced number of cases - as the ones we are analysing - would yield unstable results and force us to use too parsimonious models that might fail to include relevant variables. For a robustness check, however, we have run a nested logit model using the variables in the baseline specification (see Table 3). The results are available upon request to the authors and they confirm the general interpretation related to our variables of interest.

[10] Our model does not exclude the existence of endogeneity. Although in general a bi-directional relation between social context and FDI is widely acknowledged, in our case the possible bias resulting from reverse causality should be limited. This is because Chinese FDI are a phenomenon that is small in scale: the total amount of FDI we observe is 375, which lowers to 202 in the regressions due to missing data in the controls. Indeed, also other papers that analyse FDI flows that are far wider in numbers than ours (as, for instance, Crescenzi et al., 2016) do not control for endogeneity between social conditions and FDI flows. Our intuition is that they do not do so because social context changes at a slow pace, mostly following long economic cycles or exogenous shocks. Of course, FDI could affect such change; however, this can be the case when they represent a relevant phenomenon – usually in developing regions – that is able to clash with existing economic and social institutions. Conversely, a reduced phenomenon such as Chinese FDI in a mature economic context like the European Union does not appear to have this potential, at least in the current times.

[11] While constructing a composite indicators inevitably implies arbitrary choices by the researcher such as the aggregative methods and the choice of weights, we have preferred composite indicators over other methodologies for the following reasons: although principal component and factor analysis have been widely used to generate synthetic indices, they have also been criticized for their data-driven approach (see Greco et al., 2019 for a theoretical discussion). Also, PCA is a mathematical reduction which is not necessarily consistent with a theoretical interpretation – in other words, there is no guarantee that the weights generated via PCA have any socio-economic meaning (Somarriba and Pena, 2009). Consequently, a wide range of studies, both in the academic debate and in the international organization realm, now use less reductionist methods for building indices. For example, Mazziotta and Pareto (2017, 2019) explicitly support the idea that in order to properly represent the multidimensionality of development and well-being, synthetic indices and composite indicators should be preferred to approaches aimed at reducing dimensionality such as factor analysis. Indeed, the present study is not intended at identifying which single variable, among a larger range, drives more a specific trend. Rather, we wish to provide a comprehensive representation of the phenomena. Furthermore, the choices of the aggregative method and weights we have used are grounded on already existing composite indicators measuring aspects related to what we want to assess: QUAL_LIFE, which is a geometric mean of equally-weighted variables, is based on the methodology used by UNDP to build up the Human Development Index (UNDP, 2018); for FRAM_COND, EDUC_ATT and PUBL, that are arithmetic means of equally-weighted variables, we have followed the European innovation index (Hollanders et al., 2019).

The first variable (*QUAL_LIFE*) is inspired by the components of the European Pillars of Social Rights.[12] The latter observe large number of variables to assess the social conditions and quality of life of the European population, divided in three pillars: *Dynamic labour markets and fair working conditions; Equal opportunities and access to the labour market;* and *Public support / Social protection and inclusion*. For each pillar, we have selected one variable, based on the availability of data:

- for *Dynamic labour markets and fair working conditions*, we have selected the so called NEET, the percentage of young people (15 to 34 years old) neither in employment nor in education and training (*NEET*);

- for *Equal opportunities and access to the labour market*, we have selected the percentage of long-term unemployed workers (for 12 months or more) on total unemployment (*LT_UNEMP*). This variable has already been identified as a relevant social framework condition for FDI attractiveness to proxy the productive employment of human resources (Gordon, 2001; Crescenzi et al., 2015);

- for *Public support / Social protection and inclusion*, we have taken life expectancy at the age of 65 (*ELD_LIFEXP*). The health status of the host country's population has been investigated as a relevant FDI factor by Azémar and Desbordes (2009) and Alsan et al. (2006), who found that total FDI is positively and significantly related to the health status.

These three variables have been recombined in a unique index (*QUAL_LIFE*), built so that the higher the index, the better the social conditions represented. To do so, we have calculated the inverse of *NEET* (*INV_NEET*) and *LT_UNEMP* (*INV_LT_UNEMP*), so that lower values of them correspond to an increase in the index.

*INV_NEET*, *INV_LT_UNEMP* and *ELD_LIFEXP* are then standardized via *minmax* procedure in order to vary between 0 and 100. Finally, they are recombined in *QUAL_LIFE*, which is given by the geometrical mean of the standardized variables:

$$QUAL\_LIFE = [STD(INV\_NEET) * STD(INV\_LT\_UNEMP) * STD(ELD\_LIFEXP)]^{1/3}$$

For the second index representing the social sphere, we took into consideration variables related to framework conditions of education, training and research. Educational attainments are widely used by the international literature and international organizations as a relevant component of social wellbeing (Sen, 1991; ul Haq, 2003). The availability of highly educated workforce and strong research can be an attractor for FDI (EIU, 2007; Cantwell and Piscitello, 2005).

