University of Trento

Graduate School of Social Sciences
Doctoral Programme in Local Development and Global Dynamics
Major in Innovation and Local Development

Migration flows and local systems of production: New comparative evidence on Italy and Spain

Doctoral Thesis
Presented to the Doctoral School
in fulfillment of the requirements for the Doctoral Degree

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April 2015

Acknowledgements

Many people have contributed to the development of this thesis. I thank my supervisor, Sandro Montresor, for guiding me throughout this process and for stimulating the constant improvement of this work. The accuracy and poignancy of his comments have taught me much about research. I am grateful to my co-supervisor, Mario Davide Parrilli, for his insightful advice throughout the thesis and in particular on the case studies. The first part of the thesis has benefited from my participation in the Summer School on "Gravity Models in International Trade" held by Keith Head and Thierry Mayer in Gargnano in September 2013. Their advice as well as the exchanges with the other participants have represented a turning point in the research.

I am grateful to Francesco Quatraro and Giovanni Pegoretti for carefully reading an earlier draft of this thesis and for providing valuable comments to it. I am also indebted to Antonio Vezzani, Christopher Gilbert, Stefano Schiavo, Ermanno Tortia, Gabriella Berloffa, Udo Brixy, Damiaan Percyn, Alberto Marzucchi and Roberto Gabriele for their suggestions on different econometric issues raised by the thesis. Giuseppe Folloni has provided useful suggestions on the interpretation of the results. I thank the researchers of the Instituto Vasco de Competitividad, and in particular Mikel Navarro, Jon Mikel Zabala and Eduardo Sisti for their comments on the interpretation of the peculiarities of the Basque case study.

The staff of the ISTAT offices in Turin and in Bologna, and particularly Roberto Carnevale and Silvestro Cocchia, have allowed me analyzing the Italian trade data. Alessandro Arrighetti and Andrea Lasagni have provided advice on the Reggio Emilia case and enabled access to MET database, but their contribution to this research is much broader. Matteo Rinaldini has introduced me to the issue of immigration in Reggio Emilia. I gratefully acknowledge the support by Luis Sanzo in providing access and statistical exploitation of the CMT database.

I am indebted to the interviewees for their kind availability in contributing to the qualitative side of this research.

I duly acknowledge the financial support by the University of Trento. This thesis has also benefited much from the exchanges with my PhD fellows, Carla, Esubalew, Gashaw, Hattachan, Julianna, and Nimol. Needless to say, all remaining limitations of this work are my sole responsibility.

Without Tommaso, it would simply not have been possible.

Contents

Chapter 1

Introduction

In the literature on Marshallian industrial districts[1], cooperation, trust and social capital are seen to reduce transaction costs within networks of firms, to facilitate information flows and to sustain competitiveness (Piore and Sabel, 1984; Becattini, 1990; Becattini and Rullani, 1993; Trigilia, 2001). Among the challenges that globalization poses to these local production systems[2], an aspect that has received less attention in the literature is international migration. Yet, the work opportunities in more labour-intensive local systems have been found to attract sizable immigration flows (Murat and Paba, 2005; Barberis, 2008; Psimmenos and Georgoulas, 2001; Narotzky, 2006; Cachón Rodriguez, 2005). A side effect of immigration is the increased heterogeneity in human and social capital (Mistri, 2001; Parrilli, 2012), which is likely to challenge the local system's reliance on mutual knowledge and trust in sustaining Marshallian agglomeration economies (cfr. Asheim, 1996, p.381).

[1]Basic references include Brusco (1982); Piore and Sabel (1984); Becattini (1990). According to (Becattini, 1990), industrial districts are a "socio-economic notion" characterized by a community of firms embedded in a community of people. Their production system is based on networks of small and medium-sized enterprises that specialize in different production phases of a core industry. The vertical dis-integration of production allows for flexibility to changing market conditions but also for economies of scale and scope that are external to the firm but internal to the district. Geographical proximity among firms allows for repeated interactions and for the arising of trust; the interaction between the social, institutional and economic sphere allows contextualised, and often tacit, knowledge to dynamically integrate with codified and technical knowledge.

[2]A range of studies have addressed the different challenges that globalization poses to the reproduction of the competitive advantages of Marshallian industrial districts. For instance, their innovation capacity based on incremental improvements is found to be limited compared with what would be required by global competition (Asheim, 1996); Marshallian specialization advantages (Beaudry and Schiffauerova, 2009) are eroded by the incentives to integrate in global value chains (Gereffi et al., 2005; Bathelt et al., 2004; Amin and Thrift, 1992), to delocalize production (UNCTAD, 2004) and to vertically integrate production within lead firms (Harrison, 1994a,b).

Economic analyses usually interpret immigration as a change in the factor endowment of the host economies, mainly increasing the supply of low-skilled labour (Bodvarsson and Van den Berg, 2009; Borjas, 1999). This change in labour supply not only affects wages (e.g. Borjas, 2003; Ottaviano and Peri, 2006), but influences the local production structure as well as the production techniques: immigration has been found to alter unit factor requirements, the resort to (low-)skilled labour (Hanson and Slaughter, 2002; Gandal et al., 2004), the capital-to-labour ratio applied in production (Accetturo et al., 2012; Lewis, 2011), as well as the relative value added of low-skilled manufacturing with respect to other sectors (De Arcangelis et al., 2014; Bettin et al., 2014). The, sometimes substantial, role played by immigrants in the reorganization of local production systems has been highlighted by case study literature as well. Just to make some examples, in the textile and clothing district of Prato, the local immigrant communities have codetermined a redefinition of the production specialization of the local system, away from the traditional production of woolen textiles to "ready to wear" garments at low price (Dei Ottati, 2009a,b). In Elche and Castellón in Spain (Cachón Rodriguez, 2005; Narotzky, 2006; Viruela Martínez and Bernat Martí, 2013), and Carpi and Montebelluna in Italy (Barberis, 2008; Merotto, 2013), they have changed the profile of the local labour force by substituting for native labour in production tasks. This phenomenon has reached such a dimension that, according to a Montebelluna entrepreneur, "the profile of the technician incorporating the know-how of the industrial districts will in the medium term be that of a non-EU citizen living in the context of a multicultural society"(Sartor, 2010).

Studies focussing on the economic effects of immigration on industrial districts (Barberis, 2008; Dei Ottati, 2009a,b; Andall, 2007; Murat and Paba, 2003) have mainly seen immigrants as suppliers of less-qualified manual labour that replace the native labour and contribute to perpetuating the manufacturing tradition of industrial districts and local production systems. Employing foreign labour has been seen as an alternative to offshoring, enabling firms to avoid costly delocalization activities (Murat and Paba, 2003; Ottaviano et al., 2013), with potential implications in terms of downgrading the skills endowment of local systems and for the reproduction of the district model (Murat and Paba, 2003; Zanfrini, 2004; Mistri, 2001).

Yet, recent literature in regional economics has emphasized complementarity in skills and abilities between natives and foreigners and found that this leads to higher productivity and innovation (Ottaviano and Peri, 2006; Niebuhr, 2010; Trax et al., 2012; Brunow and Stockinger, 2013; Haas and Lucht, 2013); immigrant stocks have been established to decrease informal barriers to trade and FDI by decreasing information and enforcement costs in international business (Gould, 1994; Wagner et al., 2002; Felbermayr et al., 2012), and a few theoretical studies have highlighted the potential contributions of immigration to internationalization and innovation within local systems of production (Williams, 2007; Parrilli, 2012). Hence, there seems to be scope for immigration to contribute to innovation and internationalization in local production systems.

Among the studies that highlight a positive link between diversity and internationalization, those adopting sub-national units of analysis such as regions, departments or cities recognize the need to take into account the heterogeneous spatial distribution of immigrant stocks, as well as of the competitiveness of regions and local systems. However, in practice, the local differences in production capacity and competitiveness are not fully taken into account, and the simplifying assumptions adopted for empirical estimation generally[3] include assuming no differences in production capacities across local systems within a given country or region (cfr. Peri and Requena-Silvente, 2010; Bratti et al., 2014).

Focussing on local systems of production characterized by collaborative networks, an additional reason to emphasize sub-national differences emerges: compared to atomized firms, the embeddedness of firms in local cooperative networks of relationships is likely to alter the incentives to resort to foreign labour and to cooperate with immigrant entrepreneurs (in a similar way as collaborative networks have been found to alter the incentives for outsourcing in Antonioli et al., 2014).

Two main reasons could be identified to account for specific dynamics linking immigration to innovation and internationalization in local production systems characterized by collaborative networks of firms. First, access to local knowledge may entail comparatively higher costs for immigrants. If firms are embedded in networks where flows of knowledge have a strong tacit component, there may be barriers for immigrants to participate in such networks, at least in the short run. Williams (2007), based on Blackler (2003) taxonomy of knowledge (see also Blackler, 1995), argues that there are types of knowledge which are more difficult to acquire by immigrants than by natives. These relate to having experienced physical presence in a given locality, and are referred to as *encultured* and *embedded* knowledge. Encultured knowledge refers to "meanings that are shared understandings, arising from socialization and acculturation"; embedded knowledge is "set within contextual factors and is not objectively pre-given [and is] generated in particular language systems, (organizational) cultures and (work) groups". These definitions basically emphasize the cognitive implications of institutional and organizational proximity described by Boschma (2005). Where encultured and embedded knowledge are required for sharing technical and professional knowledge, immigrants may be unable to fully participate in knowledge transactions, especially those involving tacit knowledge exchanges, until they have incurred the costs that the acquisition of these types of knowledge implies. Yet, the acquisition of these types of knowledge is likely to occur over time through spatial proximity and exposition to the local "buzz". Also, if local knowledge is highly concentrated in "communities of practice" (Breschi and Lissoni, 2001), this may prevent immigrants from accessing the local network or sub-groups of it. Breschi and Malerba (2001) have recognised that

> "(...)tacitness is not an inherent characteristic of knowledge, but refers to the way knowledge itself is transmitted within an epistemic community. When

[3]Briant et al. (2009) constitute an exception in this framework.

> conceptualised this way, tacitness may become a powerful exclusionary means, which can be wilfully manipulated to prevent a number of actors from understanding the content of scientific and technical messages."(p. 829)

Second, local entrepreneurs embedded in local collaborative networks may find it comparatively more costly to start economic transactions with immigrants, either as employees or as business partners, if the local networks strongly draw on tacit agreements, trust and reciprocity. This is likely to apply when immigrants are embodying a redically different business culture (Hofstede, 1983; Trompenaars and Hampden-Turner, 1997) and the costs of "codifying" and making expectations and business routines explicit are deemed too high. In these conditions, immigrants are likely to remain excluded from the "core" of local economic transactions and to concentrate in the "ethnic business" - that is, immigrants' self-employment in sectors (mainly services) where both resources and clients are primarily found in the ethnic communities (Barberis, 2008; Waldinger et al., 1990; Portes and Bach, 1985).

However, the same cognitive distance (Nooteboom, 2000) that is likely to create costs in local interaction could in principle be among the factors that promote innovation and internationalization in the local systems. Boschma (2005) has argued that intermediate levels of cognitive, organizational and institutional distance, especially if mediated by geographic proximity, can turn into assets for the innovation of local systems threatened by lock-in, lack of openness and of flexibility. Within his framework, immigration flows in local production systems can be viewed as an exogenous increase in cognitive and institutional distance within a spatially bounded area marked by moderately high pre-existing levels of social, institutional and cognitive proximity; the injection of new values and cultures can eradicate the risk of lock-in. This, however, requires that the coordination costs generated by the increased distance, or diversity, are not outweighing the benefits (Nooteboom, 2000; Lazear, 1999; Boschma, 2005; Alesina and La Ferrara, 2005).

As argued in the literature on diversity and innovation, these benefits may derive from the greater creative and innovative capacity of a pool of cognitively diverse problem-solvers compared to more homogeneous, even more skilled, groups (Alesina and La Ferrara, 2005; Hong and Page, 2004, 1998). In addition, immigrants can be assumed to have an advantage with respect to natives in a range of intercultural skills. First, they bear "deep knowledge" of their origin contexts and can bridge imperfect information and informational asymmetries involved in transnational activities with their host country (or similar countries) thanks to their familiarity with institutions, practices and, if applicable, thanks to their participation in co-ethnic social and business networks (Rauch, 1999, 2001; Rauch and Trinidade, 2002). Second, immigrants supply foreign language skills that, *per se*, have an important role in facilitating international transactions (Antonietti and Loi, 2014, and the references therein). Furthermore, according to Williams (2007) immigrants could have an advantage in developing an in-depth understanding of the "assumptions and beliefs that

shape practice", deriving from their familiarity with the different ways in which knowledge is embedded in different locations: comparing different work experiences in different places, they can in principle draw conclusion on the performance implications of a given organizational culture. The author recognizes that this reflexivity is not an exclusive feature of immigrants, but "international migrants bring an additional dimension to this, because of the significance of national boundaries in the map of encultured knowledge"(p.367). The reflection about immigrants' critical reflexivity potential motivates the argument that immigrants could play a role as *boundary brokers*:

> "Wenger's (2000: 223) comments about (generic) boundaries are instructive, even though they did not specifically address international borders: they are 'areas of unusual learning, places where perspectives meet and new possibilities arise. Radically new insights often arise at the boundaries'. Boundary spanners (Tushman and Scanlan 1981) are individuals who can work across such boundaries, and leverage external knowledge into organizations. They perform three key roles: accessing external knowledge, interpreting it and refining it. Crossing an international boundary does not necessarily make a migrant a boundary spanner, but if international borders constitute significant barriers to acquiring external knowledge, then migrants potentially have a distinctive role to play."(Williams, 2007, pp.367-368).

Parrilli (2012) argues that heterogeneous social capital born by immigrants has the potential to catalyze tacit knowledge flows, which can bring about innovation and change in local systems.

In this vein, it could be added that, provided that the transnational dimension of immigrants knowledge corresponds to the skills requirements of local firms, their intercultural skills can increase the absorptive capacity (Cohen and Levinthal, 1990) of the firms where they are employed. They could play a role in allowing new external knowledge to be channelled into the local system (see also the related notions of "structural holes"(Burt, 1992) and of "knowledge pipelines"(Bathelt et al., 2004)) and in promoting local firms' access to transnational knowledge communities (Coe and Bunnell, 2003). Hence, the employment of foreign workers or the cooperation with them as professionals or entrepreneurs could be particularly valuable to firms acting as "technological gatekeepers" (Allen, 1977), within local systems[4]. These considerations clearly more directly apply to skilled immigrants, although not exclusively.

The framework illustrated above suggests there could be different dynamics at play within

[4]Technological gatekeepers are firms that contribute to local systems' access to external knowledge. On the one hand, they are capable to identifying knowledge and technologies developed outside the local systems and to apply them to their own activities. On the other hand, they contribute to the application and diffusion of such knowledge within the local system, potentially also to firms with poor external linkages (see among other Giuliani and Bell, 2005; Giuliani, 2011)

the same local production system that could have implications on the capacity of immigrants to contribute to internationalization and innovation. Tacitness in knowledge flows between firms, but also within them, may reduce the foreigners' ability to actively contribute to knowledge exchanges; greater openness of the local system or of single firms to external knowledge would increase the salience of their potential boundary-breaking role. Nevertheless, while presumably more costly in terms of more coordination costs, this could be more decisive in local systems threatened by lock-in.

A further dimension relates to the emphasis put on the embeddedness of the "community of firms" in a "community of people" in the classical literature on industrial districts (Becattini, 1990). Thus, the social dimension of the interaction of the immigrant communities with the local communities should also be taken into account. Barberis (2008) has argued, based on case studies, that the economic integration of immigrants in industrial districts has been higher in those districts marked by more cooperative rather than individualistic traditions and higher social capital. On the other hand, immigration flows could also affect the reproduction of the collaborative networks of relations characterizing the industrial district model: studies in the economic (Alesina and Ferrara, 2000; Alesina and La Ferrara, 2002; Costa and Kahn, 2001) and sociological (Putnam, 2007; Laurence, 2011; Huijts et al., 2014) areas have shown that diversity has an effect on social capital and trust. The evidence has been mixed. Alesina and Ferrara (2000); Alesina and La Ferrara (2002); Costa and Kahn (2001) have found that ethnic fragmentation reduces civic participation and trust in local communities; Putnam (2007) argues that the relationship between the group of natives and the group of immigrants imposes a deterioration of the social relations for all groups leading to a "hunkering down" and to a reduction in trust and social contacts even towards the in-group. The "hunkering down" hypothesis has been denied by Laurence (2011); Huijts et al. (2014) in favor of one that is more in line with "contact theory" (Allport, 1954; Pettigrew and Tropp, 2006), which predicts that greater ethnic diversity at the local level increases the probability of inter-ethnic contacts, reducing the within-group contacts even of the natives. This has positive effects on social association when the levels of diversity are quite high; by moderate levels of diversity, the likelihood of social conflict seems to increase. The effect of immigration depends more crucially on the dynamics of the in-group in relation to the out-group rather than on the increase in diversity *per se*; it also seems to relate not just to the levels of social capital prevailing locally but to the type of social capital prevailing in the host community (*bonding* vs. *bridging*, see Portes and Sensenbrenner (1993)): trust and reciprocity in transactions could be extended to the group of immigrants, including through the mediation of geographic proximity, or they could generate closure and hunkering down by natives excluding the immigrants from the circulation of knowledge, to the potential detriment of cooperative networks themselves.

Hence, at least four features of the local systems of production based on collaborative networks seem to have implications on the capacity of immigrants to promote innovation

and internationalization: the extent of tacitness in the knowledge flows, the tendency to lock-in, the presence of firms that are particularly open to internationalization and to the acquisition of external knowledge, and the type of social capital prevailing. The potential for diversity to promote innovation and internationalization in systems threatened by lock-in may be difficult to identify as it may be offset by the lack of opportunities - Richard et al. (2007) highlight that resource-scarse contexts bring firms to resort to consolidated problem-solving routines, reduce the scope for experimenting new modes of communication within the firm and increase rigidity in decision-making, reducing the ability of the firm to realize the innovative potential within more diverse work teams. Instead, the tacitness of knowledge, the openness of the firm to external knowledge and the type of local social capital, provided that appropriate ways are found to measure them, could be found to make a difference in local production systems.

The cases of Italy and Spain appear to have peculiar relevance to the analysis of the role of immigration in promoting innovation and internationalization in local production systems and have been chosen as an object for the analysis. Both economies are importantly relying on production systems of small and medium-sized firms (SMEs): Italian industrial districts have been at the origin of the conceptualization of the industrial district model (Brusco, 1982; Piore and Sabel, 1984; Becattini, 1990); works applying the statistical methods for identifying district-like local labour systems in Italy ISTAT (2005b) have been applied to the Spanish case highlighting their key relevance for this economy as well (Boix and Trullén, 2010). Hence, they are well-suited to an analysis that emphasizes sub-national differences in production capacity as well as on innovation and internationalization. The reliance on production systems based on SMEs, as well as on systems of large enterprise, explains the similarities in the production structures of the two countries, marked by relatively high manufacturing intensity, which is comparatively higher in the Italian case (23% of the Italian employment and 19% of the Spanish employment concentrates in this sector (ILO, 2003). This manufacturing intensity is reflected in the structure of the exports, which according to UNCTAD data[5], is similarly relying on low- and medium-skilled manufacturing. Italy, however, stands out for its much greater reliance on labour-intensive manufacturing compared to Spain as well as to other countries and for its unusually low levels of FDI compared to the other European countries, which has been considered to reflect the higher reliance of Italian firms on local, rather than international, outsourcing(Antonioli et al., 2014; Berger and Locke, 2000).

Italy and Spain are also similar in terms of their migration patterns. Both countries have a long history of emigration, mainly driven by the lack of opportunities at home, which has been particularly prominent between 1890 and the last three decades of the XXth century; since the 1980s and 1990s respectively, they have turned into important destination countries of immigration (Del Boca and Venturini, 2003). The growth of the

[5] `http://unctadstat.unctad.org/EN/`

Table 1.1: **Educational attainment of natives and foreigners in Italy and Spain, 2013**

	Spain		Italy	
Level (ISCED)	*Natives* (%)	*Foreign-born* (%)	*Natives* (%)	*Foreign-born* (%)
Low	45.2	48.6	42.7	50.0
Medium	22.5	30.3	42.4	40.5
High	32.4	21.0	14.9	9.5
Total	100	100	100	100

Source: Eurostat

immigrant populations in the two countries has been booming in the early 2000s, bringing the immigration rates to levels comparable to European countries with a more consolidated immigration experience (OECD, 2014). The changes have been quite radical in both countries but particularly in the Spanish case, which remained a emigration country until the 1980s, about a decade longer than Italy, and has today an immigrants' share over total population that higher than the Italian one (12.4% vs. 9.5%) and among the highest in Europe. The economic downturn generated by the subprime crisis in 2007 has recently inverted this tendency by reducing the growth rates of immigration stocks and by bringing emigration rates to increase again in both countries, to the point that Italy in 2013 registered a negative migration balance (ISTAT, 2014). These developments provide variation in the immigration data that is convenient to empirical analysis (Bratti et al., 2014; Peri and Requena-Silvente, 2010). In both countries, Eurostat data for 2013 show that the immigrant population was on average less represented in the high-education segment than the native population, and more represented in the low-education segment (see table 1.1).

In both countries, as we will see more in details in chapter 2, the geographical distribution of immigrants is quite heterogeneous across provinces. Murat and Paba (2003) have shown empirically that industrial districts are among the pull factors of immigration in Italy; the geographic distribution of Spanish industrial districts is also to a large extent overlapping with the distribution of immigrant residents by provinces (Boix and Trullén, 2010). While the immigration trends and dynamics are quite similar in the two countries, the composition of the immigrant population is quite different (table 1.2). In both cases, the first seven nationalities account for about 50% of the immigrant population, and the first twenty for between 70% and 80%. However, the immigrant population in Spain is to a large extent originating from Latin-American countries, the EU and Morocco. The Italian composition is more varied, with Asian countries and Eastern European countries representing a higher proportion of the immigrant population. This implies also greater language diversity, which has potential implications on the social integration of immigrants. According to OECD-DIOC data, based in both cases on the national 2011 Census of the population, Spain was hosting a total of 172 nationalities while Italy hosted 206 nationalities. This variety led

Table 1.2: **First 20 origin countries of immigrants in Italy and Spain**

Spain				Italy			
Country	Nro.	%	cumul. %	Country	Nro.	%	cumul. %
Morocco	643,445	12.6	12.6	Romania	704,378	15.8	15.8
Romania	614,550	12.0	24.7	Albania	368,194	8.3	24.0
Ecuador	367,130	7.2	31.9	Morocco	321,546	7.2	31.2
Colombia	341,255	6.7	38.5	Germany	191,881	4.3	35.5
USA	309,055	6.1	44.6	Switzerland	185,342	4.2	39.7
Argentina	256,455	5.0	49.6	Ukraine	171,845	3.9	43.6
France	191,120	3.7	53.4	China	147,609	3.3	46.9
Germany	185,750	3.6	57.0	Moldova	123,060	2.8	49.6
Peru	166,855	3.3	60.3	France	121,619	2.7	52.3
Bolivia	162,070	3.2	63.5	Philippines	102,396	2.3	54.6
Venezuela	132,990	2.6	66.1	India	94,213	2.1	56.8
Bulgaria	112,000	2.2	68.3	Poland	91,987	2.1	58.8
Dominican Republic	106,035	2.1	70.4	Peru	91,329	2.0	60.9
Cuba	103,925	2.0	72.4	Tunisia	81,970	1.8	62.7
Portugal	91,585	1.8	74.2	Brazil	75,684	1.7	64.4
Brazil	91,195	1.8	76.0	Ecuador	68,472	1.5	65.9
Uruguay	82,980	1.6	77.6	Bangladesh	63,868	1.4	67.4
Italy	75,205	1.5	79.1	Egypt	63,669	1.4	68.8
China	69,250	1.4	80.4	Argentina	62,171	1.4	70.2
TOTAL	5,100,955	100		TOTAL	4,461,351	100	

Source: OECD-DIOC 2010-11

Bratti et al. (2014) to apply the concept of *superdiversity* (Vertovec, 2007), referring to the fragmentation of the immigrant populations in a variety of communities, to the Italian case. The two countries are also differentiated in terms of the sectors of employment of immigrants. In both countries, the domestic sector and the construction sector represent important shares of the immigrants' employment. Comparing the data of the national survey on immigrants' working conditions in Spain (GETS, 2007) and the ISTAT data on immigrants' sectors of employment in 2010, the share of immigrants employed in the manufacturing sector was higher in Italy than in Spain (19% vs. 11%). Comparing the concentration coefficients of immigrants' employment in sectors calculated by Hidalgo et al. (2007) and Murat and Paba (2003), immigrants in Italy are more concentrated in the manufacturing sector than they are in Spain, where they are more often employed in the agricultural and services sectors. Overall, as the data show, Italy and Spain have a quite similar economic and export structure as well as a similar experience with migration. However, they differ with respect to the composition of their immigrant populations as well as in the sectors where they are employed. The comparison between the two countries provides an opportunity to analyze the effects of immigration in two similar contexts and potentially to highlight the implications of these differences on immigrants' capacity to

promote trade and internationalization.