In order to build the variables, we have once again referred to the elaboration done within the European Union institutions. In particular, a rich source of inspiration is represented by the Regional Innovation Scoreboard and the Regional Innovation Index (Hollanders et al., 2019).[13] While this

[12] The literature has also looked at social conditions elaborating and identifying other types of indices for social progress (Porter et al., 2014) or social conditions potentially affecting FDI localization (Crescenzi et al., 2015). The elaboration included in Porter et al. (2014) has also been used by European institutions to generate a complex and rich European Index of social progress (see https://ec.europa.eu/regional_policy/en/information/maps/social_progress). However, we could not use it given the lack of data for less recent years included in our paper. Compared to the *social filter index* developed by Crescenzi et al. (2014, 2015), we refer to a broader definition of social conditions, also including aspects related to the quality of life at large.

[13] The Regional Innovation Scoreboard is derived from the European Innovation Scoreboard (Hollanders, 2020). Similarly to the latter, it includes variables representing various dimensions of the innovative activities, such as framework conditions, investments, innovation activities, and impacts. At the national level, the set of variables encompasses, among other things, the R&D and innovative activities of all private firms. Given the lack of such data for all firms at the regional level, the RIS considers this type of activities only for Small and Medium Enterprises. For a complete list of the variables included in the RIS see Hollanders et al. (2019).

scoreboard encompasses various indicators of different dimensions of innovation (see next section), some of the included variables also represent education attainment, which is relevant for the social sphere too. This is the case in particular of the variables that the Regional Innovation Scoreboard classifies as *framework conditions*: (1) the percentage of 30-34 years old population with tertiary (*TERT_EDUC*); (2) the percentage of 25-64 years old population involved in lifelong learning activities (*LONGLIFE_LEARN*); (3) the percentage of worldwide top 10% scientific co-publication (*TOP_PUB*) 4) the number of international co-publications per million population (*INT_COPUB*).

Starting from these premises, we have built a first composite index (*FRAM_COND*), incorporating these four variables. *FRAM_COND* is built following the methodology used in the Regional Innovation Index (Hollanders et al., 2019): *TERT_EDUC, LONGLIFE_LEARN, TOP_PUB* and *INT_COPUB* are normalized as the deviation from their average in the European Union in 2011, and then aggregated in the index in an additive form (arithmetic unweighted mean):

$$FRAM\_COND = \frac{[norm(TERT\_EDUC) + norm(LONGLIFE\_LEARN) + norm(TOT\_PUB) + norm(INT\_COPUB)]}{4}$$

In the baseline model, we use *QUAL_LIFE* and *FRAM_COND*. *FRAM_COND*, however, includes two types of variables. On one hand, *TERT_EDUC* and *LONGLIFE_LEARN* proxy the education and training of working-age population, which we might consider as one of the inputs for the innovative capacity of a territory. On the other hand, *TOP_PUB* and *INT_COPUB* are rather a measure of research outputs. This means that these two types of variables are different in nature. In addition, only the first one captures aspects related to the social conditions, being linked to educational attainment. For these three reasons, we also study such variables by splitting *FRAM_COND* into two new components: *EDUC_ATT*, which includes the variables related to education and training, and *PUBL*, which includes the aspects on published research.

$$EDUC\_ATT = \frac{[norm(TERT\_EDUC) + norm(LONGLIFE\_LEARN)]}{2}$$

$$PUBL = \frac{[norm(TOT\_PUB) + norm(INT\_COPUB)]}{2}$$

#### *3.3.2.* Controls

Next to the main variable of interest, we control for other possible sources of FDI attractiveness. A first series of controls is related to market structure and economic attractiveness. In particular, we add the following variables:

- *AGGLOM_FDI_CHINA*: total number of Chinese FDI in region *i* from 2000 up to t-1 (before 2000, Chinese FDI in Europe were virtually irrelevant in number, see Spigarelli, 2010; Gao, 2017). With this variable, we aim to capture the attraction effects on a territory exerted by existing previous Chinese FDI. This is even more relevant given the peculiarity of Chinese OFDI, which not only find synergies in following an "herd" approach (Qi and Liu, 2015), but also respect government indications when investing abroad, trying to fit with the general investment and growth purpose of the home country (Liu et al., 2018), also in the strategic choice of the localities where to invest;

- *AGGLOM_FDI_WORLD*: total number of non-Chinese FDI in region *i* from 2000 up to t-1. Chinese FDI could also be sensitive to the presence of other foreign actors. The latter might signal opportunities to leverage the experience and performance of earlier investors – and therefore to decrease the risks connected to information asymmetries - and suggest that the region has already acquired a certain level of internationalization and openness and shows economic potential (Casi and

Resmini, 2010). Previous studies have already identified this effect, for example, in the cases of Hungary (Boudier-Bensabaa, 2010), Vietnam (Nguyen et al., 2005), China (Head and Ries, 1996; Cheng and Ruan, 2004), France (Crozet et al., 2004), or Portugal (Guimaraes et al., 2000);

- *Pc_GDP*: per capita GDP in region *i* at year *t*. It represents the average expenditure capacity of the inhabitants of the region, i.e. their purchasing power (Ford and Strange, 1999; Birsan and Buiga, 2009; Alshamsi et al., 2015). The effects of this determinant have been widely debated. Some studies have assigned a positive role to per capita GDP (Scaperlanda and Mauer, 1972), also in the case of Chinese investors (Buckley et al., 2007; Zhang and Daly, 2011), while others have instead highlighted a negative or null impact. This might depend on the rationale behind FDI location choice: when the investors choose the host location as a gateway to local markets, then the local purchasing power is a relevant determinant. If instead the location is selected as a base for exporting to neighbouring areas, or for acquiring technological competence, the local purchasing power may lose importance (Nunnenkamp, 2002; Loree and Guisinger, 1995) and other costs-related advantages may be sought by the investor;

- *MANUF_INTENSITY*: ratio of people employed in manufacturing on total employment in region *i* at year *t*. In presence of a strong manufacturing tradition, foreign capitals might seek to absorb from the recipient economic environment knowledge on managerial processes, organization of production and technologies (Miller and Eden, 2006; Zeng and Xu, 2019). On the other hand, a strong industrial density might discourage the entry of foreign companies, since this might imply a potentially more competitive environment;

- *AVG_FIRMS_SIZE*: average number of employees per firm in manufacturing in region *i* at year *t*. Also average firm size could work in different directions on FDI attractiveness. On the one hand, even with a weak manufacturing environment, the presence of large firms may work as attractor for new investment, since they may own the high-tech and managerial knowledge that foreign investors in some cases are looking for[14]. However, also small-firm clusters and industrial districts can be powerful attractors of foreign capital, thanks to the presence of agglomeration economies which play a key role in the location choice of MNEs (for a survey, see Arauzo-Carod et al., 2010);

- *N_FIRMS*: number of firms in manufacturing region i at year t. By adding this variable, we wish to control for the actual possibility of foreign actors to buy local firms (or foreign firms located in the region) (Basile et al., 2008).

The second set of controls is related to the innovation dimension. Also in this case, we have referred to the Regional Innovation Scoreboard. Using the variables considered to build the RIS, we have constructed a single variable and one composite indicator[15], according to the different dimensions of innovation. Namely, they refer to:

[14] Such source of attractiveness would be better proxied via a variable representing the number of large firms in a region. However, to the best of our knowledge there is no such data available in the main regional-level databases for Europe (such as Eurostat and Oecd).

[15] The regional innovation scoreboard also includes an additional set of variables representing innovation activities (see Hollanders et al., 2019). This dimension is made of ten variables, mostly related to SME innovation implementation, linkages among actors, and production of intellectual assets. We have also considered this dimension by constructing a dedicated composite indicator (INNO_ACT). Such indicator, however, appeared to be correlated with both INV_TOT and PUBL, and therefore we excluded it from the analysis. For a robustness check, we have also run specifications different from the ones presented in the paper: either including all the three variables (INNO_ACT, INV_TOT and PUBL), or including INNO_ACT and excluding INV_TOT and PUBL. The results are in line with the ones presented here, and are available upon request.

- *INNO_EMPL:* employment in medium-high and high-tech manufacturing and knowledge-intensive services as a percentage of total employment in region *i* at year *t*. This variable describes the level of specialization in high-tech activities, which can be considered a proxy of the presence of technology and knowledge spillovers, of a pool of skilled workers and of high-quality inputs and services (Casi and Resmini, 2010);

- *INV_TOT*: Investments in innovation in region *i* at year *t*. The index includes business sector R&D investments, public R&D investments, and innovative investments in non-R&D activities.[16] It proxies the innovative financial effort of the public and private sector directly devoted to increasing R&D and innovation[17]. Park et al. (2020) find that, in the case of host developed countries, private R&D investment is positively associated with attracting FDI. Similarly to *FRAM_COND*, this index is built following the Regional Innovation Index: each variable is normalized as the deviation from the 2011 EU average, and then aggregated in the index in an additive form (arithmetic unweighted mean).