The present research work positions in this context. Its aim is to investigate the role of migrants in the reshaping of local production systems in front of globalisation, exploring in particular the possibility that immigration turns into an asset for internationalization and innovation in the local systems. These objectives lead to articulating the research into two parts. Part I explores, through a systematic and quantitative-oriented approach, the evidence about the existing contributions of immigrants to the internationalization of local systems, in order to assess the economic dimension of this potential. Part II emphasizes more the peculiarities of the effects of immigration in local production systems; because of the complex interaction of local and national specificities in the production structure of local systems as well as in the characteristics of the immigrants, this parts adopts a more descriptive and explorative approach, and focuses on the characteristics of firms that hire immigrants, the extent by which they benefit from their transnational skills beyond their role as low-cost labour, as well as employers' perceptions about the potential, constraints, and existing innovation and internationalization activities involving immigrants.

More specifically, the first part of the thesis analyses whether immigrants can exert a systematic effect on the internationalization of local system by applying to the cases of Spain and Italy a specific field of the international trade literature which precisely answers to this question, the literature on the trade-facilitating role of immigrants (Gould, 1994; Rauch and Trinidade, 2002; Wagner et al., 2002; Briant et al., 2009; Felbermayr et al., 2010), (Peri and Requena-Silvente, 2010; Bratti et al., 2014). This literature, focussing mainly on the countries with a more consolidated immigration experience, has shown a remarkable coherence in results and represents an ideal benchmark against which the potential contributions of immigrants in Italy and Spain could be compared. The focus on the cases of Italy and Spain is not in itself a novelty, but the present thesis contributes to this body of literature from a theoretical and methodological point of view, showing the implications of adopting sub-national units of analysis in a way that fully takes into account their heterogeneity in exporting capacity. This is done by applying gravity models of international trade to provincial units of analysis, considered as proxies for the local systems, controlling for province-specific multilateral resistance terms. The analysis also benefits from the use of panel data, which is the most suited data structure to investigate the trade effects of migration, i.e. a phenomenon that has shown a marked evolution in the two countries in the last decades, in connection with the evolution of the economic context. The joint adoption of province units and panel data in the analysis of the migration-trade link raises a series of methodological issues which will be addressed prior to the empirical analysis in order to ensure the adoption of an econometrically sound and theoretically consistent model. A methodological chapter (chapter 2) will propose an empirical strategy which will subsequently be applied to two empirical chapters, one focussing on Spanish provinces (chapter 3) and one on Italian provinces (chapter 4). The comparison between Italy and Spain, which as seen above are characterized by a similar production and exports

structure and by comparable immigration trends, while at the same time having different compositions in their immigrant populations, is pursued to highlight the implications of country-level differences in the composition of immigrant populations as well as in the production structure for the research question at stake.

The second part of the thesis analyzes two case studies of industrial districts of firms in their relation with immigrant flows. This part represents a first exploration of the question whether cultural diversity in local systems may give rise to complementarities in internationalization and innovation. The objective is similar to the one pursued in regional studies such as Ottaviano and Peri (2006); Niebuhr (2010); Brunow and Stockinger (2013), and in organizational studies such as Østergaard et al. (2011); Richard et al. (2007); Kochan et al. (2003); Richard et al. (2002); Kilduff et al. (2000). A systematic analysis of the effect of immigration on the internationalization of industrial districts is hampered, in the Italian case, by the lack of data on innovation activities in local labour systems and by the lack of disaggregated data on the nationalities of immigrants and on the countries of destination of the local systems' exports. In the Spanish case, it is hampered by the lack of access to data on local labour systems. More crucially, given the discussion above, tacit knowledge intensity, technological and knowledge intensity in local networks of firms, as well as local social capital, are likely to mutually affect each other, the innovative and internationalization performance of districts and the potential effects of immigration in complex ways, motivating a rather descriptive and exploratory perspective. The focus on local systems of production, moreover, imposes that the methodology take into account that the majority of studies focussing on Italian local systems has so far emphasized the other side of the gains from diversity for local firms, i.e. immigrants' role as replacement labour force in production tasks (Gavosto et al., 1999; Venturini and Villosio, 2006; Accetturo et al., 2012) - and the fact that, while less systematic, the studies focussing on immigration in local production systems in Spain share this assumption (Narotzky, 2006; Cachón Rodriguez, 2005). Finally, the quantitative dimension of the immigrants' contribution to innovation and internationalization may not be large, even if it could have strategic implications for the future of the industrial district model. These considerations make case study analysis the preferred research methodology for the question at stake (Yin, 2003) (see also chapter 5); from this point of view, the research benefited from case studies of the interaction between the local system and foreign cultures such asBarberis (2008); Dei Ottati (2009a,b); Johanson et al. (2009); Narotzky (2006); Cachón Rodriguez (2005); Pohl and Heiduk (2002); Pellow and Park (2002); Saxenian (2006).

The selected case studies, Elgoibar in Spain and Reggio Emilia in Italy, are two cases of local systems characterized by high income levels and industrial density in the mechanic sector - considered as a sector that allows for more variation in the skills mix of the workforce than other more labour-intensive sectors. They are marked by similar specialization in production but by quite different modalities of integration of migrant labour in the economic system. The research objectives are pursued by comparative case study analy-

sis adopting a multi-method approach. The case study methodology with the underlying logic model is outlined in chapter 5 and is applied to the case of Reggio Emilia in chapter 6 and to the case of Elgoibar in chapter 7. In each case study, a quantitative section analyses the characteristics of firms hiring immigrants on the basis of cluster analysis and discriminant analysis applied to firm-level micro-data for the two NUTS2 regions where the local systems are located[6]. A qualitative section based on a series of semi-structured interviews will explore the reasons leading local entrepreneurs to hire immigrants, focussing on their perspectives about immigrants' potential to promote trade and innovation. Their answers are put in relation with the firms' expenditures in R&D and innovation, considered as a proxy of their openness to external knowledge, as well as with an indicator of knowledge tacitness. The propositions relating to the immigrants potential for promoting innovation and internationalization are contrasted with the more standard interpretation of immigration as replacement labour in manual tasks. A comparative chapter (chapter 8) compares the findings of the two case studies with a view to analyze in particular the role of the integration capacity of the local system in enabling this potential to arise. The main conclusions from both parts of the thesis are discussed and integrated in chapter 9.

Overall, besides the methodological contributions of this thesis in terms of accounting for local specificities in the analysis of the economic effects of immigration, the thesis proposes an analysis of the role of immigration that emphasizes complementarities between natives and immigrants in reshaping industrial districts towards a more open and innovative industrial district model, which could contribute in novel ways to sustaining the competitiveness of the Italian and Spanish economies. The focus on these two countries, against a majority of studies having focused more on countries with a more consolidated immigration experience such as the US, Canada and Germany, is potentially instructive with respect to whether differential effects can be expected for countries of more recent immigration or, rather, whether this effect occurs independently of the integration capacity of the local system. Identifying a contribution of immigrants to internationalization and innovation for local systems would also imply a reflection on the policy measures that could further promote the full exploitation of immigrants' potential, such as for example reducing the bureaucratic barriers involved in employing immigrants and in carrying out business abroad. It is important to highlight that, while such complementarities are more likely to arise by more skilled immigrant populations - and more open districts are more likely to attract a more skilled foreign labour force-, transnational skills are not specific of skilled immigrants. Gains from the deployment of transnational skills in local systems could be greater by greater integration capacity. Confirming that immigrants would have a greater capacity to promote trade and innovation in more inclusive local systems would contribute to strengthening the economic case for integration policies.

[6]Due to the lack of access to systematic data collection at lower levels of disaggregation, this regional dimension will be taken as a benchmark for the analysis of the two local systems

Part I

Migration and trade flows in local production systems

Chapter 2

Migrants' effects on trade: Methodological issues arising from the application of gravity models to sub-national units of analysis and panel data

2.1 Introduction

The impact of immigration on the host economies is a heatedly debated topic in politics and social sciences. A sizeable academic literature since Gould (1994) and Rauch and Trinidade (2002) has documented that immigrants promote trade and investment between host and the origin countries. Applied to sub-national units of analysis, this literature offers a suitable tool to answer the main research question of the thesis, i.e. whether immigration promotes the internationalization of the host local production systems. Due to data availability reasons, we will focus on international trade rather than foreign investments.

The analysis of the migration-trade link employs gravity models of international trade. The intuition underlying the gravity model recalls the one of the Newtonian law on gravity: the trade between two countries (or regions, provinces, firms) is proportional to their size (production and expenditure capacity) and inversely proportional to their distance as well as to other bilateral trade barriers. The bilateral trade costs term can include a wide range of geographic, political, cultural and economic variables that increase or

decrease trade (e.g. distance, trade agreements, colonial ties, cultural affinity, common currency, common language, migration). The unit of analysis is the trade pair. Within this conceptual framework, immigrants' networks are interpreted as factors that reduce the informal barriers to trade between the origin and the destination country.

As we will see more in details in section 2.3, immigrants can promote the bilateral trade of the host economies towards their origin countries in at least three ways. First, immigrants can mitigate the effects of incomplete information in international transactions, by reducing the effect of the informal barriers to international trade related to language, culture, or institutions; they can have easier access to information about business opportunities for sourcing and for selling abroad and facilitate the establishment of business partnerships (Dunlevy, 2006; Herander and Saavedra, 2005; Rauch and Trinidade, 2002; Gould, 1994). Second, in the cases where trade barriers are increased by information asymmetries, weak institutions and difficult enforcement of property rights, immigrant networks can overcome such barriers through internal enforcement mechanisms; these are mainly based on reputation and mutual obligations within the network of coethnics (Rauch, 2001). In this sense, immigrant networks can be seen as ways to address market failures and bring the volume of trade closer to the social optimum (Felbermayr et al., 2012; Dunlevy, 2006; Rauch and Trinidade, 2002; Gould, 1994). The "information" and the "enforcement" effects operate in terms of reducing the bilateral costs of trade. The third mechanism by which immigrants promote trade is the preference channel: this effect applies if immigrants derive higher utility from goods produced in their home countries (Gould, 1994; Wagner et al., 2002) and directly increases the demand for their home country goods in the host economy. Furthermore, the inflow of a population bearing a differentiated human capital is likely to create spillover effects and may provide the local system with trade-relevant knowledge that it would not have accessed in the absence of immigrants' networks.

The literature investigating the nexus between immigration and trade has tended to focus more on countries with a more consolidated immigration experience. Only relatively recently countries of more recent immigration like Italy and Spain have become the focus of such analyses. In the meantime, the developments in the theoretical foundations of the gravity model have co-determined an evolution in the estimation methods employed for the analysis of the migration-trade link. Therefore, to attempt answering the research question at stake, a reflection on the appropriate methodology to apply was necessary. This chapter will deal with this, while chapters 3 and 4 will apply the methodology, respectively, to the cases of Spain and Italy.

The primary aim of this chapter is, in line of the focus of the whole thesis on the effects of migration on local systems of production, to fully take into account the implications from taking sub-national units of analysis in the estimation of the immigrants' effects on trade. The empirical analyses carried out in this part of the thesis will take sub-national units of analysis at the NUTS3 level, i.e. provinces. As mentioned in the previous chapter and as I

will discuss below, even if the focus on subnational units of analysis in the analysis of the pro-trade effects of immigrants is not novel *per se*, its applications have been quite varied and not always well-grounded; in empirical applications, the heterogeneity in provinces' exporting capacity has often been assumed to play a negligible role. Building on Head and Mayer (2014), this chapter explicitly problematizes the issue of theory-consistent modelling with sub-national units of analysis; chapters 3 and 4 highlight the implications of accounting for these in empirical estimation.

Second, this chapter introduces the use, in the empirical analyses of chapter 3 and 4, of a relatively new variable in the migration-trade link literature. Building on Murat and Pistoiesi (2009) who showed that the arguments on the migration-trade link could be applied to emigration as well as to immigration, I include the analysis of emigration within the theory-consistent modelling of the migration-trade link.

The third contribution of this chapter is methodological. It introduces the application to panel data of the strategy in Head and Mayer (2014) to compare different estimators and address the main econometric issues involved in the estimation of gravity models. In spite of the strong case for the use of the Poisson estimator in gravity models since the article by Santos-Silva and Tenreyro (2006), this estimator has not found much prominence in the migration-trade link literature. The reason is probably that, due to the specific problems at stake, recent papers in this strand of the literature have been more interested in panel data than the more standard gravity literature, which has focussed very much on determinants of trade that show less marked time variation such as trade agreements, currency unions, borders and distance. In addition, as will be discussed, theory-consistent estimation by panel data involves the use of three sets of dummies (time-varying importer effects; time-varying exporter effects; and dyadic time-invariant effects), which increases very much the computational difficulty of estimating gravity models by Poisson[1]. Furthermore, Head and Mayer (2014) show that the choice of the appropriate estimator is to be based on specific considerations balancing the characteristics of the data at stake with the issues affecting each estimator. They also propose the Gamma estimator as an additional option within a "robustness-exploring ensemble". This chapter, thus, analyses the estimation issues affecting the OLS, the Gamma PML and the Poisson PML estimators, such as heterogeneity, incidental parameters problem and heteroskedasticity, taking into account potential functional form mis-specification in the gravity equation "augmented" with the migration variables.

The analysis of the main econometric issues arising from gravity estimation with panel data will lead to identifying an econometric strategy enabling the selection of the most suitable estimator in the subsequent empirical analyses. This is based on the application of the tests proposed in Manning and Mullahy (2001) and Santos-Silva and Tenreyro (2006).

[1] In practice, obtaining Poisson estimates in specifications including a large number of fixed effects may be impossible, as noted among other by Bratti et al. (2014), due to serious convergence problems.

In chapters 3 and 4, I will apply this econometric strategy. The results confirm that no estimator can be identified as a single "workhorse".

Hence, the analysis of the nexus between migration and trade in Italy and Spain will allow illustrating more general problems, relevant to the application of the gravity models to other contexts and also to other research questions: the choice of the appropriate estimator for gravity models by panel data and the sub-national heterogeneity of the multi-lateral resistance term. Furthermore, including the stock of expatriates in the set of migration variables contributes to a more balanced perspective on the migration-trade link which is potentially fruitful in similar analyses applied to other countries: it seems a particularly promising contribution to the analysis of the link between migration and development in emerging countries, which are characterized by high levels of both emigration and immigration.

This chapter is organized as follows. In section 2.2 I present the theoretical framework on gravity models; in section 2.3 I introduce the role of immigration in promoting trade; in section 2.4 I address the specificities implied by the focus on subnational units; in section 2.5 I present a survey of the literature of closest relevance to the issue at stake. Finally, in section 2.7 I outline the econometric strategy that will be applied in the subsequent chapters.

2.2 The Gravity Model

The literature on the migration-trade link can be seen as a subset of a wider international trade literature applying "augmented" gravity models. The literature on gravity models has seen a considerable development in the last two decades, especially as far as the theoretical foundations of the model are concerned (Head and Mayer, 2014). The turning point in the theoretical micro-foundations of the gravity model is the theoretical derivation of the "multilateral resistance term" by Anderson and van Wincoop (2003), which led to obsolescence of previous works that applied the gravity model omitting this term. On this ground, Baldwin and Taglioni (2007) have established three common mistakes of the literature on gravity, what they term the "gold", "silver" and "bronze-medal mistakes". Because the literature investigating the effects of migration on trade has closely followed the developments in the gravity theory, it is possible to run a critical review of this literature in the light of the developments in gravity theory. I will start from a brief introduction to the gravity model.

Introductory paragraphs on gravity models often start from the statement that the gravity model is one of the few examples of law-like behaviours in social sciences: bilateral trade is proportional to the economic "masses" of the trading countries and inversely proportional

to their bilateral trade barriers, primarily distance. Figure 2.1 shows an instance of this: gravity applies to the trade of the province of Madrid with EU countries in 2008.

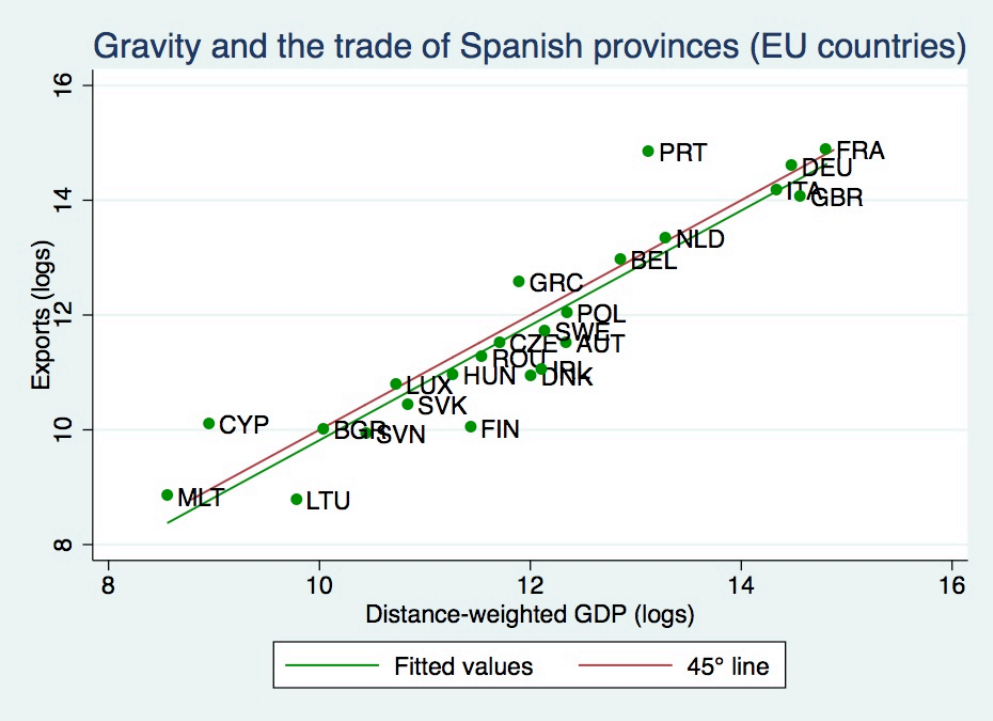


Figure 2.1: Gravity and the trade of the province of Madrid (EU countries)

In Fig. 2.1, the log of the exports of the province of Madrid to EU countries are plotted against the GDPs of these countries divided by the bilateral distance. The idea is that the EU is a sufficiently homogeneous subset of countries from the institutional point of view to reduce the bias from omitted variables. The slope of the regression line, which results from the simple regression of the log of the exports on the log of the ratio of GDP to distance, is 1.00051, and most observations lie reasonably close to it. The proportionality of the GDPs and the inverse proportionality of distance to exports confirm the analogy with the physics law of gravitation with the exception, which is common in the trade literature, that distance is not squared. The gravity equation directly deriving from the physics analogy, empirically driven, and not theoretically micro-founded was first noted by Tinbergen (1962); in their review, Head and Mayer (2014) call it the "naïve" gravity equation:

$$X_{ni} = G Y_n^a Y_i^b \phi_{ni} \tag{2.1}$$

In Head and Mayer's notation, X_{ni} is the volume of trade between country n (importing country) and country i (exporting country); Y_i represents the "mass" of production of exporting country, Y_n represents the "mass" of expenditures of the importing country, G is a constant, and a and b are parameters to be estimated which do not necessarily equal 1 (even if empirically they are often close to this value). The term ϕ_{ni} represents the transaction costs of bilateral trade; it includes natural trade barriers such as distance but also other barriers such as tariffs, as well as their respective elasticities.

The theoretical foundations given to the gravity model in Anderson and van Wincoop (2003), (building on Anderson, 1979), made it clear that the naïve version of the equation was lacking a "multilateral resistance term". While the Anderson-Van Wincoop model is, by now, just one of the many trade equations compatible with what Head and Mayer (2014) call the "structural form" of the gravity model, their derivation is useful to understand the meaning of the multilateral resistance terms. The Anderson-Van Wincoop model is derived in a general-equilibrium framework, where goods are differentiated by place of origin and each country produces only one good; preferences are approximated by a CES utility function, which consumers maximize under a standard budget constraint. Within the bundle of each consumer there are foreign-country products, whose price varies by country because of trade costs. The nominal demand for region i goods by region n consumers thus depends among other on trade costs between the two countries and on the price index in n. Assuming market clearance (and solving for the scaled prices), Anderson and Van Wincoop are able to derive an imports demand function that is analogous to what Head and Mayer (2014) label the "structural form" of the gravity model (see equation 4.1):

$$X_{ni} = \frac{y_n y_i}{y_w} \left(\frac{t_{ni}}{\Pi_i P_n} \right)^{1-\sigma} \tag{2.2}$$

In this equation, the income terms are expressed as income shares of world income $\frac{y_n y_i}{y_w}$ rather than as country income, P_n is the consumer price index of importing country n and Π_i is an exporter-specific term that is a function of all bilateral trade barriers and world income shares of its trade partners, t_{ni} are transport costs and σ is the elasticity of substitution between goods produced in different countries. Assuming symmetric trade barriers, both Π_i and P_n become price index terms expressed as functions of all bilateral trade barriers and world income shares of each partner country. The gravity equation expressed in this way is the following:

$$X_{ni} = \frac{y_n y_i}{y_w} \left(\frac{t_{ni}}{P_i P_n} \right)^{1-\sigma} \tag{2.3}$$

The term $\left(\frac{1}{P_i P_n}\right)^{1-\sigma}$, which constitutes the main difference from the "naïve" version of

the gravity equation, is called the "multilateral resistance term". The intuition is that bilateral trade depends on economic masses and *relative* trade barriers $\left(\frac{t_{ni}}{P_i P_n}\right)^{1-\sigma}$; thus, changes in bilateral trade costs influence trade between two countries to the extent that the change in bilateral costs is greater than the change in the average trade barriers of each country towards all its partner countries (Anderson and van Wincoop, 2003, :176). In this framework, assuming for example a uniform rise in trade barriers, two smaller countries which are very open to trade will face a larger effect on their multilateral resistance, and a smaller effect on their bilateral trade, than two larger countries: barriers will rise for all trade transactions of the small countries with the rest of the world, and because these make up an important part of the price indexes of the small countries, the multilateral resistance will increase. Because of the change in the multilateral resistance term, the bilateral change in trade barriers will be relatively unimportant and thus bilateral trade will not be much affected. On the contrary, larger countries for which the internal market is more important will see a relatively weaker effect of the increase in trade barriers on the internal price levels and thus on the multilateral resistance terms. Therefore, the bilateral increase in trade barriers with a given partner will have a bigger effect on bilateral trade because of the relatively smaller change occurred in the multilateral resistance term.

While Anderson and Van Wincoop express the multilateral resistance through price indices in their model, they warn that the multilateral resistance terms should be considered in a wider sense to include non-pecuniary costs of trade and non-traded goods, which all contribute to explaining price differentials across countries and regions. This makes the multilateral resistance term unobservable, while components of it can be expressed by observables such as distance, income shares, tariffs, etc. For this reason, since Anderson and Van Wincoop, analysts no longer include GDP deflators into the gravity equation and rather resort to fixed effects.

A more general way of expressing Anderson-Van Wincoop's equation, abstracting from the general-equilibrium framework and from the assumption of symmetry in trade costs, is referred to by Head and Mayer (2014) as the "structural" gravity equation:

$$X_{ni} = \frac{Y_i}{\Omega_i} \frac{X_n}{\Phi_n} \phi_{ni} \tag{2.4}$$

Where the trade cost term ϕ_{ni} includes bilateral costs as well as their elasticities of substitution, and the multilateral resistance term corresponds to $(\Omega_i \Phi_n)^{-1}$. In turn,

$$\Omega_i = \Sigma_l \frac{\phi_{li} X_l}{\Phi_l} \text{ and } \Phi_n = \Sigma_l \frac{\phi_{nl} Y_l}{\Omega_l}. \tag{2.5}$$

Where l denotes all trading partners of countries i and n. The factors composing the multilateral resistance terms can be interpreted as, respectively, the average market access

available to the exporting country (Ω_i) and the degree of competition in the importing country (Φ_n). More precisely, Ω_i represents the "expenditure-weighted average of relative access" and Φ_n the "accessibility-weighted sum of exporters' capabilities" (Head and Mayer, 2014, : 9-10).

Thus, the total exporting capacity S_i of country i depends on its total supply Y_i and on its average market access available towards all its trading partners, which in turn is a function of all bilateral cost terms, the expenditure in all countries, and the degree of competition in all countries. The total importing capacity M_n of country n depends on its expenditures X_n and on the degree of competition in its market Φ_n. The actual trade between i and n depends ultimately on the two "monadic" terms S_i and M_n and on bilateral trade barriers ϕ_{ni}.