Finally, we also add to the model time and country dummies, to control for the economic cycle and to partially proxy for different institutional frameworks.[18] Table 2 presents summary statistics and sources for the variables, while a correlation table is reported in the Appendix (Table A2).

Table 2. Summary Statistics of the independent variables

| Variable | N | Mean | St. Dev. | Min | Max | Source |
|---|---|---|---|---|---|---|
| *AGGLOM_FDI_CHINA* | 1,512 | 0.229 | 1.076 | 0 | 13 | Zephyr-Bvd |
| *AGGLOM_FDI_WORLD* | 1,512 | 7.248 | 6.117 | 0 | 18 | Zephyr-Bvd |
| *Pc_GDP* | 1,512 | 28368.850 | 16155.290 | 3600 | 227300 | Eurostat |
| *MANUF_INTENSITY* | 1,512 | 0.159 | 0.072 | 0.022 | 0.386 | Eurostat |
| *AVG_FIRMS_SIZE* | 1,512 | 17.853 | 11.572 | 2.865 | 82.597 | Eurostat |
| *N_FIRMS* | 1,512 | 8728.521 | 9898.917 | 552 | 101861 | Eurostat |
| *INNO_EMPL* | 1,512 | 103.528 | 39.503 | 2.400 | 223.200 | Authors' elaboration on Regional Innovation Scoreboard |
| *INV_TOT* | 1,512 | 92.393 | 23.664 | 17.633 | 180.233 | Authors' elaboration on Regional Innovation Scoreboard |
| *QUAL_LIFE* | 1,512 | 0.054 | 0.039 | 0.019 | 0.872 | Authors' Elaboration on Eurostat |
| *FRAM_COND* | 1,512 | 101.696 | 39.092 | 10.075 | 217.350 | Authors' elaboration on Regional Innovation Scoreboard |
| *EDUC_ATT* | 1,512 | 93.730 | 42.538 | 5.150 | 253.850 | Authors' elaboration on Regional Innovation Scoreboard |
| *PUBL* | 1,512 | 103.044 | 37.541 | 10.500 | 241.450 | Authors' elaboration on Regional Innovation Scoreboard |

[16] The original variables are: 1) R&D expenditure by the public sector as percentage of GDP; 2) R&D expenditure by the business sector as percentage of GDP; and 3) SMEs Non-R&D innovation expenditure as percentage of total turnover.
[17] For a discussion on possible measures for innovation within an economic unit, see Paci and Usai (2000).
[18] As for the variables related to institutional characteristics at the regional level, although various examples exist at the regional level of indices approximating institutional quality (see e.g. Charron et al., 2019; Nifo and Vecchione, 2014; Agostino et al., 2020), to the best of our knowledge there is a lack of available data for a sufficiently long time span, as that considered in our study.

## 4. Results and discussion

### *4.1. Main specification*

Table shows the results of the main specification of the model: in column 1 the model with the aggregated variable for framework conditions (*FRAM_COND*) is presented, while in column 2 *FRAM_COND* is split between the human capital component (*EDUC_ATT*) and the basic research component (*PUBL*). First of all, Chinese FDI seem to prefer regions with a larger presence both of Chinese investors (*AGGLOM_FDI_CHINA*) and of foreign ones (*AGGLOM_FDI_WORLD*). The first result confirms a snowball effect that has been already observed in other studies (Bronzini, 2007; Qi and Liu, 2015; Liu et al., 2018). The second one points towards the importance conferred by Chinese FDI to the level of openness and internationalization that the region shows, as proxied by the presence of multinational enterprises. In addition, we observe a negative and significant (although mild) effect of per capita GDP (*Pc_GDP*). This result might indicate that a relatively high number of Chinese FDIs is more interested in localising in relatively poor regions of Europe. Interestingly, the variables related to the manufacturing weight and structure (*MANUF_INTENSITY, AVG_FIRMS_SIZE* and *N_FIRMS*) do not influence the choice of Chinese capital.

Table 3- Main model

| | (1) | (2) |
|---|---|---|
| *AGGLOM_FDI_CHINA* | 0.319*** | 0.316*** |
| | (5.76) | (5.71) |
| *AGGLOM_FDI_WORLD* | 0.206*** | 0.210*** |
| | (6.93) | (6.89) |
| *Pc_GDP* | -4.33e-06* | -4.80e-06* |
| | (-1.77) | (-1.90) |
| *MANUF_INTENSITY* | 0.996 | 1.464 |
| | (0.47) | (0.68) |
| *AVG_FIRMS_SIZE* | -0.023 | -0.014 |
| | (-1.44) | (-0.89) |
| *N_FIRMS* | 4.65e-06 | 2.49e-06 |
| | (0.69) | (0.36) |
| *INNO_EMPL* | 0.003 | 0.002 |
| | (0.92) | (0.72) |
| *INV_TOT* | 0.002 | 0.001 |
| | (0.34) | (0.09) |
| *QUAL_LIFE* | 1.145*** | 1.018** |
| | (2.59) | (2.29) |
| *FRAM_COND* | -0.010* | |
| | (-1.79) | |
| *EDUC_ATT* | | -0.0093 |
| | | (-1.11) |
| *PUBL* | | -0.005 |
| | | (-0.10) |
| *Constant* | -4.025*** | -4.191*** |