This is the logic underlying the third and last definition of the gravity equation, that of "general gravity":

$$X_{ni} = GS_iM_n\phi_{ni} \tag{2.6}$$

In this definition, the "monadic" terms S_i and M_n capture the capacity of importing and of exporting of the two partners. This way of writing the gravity equation makes it clearer why the recent literature captures both country expenditures (or supply) and multilateral resistance terms with fixed effects.

A variety of demand-side and supply-side models of international trade, including among other the Dixit-Stiglitz-Krugman monopolistic competition assumptions, Eaton and Kortum (2002), Helpman et al. (2008) and Chaney (2008), are compatible with the "structural" form of the gravity equation, and a number of other studies are compatible with its "general" form. For a detailed review, see Head and Mayer (2014)[2].

Baldwin and Taglioni (2007) notice that, with panel and time-series data, the multilateral resistance term depends on time-varying bilateral trade costs and on time-varying economic masses. Thus, it introduces an "un-constant" in the model, whose time variation should be accounted for in the empirical estimation. This bears important implications for empirical estimation. With cross-section data, a (usually) straightforward way to account for the multilateral resistance term is the inclusion of exporter and importer fixed effects (Anderson and van Wincoop, 2003; Feenstra, 2004; Redding and Venables, 2004; Hummels, 1999). In a

[2]Head and Mayer (2014) notice that all models compatible with the structural gravity form share two assumptions: the first is market clearing on the export side; the second relates to the accounting identity by which total imports of country n from country i must equal the share allocated to country i of total expenditures in n: $X_{ni} = \pi_{ni}X_n$. The critical assumption is the multiplicative separability of π_{ni} as the product of three terms: one capturing bilateral trade costs, one capturing the degree of competition in the importing market (or multilateral resistance term for the exporter) and one capturing exporters' capabilities (such as total production).

panel context, Baldwin and Taglioni (2007) argue that the time variation in the multilateral resistance terms should be coupled with importer-time and exporter-time effects, while the correlation between the unobservable component of the bilateral trade determinants and the included trade determinants should be accounted for by time-invariant pair effects. Omitting these terms introduces a substantial bias in the estimation and is referred to as the "gold-medal mistake" of gravity literature by Baldwin and Taglioni (2007)[3].

In their Handbook chapter, Head and Mayer (2014), devote an entire section to the theory-consistent estimation of gravity equations and apply different methods in a series of MonteCarlo simulation to identify the consistent one. Fixed effect estimation is the preferred solution "so long as there are no econometric issues"[4].

2.3 The mechanism: immigrants' contribution to trade

Within the "structural" gravity equation, migration stocks can be seen as one of the factors that reduce the bilateral costs of trade. Co-ethnic networks can be seen as a factor that reduces transaction costs related to information asymmetries and contract enforcement costs in international trade (Rauch and Trinidade, 2002). Since the seminal work by Gould (1994), the literature on the US, UK and Canada has established a positive contribution of immigrants to trade and investments towards their origin countries (for example Dunlevy and Hutchinson, 1999; Wagner et al., 2002; Herander and Saavedra, 2005; Girma and Yu, 2002).

The reduction in information costs in bilateral trade attributable to immigrants and immi-

[3]The silver-medal mistake, often found in papers that use the average of bilateral flows as the dependent variable, relates to taking the log of the average of uni-directional flows rather than the average of the logs; the bronze-medal mistake relates to the inappropriate deflation of nominal trade values by the country's aggregate price index: since there are global trends in inflation rates, inclusion of this term is likely to create biases via spurious correlations.

[4]The other estimation methods they consider are: *(i)* Estimation of the multilateral resistance terms through "structurally iterated least squares", a development of the non-linear least squares method used in Anderson and van Wincoop (2003); *(ii)* Ratio-type estimation, where the monadic terms are suppressed algebraically thanks to the computation of export ratios of actual trade with either trade to self or with reference partners. The tetrad method proposed by Head et al. (2010) computes a "ratio of ratios". It first divides the observed exports from country i to country n by the exports of exporter i to a reference importer k; then it divides the exports to n from a reference exporter ℓ by the exports from ℓ to k. Finally, the ratio of these two ratios must be computed. This way the monadic terms are eliminated; the trade cost terms must be similarly "tetraded", and the standard errors must be clustered at the importer, exporter and pair level. This methodology addresses the computational difficulty involved in fixed effects estimation with dummy variables but may be sensitive to the selection of the reference country; *(iii)* Double-demeaning of the variables, i.e. demeaning for the importer and exporter dimension, or combinations of de-meaning and dummy variables, and *(iv)* "Bonus vetus OLS", proposed by Baier and Bergstrand (2009), where first-order Taylor expansions of multilateral resistance terms are introduced in the specification.

grant networks is generally referred to as the "information effect": it relies on the "deep" knowledge (Rauch, 2001) that immigrants have of their home country institutions, business culture and markets. This allows them play the role of intermediaries, provide market information, identify suitable suppliers or clients. The "enforcement effect" in international transactions relates to the contribution of community reputation mechanisms to ensure the enforcement of contracts (Rauch and Trinidade, 2002; Gould, 1994). These mechanisms assume the activation of in-group social capital as a resource for business, in the sense of the "bounded solidarity" and "enforceable trust" described by Portes and Sensenbrenner (1993), that is generated by the relations of the community of co-ethnics with the host society. These lead to members' preferential access to in-group resources, to support by other members of the community, and to increased predictability in transactions due to shared norms.

The trade cost term ϕ_{ni} in equations 2.4 and 2.6 can also be broadly construed to include the measure of trust proposed by Guiso et al. (2009), which they find to affect bilateral trade in a significant way. Whether more sizeable immigration stocks affect the trust of the host country towards their origin country in a positive or a negative way cannot be determined a priori: Gould (1994) argued that immigrants contribute to the overall diffusion in the host country, both to natives and non-natives, of information and knowledge about the institutions, business and language of the origin countries, and this can be interpreted as a positive contribution to bilateral trust. Hovewer, the social tensions that are in some cases associated with sizeable immigration stocks can have the opposite effect. In addition, levels of trust may be substantially different across sub-national units according to the size of the local immigrant communities.

According to Boisso and Ferrantino (1997); Dunlevy (2006), information and enforcement costs increase in the (cultural/institutional) distance between the trading countries. These costs may also be seen to increase by greater somatic and genetic distance. In global transactions, these could have a stronger negative effect on bilateral trust and thus on trade than what found by Guiso et al. (2009) for European countries. For these reasons, the effect of migration stocks on trade costs, and ultimately on trade volumes, is likely to be stronger for more culturally and institutionally distant trading pairs, as found in empirical studies by Girma and Yu (2002); Dunlevy (2006); Murat and Pistoiesi (2009). In this sense, according to Tadesse and White (2008), migrants effectively offset the negative effects of cultural distance on exports.

Trade costs, in particular information costs, also have a diversified impact on different types of sectors and goods, and immigrants have a stronger effect on the trade of goods that have more informational content. Since Rauch and Trinidade (2002), many authors have found evidence of a stronger effect of immigrant stocks on the trade of more differentiated goods. The underlying mechanism is that, while for internationally homogeneous and reference-priced goods, price is conveying most of the relevant information for trade, exchanges of

differentiated goods require specific efforts to identify and promote the specific features of the good and to match "buyers and sellers in the characteristics space" (Rauch and Trinidade, 2002, p.117).

In a study on the migration-trade link based on Chaney (2008)'s model, Peri and Requena-Silvente (2010) estimate the effect of immigration not only on total trade, but also on the intensive and extensive margins of trade. They find that immigrants' effects on total trade values mainly operates through the extensive margin of trade, i.e. the number of transactions, rather than the intensive margin margin, i.e. the average value per transaction. Instead, immigrants would not exert a significant effect on the variable costs of trade. This result is interpreted, according to the Chaney (2008) model, as a sign that immigrants' trade-facilitation effect proceeds mainly through the reduction in the fixed costs related to entering foreign markets, which results in a higher number of trade transactions between the province and the immigrants' origin countries. This issue as well as the underlying model will be analyzed more in-depth in chapter 4: in this chapter, the availability of more disaggregated data allows distinguishing the effects of immigration on the intensive and extensive margins of trade along with total trade values, as in Peri and Requena-Silvente (2010).

Besides trade costs, migration influences trade also trough the preferences channel (i.e., with reference to equation 2.4, by directly increasing X_n rather than reducing ϕ_{ni}). Since Gould (1994), this effect is referred to as a "preference effect", whereby immigrants affect imports of their host countries: immigrants are more likely than natives to consume their home country products and thus directly raise the demand for home country products abroad.

Murat and Pistoiesi (2009) and Flisi and Murat (2011) have argued that the arguments on the immigration-trade link can be reversed and applied to the cases of emigrant networks in countries such as Italy and Spain that have long emigration experiences. These authors, using country-level data on some European Countries, find supporting evidence to the hypothesis that emigrants facilitate exports to their destination countries through the same information, enforcement and taste effects described above; they also find the emigrants' effect on trade to be stronger than that of immigrants. However, their failure to include fixed effects at the country level or any other controls for multilateral resistance makes them incur the "gold medal mistake" of gravity estimation described by Baldwin and Taglioni (2007).

Besides the discussed mechanisms, one could argue that the inflow of foreign workers can alter the human capital endowment of the host country and generates knowledge spillovers from immigrants to natives, modifying the exporting capacity of the host economy (i.e. S_i in the general gravity equation). The direction of this effect is a priori ambiguous and it largely depends on the human capital embodied by immigrants. On the one hand, immigrants can provide complementary knowledge to the one available in native firms, increase their

productivity, and thus contribute to their easier access to foreign markets. As Williams (2007) argues, immigrants' familiarity with different economic cultures makes them in principle more likely to play a *boundary spanner* role and to contribute to innovation and productivity thanks to their "reflexivity", i.e. their ability to compare different contexts and to identify solutions based on the comparison of different outcomes. On the other hand, immigrants can in the short term decrease the productivity of host firms if their skills level is significantly below the one of the native population involved in the same tasks (cfr. Accetturo et al., 2012). This option was actually highlighted in some of the interviews reported in Part II as a significant drawback involved in hiring immigrant workforce. Rather than affecting specific bilateral trade relationships, these dynamics are likely to affect the exporting capacity of the economy towards all its trade partners, i.e. they would affect the "monadic term" in the general gravity equation[5]. In chapter 4, I provide a more formalized discussion of this possibility.

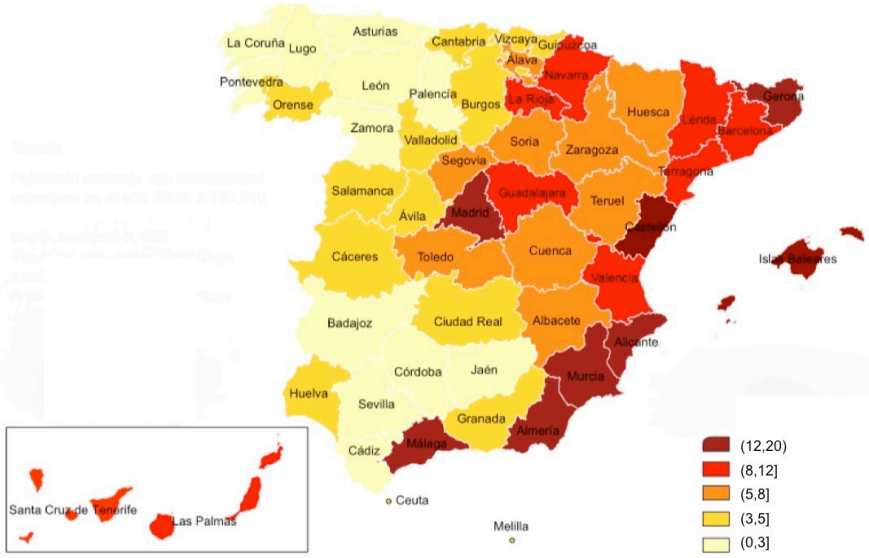
2.4 The unit of observation: provinces as local production systems

Looking at the effect of immigration on trade, one key issue to determine is the unit of observation. In most countries, the immigrant population is quite unevenly distributed. In Italy and Spain, this heterogeneity is substantial. Fig. 2.2 shows that the highest shares of the foreign population over total population are very geographically concentrated, mainly on the Mediterranean coast in Spain and in the North in Italy. A 60% of the immigrant population is concentrated in seven of the 52 Spanish provinces: Madrid, Barcelona, Alicante, Valencia, Malaga, Islas Baleares and Murcia. Eight intermediate provinces account for a 20% of the immigrant population and the remaining 37 do not add up to more than 20% (own elaborations on INE data, *Instituto Nacional de Estadística*). The 107 Italian provinces have on average a smaller size and are more than the double than Spanish provinces, and they also showed a remarkable concentration of the immigrant population: in 2010, 16 provinces (Bergamo, Bologna, Brescia, Firenze, Milano, Modena, Napoli, Padova, Perugia, Roma, Torino, Treviso, Varese, Venezia, Verona, Vicenza), mainly large urban areas and cities in the North, accounted for 50% of the immigrant population in Italy; the 63 provinces with the lowest immigrant concentrations don't even amount to a 20% of the total immigrant population; most, though not all of them, are located in the South (own elaboration on ISTAT data).

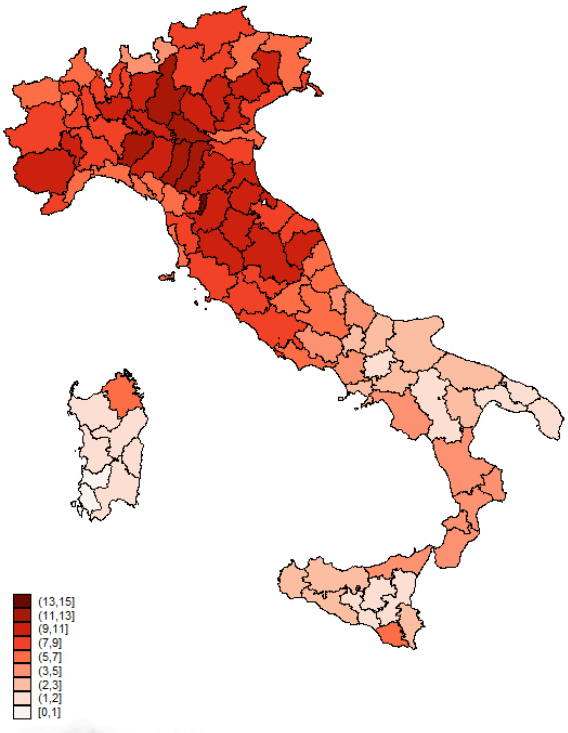
The emigrant population is also mostly originating from a few provinces: Madrid, A Coruña, Pontevedra, Barcelona, Asturias, Ourense, Santa Cruz and Lugo account for almost 57% of the Spanish expatriates. The situation is similar in Italy, where 20 Italian

[5]I would like to thank Francesco Quatraro for suggesting reflection on this point.

Figure 2.2: Foreign residents as share of provinces' population (%)



(a) Spain. Source: INE(2005).



(b) Italy. Source: ISTAT(2011)

provinces, all located in the Center-South except one (Agrigento, Avellino, Bari, Benevento, Caltanissetta, Campobasso, Catania, Catanzaro, Chieti, Cosenza, Enna, Lecce, Messina, Napoli, Palermo, Potenza, Reggio Calabria, Roma, Salerno, Treviso), accounted for 49% of the emigrant population in 2011.

Taking national units of observation would lead to imply an unrealistically homogeneous geographic distribution of the migrant population over the two nations. Furthermore, the migration effect on trade depends on networks of individuals, families and enterprises in which proximity plays a crucial role (Rauch, 1999). For this reason, in this part of the thesis I will follow a relevant strand of the migration-trade link literature that takes sub-national units of analysis such as provinces, federal states and departments (Wagner et al., 2002; Herander and Saavedra, 2005; Dunlevy, 2006; Bandyopadhyay et al., 2008; Peri and Requena-Silvente, 2010; Briant et al., 2009; Bratti et al., 2014). While the analysis of immigration based on these units may be complicated by the high mobility of immigrants across sub-national borders (Borjas, 2003) and the availability of data on migrants' characteristics radically shrinks at this disaggregation level, properly accounting for the geographic distribution of the immigrant population is deemed more important. Furthermore, for the available data, the variation and number of observations increase sizably.

Applying gravity theory to subnational units is rather straightforward, if one applies the argument in Head and Mayer (2014) about firm-level heterogeneity: the exporting capacity S_i in equation 2.6 and the expenditure-weighted market access Ω_i in equation 2.4 need not be equal across provinces. In fact, the Italian and Spanish literature on industrial districts and local systems of production shows that local-specific comparative advantage, deriving among other from local specialization, production tradition, R&D intensity or labour force training, can vary substantially from one local system to another and it does not necessarily align to regional boundaries (see for example ISTAT, 2005b; Boix and Galletto, 2008, , respectively, on Italy and on Spain)). Thus, there is no reason to assume that the multilateral resistance term be the same across provinces, as works like Peri and Requena-Silvente (2010) and Bandyopadhyay et al. (2008) do. By cross-sectional data, the multilateral resistance term on the sub-national unit is to be substituted by, as relevant, province, *département* or county effects. By panel data, the argument in Baldwin and Taglioni (2007) applies: time-varying dummies and pair effects should be included in the equation to appropriately take account of the multilateral resistance term and of unobservables in bilateral trade determinants. In both the Spanish and the Italian case, exports data are recorded by province of origin and country of destination. This leads the micro-founded set of effects to include province-time, country-time and province-country effects.

Nevertheless, with the exception of Briant et al. (2009) who explicitly take account of the heterogeneity at the *département* level in a pooled cross-sectional context, empirical studies adopting sub-national units are often omitting an explicit reflection on whether

the provincial units are to be treated as fully-fledged trading partners. Instead, they seem to assume that the size disproportion between the average country and the average province justifies neglecting the sub-national heterogeneity in multilateral resistance terms. Wagner et al. (2002), for instance, do not add province dummies in their pooled cross-section on Canadian provinces exports arguing that "the special relationships that affect both trade and immigration likely occur politically at the national level" (p. 514-515); Bandyopadhyay et al. (2008) and Peri and Requena-Silvente (2010), using panel data on the exports of respectively US states and Spanish provinces include province-country dummies and country-time dummies but impose the restriction that exporter-time effects be all the same. Peri and Requena-Silvente justify this, framing their empirical analysis in the Chaney (2008) model, by assuming that the wage levels nation-wide be the all the same and, thus, be accounted for in simple time dummies. Considering, to the contrary, that within-country wage differences may be substantial in countries like Italy and Spain, failing to include province-specific time-varying effects could bias the estimates of the variables of interest if the migration effect is correlated with the wage levels of the province, i.e. if the migrants' effects also partially affects the "monadic" term and not only the bilateral trade costs term of the general gravity equation. Bratti et al. (2014), on Italian province-level data, propose a mixed approach where exporter-time and pair effects are included at the regional instead of the provincial level (as region-time and region-country effects), but control for province-specific income and for bilateral distance between provinces and countries of destination.

The trade cost term on sub-national units includes all the bilateral-specific factors that are affecting trade between a given province and a given country. While some of these bilateral trade determinants, such as trade agreements, are not varying by province, others may vary quite substantially, like distance, common borders, institutional partnerships between a given province and a country, or region, such as those described in Stocchiero (2009) between the provinces of Vicenza, Verona and Treviso and Romania, as well as cultural proximity and preferential ties deriving, for example, from path-dependence associated with past emigration from one province to a country, and, particularly in Italy, language commonality. Bilateral time-invariant effects are intended to reflect these specificities in trade flows.

In sum, using sub-national units in the empirical estimation leads the theoretically-founded set of effects to include country-time, province-time and province-country effects.

Adopting sub-national units also allows exploring whether the elasticity of trade to migration differs by country or by region[6].

In addition, the use of sub-national units provides some insights on whether the diffusion

[6]In Table A.0.2 in the Appendix, I also report the results of a model where the elasticity of trade is allowed to vary by province; however, the province-specific estimates rely on a relatively limited number of observations and are to be interpreted carefully.

of information within immigrants' networks has a geographic dimension: Herander and Saavedra (2005) and Bratti et al. (2014) find that province exports, on the whole, are affected by the stocks of immigrants residing within the province and not significantly affected by those residing outside the province, supporting their hypothesis that geographic proximity within the network of immigrants matters to trade. Herander and Saavedra (2005) also find that provinces with a high concentration of immigrants from a certain nationality affect the exports of provinces with lower levels of concentration, suggesting potential information flows from high-concentration to low-concentration provinces.

2.5 Extant empirical literature

In this section I will briefly review the empirical works on the migration-trade link that use subnational units and are of highest relevance for this work[7].

Wagner et al. (2002) run an extensive review of the empirical work on the migration-trade link and analyse the trade of 5 Canadian provinces with 160 countries in a pooled cross-section running from 1992 to 1995. Based on the consideration that the inclusion of fixed effects increases the "noise-to-information ratio" and biases estimates downward (Griliches, 1986), they opt for the inclusion of fixed effects at the country level but exploit the cross-sectional variation at the province level. This allows them to control for time-invariant country-level factors that simultaneously affect trade and immigration and that could bias the estimates of the immigration elasticities. This applies in particular to language commonality (including minority languages) which they account for through a variable that captures the probability that two randomly chosen individuals within a trading pair will speak the same language. In their review, they note that, with the important exceptions of Gould (1994) and Rauch and Trinidade (2002), most studies on the migration-trade link assume constant elasticity of trade to immigration: this implies that a given increase in the immigrant stock will lead to the same increase in bilateral trade regardless of the size of the immigration stock. Noting a lack of theoretical foundations for more realistic diminishing returns on trade from immigration, they develop a "random encounter" model. This is based on the idea that there are two types of trading opportunities: the "hard" and the "easy" trading opportunities; the facilitation of a migrant is required to grasp the "hard" opportunities, while the easy ones get exhausted. Because the "hard" opportunities require skills and knowledge, a given immigrant has a probability p of being able to facilitate the exchange. Thus, the probability that at least one immigrant is able to facilitate the exchange is

$$1 - (1 - p)^{\text{immi}_{ni}}, \tag{2.7}$$

[7]Other works on the migration-trade link that use subnational units are Co et al. (2004); Bardhan and Guhathakurta (2004) on US state exports and Combes et al. (2005)on the intra-national trade of 93 French Departments.

which implies diminishing returns to immigration. The authors estimate their models through the Heckman procedure and by MLE, and find evidence in support of the information, enforcement and taste effects of immigrants on trade, and of diminishing returns to immigration; their results show that the effect of language commonality is not significant when immigration controls are included, leading them to conclude that the immigration effect goes beyond a language effect.

Herander and Saavedra (2005) focus on US states trade with a focus on identifying the role of geographic proximity in immigrants' networks in promoting trade. Their data is a pooled cross section on the exports of 50 US states and 36 countries, over 1993-1996, where they admit they do not exploit the time dimension because of their interest in time-invariant factors. They include controls for immigrant population ancestry, skills, length of stay and quality of institutions. The latter is obtained by interacting the immigration variable with a rule of law index based on Kaufmann et al. (1999). Because of the high number of zeros in their dependent variable, they use a threshold-Tobit model based on Eaton and Tamura (1994), where the dependent variable is $ln(X_{ni} + \delta)$ and δ is a threshold to be estimated; they also compare their estimates with Powell (1984)'s Least Absolute Deviation estimator to ensure spatial and serial correlation do not affect the results. As mentioned above, they find that province exports, on the whole, are affected by the stocks of immigrants residing within the province but are not significantly affected by those residing outside the province, supporting their hypothesis that geographic proximity within the network of immigrants matters to trade. Another finding is that provinces with a high concentration of immigrants from a certain nationality seem to have an effect on the exports of provinces with lower levels of concentration, suggesting informational spillover effects from high-concentration to low-concentration provinces. Their failure to include fixed effects makes them run into the "gold medal mistake", while the effect of time-invariant variables could, according to Cheng and Wall (2005), have been accounted for by regressing the estimated dyadic effects on the time-invariant variables of interest.

Dunlevy (2006) focuses on cross-sectional data on the trade of 50 US states trade to 87 countries in 1990 and, motivated by the high number of zeros in the dependent variable, applies a Tobit model where the dependent variable is the log of exports plus one. His focus is on whether immigration affects more strongly the trade of US states with weaker institutions and more corruption, hypothesizing that immigrants' "enforcement effect" substitutes for the weak institutional setting. He finds support in favour of this hypotheses and of a few other corollaries and includes in some specifications both country and province effects.

Briant et al. (2009) analyse a pooled cross-section on the trade of 94 French *départements* with 100 countries in 1999-2001. They explicitly account for the sub-national heterogeneity by adding fixed effects at the *département* level as well as country fixed effects. They also account for the potential heteroskedasticity bias noted by Santos-Silva and Tenreyro

(2006) in log-linearised equations and run their estimates on the immigration effect on trade using the two-step Negative Binomial procedure suggested in Head et al. (2010), besides OLS. They address the potential endogeneity of trade to immigration by instrumenting the immigration variable with the lagged values of the variables in 1990, 1982 and 1975. Running separate regressions on the trade of differentiated and reference-priced products, based on Rauch (1999) classification, and interacting their immigration variable with a rule of law index, on the export side they find that immigrants matter to exporting all kinds of products, and more so when institutions are weak; on the import side they find that immigrants matter to the trade of simple goods only when institutions are weak, and to the trade of complex goods by higher institutional quality.