| | | |
|---|---|---|
| | (-4.23) | (-4.42) |
| *Constant(lnalpha)* | -1.647** | -1.732** |
| | (-2.27) | (-1.91) |
| *N* | 1512 | 1512 |
| *ll* | -463.308 | -460.753 |
| *BIC* | 1219.490 | 1221.676 |
| *AIC* | 1006.616 | 1003.507 |
| *Chi2* | 13270.744 | 14501.485 |
| *Chi2 Pvalue* | 0.000 | 0.000 |
| *Pseudo_R2* | 0.290 | 0.294 |

Source: authors' elaboration. All models are negative binomial with clustered standard errors. Z statistics in brackets.

At the same time, Chinese investors do not show a particular sensitivity towards the indicators approximating the innovative performances of territories: both *INNO_EMPL* and *INV_TOT* are not significant in both models.

Some interesting results, however, can be found when looking at our main variables of interest, representing the effect that the social sphere can have to attract FDI. First, looking at *QUAL_LIFE*, our results highlight that a better social context encourages Chinese investors to enter the regional market. This is in line with the idea that it can contribute to boost the attractiveness of places (Kolstad and Tøndel, 2002). Second, we find less strong evidence with respect to educational attainments and research framework conditions (*FRAM_COND)*, and their components (*EDUC_ATT* and *PUBL*). In particular, we find that, at most, good territorial performances related to such aspects are detrimental to the attraction of Chinese FDI. However, when we split the variable to assess whether Chinese FDI are more sensitive to human capital or to basic research, we do not find any evidence, as neither *EDUC_ATT* nor *PUBL* are significant. According to our interpretation, this result is consistent with the negative impact of per capita GDP highlighted above, and confirms that Chinese investors seem to prefer relatively poorer regions, both in terms of income and of human capital endowment.

Two preliminary considerations can be drawn from this first evidence. First, our results suggest that different dimensions of the social sphere can exert a different role in FDI attraction. This partially explains the results of Crescenzi et al. (2015), who find out that soft innovation related to the socio-institutional conditions are not significant attractors for emerging countries firms investing in the EU regions.

Second, our results on framework conditions are to be read also in the light of what previous studies on Chinese investments have found (Ninni et al., 2020). Indeed, this previous contribution has shown a negative effect of education on Chinese FDI. This can be explained, *ceteris paribus* other relevant variables related to innovation, as a disincentive to invest in regions with more qualified, and therefore more expensive human capital, and in regions that produce knowledge that is more distant from the market. However, such effects might be relevant only for specific types of FDI. In particular, they might be strong for those FDI targeting sectors more sensitive to cost factors and not requiring specific assets embedded in well-educated and well-trained workforce (such as productions with a lower technological content, that is low-tech or medium low-tech , hereinafter low-tech, sectors). They, instead, might be weaker (or irrelevant) for FDI targeting high-tech and medium high-tech (hereinafter high-tech) sectors. In order to assess this aspect, we move to the subgroup analysis.

*4.2. Subgroup analysis: exploring the heterogeneity of FDI target sectors*

Table 4 shows the results of the subgroup analysis, according to whether the FDI targets firms in high-tech sectors (column 1), or low-tech sectors.