Bandyopadhyay et al. (2008) are the first to employ panel data with subnational units, using a panel on 51 US states exports to 29 countries in 1990 and 2000. They draw on Cheng and Wall (2005) argument in favour of bilateral pair-specific fixed effects to appropriately account for unobserved heterogeneity in gravity models, and apply their methodology to sub-national units. They run panel regressions with pair-specific fixed effects and country-time dummies. Their main contribution is in terms of showing that country-specific elasticities of trade to immigration may substantially depart from the elasticity measured for the full sample and are significant only for a subset of countries; this leads the authors to infer that the impact of immigration on trade differs by ethnicity. As mentioned, however, they omit a theoretical reflection on the multilateral resistance. Rather than as the way to include multilateral resistance controls in panel data recommended by Baldwin and Taglioni (2007), fixed effects are included as a more handy way to account for heterogeneity and country-specific macroeconomic changes; the inclusion of state-time effects is completely neglected.

Peri and Requena-Silvente (2010) use a panel on province-level exports of 50 Spanish provinces to 77 countries in the 1995-2007 period. They derive from the Chaney (2008) model a specification that is similar to the one used by Bandyopadhyay et al. (2008); drawing on Chaney (2008), however, they are able to test hypotheses on the effect of immigrants on the intensive and extensive margins of trade. They find that the immigration effect is concentrated on the extensive margin of trade: according to their results, immigrants contribute to lowering the fixed costs of opening new business ventures in their home countries to a much greater extent than they increase the average value per transaction. Peri and Requena-Silvente (2010) also apply instrumental variables regression to exclude reverse causality from trade to immigration. Within their robustness checks, they find that the immigration effect is concentrated in the provinces with a high share of immigrants over the total population and is stronger in more recent years. While they briefly refer to the application of Poisson estimation to address the potential heteroskedasticity bias in log-linearised models, they do not specify the underlying model. As mentioned above, they assume equal wage levels across provinces and do not include province-time dummies.

Bratti et al. (2014) present a peculiar model which integrates the use of province-level data on trade and immigration from Italy with the inclusion of region-time and country-region effects instead of province-time and country-province effects. This approach has the advantages of allowing the inclusion of province-level determinants such as income and distance while reducing the saturation of the model and thus leaving more scope for the variation in immigration and trade to be explained by the model. However, the arguments for adopting this approach, which mostly refer to the modifiable areal unit problem (MAUP), are not confronted with the implications deriving from the use of a gravity model: again, while income levels and thus expenditures and production are allowed to vary by province, the multilateral resistance terms are implicitly assumed to be the same within the same region without an explicit comparison with the results of the model that uses the theory consistent set of dummies. Contributions of the paper also include the use of an IV approach similarly to Briant et al. (2009) and Peri and Requena-Silvente (2010) and the analysis, which draws on Herander and Saavedra (2005), of the effects of distance on the networks effectiveness in promoting trade. I will discuss their model more in details in chapter 4, where it will be more directly compared with the one developed here.

2.6 Open econometric issues in the estimation of gravity models

Briant et al. (2009) identify three econometric issues to be addressed for consistently estimating gravity models: zeros, heteroskedasticty and endogeneity. This partially contributes to explain the variety of estimation methods outlined in the review above.

2.6.1 Zero trade flows

The issue of zero trade flows is a concern for the international trade literature in general (Helpman et al., 2008) and is particularly relevant for the trade of sub-national units, where small flows are common and zero flows are common. The problem of zero flows arises from the log linearization in gravity models, due to the indeterminacy of the log of zero. Thus, OLS estimates are only possible on non-zero observations. Also, the censoring at zero introduces a bias in the simple OLS estimator and the model is more consistently estimated in levels through Tobit models or models of the Poisson family, as argued by Santos-Silva and Tenreyro (2006) and Eaton and Kortum (2002). Eaton and Tamura (1994) threshold Tobit model is one of the first applications of the Tobit estimator to gravity models which has been applied to the migration-trade link literature by Herander and Saavedra (2005) and by Dunlevy (2006). Wagner et al. (2002) use the Heckman procedure. As to my data, the sample selection dictated by the need to ensure that data are available on the

migration variables causes the issue of zero trade to be negligible, limited to only 0.24% of the observations. Hence, the issue of zero trade will not be addressed here.

2.6.2 Heteroskedasticity and functional form of the errors

Santos-Silva and Tenreyro (2006), drawing on Manning and Mullahy (2001), note that the usual procedure of log-linearizing the gravity equation and estimating it by OLS could introduce a bias in the estimates when the error term is heteroskedastic. Because the expected value of the logarithm of a random variable depends both on its mean and on the higher-order moments of its distribution, in presence of heteroskedasticity it cannot be assured that the unconditional mean of the log of the errors is zero, and that their conditional mean is independent from the covariates. In practice, the variation in trade data typically increases by larger trade flows; larger trade flows are in general associated with greater economic size and lower bilateral trade costs, i.e. the gravity model covariates. While this poses no consistency problem in standard OLS estimation, by log-linearisation the variance enters the determination of the expected value of the error term. Thus, a violation of the homoskedasticity assumption will in general lead to the fact that the expected value of the log-linearized error term depends on the covariates, leading to inconsistent OLS estimates. The bias in the OLS estimation is partially reduced by fixed effects. Santos-Silva and Tenreyro (2006) compare OLS, Gamma regression, non-linear least squares (NLS) and Poisson pseudo-maximum likelihood estimators in a cross-sectional context. They argue in favour of the use of a Poisson pseudo-maximum likelihood estimator as it is more consistent than OLS and more efficient than NLS. Because the Poisson estimator allows accounting for the zeros in the dependent variable and is consistent even by variance misspecification (Wooldridge, 2002), the authors prefer the Poisson Pseudo-Maximum-Likelihood Estimator (PPML) to other count models such as the Negative Binomial[8].

The Santos-Silva and Tenreyro argument to make the PPML the new "workhorse" for

[8]Santos-Silva and Tenreyro also argue against the use of the Negative Binomial in their "Log of gravity" webpage,`http://privatewww.essex.ac.uk/~jmcss/LGW.html`:

> "The estimator proposed in the Log of Gravity is simply a weighted non-linear least squares estimator. It turns out that with the proposed weights, the first-order conditions for this estimator are identical to those of the Poisson pseudo-maximum likelihood regression. Therefore, the fact that we recommend the used of a count data estimator for the gravity equation is just a fortunate coincidence that allows the use of a well-known regression method which is widely available is econometric and statistics software. (...) both the negative-binomial and the zero-inflated regression models have the important drawback of not being invariant to the scale of the dependent variable. That is, measuring trade in dollars or in thousands of dollars will lead to different estimates of the elasticities of interest!"

Head and Mayer (2014), too, urge researchers to "resist the siren song of Negative Binomial", mainly because of the problem that the estimates depend on the unit of measurement in the dependent variable (Boulhol and Bosquet, 2014).

gravity models in the presence of heteroskedasticity has been recently challenged by Head and Mayer (2014) in their handbook chapter. The selection of the appropriate estimation method based on considerations on the functional form of the errors lies at what the authors call the "frontiers of gravity research". The authors compare the moment conditions of the PPML and of the OLS with those of the Gamma PML and note that the OLS and Gamma PML pursue a similar objective: in the case of the Gamma, to set to zero the sum of the percent deviations of actual trade from predicted trade; in the case of OLS, to set to zero the sum of the log deviations of actual from predicted trade. The two are approximately equal (p.40). The Poisson PML moment conditions, instead, set to zero the *level* deviations of actual from predicted trade. For this reason, Poisson PML gives more weight to larger observations compared to the other two estimators. The Gamma regression, like the Poisson PMLE, delivers consistent estimates regardless of the functional form of the errors as long as the conditional mean is correctly specified, because it also measures the dependent variable in levels. The relative efficiency of the two estimators depends on the assumptions made about the variance of the errors. Drawing on Santos-Silva and Tenreyro (2006) and on Manning and Mullahy (2001), Head and Mayer (2014) propose a general relation linking the variance to the conditional mean which contains the different cases:

$$\text{var}[X_{ni}|\mathbf{z}_{ni}] = h\text{E}[X_{ni}|\mathbf{z}_{ni}]^{\lambda} \tag{2.8}$$

The Poisson PML is the most efficient estimator by $\lambda = 1$, corrisponding to a constant variance-to-mean ratio, a generalization of the Poisson assumption of $h = \lambda = 1$. The homoskedastic OLS estimator in logs is the MLE by $\lambda = 2$, which corresponds to a constant coefficient of variation. By heteroskedasticity and $\lambda = 2$, the consistent and efficient estimator is the Gamma PML[9]. Both the Poisson and the Gamma PML remain consistent by $h > 1$, i.e. by overdispersion (Wooldridge, 2002). Equation (2.8) can be log-transformed and applied to the sample counterparts of the mean and variance parameters to become the Manning and Mullahy (2001) test on the underlying functional form of the errors, or Santos-Silva and Tenreyro (2006)'s "Park-type test"; Head and Mayer (2014) dub it "MaMu test":

$$\ln\hat{\epsilon}^2_{ni} = \text{constant} + \lambda\widehat{\ln X}_{ni} \tag{2.9}$$

Based on the results of a series of Monte Carlo simulations in a cross-sectional context, Head and Mayer (2014) confirm the robustness of the Poisson and Gamma PML to different functional form of the errors. However, they also find some evidence against the Poisson as the new "workhorse" for gravity equations: by mis-specification of the conditional mean, the Poisson PML results severely biased due to the higher weight given to larger observations, while the OLS on logs and the Gamma PML are consistent by sufficiently large sample sizes. The kind of model mis-specification that they introduce is of particular interest for empirical works on the migration-trade link: non-constancy in the variable of

[9] Another possible option is the heteroskedastic-retransformed OLS estimator (Manning and Mullahy, 2001), which is however not practicable here.

interest. As seen above, while the large majority of the recent works assume constant elasticity of trade to migration, earlier works explored the hypothesis of diminishing returns to migration (Gould, 1994; Rauch and Trinidade, 2002; Wagner et al., 2002).

Hence, none of these estimation methods can be considered as a single "workhorse". Instead, the consistent and efficient estimator in relation to the specific issues posed by a given dataset is more likely to be identified from the comparison of the three estimation methods. Head and Mayer (2014) identify a few simple selection criteria (p.44):

1. If the three give similar results, the model appears well specified, with approximately log-normal errors and constant variance. In this case, the OLS is the MLE.
2. If the Poisson and Gamma PML estimates are similar to each other and different from the OLS, heteroskedasticity should be considered as a problem and the OLS is to be considered as inconsistent.
3. If the Gamma PML and OLS coefficients are similar and the Poisson estimates are smaller in absolute values, there are two possible interpretations: (a) By small samples, this may be due to small sample bias in either of the PML estimators. If the $\hat{\lambda}$ derived from the MaMu test in Equation (2.9) is close to 1, Poisson should be preferred. (b) By large samples, significantly divergent estimates may a signal non-constant elasticities and model mis-specification.

In the empirical chapters follows, I will follow this approach. I will run the three estimators (OLS, Poisson and Gamma) on my data, and compare their results, as outlined more in details in section 2.7.

2.6.3 Reverse Causality

According to Briant et al. (2009), the third econometric issue affecting trade studies is endogeneity, which may arise from reverse causality or omitted variables.

As to reverse causality, Briant et al. (2009) Peri and Requena-Silvente (2010) and Bratti et al. (2014), using sub-national trade and migration data on France, Spain and Italy, apply instrumental variables approaches; their IV estimates, mainly based on imputed values of immigration drawn by the distribution of immigrants in the nineties, confirm the estimates obtained by OLS. On the other hand, as argumented by Gould (1994) and Briant et al. (2009)it is unlikely that the preferential bilateral links between two countries are simultaneously causing trade and migration flows: migration flows are mainly driven by family reunification motives, wage and income differentials and similarity in languages (see also de Haas, 2010). Therefore, I will assume that reverse causality is not a problem in my data and I will not address it specifically in my estimates.

2.6.4 Omitted variables and heterogeneity

Another possible ground for the violation of the assumption of independence of the errors may derive from omitted variables.

In the case of the gravity models, a large component of the multilateral resistance terms, as well as of the bilateral trade determinants, are known to be unobservables (Anderson and van Wincoop, 2003; Baldwin and Taglioni, 2007; see also section 2.2). By panel data, the time-varying component of the multilateral resistance terms should be accounted for by time-varying effects; the correlation between unobservable bilateral trade determinants and included bilateral trade determinants (migration variables, in this case) should be accounted for by dyadic time-invariant effects (Baldwin and Taglioni, 2007).

Additional unobservables may be the consequence of heterogeneity at the level of the trading pair that affect trade through the bilateral trade costs channel. This is discussed, for the case of panel data, in Cheng and Wall (2005) and Bandyopadhyay et al. (2008). These studies argue in favour of the inclusion of bilateral pair-specific fixed effects, discarding other, less computationally burdensome, simplifications deriving from arbitrary restrictions imposed to the effects (e.g. symmetric pair-specific effects, a single fixed effect for a given importer towards all exporters, a single exporter effect towards all importers).

Including the three sets of effects (importer-time, exporter-time and dyadic) implies that bilateral-specific time-invariant variables are absorbed in the trading pair effects, and that importer-specific and exporter-specific time-varying variables are absorbed in the importer-time and exporter-time effects. This leaves out for estimation only those variables that are at the same time dyadic and time-varying, such as immigration and emigration stocks.

The absorption of variables of interest in the fixed effects does not prevent analyzing their role in determining trade flows. According to Cheng and Wall (2005), the unbiased estimation of time-invariant variables such as distance, language and institutional similarities is best performed by running a regression with the estimated pair effects as dependent variable and the time-invariant variables as regressors. This technique leads the authors to confirm the effect of time-invariant variables in the expected directions, in line with the findings of the gravity literature. Yet, it should be noted that this procedure is only applicable where the fixed effects can be consistently estimated, which is not the case when the estimates are affected by the incidental parameter problem (see below).

2.7 Proposed econometric strategy

Based on the considerations above, the optimal strategy in a panel context would be to include the three suggested sets of effects (province-time, country-time and province-country) in the OLS, Poisson and Gamma models, both to account for unobserved heterogeneity and for theory consistency, and to proceed with the steps outlined in section 2.6.2 to identify the suitable model for the specific data at stake. While this poses no problem to the OLS and Poisson estimation, Gamma estimation with many dummies in short panels is problematic. Here, the estimation of the coefficients of the bilateral fixed effects relies on the time variation only; when the panel is short, the coefficient cannot be consistently estimated; and the inconsistency could in principle pass on to the estimates of the variables of interest (Cameron and Trivedi, 2009).

To the best of my knwoledge, there is no way to estimate a Gamma regression with a high number of dummies without incurring the incidental parameters problem. On the other hand, not including the bilateral fixed effects implies certainly incurring into omitted variable bias. We have discussed the theoretical and econometric arguments supporting their inclusion; empirically, the bilateral fixed effects are jointly highly significant; they are supported by likelihood ratio tests, dramatically increase the R-squared and decrease the Akaike Information Criterion statistics. Thus, I will include the three sets of effects in the Gamma regression and rely on the high number of time-varying exporter and importer effects, as well as on the high number of observations (15195) on which the migration variables can be estimated, to prevent the possible inconsistency in the coefficients of the fixed effects from passing on to the variables of interest.

The basic theory-consistent model to analyse the immigrants' and emigrants' effects on the trade of Spanish provinces in a panel context is the following:

$$X_{nit} = \alpha X_{nt}^{b_1} Y_{it}^{b_2} \text{Immi}_{nit}^{\beta_1} \text{Emi}_{nit}^{\beta_2} e^{(\gamma_1 \theta_{nt} + \gamma_2 \omega_{it} + \gamma_3 \eta_{ni} + \varepsilon_{nit})} \tag{2.10}$$

Where:

X_{nit} = Nominal value of the exports from the Spanish province i to country n at time t;

X_{nt} = Total expenditures by country n, approximated by GDP,

Y_{it} = Total production by province i, approximated by province gross product[10];

Immi_{nit} = Stock of immigrants from country n living in province i at time t;

[10]Notice that, in spite of disproportion in size between countries and regions, we keep here the same notation as in the country-level version of the gravity equation. Indeed, Head and Mayer (2014) explicitly state that the trading partners involved in the gravity equation could as well be smaller units than countries, such as regions, provinces, or even firms

Emi_{nit} = Stock of emigrants from province i living in country n at time t;

$\theta_{\mathbf{nt}}$ = vector of the importer-time effects, corresponding to country-time dummies;

$\omega_{\mathbf{it}}$= vector of the exporter-time effects, corresponding to province-time dummies;

$\eta_{\mathbf{ni}}$= vector of the trading-pair specific fixed effects, corresponding to province-country dummies

ε_{nit}= error term

The right-hand side of the equation is log-linearised in the estimation. The left-hand side of the equation is in levels for in the cases of the Poisson and Gamma PML estimation and in logs in the case of OLS estimation.

As mentioned in section 3.3,to address potential non-linearities and the indeterminacy of the log of zero in the immigration and emigration variables, I add one unit to each observation and include a No-Immigrant-Dummy (NID) and a No-Emigrant-Dummy (NED) to the equation.

The log-linearised model to be estimated by OLS becomes:

$$ln(X_{nit}) = b_1 ln(X_{nt}) + b_2 ln(Y_{it}) + \beta_1 \ln(\text{Immi}_{nit} + 1) + \beta_2 \ln(\text{Emi}_{nit} + 1) + NID_{nit} + \\ + NED_{nit} + \gamma_{\mathbf{1}}\theta_{\mathbf{nt}} + \gamma_{\mathbf{2}}\omega_{\mathbf{it}} + \gamma_{\mathbf{3}}\eta_{\mathbf{ni}} + \varepsilon_{nit} \quad (2.11)$$

The model to be estimated by Poisson and Gamma PML is the following:

$$X_{nit} = b_1 ln(X_{nt}) + b_2 ln(Y_{it}) + \beta_1 \ln(\text{Immi}_{nit} + 1) + \beta_2 \ln(\text{Emi}_{nit} + 1) + NID_{nit} + \\ + NED_{nit} + \gamma_{\mathbf{1}}\theta_{\mathbf{nt}} + \gamma_{\mathbf{2}}\omega_{\mathbf{it}} + \gamma_{\mathbf{3}}\eta_{\mathbf{ni}} + \varepsilon_{nit} \quad (2.12)$$

In practice, estimating X_{nt} together with importer-time effects, and Y_{it} together with exporter-time effects in the same equation gives rise to perfect collinearity, hence the income terms are omitted in the empirical application unless the relevant set of fixed effects is removed[11].

As discussed above, the first step in the empirical strategy will be to follow Head and Mayer (2014) in estimating the model with the three estimation methods, construing the

[11]The analyst may actually be able to estimate log-linear versions of model 2.10 and to view coefficients for the income variables, as in Peri and Requena-Silvente (2010) and in Bandyopadhyay et al. (2008). This comes however at the cost of omitting some dummies, which are dropped automatically by the software and are not fully controlled by the analyst. This implies that the estimated coefficients for the income variables actually refer to the single cases for which the dummies have been dropped and cannot be interpreted more generally.

whole strategy as a "robustness-exploring ensemble"[12].

The second step will be to compare the estimates based on the criteria proposed by Head and Mayer (2014) and draw conclusions on this basis; as relevant, I will test for heteroskedasticity, learn about the functional form of the residuals through a MaMu test, and run a Ramsey RESET test to confirm the consistency of the models for the data at stake.

In the third step, the selected model will be used to test the arguments made in section 2.4 about sub-national heterogeneity in the multilateral resistance terms. As this paper focuses on the exports side, the test for sub-national heterogeneity on the multilateral resistance term will focus on the Ω_i in the structural gravity model (equation 2.4), i.e. on the average market access of the province on all markets, which by panel data is time-varying and corresponds to ω_{it} in model 2.10. The papers which omit this term explicitly or implicitly assume that the average market access is the same across provinces. Hence, to verify the hypothesis of province-level heterogeneity in this term, I will run a statistical test on the basic specification to verify the joint statistical significance of the set of province-time effects; I will also estimate the model with a different specification that excludes the province-time effects but includes province income (to ensure that the exclusion of the province-specific multilateral resistance term does not exclude the production term Y_i). I will compare the log-likelihood and AIC statistic[13] to conclude whether province-level heterogeneity is supported by the data, besides theory.

The strategy will be applied in slightly different ways to the Italian and Spanish case for reasons driven by the availability of trade data. In Spain, the DataComex database is publicly available and provides yearly bilateral data on the trade flows between each province and each country. Hence, the empirical analysis will follow the steps outlined here. In the Italian case, the access to transaction-level micro-data that could be aggregated at the province-country-year level provided a unique opportunity to analyze the migration trade link not solely in relation to trade values, but also with respect to the intensive and intensive margins of trade, measured as number of transactions and average value per transaction as in Peri and Requena-Silvente (2010). This also allowed distinguishing the effects of migration by different types of goods and by different technological intensity in production .

Finally, the model will be used to test country-specific hypotheses. In the Spanish case, these will mainly refer to the role of language and institutional similarity, of geographic

[12]The Poisson estimates are run using the robust feature of the `xtpoisson` estimator in Stata12, which includes the features of `xtpqml`, the previous version of the command developed by Timothy Simcoe. The Gamma estimates are run using the `glm` command with the options `link(log) family(gamma)` with a series of trading pair dummies representing the three sets of effects and standard errors clustered at the pair level. In the case of OLS, too, unless otherwise specified, the standard errors are clustered at the pair level.

[13]Stata does not allow likelihood ratio tests on models with clustered and robust standard errors.

proximity and of sub-national heterogeneity in the immigrants' effects (chapter 3). In the Italian case, the articulation of the data into the intensive and extensive margins of trade allows decomposing the migration effects into the two components and analyzing changes in the magnitude of the effects arising from product differentiation, which according to Rauch and Trinidade (2002) sheds light on the mechanism underlying immigrants' effects on trade (information vs. enforcement); further tests will analyze how immigrants' effects are affected by the duration of trade partnerships, technological intensity in production as well as by the shares of overall immigrant population residing in the provinces (chapter 4.

Chapter 3

Migration and trade flows in the Spanish provinces

3.1 Introduction

This chapter analyzes the impact of immigration and emigration on the trade of Spanish provinces. It aims to integrate the insights coming from the country-level studies by Murat and Pistoiesi (2009) and Flisi and Murat (2011) on the trade-facilitating effect of emigrant networks with those of the literature on sub-national units: while the former refers to the Italian case and the latter is a comparative study of Italy, Spain, France, Germany and UK, these are the only papers focussing on both immigration and emigration effects on international trade and FDI; their insights hold for the case of Spanish provinces. As seen in chapter 1, the present paper takes the case of Spain because of its peculiar relevance to the problem and because of its comparability with the Italian case, which is addressed in the next chapter[1]: both countries are marked by a similar economic structure based on small and medium-sized enterprises, a similar sectoral structure of exports and have a long-lasting emigration hystory coupled with recent and booming immigration.

According to Eurostat data, immigrant stocks have been growing at an average rate of 17,9% over the 1998-2011 period, reaching peaks of almost 50% per annum in the early 2000s but showing a marked decline in the years of the economic crisis. Emigration stocks have been growing at an average of 4.17% per year, and, contrarily to immigration stocks, have been accelerating since 2008.

[1]The Spanish case is presented here before the Italian one because it directly corresponds to the econometric strategy outlined in chapter 2. In the Italian case, the empirical strategy slightly departs from this due to the availability of a richer dataset providing information about the intensive and he extensive margins of trade (chapter 4).

Within Spain, the distribution of foreign residents is very heterogeneous. Seven provinces out of 52 (Madrid, Barcelona, Alicante, Valencia, Malaga, Islas Baleares and Murcia) host a 60% of the total immigrant population, while 37 of them do not add up to more than 20%. While the average share of foreigners in Spain was 12.2% in 2010, the share of immigrants over the total resident population reached over 20% in four provinces in 2010 (Alicante, Islas Baleares, Almería, Girona) while it remained below 5% in 19 provinces (INE, *Instituto Nacional de Estadistica*).

Also, there is strong sub-national heterogeneity in the distribution of emigrants across the provinces of origin. Eight provinces (Madrid, A Coruña, Pontevedra, Barcelona, Asturias, Ourense, Santa Cruz and Lugo) account for almost 57% of the Spanish expatriates. In 2010, Spanish nationals abroad represented a 3% of the national population, but in 7 provinces (Santa Cruz de Tenerife, Leon, Asturias, Zamora, Pontevedra, Lugo and A Coruña) the share of expatriates was more than doubling the average, scoring above 7% (INE, *Instituto Nacional de Estadistica*).

Hence, as highlighted in chapter 2, to analyze the effect of immigration and emigration on trade, the adoption of sub-national units is necessary to appropriately take into account sub-national differences in the structure of opportunities (Kloosterman and Rath, 2001), which are likely to be correlated with the determinants of trade. Furthermore, the adoption of sub-national units is likely to provide a comparatively more precise measure of the issue at stake: the contacts of relevance to trade opportunities are more likely to occur within networks of proximity (Rauch, 1999). Sub-national units also conveniently increase the available variation in the observations.

Based on these considerations, the theory-consistent gravity model developed in chapter 2 will be applied to trading pairs constituted by Spanish provinces and foreign countries in a panel covering the 2006-2010 period. As discussed at length in chapter 2, the theory-consistent model with panel data includes province-time, country-time and bilateral time-invariant fixed effects. The econometric strategy outlined in section 2.7 will be applied to address methodological problems which stand at the "frontiers of gravity research" (Head and Mayer, 2014), in order to identify the most efficient and consistent estimation method: OLS, Gamma PML and Poisson PML estimators will be compared on the basis of the tests suggested in Head and Mayer (2014) and Santos-Silva and Tenreyro (2006); on this basis, the model that best suits the data will be selected and applied to hypothesis testing.

The results of the analysis applied to the Spanish case confirm the usefulness of the proposed econometric strategy, leading to select the Gamma estimator among the three estimation methods. The results also show that the choice of the Gamma estimator prevents from drawing incorrect conclusions on the effects of language commonality on the immigration effects and of proximity on the emigrants' effects; the Gamma estimates also highlight a clearer pattern for the immigrants' effects in provinces characterized by different shares of overall immigrants' and emigrants' populations. As regards the inclusion of controls for

province-level heterogeneity in the multilateral resistance term, while it is supported in the statistical tests, it does not appear to make a radical difference in the magnitude of the estimates of the immigration effects on total trade. It does, however, produce different results in the disaggregated analysis that distinguishes provinces according to their shares of total immigrant population. A further finding of this study is that the geographical reach of the flows of information underlying the trade facilitation effect is different for immigrant and emigrant networks.

3.2 Empirical background and methodology

3.2.1 Empirical works on the migration-trade link in Spain

Gravity models have been applied to the analysis of the international trade flows in the case of Spain by Blanes-Cristóbal (2008) and Peri and Requena-Silvente (2010)[2].

Blanes-Cristóbal (2008) uses country-level data from 1993 to 2003 about Spanish trade (imports and exports) with 83 countries and exploits a database - the Active Population Survey - that includes information about immigrants' characteristics. Using information about the level of education, and about whether the immigrant is an employer, an employee, or in another condition (e.g. involved in family assistance of member of a cooperative), he finds that a positive and significant effect on trade is exerted by immigrants with a secondary education degree (nor lower nor higher), and by non-employed immigrants (i.e. either managers or involved in other activities). He also distinguished products into producer and consumer goods, finding a stronger immigration effect for consumer goods. In order to account for institutional similarity, he also allowed the immigrants' effects to vary between former colonies and countries that have not been Spanish colonies, and between EU and non-EU countries, interacting the migration variable with the relevant dummies. His results show that the immigrants' effect is stronger for countries that have never been Spanish colonies but, unexpectedly, also for EU countries. The literature, instead, predicts the trade-facilitating effect to be stronger when it isn't redundant with other trade-facilitating factors, such as commonality of regulations and institutions (Girma and Yu, 2002). Because, in his specification, he did not include fixed effects with a view to draw conclusions about the time-invariant determinants of trade, and only took account of time variation through year dummies, the explanation of this strange result could be in the failure to account for the multilateral resistance terms of these countries, i.e. according to Baldwin and Taglioni (2007), the "gold medal mistake" of gravity literature. While the findings about the immigrants' characteristics cannot be tested with sub-national units due to data

[2]Blanes-Cristóbal (2005) and Blanes-Cristóbal and Martin-Muntaner (2006) analyze the effect of immigration on intra-industry trade in the 1990s, showing that the immigration effect is stronger for differentiated products.

availability, the role of institutional similarity arising both from EU integration and colonial ties will be tested in the following sections.

Peri and Requena-Silvente (2010) use a panel on province-level exports of 50 Spanish provinces to 77 countries in the 1995-2007 period. They derive from the Chaney (2008) model a specification that, similarly to Bandyopadhyay et al. (2008), includes province and country income, immigration stocks, time-varying importer dummies and time-invariant bilateral fixed effects. As mentioned in chapter 2, they assume equal wage levels across provinces and do not include province-time dummies. They estimate their equations mainly by OLS and with an instrumental variable approach. Drawing on the aggregation of transaction-level data, they are also able to test hypotheses on the effect of immigrants on the intensive and extensive margins of trade. They find that the positive and significant immigration effect on trade value is due to the extensive, rather than the intensive, margin of trade. Thus, according to their results, immigrants contribute to lowering the fixed costs of opening new business ventures in their home countries, while they don't significantly increase the average value per transaction. They also find that the effect is stronger for differentiated goods. Within their robustness checks, they find that the immigration effect is concentrated in the provinces with a high share of immigrants over the total population and is stronger in more recent years. While their findings on the intensive and extensive margins and on goods differentiation will not be addressed here due to the nature of the data[3], and while the time period is slightly different due to the selection in the data drawn by the emigration variable, the model used here will be quite similar to the one used by them and can be quite directly compared: it basically only adds province-time effects to their specification and removes income terms due to collinearity with the fixed effects. Also, the same model will be estimated by Poisson, an estimation method they make a quick reference to without specifying the underlying model. In addition, because of the relevance of their findings on province-level heterogeneity in the immigrants effect to the issue of potential non-constancy in the migration effects, which has implications on the choice of the estimator, inspiration will be drawn from their work and some hypotheses about the non-constancy in the migration effects will also be tested.

[3]The ready DataComex database on the trade between Spanish provinces and countries worldwide was used instead of aggregating the data from the 8-digit transaction level as done by Peri and Requena-Silvente (2010)

3.2.2 Model and hypotheses

As derived in chapter 2, the empirical model that will be tested on Spanish data will be as follows. The log-linearised model to be estimated by OLS is:

$$ln(X_{nit}) = b_1 ln(X_{nt}) + b_2 ln(Y_{it}) + \beta_1 \ln(\text{Immi}_{nit} + 1) + \beta_2 \ln(\text{Emi}_{nit} + 1) + NID_{nit} + \\ + NED_{nit} + \gamma_{\mathbf{1}}\theta_{\mathbf{nt}} + \gamma_{\mathbf{2}}\omega_{\mathbf{it}} + \gamma_{\mathbf{3}}\eta_{\mathbf{ni}} + \varepsilon_{nit} \quad (3.1)$$

The model to be estimated by Poisson and Gamma PML is the following:

$$X_{nit} = b_1 ln(X_{nt}) + b_2 ln(Y_{it}) + \beta_1 \ln(\text{Immi}_{nit} + 1) + \beta_2 \ln(\text{Emi}_{nit} + 1) + NID_{nit} + \\ + NED_{nit} + \gamma_{\mathbf{1}}\theta_{\mathbf{nt}} + \gamma_{\mathbf{2}}\omega_{\mathbf{it}} + \gamma_{\mathbf{3}}\eta_{\mathbf{ni}} + \varepsilon_{nit} \quad (3.2)$$

With the same notation as in Chapter 2:

X_{nit} = Nominal value of the exports from the Spanish province i to country n at time t;

X_{nt} = Total expenditures by country n, approximated by GDP,

Y_{it} = Total production by province i, approximated by province gross product;

Immi_{nit} = Stock of immigrants from country n living in province i at time t;

Emi_{nit} = Stock of emigrants from province i living in country n at time t;

NID_{nit}="No immigrants dummy", equal to 1 if no immigrants from country n are residing in province i at time t, and zero otherwise;

NED_{nit}="No emigrants dummy", equal to 1 if no immigrants from country n are residing in province i at time t, and zero otherwise;

$\theta_{\mathbf{nt}}$ = vector of the importer-time effects, corresponding to country-time dummies;

$\omega_{\mathbf{it}}$= vector of the exporter-time effects, corresponding to province-time dummies;

$\eta_{\mathbf{ni}}$= vector of the trading-pair specific fixed effects, corresponding to province-country dummies

ε_{nit}=random error term

Once the suitable estimation method defined, I will test the hypothesis that immigrants and emigrants have a positive effect on the trade of Spanish provinces. The coefficients β_1 and β_2 in equations 3.1 and 3.2 are expected to be positive and significant.

As mentioned in chapter 2, including $ln(X_{nt})$ together with $\theta_{\mathbf{nt}}$ and $ln(Y_{it})$ together with $\omega_{\mathbf{it}}$ gives rise to perfect collinearity. Hence, the income terms are omitted in the empirical

estimation of the basic model. They are, instead, included in the models omitting the corresponding fixed effects.

Along with the hypothesis of a positive and significant effect of immigration and emigration stocks on trade, two "corollaries" deriving from the literature will be tested: that immigrants' and emigrants' effect on trade is stronger with more culturally distant and more institutionally distant countries. To this end, the effect of immigrants and emigrants on trade will be split between Spanish-Speaking and non-Spanish-speaking countries (to account for cultural similarity), and between EU and non-EU countries (to analyze the role of institutional similarity). As in Girma and Yu (2002) and Blanes-Cristóbal (2008), this implies interacting $ln(Immi_{nit})$ and $ln(Emi_{nit})$ with, respectively, a D_{EU} and a D_{Spa} dummy. D_{EU} equals 1 for EU Member States and zero otherwise; the coefficients of its interaction with the migration variables are aimed to test the role of institutional (dis)similarity in promoting trade. D_{Spa} equals 1 when the country has Spanish as an official language and zero otherwise. Il closely mirrors remote colonial ties; the coefficient of these interaction terms with $ln(Immi_{nit})$ and $ln(Emi_{nit})$ are expected to test the role of cultural similarity in promoting the migration-trade link[4]. A confirmation of the hypotheses that the migration effect is stronger towards more culturally and institutionally distant countries is usually read as a proof of the prevalence of the information and enforcement effects, mediated by immigrants and emigrants, on the preference effect mechanism of trade promotion, as both information and enforcement costs are likely to increase with institutional and cultural distance[5].

The second set of hypotheses relates to subnational heterogeneity. First, I will use the estimation method selected from the econometric strategy to test Herander and Saavedra (2005)'s hypothesis that local networks of immigrants from the same province have a stronger effect on the trade of provinces than more distant networks. This intuition will be applied to emigrant networks as well and will be tested by applying a similar as in Herander and Saavedra (2005) to my data, i.e. by distinguishing the effect on trade of immigrants residing in the province from those residing outside the province. Hence, two additional variables called $ln(ImmiOut_{nit})$ and $ln(EmiOut_{nit})$ will be included in models 3.1 and 3.2. The term $ln(ImmiOut_{nit})$ represents the total stock of immigrants from country n living in provinces other than i at time t, and $ln(EmiOut_{nit})$ represents the total stock of emigrants registered in provinces other than i who had migrated to country n at time t. They are meant to represent national networks of immigrants and emigrants that extend beyond the province. A positive and significant effect of $ln(ImmiOut_{nit})$ or $ln(EmiOut_{nit})$ would suggest that the information that is relevant to promoting trade towards country n is exchanged country-wide, respectively within the group of immigrants from n and within the

[4]It was preferred to use language commonality than colonial tie due to the high collinearity between the two measures, with the former more broadly reflecting cultural similarity.

[5]Cultural distance is defined by Tadesse and White (2009) as the "degree to which shared norms and values in one country differ from those in another country"(p.147)

group of emigrants to n. A positive and significant effect of $ln(Immi_{nit})$ and $ln(Emi_{nit})$ only is instead to be interpreted as a sign that the information that is relevant for trade is predominantly exchanged within the local network of immigrants from country n living in province i; in the emigration case, a positive effect of the latter could be interpreted as a sign of localised information flows on business opportunities abroad occurring prior to the decision to leave.

I will also allow the immigration effect to vary by *Comunidad Autónoma* (i.e. at the NUTS2 level) using a method which is very similar to that used by Bandyopadhyay et al. (2008) to test ethnic heterogeneity in the migration effect, in order to test whether there is heterogeneity among regions in the immigrants' and emigrants' effects. This implies substituting the coefficients β_1 and β_2 of $ln(Immi_{nit})$ and $ln(Emi_{nit})$ in equations 3.1 and 3.2 with region-specific β_{1i} and β_{2i}. I expect to find evidence that the effect of immigrants and emigrants on trade is differentiated by regions.

The third set of hypotheses looks at non-constancy in the elasticity of trade to immigration and emigration. First, I hypothesize that the effect of immigration and emigration is differentiated by the shares of immigrants in each province as in Peri and Requena-Silvente (2010). The share of immigrants in province i s_i^{immi} is calculated on the overall population of immigrants from any country over the total population of province i. Similarly, the share of emigrants from province i over the total population s_i^{emi} is calculated on all the Spanish expatriates from province i to any country. The values of s_i^{immi} and s_i^{emi} for the single province will be considered as high if they lie above the 33^{rd} percentile, intermediate if they are between the 34^{th} and the 67^{th} percentile and high if they are above the 67^{th} percentile of the values of the shares of immigrants in all provinces each year.

Second, I will address the possibility that the immigration and emigration effect is non-constant. This is to test the non-linearity hypothesis proposed by Gould (1994) and Wagner et al. (2002): before they can exert an effect on trade, a certain "mass" has to be reached by immigrants; after a given level, the returns from immigration to trade are diminishing. While this hypothesis cannot be directly tested by an adaptation of the methodology applied by Gould (1994) and Wagner et al. (2002) as it would imply the inclusion of fixed effects in non-linear least squares estimators[6], it will be addressed through the inclusion of non-linear terms in the model as part of the exploration of the correct specification of the functional form of the conditional mean.

[6]Stata does not allow including fixed effects in `nlls` models.

3.3 Data

The database used for the empirical analysis is a balanced panel based on export data about 50 Spanish provinces[7] (NUTS 3) and 65 destination countries over 5 years (2006-2010). The selection of the countries is driven by the availability of province-level data on immigrant and emigrant stocks, and by whether their share on total Spanish exports is at least 0,1% every year[8]. Overall, the selected countries account for more than 91% of total Spanish international trade for each year of the panel (see table A.0.1 in the Appendix for the complete list of countries)[9].

The interpretation of the migration variables is subject to some caveats. Following the literature on the migration-trade link, throughout this paper I refer to "immigration" in a province as the stock of residents registered in the "Padrón Municipal" (i.e. municipal census) in that province who hold a non-Spanish citizenship (data on immigration in Spain are from the National Statistics Institute, INE; see Table 3.1 for a list of the main data sources). As it is common in migration studies, this is an imperfect measure of immigration[10] since it neglects the portion of foreign-born people that have acquired the nationality of the host country. It also only refers to formally residing people; this implies neglecting undocumented immigrants and including cases of immigrants registered twice or of immigrants' relatives registered before their arrival in Spain, as observed by Blanes-Cristóbal (2008). Furthermore, it neglects the intra-national mobility that is not registered in changes of residence. Similarly, the emigration variable used here is imperfect as it refers to the stock of people that have moved their residence outside Spain but are still recorded in the election registries in Spain (as in Flisi and Murat, 2011, data originate from the CERA, *Censo Electoral de Residentes Ausentes*). These data are not informative as to the country of birth of these emigrants, and thus in principle one cannot distinguish return migrants from the native Spanish diaspora: only the portion of former residents

[7] The provinces of Ceuta and Melilla are excluded due to data availability reasons.

[8] This threshold is motivated by the pragmatic trade-off between the need to maintain tractability in the Poisson and Gamma estimates and the need to account for the highest possible number of countries in empirical estimation. The results of the OLS estimates on the full sample of countries are similar and can be provided upon request.

[9] In order to ensure that the largest possible number of observations was included in the analysis, I included all those dyads for which the panel resulted balanced. This implies that, among the 3039 resulting dyads - leading, over five years, to 15195 observations-, some of the 50 provinces have not been associated with all of the 65 countries.

[10] "Immigration denotes the action by which a person establishes his or her usual residence in the territory of a Member State for a period that is, or is expected to be, of at least 12 months, having previously been usually resident in another Member State or a third country"; "Emigration denotes the action by which a person, having previously been usually resident in the territory of a Member State, ceases to have his or her usual residence in that Member State for a period that is, or is expected to be, of at least 12 months" (Eurostat definitions: `http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/en/migr_flow_esms.htm/unit_measure`).

in Spain who have expatriated and who still vote in Spain is represented. Yet, maintaining one's voting rights in Spain implies the persistence of strong ties to Spain. It is thus relatively safe to assume these data to more closely reflect the dynamics of the Spanish emigrant population than the dynamics of return migration. Due to often circular migration ties between Spain and several Latin-American countries, however, the results on the emigration variable should be interpreted with particular care[11]. Furthermore, neither immigration nor emigration data at the province level allow distinguishing between economically active and inactive migrants; consequently, it cannot be elicited from these data whether migrants' contribution to trade is "active", e.g. as entrepreneurs, intermediaries or labour force who sell primarily to their home country, or whether it is an "indirect" one that goes through familiarization and trust-building in the destination context with the home countries. This is a consequence of the sub-national level of analysis: at the NUTS 3 level, the availability of detailed data on immigrants' characteristics, especially on skills, employment status and length of stay is severely constrained: the results of the Labour Force Survey are only considered as reliable from the NUTS 2 level onwards.

Fig. 3.1 shows the growth rates of trade volumes, immigrant stocks and emigrant stocks over the most recent period. For data availability reasons of the emigrant variable, this period includes the period of the burst of the global financial crisis. On the whole, the three variables have been growing over the period, with exports growing at an average rate of 6.46%, emigration stocks growing at an average rate of 4.17%, and immigration stocks booming at an average rate of 17,9%. However, the 2008-2009 crisis period has severely affected both exports and immigrant stocks. While the exports have rapidly recovered, this period has brought the yearly growth of immigration stocks to stagnation. On the contrary, emigrant stocks have been growing faster since the crisis years on. The extremely high levels of unemployment associated with the crisis in Spain are probably responsible for these changes.

The correlation between the immigration and emigration variables is 0.10, so the two variables can be assumed to portray quite different phenomena. Indeed the distribution of immigrants and emigrants across provinces follows quite distinct, in some cases opposing, patterns: where the immigrant share over total population in a given province is high, the corresponding share of emigrants is often low (see Table A.0.2 in the Appendix, reporting data about immigrants and emigrants distribution across provinces in 2010). As well as the concentration of foreign population seen in section 2.4, also the share of residents with a foreign nationality shows substantial variation across provinces. In 18 out of 52 provinces the share of foreigners was above the national average in 2010, reaching above 20% in four provinces (Alicante, Islas Baleares, Almería, Girona); in 15 provinces the share was below 5%; it lagged below 4% in Cádiz, Cáceres, Badajoz, A Coruña, Córdoba and Jaén.

[11] The available INE data on residential variations to foreign countries report that from 2004 to 2011 the percentage of Spanish residents of Spanish nationality changing their residence to foreign countries has been less than 25% of total residential variations in all years but 2005 (when it was 28,4%).

Table 3.1: **Main Data Sources**

Variable	Description	Source
X_{nit}	value of the exports from province i to country n in year t (thousands of €)	1995–2011: Datacomex, `http://datacomex.comercio.es/principal_comex_es.aspx`. Full database at 3-digit disaggregation requested and received by email
X_{nt}	Country n GDP in year t (billions of US$)	1995–2011: IMF World Economic Outlook Database, `http://www.imf.org/external/pubs/ft/weo/2012/01/weodata/index.aspx`
Y_{it}	Province i gross product in year t (thousands of €)	1995-2010: INE - "PIB a precios de Mercado precios Corrientes", `http://www.ine.es/jaxi/menu.do?L=0&type=pcaxis`
$Immi_{nit}$	Foreign residents with country n nationality residing in province i at year t	1998–2011: INE – "Población extranjera por sexo, comunidades y provincias y nacionalidad" `http://www.ine.es/jaxi/menu.do?type=pcaxis&path=%2Ft20%2Fe245`
NID_{nit}	"No Immigrants Dummy", equal to 1 if at time t there are no immigrants from country n in province i, and zero otherwise	
Emi_{nit}	Spanish expatriates registered in province i and residing in country n at year t	2006-2011: Censo Electoral de españoles residentes en el extranjero (CERA) por provincia de inscripción y país de residencia, `http://www.ine.es/ss/Satellite?c=Page&cid=1254735793323`
NED_{nit}	"No emigrants dummy", equal to 1 if at time t there are no emigrants from province i residing in country n, and zero otherwise	

As to the origin and destination countries, Fig. 3.2 shows the subset of the most frequent origin countries for immigrants and destination countries for emigrants. While in both cases many are OECD and Spanish-speaking countries, the ranking is quite different. Romania and Morocco are the most frequent origin countries for immigrants (respectively accounting for 14.5% and 13.1% of the immigrant population), while Argentina is by far the most popular destination country for emigration, hosting 22% of the Spanish expatriates (See also Table A.0.3 in the appendix for some information about the profile of the migrants).

Table 3.2 reports the summary statistics for main variables of interest of this paper: the value of the exports from province i to country n in year t (X_{nit}), the stock of immigrants from country n living in province i at year t ($Immi_{nit}$) and the stock of emigrants from province i living in country n at year t (Emi_{nit}). Included are also province i gross product in year t (Y_{it}), country n GDP in year t (Y_{nt}). The extent of the correlation is higher between exports and each of the migration variables (the correlation of exports is respectively 0.15 with immigration stocks and 0.24 with emigration stocks[12]), than between immigra-

[12]The correlations between the log of the exports and the log of the two variables are respectively 0.39

Figure 3.1: Growth rates in trade volumes, immigrant and emigrant stocks in Spain (country-level data, 1997-2011). Source: own elaboration on Datacomex and INE data.

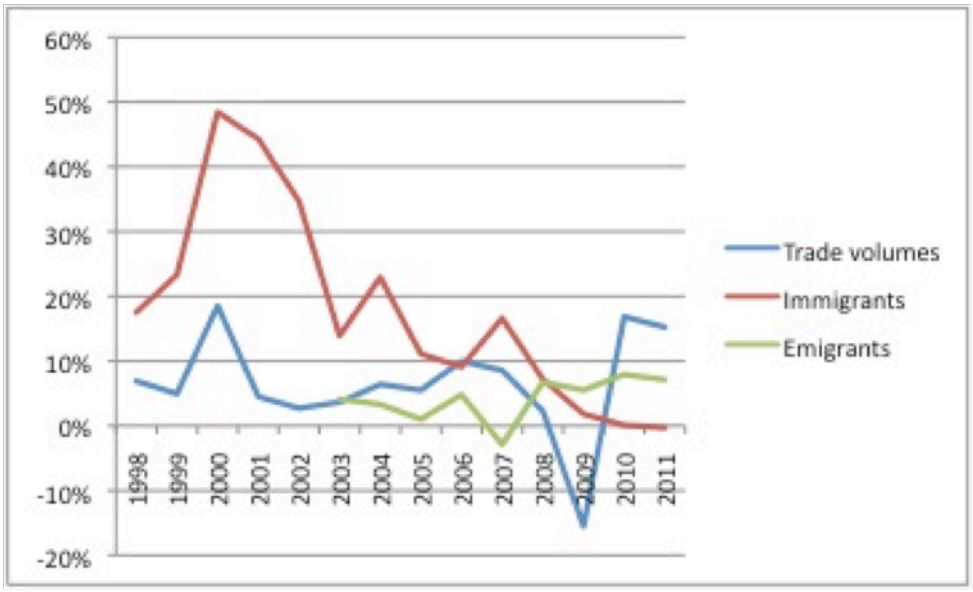
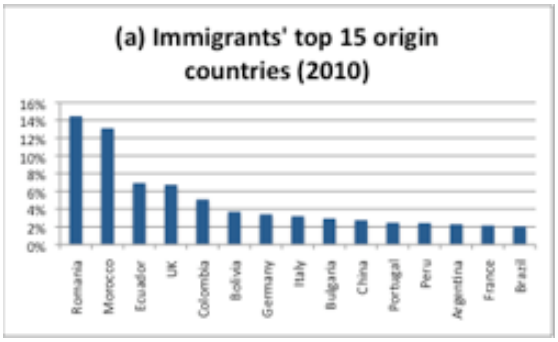


Figure 3.2: Top 15 origin countries of immigrants and destination countries of emigrants in Spain, 2010. Source: Own elaboration on INE data.