Table 4 – Subgroup analysis

| | (1)<br>High-tech and Medium high-tech FDI | (2)<br>Low-tech and Medium low-tech FDI |
|---|---|---|
| *AGGLOM_FDI_CHINA* | 0.301*** | 0.355*** |
| | (4.53) | (4.63) |
| *AGGLOM_FDI_WORLD* | 0.085*** | 0.041 |
| | (3.05) | (0.62) |
| *Pc_GDP* | -7.73e-07 | -7.73e-07 |
| | (-0.22) | (-1.07) |
| *MANUF_INTENSITY* | 3.615 | 0.395 |
| | (1.17) | (0.12) |
| *AVG_FIRMS_SIZE* | -0.021 | -0.014 |
| | (-1.09) | (-0.58) |
| *N_FIRMS* | 4.61e-06 | 4.61e-06 |
| | (0.42) | (0.72) |
| *INNO_EMPL* | -0.001 | 0.014*** |
| | (-0.17) | (2.94) |
| *INV_TOT* | 0.007 | 0.010 |
| | (1.06) | (1.24) |
| *QUAL_LIFE* | 1.643** | -1.335 |
| | (2.40) | (-0.79) |
| *EDUC_ATT* | 0.002 | -0.024* |
| | (0.15) | (-1.79) |
| *PUBL* | -0.007 | 0.004 |
| | (-1.00) | (0.44) |
| *Constant* | -5.925*** | -4.632*** |
| | (-3.89) | (-3.47) |
| *Constant(lnalpha)* | -0.993 | -0.552 |
| | (-0.71) | (-0.97) |
| *N* | 1512 | 1512 |
| *ll* | -358.501 | -385.877 |
| *BIC* | 1009.849 | 1071.922 |
| *AIC* | 797.002 | 853.753 |
| *Chi2* | Missing | 14216.226 |
| *Chi2 Pvalue* | Missing | 0 |
| *Pseudo_R2* | 0.213 | 0.239 |

Source: authors' elaboration. All models are negative binomial with clustered standard errors. Z statistics in brackets.

The results highlight few differences in the drivers that attract high-tech FDI compared to that relevant for low-tech ones. First, for both types of flows the presence of previous Chinese investors in the region appears crucial. Conversely, we observe a sensitivity to previous international investors, representing the level of openness, only for the case of high-tech FDI. Secondly, it seems that the size of high-tech and knowledge-intensive sectors has a positive effect in attracting low-tech FDI, while no

effect emerges for high-tech FDI. As regards our variables of interest, they have different and opposite effects according to the technology intensity of the FDI target sector. Quality of life factors (*QUAL_LIFE*) work as a driver for high-tech FDI and educational attainments (*EDUC_ATT*) have no effect in this regards. Conversely, the latter has an opposite effect for low-tech FDI, discouraging them, while no effect is observed for *QUAL_LIFE*.

From these results, it emerges that the type of target sector is very relevant in mediating the effect that several potential drivers exert: regions that have already a tradition of openness to foreign firms – both Chinese and non-Chinese – are better candidate to attract high-tech FDI. This might be related to a growing interest of Chinese FDI for more and more sophisticated high-tech productions, in which also investors from other countries are actually interested (Hanemann and Rosen, 2014). This race for technology reflects at regional level a larger attractiveness for Chinese investors of territories hosting other FDI. However, the null impact of the variables related to the dimension of high-tech sectors, and both input and output measures of human capital (education attainment and publications) seem to indicate that Chinese investors tend to acquire firms positioned in the lower bound of high-tech sectors. A closer look to our data give indications that are consistent with such intuition: 130 out of the 197 Chinese FDI that fall in this subgroup target sectors that are classified as medium high-, rather than high-, tech. These findings are consistent with a descriptive evidence already highlighted by the literature, according to which Chinese investments in Europe would tend to approach firms and sectors that are less strategic in the eyes of European governments and institutions, which adopt more stringent investment screenings for more high-tech and core productions (Kratz et al., 2020). To further verify this aspect, we would need data looking more in depth in the production phases the target company is focused on (R&D-intensive phases, design activity, assembly, commercialization, and so forth). Our data do not allow us to disentangle FDIs according to this aspects, yet this represents an interesting aspect to be investigated more in depth in future researches.

High-tech FDI is also attracted by those areas that have a good quality of life – encompassed in *QUAL_LIFE*. Good social conditions might indicate to foreign investors a certain dynamicity of the society and of the host economy.

Low-tech FDI, conversely, show a different behaviour, in particular for what concerns educational attainment and innovative resources at the local level. On the one hand, the negative effect of *EDUC_ATT* confirms that low-tech FDI are discouraged, *ceteris paribus*, by the presence of more costly workforce. At the same time, these investors are prone to exploit the opportunities given by the presence of an innovative environment, represented by the positive effect associated to *INNO_EMPL*. In other words, we might say that Chinese investors targeting European low-tech firms are interested in upgrading, but at the same, they are not willing to do it by hiring well-educated local workforce. Locating in an area with a larger high-tech sector might anyway offer them the possibility to access knowledge externalities produced by local innovation networks.

## 5. Concluding remarks and policy implications

The main finding of our empirical work is that *the social context matters*: it has, in fact, shown to be positively associated with the FDI attracted to the region, capturing, in particular, aspects that are not directly related with other traditional attractors of FDI, such as innovation or knowledge.

This has some relevant implications in term of policy design.

To begin with, while implementing traditional initiatives aimed at favouring FDI localization (such as fiscal incentives, R&D subsidies, etc., see OECD, 2000), particular attention has to be paid to possible unexpected or underestimated consequences (backlashes) of these measures on the local social context. In fact, worsening in social conditions might undermine the policy efficacy in terms of foreign capital attraction.