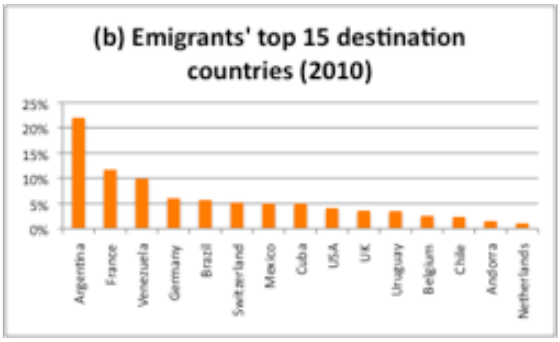


Table 3.2: Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
X_{nit}	15195	53667·32	243745	·00	7208594
$ln(X_{nit})$	15195	8·30	2·55	−6·91	15·79
$ln(Y_{it})$	15195	16·41	·88	14·472	19·079
$ln(X_{nt})$	15195	19·23	1·65	14·85	23·40
$ln(Immi_{nit}+1)$	15195	4·49	2·50	0	12·26
$ln(Emi_{nit}+1)$	15195	3·03	2·35	0	10·75
NID_{nit}	15195	·041	·20	0	1
NED_{nit}	15195	·134	·34	0	1

tion and emigration stocks. The correlation of the migration variables with the province income is relatively high - the correlation between province income and immigration is 0.33; between province income and emigration it is 0.17. It is, instead very low with the country income variable: between emigration and country income the correlation is 0.08; it goes to almost zero (0.001) between immigration and country income. This suggests that probably the correlation is to be found at the local rather than at the country-level and is another element in favour of the use of subnational units.

As the summary statistics in Table 3.2 show, the variation in the data is high. The export, income and migration data are typically highly concentrated around the small values of the distributions, with long right tails. This is typical in trade data, combining data about pairs that may be radically different in terms of economic sizes (and, consequently, in terms of their push/pull factors for immigration and emigration). This variance is usually reflected in heteroskedasticity, which in turn can seriously bias the estimates when they are based on logs, as noted by Santos-Silva and Tenreyro (2006) (see section 2.7). The migration variables, especially the emigration variable, are quite zero inflated: the share of zeros out of the total number of observations is 4,09% for $Immi_{nit}$ and 13,45% for Emi_{nit}. Instead, because of the data selection procedure described above, the data on exports only have a negligible number of zeros: the unit of exports is thousands of euros, and the share of province exports to partner countries below 1 thousand euros is limited to 0,24% of total observations.

Within this framework, Figure 3.3 brings together the data on trade and migration for the province of Madrid in 2010. The figure plots the exports-to-GDP ratio to each OECD trade partner of the province of Madrid, with the distance-weighted immigrant and emigrant stocks from each country. The rationale for taking distance-weighted immigration and emigration stocks is that migration typically decreases with distance. The rationale for taking OECD countries only is to achieve a certain degree of institutional similarity which can be expected to reduce the omitted variables bias in the relation. The relationship

and 0.45.

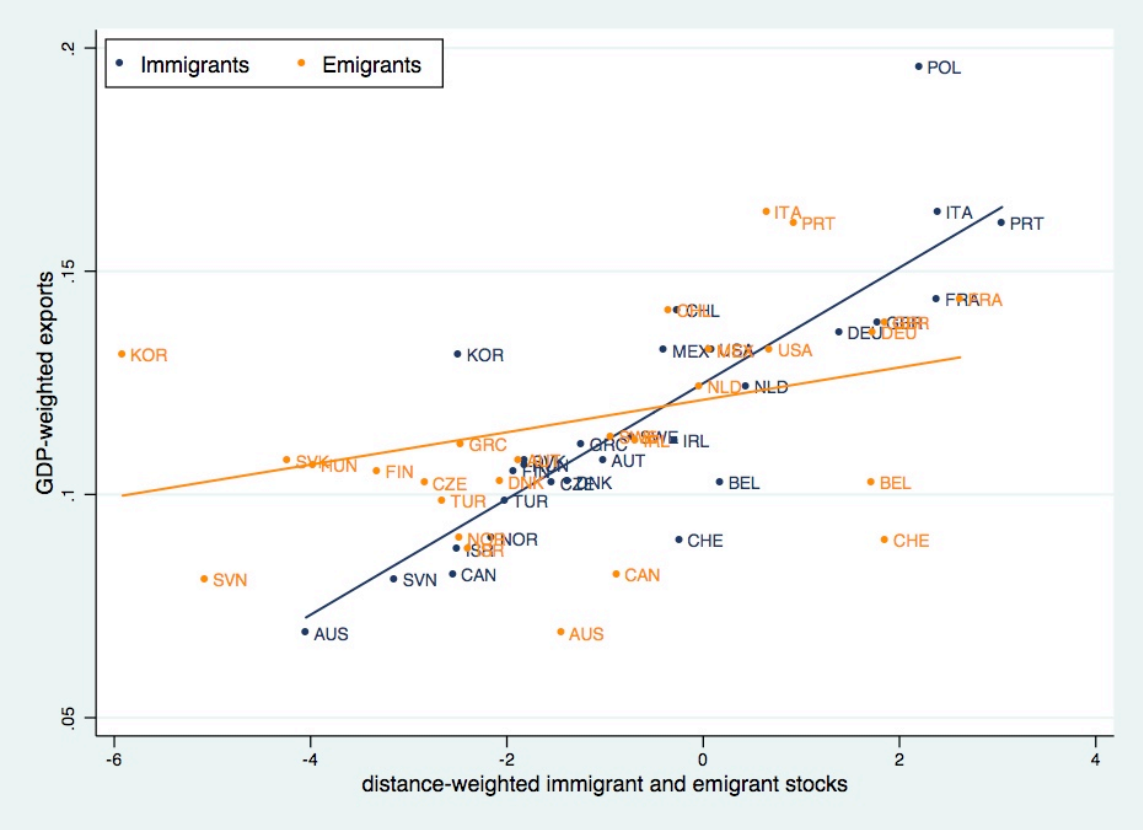


Figure 3.3: The migration-trade link: province of Madrid and OECD countries, 2010. The graph shows the relationship between GDP-weighted exports and the distance-weighted immigrants and emigrant stocks. Own elaboration on Datacomex, INE, CERA and FMI data.

appears positive for both immigration and emigration, and stronger for the immigrants than the emigrants. The picture is similar when restricting the analysis to EU countries only. This purely descriptive result motivates a more rigorous econometric analysis of the relationship.

3.4 Results

3.4.1 Immigrants' and emigrants' effects on trade

In table 3.3 I compare the three estimation methods to address the hypothesis of whether immigrants and emigrants have an effect on the trade of Spanish provinces. This table

shows a pattern that is common to most of the estimation results in this chapter. The OLS and Gamma estimates show a positive and significant effect of the immigrant stocks on trade, with magnitudes that are comparable with each other: the OLS estimates show that, by a 10% increase in the immigrant population, trade is expected to grow on average by 1.6%; according to the Gamma estimates, by the same increase in the immigrant stocks, trade will grow by 1.4%. The Poisson estimation, instead, does not portray any recognizable pattern of trade creation by either immigrants or emigrants. Instead, they show a positive and significant effect of the no-immigrant dummy, pointing at possible non-linearities in the immigration variable. The magnitude of NID is almost exactly the same in the Poisson PML and the Gamma PML regression.

Table 3.3: Regression results - The effect of immigrants and emigrants on the trade of Spanish provinces

Model	OLS	PPML	GammaPML
$ln(Immi_{nit})$	0·162***	0·045	0·137***
	(0·061)	(0·048)	(0·032)
$ln(Emi_{nit})$	−0·012	0·030	0·005
	(0·044)	(0·031)	(0·026)
NID	0·176	0·217 **	0·216***
	(0·111)	(0·108)	(0·065)
NED	0·030	0·083	0·045
	(0·067)	(0·063)	(0·040)
Trading pair effects	Yes	Yes	Yes
Province-time effects	Yes	Yes	Yes
Country-time effects	Yes	Yes	Yes
N	15195	15195	15195
r2	0·119		
log-likelihood	−14537·1	−1·54e+07	−143798·1
AIC	29994·2	3·08e+07	288516·1

Standard errors in parentheses
* p<0.1, ** p<0.05, *** p<0.01

The numerosity of the observations allows excluding small sample bias. The scenario in which the two PML estimates, both supposed consistent, show different results, falls under case 3 of the options presented in section 2.6.2, i.e. one where heteroskedasticity in the OLS estimates is not too marked and the elasticitity of the variable of interest has been misspecified. The case presented in Head and Mayer (2014) is the case of a non-constant elasticity, which the Poisson PML mis-estimates because of the higher weight it gives to more sizeable observations in the trade variable.

It is important to note that the model presented here is derived from a vast literature which, with the exceptions of the earlier works by Gould (1994) and Wagner et al. (2002),

assumes a linear relationship between the log of the immigration stocks and the log of trade. Thus, confirming model mis-specification would bear important implications to this literature. This possibility will be analysed in section 3.4.2.

Reliance on the Gamma PML estimates, however, is in turn subject to some caveats. The incidental parameter problem affects the estimation of the fixed effects in the Gamma regression, making their estimates inconsistent. While the coefficients of the fixed effects are *per se* of little interest to the analyst, it is possible that this inconsistency affects the estimation of the variables of interest (Cameron and Trivedi, 2009). Appying the "tetrad" approach proposed in Head et al. (2010) to Gamma (and Poisson) estimation as in table 3.4 partially addresses this problem, allowing algebraic elimination of the importer-time and exporter-time effects (but not of the trading pair effects)[13].

The results of the regressions on the tetrads in table 3.4 are quite similar to those of the regressions based on the structural gravity equation. Again, the Gamma and the OLS regression support a positive and significant role of the immigrants in promoting the international trade of Spanish provinces while, as before, the PPML estimates do not support a significant role of either immigrants or emigrants. The magnitude of the elasticities, in this case, ranges between 0.14 and 0.187, a slightly wider range than in the previous case. As to the Gamma regression, the estimates based on the tetrads method are even closer to the Gamma regression in table 3.3 than are the OLS regressions: eliminating 575 indicator variables has not radically altered the estimates, suggesting the inconsistent estimates of the time-varying effects were not affecting $ln(Immi_{nit})$ and $ln(Emi_{nit})$; but it must be noted that the estimation of the time-varying effects counts on a much higher number of observations than the estimation of dyadic effects. Yet, it is not possible to definitely rule out the possibility that this occurs through the remaing time-invariant pair-specific effects. While it is not possible to definitely exclude the possibility that the Gamma estimates are inconsistent, the similarity of the Gamma and OLS estimates seems to be a recurrent pattern in the different specifications reported in section 3.4.4, where the migration variables are articulated according to differing country groupings.

3.4.2 Tests on the underlying distribution of the errors

In this section I will address the underlying distribution of the errors through some tests based on Manning and Mullahy (2001) and Santos-Silva and Tenreyro (2006) to identify

[13] Efficient estimation using the tetrad method requires multi-way clustering at the level of the pair, of the importer-year and of the exporter-year, which I performed in the case of OLS using the code provided by Head et al. (2010) in their web appendix. Multi-way clustering is not available for Gamma and Poisson regression so I used clustering at the pair level for Gamma and robust standard errors for the Poisson estimation. I also compare the results of multi-way clustering and of clustering at the pair level in the case of OLS, showing that the standard errors are not radically affected. In any case, the interest here is more on the magnitude of the point estimates than on their the significance.

Table 3.4: Regression results - Tetrads

Model	Head et al. (2010)	OLS	PPML	GammaPML
$ln(Immi_{nit})$	0·187***	0·185***	−0·122	0·140***
	(0·053)	(0·052)	(0·103)	(0·031)
$ln(Emi_{nit})$	−0·0229	0·026	−0·127	0·038
	(0·052)	(0·040)	(0·110)	(0·027)
NID	0·244*	0·192*	0·179	0·194***
	(·114)	(0·100)	(0·175)	(0·066)
NED	0·016	0·042	−0·102	0·051
	(·069)	(0·065)	(0·138)	(0·044)
Trading pair effects	Yes°	Yes	Yes	Yes
Province-time effects	Yes°	No	No	No
Country-time effects	Yes°	No	No	No
Year dummies	Yes	Yes	Yes	Yes
Constant	−1·02e−09	31·411***		13·843***
	(·018)	(5·572)		(4·077)
N	14625	15195	15195	15195
r2		0·008		

Note: Reference importer is France, reference exporter is the province of Madrid. All dependent and independent variables are "tetraded" and demeaned with respect to the reference importer and exporter (see (Head and Mayer, 2014; Head et al., 2010)). Multi-way clustered standard errors in parentheses in column "Head et al. (2010)"; standard errors are clustered at the pair level in columns "OLS" and "GammaPML". Standard errors are robust in column "PPML".
°All variables tetraded and de-meaned by pair, which is equivalent to including the three sets of effects.
* p<0.1, ** p<0.05, *** p<0.01

the most efficient model among the three. The coefficient of interest in the Park-type test suggested by Manning and Mullahy (2001) and Santos-Silva and Tenreyro (2006) and reported in table 3.5 is the λ in equation 2.9. Regressing the log of the squared residuals on the log of the fitted values of the OLS regression, the estimate for λ is 1.56. Because the MaMu test is in fact a modification of Park's test for heteroskedasticity, this result confirms that the OLS estimates are affected by some heteroskedasticity. Because the estimates of the MaMu test may be affected by heteroskedasticity just like those of the gravity regressions (Santos-Silva and Tenreyro, 2006), Manning and Mullahy (2001) advise to rely on the PML estimates for λ rather than on the OLS estimates. The coefficients for λ estimated by Poisson and Gamma PML are in both cases very close to 2. This result points at a constant coefficient of variation in the residuals; in this case the most efficient estimators are the homoskedastic OLS on logs, which is the maximum likelihood estimator in case it is available, and the Gamma PML (Manning and Mullahy, 2001). This explains why, if heteroskedasticity is not too marked, the Gamma and OLS estimates are quite

similar.

Table 3.5: Manning and Mullahy test on the underlying distribution of the errors

Model	OLS residuals	Poisson PML residuals	Gamma PML residuals
$ln(\hat{\mu})$	1·562***	1·981***	2·123***
	(·008)	(0·130)	(0·006)
Constant	−0·486***	15·728***	−1·405***
	(·0725)	(0·066)	(0·059)
N	15195	15195	15195
r2	0·702	0·014	0·922

Standard errors in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table 3.6: Simple regression of the residuals on the covariates

Model	OLS residuals	Poisson PML residuals	Gamma PML residuals
$ln(Immi_{nit})$	0·485***	0·312 * *	0·354***
	(0·115)	(0·126)	(0·095)
$ln(Emi_{nit})$	−0·190	−0·033	−0·038
	(0·119)	(0·091)	(0·076)
NID	0·636***	0·367	0·465 * *
	(0·222)	(0·233)	(0·186)
NED	−0·0322	0·081	0·065
	(0·160)	(0·142)	(0·119)
Constant	10·93 * **	14·476***	25·821***
	(0·728)	(0·731)	(0·636)
N	15195	15195	15195
r2	0·0970	0·114	0·936

Standard errors in parentheses
* p<0.1, ** p<0.05, *** p<0.01

In table 3.6 I perform a similar exercise regressing the log of the squared residuals on the covariates. In the three models, the variance of the errors increases in the logs of the immigrant stocks. To detect whether this result is to be interpreted as a sign of functional form mis-specification and non-constancy in the covariates, as suggested by case 3 in Head and Mayer (2014), in table 3.7 I report the coefficients and p-values resulting from Ramsey (1969) RESET-tests on each estimation method, where, differently from Santos-Silva and Tenreyro (2006), I also include the cube of the fitted values. The results of the tests provide some evidence in favour of the hypothesis of functional form mis-specification and of non-linearity in the migration variables for Poisson and OLS. In the cases of OLS the p-values of the RESET tests are always below 5%. The tests for the Gamma PML, while very precise, result in coefficients for the square and cube of the fitted values that are so small that they actually confirm the consistency of the estimator. The results of the tests,

Table 3.7: RESET tests on the estimation methods

Model	OLS model	PPML model	GammaPML
Square of the fitted values	−·241	−0·1103	$-1{\cdot}33e{-}13$
P-value	0·0004	0·1455	0·000
Cube of the fitted values	·0067	0·0107	$1{\cdot}42e{-}20$
P-value	0·0137	0·4352	0·000
Joint p-value	0·0000	0·0092	·

thus, coherently lead to selecting the Gamma PML as the estimator that is more likely to be consistent. The Gamma estimator, with respect to the PPML, appears also more flexible in terms of distributional assumptions.

Table 3.8: Regression results - Non-linearity in migration

Model	OLS	PPML	GammaPML
$ln(Immi_{nit})$	0·18*	0·11	0·10*
	(0·11)	(0·08)	(0·06)
$ln(Immi_{nit})^2$	−0·00	−0·01	0·01
	(0·02)	(0·01)	(0·01)
$ln(Emi_{nit})$	−0·03	−0·04	0·01
	(0·08)	(0·06)	(0·05)
$ln(Emi_{nit})^2$	0·00	0·01	−0·00
	(0·01)	(0·01)	(0·01)
NID	0·19	0·27**	0·19**
	(0·13)	(0·12)	(0·07)
NED	0·02	0·03	0·05
	(0·08)	(0·07)	(0·05)
N	15195·00	15195·00	15195·00
r2	0·12		

Standard errors in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Based on the tests performed above, the question arises of whether the differences in the estimation results between the OLS, Poisson and Gamma estimates are due other forms of non-linearity or functional form mis-specification or simply to differences in the efficiency of the estimators.

The main problem with the Poisson PML is related with the possibility of conditional mean mis-specification implied by the Ramsey test in Table 3.7: indeed, while the distributional assumptions of independence and small probability may look peculiar for trade data, and the value of the constant in table 3.5 implies $h = 2.75$ in equation 2.9, i.e. overdispersion, these should not matter for the consistency of the estimator as long as the conditional

mean is correctly specified (Wooldridge, 2002; see also Santos Silva and Tenreyro's "Log of gravity webpage"). The results of the Ramsey test in table 3.7 shed some doubts on this assumption.

As the residuals result roughly log-normally distributed, the homoskedastic OLS estimator would be the MLE estimator; according to the simulations performed by Head and Mayer (2014), it should also be more robust than the Poisson PML estimator to functional form mis-specification. Whether the heteroskedasticity that has been detected in the estimator has practical implications depends on the countervailing effects of the positive bias in the OLS estimator introduced by heteroskedasticity vis-à-vis the high number of effects included in the specification which drive the estimates towards zero. In the specifications carried out in this paper, the difference in the magnitude of the coefficients between the OLS and the Gamma PML is between 10 and 35%, so, assuming consistency of the Gamma estimator, this should be roughly the order of magnitude of the bias.

The reason for the persisting differences in the estimates of the OLS, Poisson and Gamma PML could be found in the non-linearity: including the squared terms of $ln(Immi_{nit})$ and $ln(Emi_{nit})$ (Table 3.8) in the model, however, has the effect of reducing the efficiency of the linear estimates, while the squared terms result both economically and statistically insignificant. The point estimates, while not statistically significant from zero, are more aligned. The results are similar when including a cubic term.

An alternative explanation for the divergence between the PPML and Gamma estimates could be found in the different weights attributed by the estimators to the trade flows of different sizes (Head and Mayer, 2014): the Poisson estimator attributes greater weight to larger trade flows, those which are likely to rely less on immigrant and emigrant networks because they are mainly determined by geographic proximity, institutional similarity and common trade arrangements; by contrast, according to Santos-Silva and Tenreyro (2006) the Gamma estimator gives more weight to smaller (and noisier) trade flows, those which are more likely to rely on immigrant and emigrant networks. I could not find support to this explanation in a series of unreported regressions where I scaled the variables taking into account Eaton and Kortum (2002), where I split the immigrant and emigrant variables by their above-median and below median elements and where I restricted the analysis to the smallest 75% of the observations: in all cases, the results remained qualitatively unchanged[14].

[14] An alternative but untestable explanation is that the differences are due to measurement error, which according to the estimates in Santos-Silva and Tenreyro (2006) would bias the Gamma estimates upward by 17%. In this case the PPML would be preferable as the bias would only be of 2%. Yet, even taking into account the possibility that measurement error would upward bias the Gamma estimates upward, the differences between the PPML and Gamma estimates persist; considering that the confidence intervals of the very inefficient PPML estimates in some cases do not include the OLS estimates, divergence in the estimates seem to be more likely to be associated with other forms of functional form mis-specification that should be further explored

Based on the considerations above, I will rely on the Gamma estimates to test hypotheses in the next section 3.4.4. For the sake of completeness and in order to show the systematic similarity of the OLS and Gamma estimates, however, in what follows I will report the results of the estimates for the three estimation methods.

3.4.3 Sub-national heterogeneity in the multilateral resistance terms

In this section I will analyze the role of heterogeneity in the multilateral resistance term, which empirically implies including time-varying exporter effects, i.e. province-time dummies, in the model. Table 3.10 reports the results of the specifications that omit these effects, but include province income, which implies assuming that the multilateral resistance terms do not vary by province. The point estimates of the immigration variables are clearly not very sensitive to this change, suggesting that the bilateral immigration effect on trade is not strongly correlated with the average market access of the host province; this in a way confirms empirically that the immigration effect acts at the level of the bilateral costs of trade. The estimates for the emigration effect remain insignificant. As far as the whole of the gravity model is concerned, however, the province-time effects results jointly highly significantly different from zero with all estimation methods (table 3.9); while a likelihood ratio test is not reliable with clustered and robust standard errors, the log-likelihood and Akaike information criterion statistics support the inclusion of such effects in the specification. Thus the hypothesis that the multilateral resistance term varies sub-nationally is fully supported by the data and the inclusion of the province-time effects is preferred on both theoretical and practical grounds, even if the practical effect on the variables of interest is minor.

Table 3.9: Joint significance of the province-time effects (Table 3.3)

Model	OLS	PPML	GammaPML
test	F(199, 3038) =1.90	chi2(196) = 1169.52	chi2(206) = 5.2e+05
p-value of the test	0.0000	0.0000	0.0000

Table 3.10: Regression results - Sub-national heterogeneity in the multilateral resistance terms

Model	OLS	PPML	GammaPML
$ln(Immi_{nit})$	0·161***	0·0485	0·126***
	(0·0611)	(0·0535)	(0·0319)
$ln(Emi_{nit})$	−0·001	−0·005	0·004
	(0·0438)	(0·0329)	(0·0266)
$ln(Y_{it})$	0·384	0·660***	0·306
	(0·373)	(0·202)	(0·205)
NID	0·169	0·173	0·182***
	(0·110)	(0·115)	(0·0653)
NED	0·0275	0·0604	0·0355
	(0·0694)	(0·0686)	(0·0411)
N	15195	15195	15195
r2	0·077		
log-likelihood	−14886·3	−1·71e+07	−143904·7
AIC	30302·6	3·42e+07	294417·3
Trading pair effects	Yes	Yes	Yes
Province-time effects	No	No	No
Country-time effects	Yes	Yes	Yes

Standard errors in parentheses
* p<0.1, ** p<0.05, *** p<0.01

3.4.4 Testing of the Hypotheses

In section 3.2 I outlined a series of hypotheses that can now be tested based on the identification of the OLS as the consistent and efficient model.

Immigrants' and emigrants' aggregate effects on trade

The hypothesis on the positive and significant effect of both immigrants and emigrants in promoting the trade of Spanish provinces finds only partial confirmation in the data. As regards the immigration side, the hypothesis is strongly confirmed. As shown in Table 3.3, the Gamma (and OLS) estimates of the coefficients of $ln(Immi_{nit})$ are positive and significant[15]. According to this specification, increasing the immigrant population by 10% would

[15]Considering the specific period at stake, which, as discussed above, includes the financial crisis period, a similar specification including immigration stocks but not emigration stocks was estimated to exploit the longer panel available for immigration data, and to see whether the financial crisis affects the immigrants' effect on trade. The crisis appears to mark a break in the immigrants effect on trade: over the whole 1998-2010 period, the effect of immigration is small (with an elasticity of ca. 0.02) and is not significant; when distinguishing the pre-crisis from the crisis period (before and after 2007), it becomes clear that the positive effect of immigration on trade becomes much stronger and more significant during the crisis. The estimates are available upon request; a full exploitation of this result is postponed to my future research agenda. I would like to thank Giovanni Pegoretti for suggesting this point.

increase the trade of Spanish provinces by 1.4%, a higher but comparable estimate than the one found by Peri and Requena-Silvente (2010) on an earlier time period[16]. Instead, the coefficient of $ln(Emi_{nit})$ is not statistically significantly different from zero. Thus, the hypothesis of a positive role of emigrants in promoting the trade of Spanish provinces proposed by Murat and Pistoiesi (2009) for the case of Italy does not find empirical support when looking at the local networks of emigrants. This does not exclude that the flows of information within the emigrants network be mainly determined at the national level (see below the tests on geographic proximity).

The role of cultural and institutional similarity

The hypotheses that the immigrants' and emigrants' effect on the trade of Spanish provinces is stronger with more institutionally and culturally distant countries are tested in Tables 3.11a and 3.11b.

In table 3.11a, only the immigrants from extra-EU countries result significant in increasing the trade of Spanish provinces in the Gamma and OLS estimates. Coherently with the findings in Table 3.3, no emigrant variable results statistically to determine the level of trade. This result is compatible with the idea that the role of immigrants as brokers of the flow of communication and as facilitators of the enforcement of contracts in international transactions is stronger with countries that do not share the same institutional setting, i.e. in this case are non-EU countries. The reason is that sharing the institutional setting or a regional trade agreement (RTA), as well as a common language, are factors that increase bilateral trade *per se*, independently from the immigrant population; the direct effect of these determinants is absorbed in the fixed effects.This is shown more explicitly in table 3.12, where the estimated pair-specific fixed effects from the OLS regression (more consistent than the Gamma estimates of the fixed effects) are regressed on a series of traditional gravity determinants (Cheng and Wall, 2005). From this regression, Spain results to trade on average 20% more with EU countries and countries of the European Economic Area (EEA), and 63% more with OECD countries.

As regards language commonality, D_{lang} has a coefficient of 0.975: Spanish provinces trade about 97.5% more with Spanish-speaking countries, independently from the immigrants that they host from these countries. In addition to this, the Gamma estimates in table 3.11b shows that immigrants from Spanish-speaking countries increase trade with their

[16]Similarly to Peri and Requena-Silvente (2010), the coefficient of the no-immigrant dummy (NID) does not result significantly different from zero in the OLS estimates. Instead, it remains positive and statistically significant in all specifications of the Poisson and the Gamma model, with comparable or even greater magnitudes than $ln(Immi_{nit})$. According to this result, the provinces with no immigrants would on average trade more than the provinces with at least one immigrant. NID assumes frequently the value of 1 by two main types of countries: those which enjoy particularly favourable fiscal conditions (e.g. Andorra, Luxembourg, Cyprus) and the very remote countries. Because of the smaller distances and closer institutional settings, the former group is likely to be more represented than the latter in Spanish trade data.

Table 3.11: Regression results: cultural and institutional similarity

(a) Regression results - Institutional similarity: EU countries

Model	OLS	PPML	GammaPML
$ln(Immi_{nit}^{EU})$	0·123	−0·013	0·080
	(0·094)	(0·071)	(0·051)
$ln(Immi_{nit}^{NEU})$	0·173**	0·088	0·155***
	(0·071)	(0·064)	(0·038)
$ln(Emi_{nit}^{EU})$	0·001	−0·036	0·036
	(0·074)	(0·052)	(0·046)
$ln(Emi_{nit}^{NEU})$	−0·015	0·064*	−0·004
	(0·049)	(0·034)	(0·029)
NID	0·173	0·228**	0·211***
	(0·111)	(0·109)	(0·065)
NED	0·033	0·077	0·054
	(0·069)	(0·065)	(0·041)
Trading pair effects	Yes	Yes	Yes
Province-time effects	Yes	Yes	Yes
Country-time effects	Yes	Yes	Yes
N	15195	15195	15195
r2	0·119		

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01

(b) Regression results - Cultural similarity

Model	OLS	PPML	GammaPML
$ln(Immi_{nit}^{Spa})$	0·234	−0·038	0·235**
	(0·216)	(0·235)	(0·109)
$ln(Immi_{nit}^{NSpa})$	0·156**	0·049	0·129***
	(0·064)	(0·049)	(0·033)
$ln(Emi_{nit}^{Spa})$	−0·002	0·074	−0·026
	(0·056)	(0·121)	(0·036)
$ln(Emi_{nit}^{NSpa})$	−0·015	0·029	0·017
	(0·055)	(0·032)	(0·033)
NID	0·173	0·221**	0·211***
	(0·113)	(0·108)	(0·065)
NED	0·027	0·082	0·054
	(0·071)	(0·063)	(0·043)
Trading pair effects	Yes	Yes	Yes
Province-time effects	Yes	Yes	Yes
Country-time effects	Yes	Yes	Yes
N	15195	15195	15195
r2	0·119		

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01

origin countries to a much greater extent - 82% more - than do the immigrants from non-Spanish speaking countries. This strongly disconfirms the hypothesis that the effect of trade is stronger with more culturally distant countries; notice that relying on the OLS estimates would have led to confirm the hypothesis, even if the magnitude of $ln(Immi_{nit}^{Spa})$ estimated by OLS is very similar to the Gamma estimate. This result could be explained by taking as a reference the random encounter model by Wagner et al. (2002)(equation 2.7): sharing a common language may give the immigrant easier access to information on trading opportunities not just in the origin country but also in the host country and increase the capacity of the immigrant to successfully realize the trading opportunity, i.e. act as a factor that increases the probability p that an immigrant has the capacity to facilitate the exchange.

Table 3.12: Determinants of the fixed effects (OLS estimates)

$ln(Y_i)$	1·292***
	(0·014)
$ln(Y_j)$	0·642***
	(0·011)
$ln(DIST)$	−1·051***
	(0·030)
D_{colo_tie}	−0·137
	(0·150)
D_{lang}	0·761***
	(0·148)
D_{common_border}	0·890***
	(0·065)
D_{EUEEA}	0·207***
	(0·046)
D_{OECD}	0·631***
	(0·043)
Constant	−25·598***
	(0·340)
N	3039
r2	0·516

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01

Geographic proximity

Table 3.13 reports the results of the regression which includes both the immigrants from a given country residing within the province and those residing outside the province. They confirm the hypothesis that it is local networks of immigrants, rather than more far-reaching networks, that determine the trade-facilitation effect by immigrants. The flows of information relevant to trade creation by emigrants, instead, are to be found at the level of

nation-wide networks of expatriates; as in the specification about language commonality, the OLS identifies a similar magnitude but not a statistically significant effect. This suggests that the type of information relevant to the trade facilitation effect is quite different for immigrants and emigrants. Considering that the emigrants' effects is likely to be associated with a taste effect, this result implies that either the information or the tastes - a distinction between the two is unfortunately impossible with the data at stake - that drive trade are not province-specific but rather nation-wide. This may also bear implications with respect to the profile of the migrants able to exert the trade facilitation effect.

Table 3.13: Regression results - Geographic proximity

Model	OLS	PPML	GammaPML
$ln(Immi_{nit})$	0·154 ∗ ∗	0·045	0·144∗∗∗
	(0·064)	(0·048)	(0·032)
$ln(ImmiOut_{nit})$	−1·117	−0·544∗∗∗	−0·082
	(1·307)	(0·190)	(0·065)
$ln(Emi_{nit})$	−0·002	0·013	0·025
	(0·051)	(0·035)	(0·026)
$ln(EmiOut_{nit})$	0·524	−0·429	0·279∗∗∗
	(0·936)	(0·379)	(0·057)
NID	0·170	0·218 ∗ ∗	0·189∗∗∗
	(0·112)	(0·109)	(0·065)
NED	0·034	0·067	0·051
	(0·068)	(0·062)	(0·039)
Constant	14·490		10·635∗∗∗
	(14·577)		(0·956)
Trading pair effects	Yes	Yes	Yes
Province-time effects	Yes	Yes	Yes
Country-time effects	Yes	Yes	Yes
N	15195	15195	15195
r2	0·119		

Standard errors in parentheses
* p<0.1, ** p<0.05, *** p<0.01

More generally, these results suggest that immigration and emigration networks operate through different dynamics. Indeed, one could approach the issue differently and argue that any migrant linkages, in one direction or another, could promote trade, or, alternatively, that the net change in the stock of individuals able to create a bridge between the two countries matters more to trade than the stocks of immigrants and emigrants separately. Hence, in a series of unreported regressions, the migration variables were combined to check for interactions and net effects. In all cases, the explanatory power of the joint variable (either adding the two stocks or computing the net effect of the two) is lower than

that of the two variables separately. Comparison of the related AIC strongly support the interpretation that the two variables operate through different dynamics and no specific insight is drawn from their combination[17].

Sub-national heterogeneity in the immigrants' effects

Allowing the elasticity of immigration and emigration to vary by region (i.e. by *Comunidad Autónoma*), the hypothesis that the effects of immigrants and emigrants are differentiated by region finds strong support. Table 3.14 shows that immigrant and emigrant stocks result significant in only a few regions; according to the Gamma estimates, only in Castilla y Leon, Cantabria, Catalunia, Extremadura, Galicia, Islas Canarias, Navarra and Region de Murcia the immigrants are able to exert a positive effect on trade; the magnitude of the effect ranges from 0.137 to 0.32, with a peak of 0.742 in the Islas canarias. In one case, the Islas Baleares, the effect is negative but weakly significant. With the exception of the Gamma estimate for Asturias, the regions where the effect on trade is significant for immigrants do not find a symmetric effect for emigrants, which result significant only in one region. In table A.0.4 in the Appendix, I further address the hypothesis of sub-national heterogeneity on the immigration and emigration effect on trade by performing province-specific estimates. Also in this case, and similarly to the findings by Bandyopadhyay et al. (2008) on ethnic groups, I get that the effect is very heterogeneous across provinces. The immigration effect results especially significant for the provinces of Almeria, Cordoba, Girona, Las Palmas, Salamanca and Segovia and its magnitude results much higher - between 0.27 and 0.80 - than the average estimate of 0.17. It is negative and weakly significant in the case of Bizkaya. This result usefully complements the aggregate information provided in previous specifications and confirms the importance of focusing on the province level, but should be taken carefully, considering the smaller number of observations available to estimate each province-specific immigrant effect (max ca. 500 per province).

Non-constancy in the migration effects

In tables 3.15a and 3.15b, the hypothesis of non-constancy of the elasticity is tested by running the estimates separately for groups of regions distinguished by their shares of immigrants and expatriates. In Table 3.15a provinces are grouped by their total share of immigrants (low, intermediate, high), and immigrants result having an effect on trade only by intermediate levels of foreign population residing.It is important to notice that the immigration and emigration shares are calculated on the whole of the migrating population, and not on a single country group. So high immigration provinces represent provinces where the overall population of foreigners is comparatively high in relation to the total population of the province; high expatriation provinces represent provinces which have lost a comparatively high portion of their resident population through emigration to any

[17]The results are unreported here for brevity, but are available upon request. I would like to thank Francesco Quatraro for suggesting this additional check.

Table 3.14: Regression results - Elasticities by *Comunidades Autónomas*

Model	OLS		PPML		Gamma PML	
	Immigrants	Emigrants	Immigrants	Emigrants	Immigrants	Emigrants
Aragón	−0·00711	−0·0158	−0·120	0·133	−0·0571	−0·00337
	(0·130)	(0·147)	(0·125)	(0·126)	(0·0808)	(0·102)
Cantabria	0·332	−0·0705	0·0810	0·0992	0·240**	−0·0946
	(0·233)	(0·169)	(0·0929)	(0·150)	(0·109)	(0·104)
Castilla y León	0·230**	−0·0436	0·0926	−0·259*	0·137**	0·0111
	(0·110)	(0·125)	(0·0798)	(0·139)	(0·0570)	(0·0813)
Castilla-La Mancha	0·0267	0·166	0·0973	0·0560	−0·00496	0·134*
	(0·0813)	(0·127)	(0·0759)	(0·139)	(0·0494)	(0·0774)
Cataluña	0·244**	−0·00782	−0·146*	0·0211	0·276***	−0·0292
	(0·0957)	(0·100)	(0·0753)	(0·0511)	(0·0645)	(0·0622)
Com. Valenciana	−0·0825	−0·0609	0·00851	−0·113*	−0·0998	−0·0501
	(0·104)	(0·0701)	(0·0799)	(0·0623)	(0·0674)	(0·0439)
Comunidad de Madrid	0·151	−0·0584	0·182**	0·162	0·137	−0·0393
	(0·156)	(0·168)	(0·0815)	(0·107)	(0·104)	(0·112)
Extremadura	0·265	−0·249	0·202	0·378**	0·320***	−0·257
	(0·205)	(0·289)	(0·141)	(0·177)	(0·124)	(0·162)
Galicia	0·293	−0·0272	0·0274	0·0561	0·268***	−0·0686
	(0·180)	(0·189)	(0·0930)	(0·0712)	(0·0852)	(0·103)
Illes Baleares	−0·347	0·0591	0·0283	−0·798	−0·444*	0·284
	(0·334)	(0·340)	(0·481)	(0·504)	(0·265)	(0·215)
Islas Canarias	0·638	0·269	0·792	0·122	0·742***	0·187
	(0·435)	(0·324)	(0·689)	(0·225)	(0·238)	(0·206)
La Rioja	0·109	−0·000220	0·130	0·0696	0·147	0·000867
	(0·334)	(0·0390)	(0·125)	(0·0743)	(0·193)	(0·0277)
Navarra	0·292	−0·0390	0·501***	−0·0586	0·204*	0·0360
	(0·196)	(0·223)	(0·184)	(0·139)	(0·121)	(0·147)
País Vasco	−0·103	−0·0243	−0·126	0·00161	−0·0927	0·00892
	(0·0844)	(0·0934)	(0·0862)	(0·0875)	(0·0606)	(0·0709)
Principado de Asturias	0·251	−0·127	−0·344*	0·766**	0·137	0·0398
	(0·275)	(0·195)	(0·182)	(0·353)	(0·146)	(0·116)
Región de Murcia	0·161	−0·00736	0·374***	−0·0270	0·222**	−0·0218
	(0·185)	(0·107)	(0·0893)	(0·0681)	(0·110)	(0·0675)
NID	0.143		0.162		0.151***	
	(0.110)		(0.106)		(0.0656)	
NED	0.0252		0.0307		0.0345	
	(0.0683)		(0.0541)		(0.0419)	
Constant	7.716***				13.87***	
	(0.249)				(0.216)	
N	15195		15195		15195	

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01

country in the world. The Gamma estimator shows a non-constant pattern in the migration effect when differentiated by foreign or expatriates population shares. The effect of immigrants on trade results stronger by lower shares of the immigrant population and decreases by increasing shares of foreign population. This result contrasts with the one found by Peri and Requena-Silvente (2010) who instead find that the immigrants' effects increase by greater shares of the immigrant population. This difference could be attributed to their failure to control for province-time effects. The result implies that the bridging effect of immigrants is more valuable in provinces with lower overall shares of immigration.

Looking at table 3.15b, where the provinces are distinguished by their expatriation rates, the Gamma estimates, as well as the OLS, suggest that, by low emigration rates, immigrants do not play a statistically significant role in promoting trade. Instead, the expatriates from these provinces have a positive effect on trade, with a positive and significant coefficient of 0.168 in the GammaPML case. In the case of provinces with intermediate shares of emigrant population, the effect of the expatriates becomes negative and significant in both the cases of OLS and GammaPML. Immigrants in mid-expatriation provinces, instead, have a positive and significant role in promoting trade; the magnitude of their effect is 0.18 in the case of Gamma and 0.22 in the case of OLS. The effect of immigrants is even stronger in high-expatriation provinces: the coefficient is 0.38 in the case of Gamma and 0.44 in the case of OLS. In the same provinces, the effect of emigrants is insignificant in determining trade.

An explanation for this result which can't be definitely tested here is that the fact that provinces today result as high-expatriation provinces are actually mirroring longer-term dynamics of expatriation. The experience of emigration in the provinces may have created the social and institutional conditions that are conducive to the economic integration of a more diverse population and to the access to new markets abroad through enforcement and information effects, while the long experience in emigration has exhausted the opportunities available to emigrants, in particular those associated with the "taste effects". Notice that this interpretation is not substitutable with the hypothesis that has been put forward in the literature (e.g. Gould (1994); Herander and Saavedra (2005)), that migration ancestry of a given ethnic group affects trade. Because the provinces are separated by the overall shares of emigrants, the mechanism is probably to be found at the level of the social sedimentation of the emigration experience. This explanation would also be compatible with the positive, but less sizeable role played by immigrants in mid-expatriation provinces and with the positive role played by emigrants in low expatriation provinces, i.e. where, according to this interpretation, the opportunities for entering new markets are not yet exhausted. The data do not allow distinguishing whether this goes through a taste effect, an enforcement or an information effect, but the first is likely to be important. The negative coefficient of the emigration variables in the mid expatriation provinces could be explained by the loss of human resources through emigration which also affects trading opportunities. The results in table 3.15b could also explain why, on the aggregate sample,

the emigrant population does not result significant in affecting trade: the effects of the emigrants from low-expatriation provinces are offset by those of the emigrants in mid-expatriation provinces. Such an effect would logically imply a similarly negative effect of emigration in high-expatriation country. Indeed, the Gamma and OLS estimates are negative, while not significant.

Overall, the hypotheses of non-constancy in the immigrants' and emigrants' effect on trade in connection with external factors find strong support in the Gamma estimates. Comparing tables 3.15a and 3.15b with the estimates in table 3.8 above, however, it seems appropriate to conclude that the non-constancy is due to the interaction of the immigration and emigration variables with other factors associated with the characteristics of the location rather than to non-linearity in functional form of the variables themselves.

3.5 Conclusions

This chapter has analyzed the effects of immigration and emigration on the trade of Spanish provinces applying a gravity model. It integrates contributions to the literature on the migration-trade link at the methodological level with theoretical arguments in support of the inclusion of controls for sub-national heterogeneity in the multilateral resistance terms; the resulting empirical estimates provide insights that are partially confirming the existing literature and partially extending it.

From the theoretical point of view, the model used to analyze the effect of the migration-trade link included controls for province-level heterogeneity in the multilateral resistance terms besides controls for trading pair heterogeneity and time-varying controls for the partner countries' multilateral resistance terms. While the inclusion of time-varying exporter effects is an obvious implication of the gravity model, it has been often neglected in empirical studies on the migration-trade link that adopt sub-national units. The rationale for including such controls has been discussed and statistical tests have showed that they contribute to a better fit of the model.

From the methodological point of view, the application of the empirical strategy outlined in chapter 2 led to identifying the Gamma estimator as the most suited estimator for the data at stake on both efficiency and consistency grounds. The OLS estimator was discarded on grounds of heteroskedasticity, which leads to bias by log-linearization; throughout the different specifications, however, the magnitudes of the OLS and Gamma PML estimates have resulted comparable with each other, with the Gamma PML generally outperforming the OLS in terms of efficiency of the estimates and the OLS estimates exceeding those of the Gamma by between 10% and 35%. The Poisson PML has instead shown a different pattern of systematic non-significance in the estimates and in many cases estimates that were not comparable with the Gamma and OLS, to an extent which can hardly be solely explained

Table 3.15: Regression results - Immigration and Emigration shares

(a) Shares of immigrants in provinces

Immigrants share	High			Intermediate			Low		
Model	OLS	GammaPML	PPML	OLS	GammaPML	PPML	OLS	GammaPML	PPML
$ln(Immi_{nit})$	0·025	0·032	0·169**	0·206**	0·110**	0·065	0·112	0·172**	0·001
	(0·110)	(0·061)	(0·078)	(0·093)	(0·045)	(0·071)	(0·112)	(0·067)	(0·115)
$ln(Emi_{nit})$	0·004	0·002	0·083**	0·057	0·089	−0·123*	−0·232*	−0·193**	0·029
	(0·051)	(0·029)	(0·039)	(0·093)	(0·055)	(0·063)	(0·124)	(0·080)	(0·064)
NID	−0·053	−0·047	0·112	0·216	0·197**	0·218*	0·193	0·277*	0·253
	(0·336)	(0·181)	(0·216)	(0·149)	(0·081)	(0·120)	(0·217)	(0·145)	(0·227)
NED	0·006	0·019	0·051	0·055	0·080	0·004	−0·061	−0·054	0·150
	(0·087)	(0·058)	(0·066)	(0·105)	(0·067)	(0·098)	(0·187)	(0·108)	(0·106)
Effects									
Pair	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prov.-time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	4460·000	4460·000	4460·000	6915·000	6915·000	6915·000	3505·000	3505·000	3505·000
r2	0·168			0·147			0·183		

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01

(b) Shares of emigrants in provinces

Emigrants share	High			Intermediate			Low		
Model	OLS	GammaPML	PPML	OLS	GammaPML	PPML	OLS	GammaPML	PPML
$ln(Immi_{nit})$	0·444**	0·378***	0·044	0·220***	0·182***	0·114*	−0·067	−0·052	−0·144
	(0·192)	(0·099)	(0·145)	(0·082)	(0·046)	(0·068)	(0·096)	(0·057)	(0·102)
$ln(Emi_{nit})$	−0·130	−0·069	0·100*	−0·121**	−0·105***	−0·039	0·180*	0·168***	0·107
	(0·178)	(0·105)	(0·054)	(0·053)	(0·033)	(0·049)	(0·093)	(0·059)	(0·065)
NID	0·512*	0·527***	0·634***	0·077	0·152*	0·144	0·084	0·135	−0·025
	(0·286)	(0·166)	(0·217)	(0·145)	(0·089)	(0·168)	(0·195)	(0·125)	(0·197)
NED	−0·133	−0·049	−0·058	−0·151*	−0·122**	0·139	0·264**	0·281***	0·155**
	(0·222)	(0·133)	(0·135)	(0·091)	(0·058)	(0·109)	(0·114)	(0·071)	(0·079)
Effects									
Pair	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prov.-time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2900·000	2900·000	2900·000	7000·000	7000·000	7000·000	4035·000	4035·000	4035·000
r2	0·190			0·163			0·176		

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01

by its lower efficiency for the data at stake. The main reason for the persisting differences in the estimates seems to be primarily found in functional form mis-specification which is likely to be associated with non-constancy in the immigration and emigration effects; in particular, non-constancy in the immigration and emigration effects has been identified across provinces with different overall immigration and expatriation shares. This non-constancy could account for the worse performance of the Poisson estimator because the Poisson estimator gives more weight to larger observations, i.e. larger trade flows (as found in Head and Mayer, 2014).

The methodology adopted in this chapter represents an application to panel data of the empirical strategy proposed in Head and Mayer (2014) and is *per se* novel: it applies a quite recent methodology lying at the "frontier of gravity research" (Head and Mayer, 2014) to panel data. Comparing the results obtained by applying Gamma regression with those obtained by OLS and Poisson, it becomes clear that the application of a sound methodology has important implications on the findings for the research question at stake, i.e. whether immigrants and emigrants have an effect on trade.

As regards the main empirical findings, overall, the Gamma (and OLS) estimators robustly confirm a positive effect of immigrants on trade. The identified magnitude of the effect ranges between 0.126 and 0.144, implying that an increase in the immigrant population in a given province would increase its exports by between 1.26% and 1.4%.

In practice, including time-varying exporter effect has a minor impact on the magnitude of the immigrants' and emigrants' elasticities on the aggregate sample. However, a comparison of the results from the Gamma estimation applied on the theory-consistent model with those identified in Peri and Requena-Silvente (2010) leads to conclude that the implications from the inclusion of these effects are more important when subgroups of provinces are taken. Indeed, when distinguishing the provinces by their shares of the immigrant population, they find a greater effect of immigration in provinces with higher immigrant shares. Our estimates, instead, suggest that the *ceteris paribus* greatest effect is found in the provinces with the lowest immigrant shares. This difference can be explained by the fact that failing to account for sub-national heterogeneity in the exporting capacity leads to neglect that provinces attracting more immigrants are likely to be *per se* more competitive and to export more - and omitting the exporter-time effects omits the time-varying dimension of this heterogeneity; this could imply that, in their case, the immigrants' effect is biased upwards. The finding that the immigrants' effect on trade is greater for provinces with lower immigrant shares and it decreases by greater immigration shares could mean that, in provinces where immigrant shares are lower, the role of immigrants in promoting export opportunities is more valuable than in other provinces.

The effect of immigration also results stronger in the trade with more institutionally distant countries, i.e. with non-EU countries. This confirms the findings of the literature on the migration-trade link in this regard: the integration of Member States within the European

Union *per se* increases trade and immigrants don't play a significant role in this regard; immigrants, instead, play a relatively large and statistically significant role in promoting trade towards these countries with which there are no institutionalized trade agreements. Hence, immigrant stocks results to contribute to realizing potential trade opportunities by decreasing the impact of informal trade barriers that do not seem to apply to the trade with EU countries.

The results in terms of language commonality, instead, suggest that, while the value of trade with Spanish-speaking countries is much higher *per se* than the trade with other countries, immigrants from Spanish-speaking countries have a magnifying effect and further increase trade. This result suggests that there are factors that increase the capacity of immigrants to promote trade. Among the potential trade opportunities that an immigrant could facilitate, some could be lost due to language differences, which would have the effect of reducing the immigrant capacity to promote trade (Wagner et al., 2002). An implication of this finding would be that promoting the knowledge of the host country language among the immigrant communities could, among other, contribute to realizing potential opportunities for exports.

The analysis also confirmed that it is mainly localized, rather than more far-reaching networks, that result relevant in the promotion of the trade of provinces and, thus, that immigration is an issue of relevance for local production systems. Accordingly, the analysis showed that there is marked sub-national variation in the effects of immigration and emigration, which implies, *coeteris paribus*, differentiated capacity of the local systems to enable the immigrants' potential to promote trade.