In addition, policymakers should be aware that a boost in FDI might also indirectly come from policies aimed at fostering the social progress of territories. This is not to suggest that social policies should be used to directly attract foreign companies, as they are clearly aimed at reaching other kinds of objectives, which are valued per se. What we instead want to underline is that, while implementing such initiatives, positive or negative spillover effects on FDI might arise, indirectly affecting the competitiveness of territories. The complexity of this scenario is also linked to the articulated impact of the different dimensions of social context on FDI. Indeed, our results point to a heterogeneous effect of the social indices on FDI, according to the technological intensity of the targeted sectors. While for high-tech FDI quality of life has a positive impact, such effect disappears in the case of low-tech FDI, for which, instead, educational attainment exerts a negative effect.

Of course, these policy implications assume that the promotion of FDI is a desirable factor. It has to be said that the literature has emphasised the fact that this is not always the case. For example, many developing and emerging economies have been actively seeking to attract FDI. In doing so, they have engaged in what has been called a global "bidding war", consisting in an uncontrolled pressure on global standards of protection of the environment and/or social conditions of people and workers (see, among others, OECD, 2000; Herman et al., 2004; Lehnert et al., 2013; Lee and Vivarelli, 2006).

In this context, our work also represent an occasion to further stress how the analysis of industrial policy is not only a discussion about the best means to achieve given goals, but also a reflection about which long-term societal objectives it should contribute at achieving (Andreoni and Chang, 2016; Andreoni and Scazzieri, 2014; Di Tommaso and Schweitzer, 2013; Di Tommaso et al., 2020a).

Indeed, some of our findings might be specific, due to the case we consider, i.e. Chinese investments. Some drivers of location choice might be very peculiar of the "Chinese case". On one side, one evidence is the result that *Chinese capital follows Chinese capital*, which is coherently found across all specifications: new FDI are attracted by previous Chinese FDI located in the same region. The reasons behind such behaviour become clear considering the political economy of Chinese outward FDI: these are in fact used by China's national and provincial governments as a strategic lever to improve their systemic efficiency, to facilitate the access to technological, market and resource assets, as well as to improve international geo political relevance (Spigarelli, 2010; Di Tommaso et al., 2013; Clegg and Voss, 2014; Di Tommaso et al., 2020a).[19] Moreover, as it has been widely documented, the existence in a territory of Chinese communities with a consolidate experience on the recipient environment helps overcome obstacles concerning knowledge of the local environment and pave the way to new investments (Liu et al., 2018). Another element to consider in terms of potential specificity of "Chinese case", is that investors tend to be particularly sensitive to non-economic aspect, due to cultural and political motivations, as other studies have highlighted (Vaccarini et al., 2016, 2017). For

[19] The capacity of the government to steer the behaviour of firms towards its aims is, of course, higher in the case of State Owned Enterprises. Therefore, if we consider that SOEs has represented the majority of Chinese FDI (Gao, 2017), it is reasonable to assume that the concentration of Chinese capital in certain localities is also the result of direct or indirect choices of the government in terms of resource seeking, market exploration, knowledge and technology transfer. In some cases, this is also coupled with the need of rebalancing China's assets and liabilities (Gao and Coffman, 2013).

this reason, the external validity of our findings need to be confirmed by further studies focusing on other countries of origin.

In terms of future lines of research, the analysis might also benefit from specific case studies carried out by means of primary data collected through interviews and surveys to foreign investors about their location choices. Moreover, our data only take into account brownfield FDI. It might be interesting to extend it to greenfield investment, which might follow different patterns and be sensitive to different drivers. Finally, given the multidimensional nature of the social context, which is difficult to capture with the available data, future research might be grounded on specific data collections aimed at gathering more information on the social components, so as to enlarge the domain of the analysis.

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## Appendix

Table A1 – list of NACE Rev.2 sectors included in the sample of FDI

| Code | Description |
|---|---|
| 01 | Crop and animal production, hunting and related service activities, |
| 02 | Forestry and logging, |
| 03 | Fishing and aquaculture, |
| 05 | Mining of coal and lignite, |
| 06 | Extraction of crude petroleum and natural gas, |
| 07 | Mining of metal ores, |
| 08 | Other mining and quarrying, |
| 09 | Mining support service activities, |
| 10 | Manufacture of food products, |
| 11 | Manufacture of beverages, |
| 12 | Manufacture of tobacco products, |
| 13 | Manufacture of textiles, |
| 14 | Manufacture of wearing apparel, |
| 15 | Manufacture of leather and related products, |
| 16 | Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials, |
| 17 | Manufacture of paper and paper products, |
| 18 | Printing and reproduction of recorded media, |
| 19 | Manufacture of coke and refined petroleum products, |
| 20 | Manufacture of chemicals and chemical products, |
| 21 | Manufacture of basic pharmaceutical products and pharmaceutical preparations, |
| 22 | Manufacture of rubber and plastic products, |
| 23 | Manufacture of other non-metallic mineral products, |
| 24 | Manufacture of basic metals, |
| 25 | Manufacture of fabricated metal products, except machinery and equipment, |
| 26 | Manufacture of computer, electronic and optical products, |
| 27 | Manufacture of electrical equipment, |
| 28 | Manufacture of machinery and equipment nec, |
| 29 | Manufacture of motor vehicles, trailers and semi-trailers, |
| 30 | Manufacture of other transport equipment, |
| 31 | Manufacture of furniture, |
| 32 | Other manufacturing, |
| 33 | Repair and installation of machinery and equipment, |
| 35 | Electricity, gas, steam and air conditioning supply, |
| 36 | Water collection, treatment and supply, |
| 38 | Waste collection, treatment and disposal activities; materials recovery, |
| 39 | Remediation activities and other waste management services, |
| 41 | Construction of buildings, |
| 42 | Civil engineering, |
| 43 | Specialised construction activities, |
| 45 | Wholesale and retail trade and repair of motor vehicles and motorcycles, |
| 46 | Wholesale trade, except of motor vehicles and motorcycles, |
| 47 | Retail trade, except of motor vehicles and motorcycles, |
| 49 | Land transport and transport via pipelines, |
| 50 | Water transport, |
| 51 | Air transport, |
| 52 | Warehousing and support activities for transportation, |
| 53 | Postal and courier activities, |
| 55 | Accommodation, |
| 56 | Food and beverage service activities, |
| 58 | Publishing activities, |
| 59 | Motion picture, video and television programme production, sound recording and music publishing activities, |

| | |
|---|---|
| 60 | Programming and broadcasting activities, |
| 61 | Telecommunications, |
| 62 | Computer programming, consultancy and related activities, |
| 63 | Information service activities, |
| 72 | Scientific research and development, |
| 73 | Advertising and market research, |
| 74 | Other professional, scientific and technical activities, |
| 75 | Veterinary activities, |
| 82 | Office administrative, office support and other business support activities, |
| 90 | Creative, arts and entertainment activities, |
| 91 | Libraries, archives, museums and other cultural activities, |
| 92 | Gambling and betting activities, |
| 93 | Sports activities and amusement and recreation activities, |
| 95 | Repair of computers and personal and household goods, |
| 96 | Other personal service activities |

Table A2. Correlation table

| | | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* | *11* | *12* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *1* | *AGGLOM_FDI_CHINA* | 1 | | | | | | | | | | | |
| *2* | *AGGLOM_FDI_WORLD* | 0.278 | 1 | | | | | | | | | | |
| *3* | *Pc_GDP* | 0.403 | 0.519 | 1 | | | | | | | | | |
| *4* | *MANUF_INTENSITY* | -0.070 | -0.245 | -0.297 | 1 | | | | | | | | |
| *5* | *AVG_FIRMS_SIZE* | 0.063 | 0.243 | 0.146 | 0.376 | 1 | | | | | | | |
| *6* | *N_FIRMS* | 0.220 | 0.013 | -0.107 | 0.262 | -0.276 | 1 | | | | | | |
| *7* | *INNO_EMPL* | 0.222 | 0.376 | 0.471 | 0.264 | 0.372 | 0.129 | 1 | | | | | |
| *8* | *INV_TOT* | 0.075 | 0.351 | 0.410 | 0.029 | 0.307 | -0.024 | 0.523 | 1 | | | | |
| *9* | *QUAL_LIFE* | 0.056 | 0.109 | 0.257 | -0.117 | 0.018 | -0.107 | 0.145 | 0.202 | 1 | | | |
| *10* | *EDUC_ATT* | 0.088 | 0.271 | 0.500 | -0.440 | -0.216 | -0.132 | 0.254 | 0.416 | 0.341 | 1 | | |
| *11* | *PUBL* | 0.187 | 0.636 | 0.654 | -0.454 | 0.051 | -0.128 | 0.418 | 0.603 | 0.256 | 0.609 | 1 | |
| *12* | *FRAM_COND* | 0.155 | 0.516 | 0.634 | -0.531 | -0.101 | -0.176 | 0.365 | 0.527 | 0.340 | 0.867 | 0.892 | 1 |



CRediT author statement

Lauretta Rubini: Conceptualization, Methodology, Validation, Writing - Original Draft

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