The networks of expatriates, instead, appears to affect trade through different mechanisms, with a strong role of nation-wide networks and negligible effects of the local networks: this result means that what matters to trade is the existence of a network of Spanish expatriates in the same country, irrespective of their provinces of origin, that enables emigrants to promote imports from their origin provinces. The magnitude of this effect, implying that a 10% increase in the emigrant population would increase exports by 2.7%, is aligned with the elasticities identified for imports in the meta-analysis carried out by Genc et al. (2011) on the migration-trade link literature and is comparatively larger than the effect of immigrants in promoting exports. This results bears slightly optimistic implications about the fact that expatriation in Spain in more recent years has not only been a way to escape unemployment but has also exploited trading opportunities.

Dividing the provinces by their overall shares of expatriates over total population, it emerges that, while in provinces with higher expatriation shares the effect of emigrants is smaller - even negative - , by higher expatriation shares, the effect on trade of the immigrant communities is larger. The explanation could relate to longer-term effects of expatriation. On the one hand, the negative coefficient of the emigration variables could be explained by the loss of human resources through emigration which also affects trading op-

portunities. The experience of emigration in the provinces may have created the social and institutional conditions that are conducive to the economic integration of a more diverse population and to the access to new markets abroad through enforcement and information effects, thereby increasing the immigrants' effect. At the same time, the experience in emigration has exhausted the opportunities available to emigrants, in particular those associated with the "taste effects". These results could also explain why, on the aggregate sample, the emigrant population does not result significant in affecting trade: the effects of the emigrants from low-expatriation provinces are offset by those of the emigrants in mid-expatriation provinces.

Chapter 4

Migration and trade flows in the Italian provinces

4.1 Introduction

As seen in chapter 1, the long-term trends in migration are similar between Italy and Spain. Both countries have been among the main emigration countries in Europe for about a century, between the 1870s and 1970s, with Spanish emigration having remained high until the 1980s; both have turned into immigration countries between the 1970s and 1980s (Del Boca and Venturini, 2003; Bonifazi et al., 2009); today, their shares of the immigrant population are comparable with the European averages, while emigration rates remain important and have been growing since 2007 as a reaction to the economic downturn (ISTAT, 2014). Yet, the migration patterns in the two countries differ with respect to two important aspects: their nationalities and their sectors of employment. In Spain, almost 80% of the immigrant population originates either from Morocco, the EU or from Latin-American countries. In Italy, the greater variety of origins, with Asian and Eastern European countries being relatively more represented, has led Bratti et al. (2014) to apply the concept of *superdiversity* to the Italian case (Vertovec, 2007). This refers to "new, small and scattered, multiple-origin, transnationally connected, socio-economically differentiated and legally stratified immigrants who have arrived over the last decade" (p.1024). As regards the sectors of employment, the concentration coefficients of immigrants' employment in sectors calculated by Hidalgo et al. (2007) and Murat and Paba (2003) show that immigrants in Italy are more concentrated in the manufacturing sector than they are in Spain, where they are more often employed in the agricultural and services sectors. These differences could affect the abilities of immigrants to exert an effect on trade and could lead to different contributions of immigrants to the trade of provinces in Italy and Spain. On the one hand, as found in the

previous chapter, language commonality may act as a factor that increases the immigrants' ability to promote trade; as immigrants in Italy mainly lack such a commonality, the effect of immigration on Italian trade could be expected to be lower. The implications from the sector of employment is a priori ambiguous: the greater concentration of immigrants in the services sector in the Spanish could reflect a greater reliance on the ethnic economy and thus on ethnic networks, which would support the standard theory on the migration-trade link and imply a greater effect of immigrants on trade in the Spanish case than in the Italian one. However, the services sector to a large extent includes non-tradables or can be realistically expected to raise imports of home country goods, rather than exports. Furthermore, it seems questionable that employees in the hospitality sector and domestic workers promote exports comparatively more than workers in the manufacturing sector.

Taking these differences into account, this paper applies the gravity model identified in chapter 2 to the case of Italian provinces.

The basic model that is tested is, as in chapter 3, the simplest theory-consistent gravity model for panel data: i.e. it regresses trade values on migration variables and on the three set of fixed effects suggested in Baldwin and Taglioni (2007) (see also chapter 2). With respect to the Spanish case, the availability of a rich transaction-level dataset provided by ISTAT allows analyzing of a richer set of aspects of relevance to the analysis of the migration trade link. These relate primarily to the disentangling the underlying mechanism driving the immigrants' effects (whether their effects operate through information, enforcement or taste effects, see chapter 2.3 and Rauch and Trinidade, 2002); secondly, they allow identifying differential effects of migration on the intensive and extensive margins of trade, providing insights on the types of trade barriers that are affected by migrants' brokering role (whether relating to fixed or variable costs, see Peri and Requena-Silvente, 2010); third, the ISTAT data allow differentiating the migrants' effects for different technological intensity in sectors. This richer set of insights imposes a slightly different structure of this chapter with respect to the previous one, requiring an extension to methodological reflection and introducing some asymmetries in the econometric strategy and in the empirical analysis. Comparability with the Spanish case is maintained in the main specification linking migration to trade values, in the specifications testing the role of time-varying exporter effects and in the specifications testing the non-constancy of the immigration elasticity; hence, the asymmetry seems more than justified by the ability to explain a richer set of aspects.

As the previous one, this chapter compares the relative efficiency and consistency of the OLS and Poisson estimators on the basis of the econometric strategy defined in chapter 2 to identify the most suitable estimator for the data[1] The analysis leads to select OLS as the most suited estimator for the data.

[1]For practical reasons, the Gamma estimator could not be implemented; see below.

Applying the same model which in the Spanish case led to identifying a positive and significant effect of immigrants on trade[2], a very peculiar pattern of results is obtained. On the one hand, the availability of disaggregated data allows observing that the effects of immigration on trade operate through the same channels identified in the literature as compatible with an information-brokering effect on trade. Immigrants' effect mainly goes through the extensive, rather than the intensive margin, as in Peri and Requena-Silvente (2010), and is greater in absolute value for diversified products rather than for reference-priced and homogeneous products, as in Rauch and Trinidade (2002). As in the Spanish case, it has, in absolute value, a larger effect on the trade of provinces with less immigrants. The crucial distinction, however, is that the immigrants' effect operates in a negative, instead of a positive, direction.

This chapter contributes to the literature on the migration-trade link not only through the application of a theory-consistent model that accounts for subnational heterogeneity in the multilateral resistance term and through the methodological steps discussed in the previous two chapters. It also proposes a reflection on the possible determinants of a negative effect on trade by immigrants, which goes beyond the explanations that have been proposed so far in the literature. Indeed, while a number of explanations could account for a non-significant effect, a negative effect is a less obvious result which could imply trade substitution (Dunlevy and Hutchinson, 1999; Gould, 1994); the insights of a variety of specifications employed lead to proposing, as a tentative explanation, that immigrants' effect on trade in Italy is negative because it promotes market-access FDI which substitute for trade. This would be justified by the Italian peculiar internationalization pattern, which is characterized by unusually low levels of FDI compared to the other EU countries, which in turn have been attributed to the firms' greater reliance on local, rather than international, outsourcing (Antonioli et al., 2014; Berger and Locke, 2000).

A different pattern was identified for emigrants' effects on trade. The effect of emigration on total trade results to be null as a result of mutually offsetting dynamics at the level of the intensive and of the extensive margin, compatible with a trade promotion effect that shifts the content of trade towards lower-value added products.

The chapter is organized as follows: section 4.2 discusses the relationships between the gravity model presented in chapters 2 and 3 based on Head and Mayer (2014) and the model in Chaney (2008), in order to articulate the contribution of migration to the intensive and extensive margins of trade; it proposes a framework for the interpretation of negative effects of immigrants on trade and it also reviews the contributions of empirical works having focussed on the Italian case. Section 4.3 describes the data. Section 4.4 presents the empirical model and its specifications. Section 4.5 collects and discusses the main

[2]Even if the selected estimator in the Spanish case was the Gamma PML, in the Spanish case also the OLS estimator identified a positive and significant coefficient for immigration stocks; thus the two are comparable.

results. Section 4.6 concludes.

4.2 Background and methodology

4.2.1 The Model

In order to explain whether the immigrants' and emigrants' information and enforcement effects on trade affect the intensive or the extensive margins of trade, it is necessary to extend the conceptual framework underlying empirical estimation. This is done on the basis of the discussion carried out by Peri and Requena-Silvente (2010), who applied the Chaney (2008) model to the analysis of the migration-trade link distinguishing the effects on the two margins of trade. To this end, I will first briefly recall the main features of the gravity model described in chapter 2 and I will show, based on Head and Mayer (2014), that the Chaney (2008) model fits with the general form of the gravity equation. With reference to this model, I will present the effects of migration on the two margins and propose a few mechanisms through which a negative effect on trade could be explained. These tentative explanations will be confronted in the subsequent empirical analysis.

As discussed in Chapter 2, the "structural form" of the gravity equation can be expressed as in equation 4.1, which applies the notation in Eaton and Kortum (2002) and Head and Mayer (2014):

$$X_{ni} = \frac{Y_i}{\Omega_i}\frac{X_n}{\Phi_n}\phi_{ni}. \tag{4.1}$$

In this equation, X_{ni} represents the volume of trade between country n (importing country) and country i (exporting country); Y_i represents the "mass" of production of exporting country, X_n represents the "mass" of expenditures of the importing country; the "multilateral resistance term" (Anderson and van Wincoop, 2003) corresponds to $(\Omega_i\Phi_n)^{-1}$. The factors composing the multilateral resistance terms can be interpreted as, respectively, the average market access available to the exporting country (Ω_i) and the degree of competition in the importing country (Φ_n). More precisely, Ω_i represents the "expenditure-weighted average of relative access" and Φ_n the "accessibility-weighted sum of exporters' capabilities" (Head and Mayer (2014): 9-10). The term ϕ_{ni} captures bilateral costs of trade, including both natural and man-made trade barriers as well as their respective elasticities.

As seen in Chapter 2, the terms referring respectively to the importer income and multilateral resistance term and the exporter production and multilateral resistance term can be grouped under two "monadic" terms into the "general" form of the gravity equation (4.2)

$$X_{ni} = GS_iM_n\phi_{ni}, \tag{4.2}$$

where S_i represents the production of the exporter and its multilateral resistance term; M_n represents the income of the importer and is multilateral resistance term; G is a constant and ϕ_{ni} is the bilateral costs term.

Immigrant networks are usually represented by immigrant stocks which are considered to proxy for the probability of forming a tie between co-ethnics (Rauch and Trinidade, 2002). They are usually seen to affect equation 4.1 by two main channels: first, immigrant stocks are seen as factors that potentially reduce the bilateral costs of trade ϕ_{ni} by decreasing the costs of contract enforcement and of collecting trade-relevant information between the origin and the destination country (Rauch and Trinidade, 2002; Gould, 1994); second, immigrant stocks can also directly increase the demand for goods from their origin country, X_n, especially in the early phases of their immigration experience, through their preference for their home country products, through what Gould (1994) has labelled a "transplanted-home bias" or "preference" effect, which, however, applies exclusively to imports. Because of the greater developmental relevance of the information and enforcement effect vis-à-vis the preference effect, many studies have chosen, as we do, to focus on the side of the exports. The same arguments can be reversed and applied to emigrant networks (Murat and Pistoiesi, 2009).

The "transplanted-home bias effect", however, is of relevance in explaining the effect of emigration on trade.

The possibility of a negative effect of immigrants on trade is recognized by Gould (1994) and Dunlevy and Hutchinson (1999). The authors suggest that immigrants, especially skilled ones, could be driven to establish trade-substituting businesses in the host country. This effect, however, should be stronger in sustituting imports than exports: "(...)[I]mmigrants might cause production in the host country to be substituted for goods that previously had been imported. This could develop to the extent that immigrants possess specialized knowledge relating to technology or production methods or to the extent that domestic producers accommodate immigrant tastes by home production. To the extent that foreign capital flows with the immigrants, this entrepreneurial process could be enhanced. This trade-substitution effect, in a sense, is the application of the taste, information, and ethnic networks to trade substitution rather than trade creation. In principal, therefore, the posited effect of immigrants on trade is ambiguous."(Dunlevy and Hutchinson, 1999)[p.1045].

Recent work (Gao, 2003; Tong, 2005; Buch et al., 2006; Flisi and Murat, 2011; Nijkamp et al., 2011) has shown that the information effect exerted by immigrants could also facilitate FDI, both inward and outward. Assuming that immigrants provide relevant information about business opportunities abroad, "a given firm, at a given time, on a given product" (Brincogne and Forero, 2013), pursuing market access, could choose between exploiting this information to promote its exports or to establish plants abroad through trade-substituting horizontal FDI, depending on whether the gains from being proximate

to consumers are higher than the gains from concentration(Markusen, 1984). The information effect, thus, could either increase or reduce trade. This effect, *per se*, is most likely to go entirely through a negative effect on the extensive margin - less export transactions from a given province to a given country. If, however, it is associated with complementarities in trade of intermediate goods, the shift towards lower-value added production could offset the reduction in the extensive margin and have a *ceteris paribus* negative effect on the intensive margins of trade.

Peri and Requena-Silvente (2010), using a dataset which is based on Spanish transaction-level data, articulate for the first time the differential impact of immigrants on the intensive and extensive margins of trade. They apply an empirical model based on Chaney (2008), which is reported in equation 4.3 (with slight changes in notation to ensure coherence with Eaton and Kortum, 2002 and Head and Mayer, 2014):

$$ln(X_{nit}) = \text{Const} + ln(w_{it}^{-\gamma} Y_{it}) + ln(X_{nt}\theta_{nt}^{\gamma}) - \gamma ln(\tau_{nit}) - \left(\frac{\gamma}{\sigma - 1} - 1\right) ln(f_{nit}) \quad (4.3)$$

In this equation, w_{it} represents the wage levels of the exporting province or, more generally, the costs incurred in the home country to enter foreign markets, which in a general equilibrium framework correspond to productivity; γ is a parameter which is inversely related to firm heterogeneity in productivity; θ is a "remoteness" parameter which, together with its elasticty, is very similar to a multilateral resistance term from the side of the importer; τ_{nit} represents the variable costs of trade; σ is the elasticity of substitution between goods and f_{nit} represents the fixed costs of trade. In the model, this equation is obtained from aggregating the exports of firms with heterogeneous productivity, which are able to enter foreign markets if they overcome a productivity threshold $\bar{\alpha}_i$[3].

An important implication of the model to the ends of this chapter[4] is that the elasticity of trade with respect to fixed trade costs goes entirely through the extensive margin elasticity $\frac{\gamma}{(\sigma-1)} - 1$, while factors altering the variable costs of trade affect both the intensive and the extensive margins of trade and ultimately depend on the homogeneity in the productivity distribution (Chaney, 2008, p.1717). Peri and Requena-Silvente (2010) hypothesize that immigrants positively affect trade volumes mainly by reducing the fixed costs; coherently,

[3]The introduction of such a threshold is due to the model in Melitz (2003), that analyzes the impact of trade on intra-industry reallocation. It derives from the assumption of firm heterogeneity and is functional to explain that the exposure to trade forces less productive firms to exit and more productive firms to enter the export markets. Chaney (2008) model, as well Helpman et al. (2008), include these assumptions in gravity models to explain the effects of fixed and variable costs of trade on both margins of trade (Melitz, 2008)

[4]Head and Mayer (2014) have shown that the Chaney (2008) model, among other trade models, is theoretically compatible with the general form of the gravity equation when assuming Pareto distribution of firm productivity and of on no upper bound in the productivity threshold (p. 15).

they find that immigrants increases in the extensive margin of trade, i.e. the number of transactions, leaving the intensive margin of trade virtually unaffected. They interpret this result as an indication that immigration reduces the fixed, rather than the variable, costs of trade.

The negative effect of the elasticity of substitution on trade elasticity in equation 4.3 implies that, by relatively homogenous goods (high σ), the effect of a reduction on trade barriers such as the one brought by larger immigrant stocks will be relatively moderate. Conversely, by differentiated goods, the effect of a reduction in trade barriers will be larger. This conclusion is fully in line with the one in Rauch and Trinidade (2002), where the classification in Rauch (1999) into homogeneous, reference-priced and differentiated goods, is used to illuminate the dynamics underlying the network effect. The authors assume that immigrants' "information effect" will affect differentiated goods more strongly, while the "enforcement effect" will affect all products equally. Since their work, many empirical works on the migration-trade link have found evidence that the trade-facilitating role of immigrants is mainly driven by the information effect.

Incidentally, Head and Mayer (2014) have shown that, by assuming that the fixed costs of trade are expressed as a function of costs incurred in the exporting market, of costs incurred in the destination market and of bilateral-specific costs, as in Arkolakis et al. (2012): $f_{ni} = \varrho_{ni} w_i^{\mu} w_n^{1-\mu}$, the Chaney model can be expressed in the general form of the gravity equation (Head and Mayer, 2014)[p.16]:

$$S_i = N_i \bar{\alpha}_i^{-\gamma} w_i^{-\gamma-\mu\left(\frac{\gamma}{\sigma-1}-1\right)} \text{ and } \phi_{ni} = \tau_{ni}^{-\gamma} \varrho_{ni}^{-\left(\frac{\gamma}{\sigma-1}-1\right)} \tag{4.4}$$

In this equation, N_i represents the mass of active firms in country i and $\bar{\alpha}_i$ is the productivity threshold required to access foreign markets in country i. This way of expressing the equation suggests another channel through which migration can potentially affect trade, provided the immigration stock from a given country in a given province has a significant effect on the overall wage level of the province: w_i. This term has been defined by Head and Mayer (2014) as the costs incurred domestically to export. Including this way of expressing S_i in the general gravity equation, an increase in these costs would lead to reduce S_i and thus trade. The effect of migration on wages and productivity is a debated issue in the literature. If immigration reduces wages, such as in Borjas (2003), the wage-related component of the elasticity of trade to immigration should be positive; on the other hand, Ottaviano and Peri (2006) find a positive effect of immigration on productivity which should increase the costs but also make it easier for firms to overcome the productivity threshold and export. In Accetturo et al. (2012), and in a number of interviews reported in Chapters 7 and 6, the low average qualification of immigrants coupled with the reluctancy by natives to undertake production tasks is considered to reduce productivity to the point that entrepreneurs have to compensate higher shares of foreign labour force with higher

training expenses and higher investments in capital goods and automation. If this is the case, in the short term the overall costs incurred domestically to export may be increased by immigration flows and the wage-related component of the elasticity of trade to immigration could be negative. This line of reasoning cannot be fully elaborated here, as in the Chaney (2008) model labour is the only factor of production and is not a dynamic model, but an indirect way to test whether further research would be promising is to look at whether variations in the expressions used to account for the exporter-side monadic term affect the estimates on immigration: if the domestic costs are correlated with immigration, changes in the monadic term should have an effect on the immigration coefficients.

4.2.2 Empirical studies on the migration-trade link in Italy

The migration-trade link has been investigated in the case of Italy by Murat and Pistoiesi (2009) and Bratti et al. (2014), with quite different approaches. The main contribution by Murat and Pistoiesi (2009), who use a pooled cross-section of country-level data from 1990 to 2005, relates to noting that the argument that immigrants facilitate trade can be applied to expatriates as well, a dimension of interest for countries like Italy and Spain which have historically been marked by sizable emigration flows[5].

The work by Bratti et al. (2014), using province-level panel data for the period 2002-2011, proposes an original interpretation of the gravity model. A careful reading of their work raises some questions relating to the application of gravity models to panel data when the analysis is based on sub-national units.

The first question relates to how to express the multilateral resistance term in case of sub-national units, an issue that was already seen in Chapter 4. The intuition behind introducing the term in country-level analysis is that "changes in bilateral trade costs influence trade between two countries to the extent that the change in bilateral costs is greater than the change in the average trade barriers of each country towards all its partner countries" (Anderson and van Wincoop, 2003)[p.176]. If we focus on the analysis of the trade between a given province and a given country, the same argument can be applied: changes in bilateral trade costs influence trade between that province and that country to the extent that the change in bilateral costs is greater than the change in the average trade barriers of that province towards all its partner countries, and that the change in bilateral costs is greater than the change in average trade barriers between the country and all the other countries and provinces it trades with. Hummels (1999) and Anderson and van Wincoop (2003) argue that the multilateral resistance terms can be accounted for by country fixed effects; in a panel context, Baldwin and Taglioni (2007) show that the time variation in the multilateral resistance terms should be accounted for with importer-time

[5] Flisi and Murat (2011) have investigated the link between migration - immigrants and emigrants - and FDI in 5 countries including Italy.

and exporter-time effects (and omitting these terms configures the "gold-medal mistake" in gravity literature), while the correlation between the unobservable component of the bilateral trade determinants and the included trade determinants should be accounted for by time-invariant pair effects. When using export data at the province level, this implies using province-country effects as the bilateral time-invariant effects, province-time as the exporter-time effects, and country-time as the importer-time effects.

Bilateral time-invariant effects are intended to reflect cultural proximity or historical ties between a province and a partner country, such as long-term emigration ties from a province to a country (e.g. the province of Cuneo and Argentina), institutional partnerships between a given province and a country, or region, such as those described in Stocchiero (2009) between the provinces of Vicenza, Verona and Treviso and Romania. Country-time effects are intended to capture macroeconomic shocks and events in foreign countries likely to affect both trade and immigration. Province-time dummies are intended to capture the state of the local economies, including the level of wages and domestic production costs discussed in section 4.2.1, which are well likely to vary by province and may also be affected by the immigration stocks. When focussing on the exports of provinces, omitting province-time effects would imply that the average market access of two different provinces be assumed to be the same; in case we look at province imports, this would imply that the degree of competition be assumed to be the same. Extending an argument about firms in Head and Mayer (2014), however, there is no specific reason why this should *a priori* assumed to be the case. This applies especially when looking at cases, like the Italian case, where the sub-regional articulation of the economy has marked the specificity of the development model.

While fixed-effect estimation is considered as the preferrable theory-consistent methodology under most circumstances (Head and Mayer, 2014) and, in connection with the exploitation of sub-national variation through sub-national units, it is likely to attenuate the potential endogeneity problems of immigration with respect to trade (Bratti et al., 2014), it implies substantial computational difficulty in the empirical estimation as it typically implies adding thousands of dummies[6]. These difficulties even more substantially affect Poisson and Gamma estimation (see Chapter 2.

A compromising approach is proposed in Bratti et al. (2014). In their study on the trade of Italian provinces, they recognize the practical difficulty of running Poission estimates and opt for OLS estimation. Furthermore, instead of including the three sets of effects described above, they substitute the province-time effects with region-time effects, and the bilateral specific effects with region-country effects. Their argument, developed in

[6]This difficulty has been partially addressed as regards OLS estimation in logs: demeaning can account for the bilateral effects, and the time-varying importer and exporter effects can be eliminated algebraically through the "tetrad" method introduced by Head et al. (2010). However, this turned out not to be a viable option for the data at stake, see section 4.4

the appendix, is as follows: using the three theory consistent sets of effects (province-country, province-time, and country-time), 89% of the variation in exports is explained and no variation would be left to be explained by immigration; furthermore, 98.4% of the variation in immigration is explained by the three sets of effects. Thus, they opt for a mixed approach: they include income terms at the province level and a measure of bilateral distance of each country towards each province, but bilateral time-invariant effects at the region-country level and time-varying effects at the region and country level. The implied assumption is that the average market access be the same across provinces within the same region, and that the special institutional, cultural and contractual relationships with given countries differ significantly across provinces of the same region. At the same time, they account for different production and expenditure capacities within the region and account for some bilateral specificity between the province and the partner country by adding province-country distance. With this specification, the authors obtain a significant coefficient in the immigrant stocks at the province level and they interpret this result as a confirmation of the scale at which the migration-trade link operates, i.e. the province level (cfr. also Herander and Saavedra (2005)).

While this seems a reasonable approach, the main argument on which they base it, i.e. model saturation, does not necessarily hinder the identification of a significant effect of immigration on trade. In Chapter 3, I apply the three theory-consistent sets of effects to province-level Spanish data. There, the model is even more saturated than the one in Bratti et al. (2014): 91.8% of the variation in exports and 99.3% of the variation in immigration are solely explained by pair, importer-time and exporter-time effects. Yet, the OLS estimates of the immigration effect on trade are positive, significant and robust, as well as the Gamma estimates which turn out to be the optimal ones. Thus, it is not model saturation *per se* which hampers identification of the immigrants' effect. Unfortunately, Bratti et al. (2014) do not report any estimates confirming their assumptions about model saturation.

A second debatable point in Bratti et al. (2014) is that, while they control for distance between trading pairs, they do not fully control for trading-pair heterogeneity due to other factors. This implies assuming no heterogeneity in bilateral trade determinants below the regional level. While the exporting capacity of provinces within the same region may not change substantially, and including region-time effects may be a good approximation, failing to control for pair heterogeneity may have more substantial implications.

In what follows, thus, I apply the three theory-consistent sets of effects. The aggregate estimates lead to identifying no significant effect on trade for neither immigrants nor emigrants. Instead of attributing the non-significance of the effect to model saturation, I look for an explanation in the relative effects of immigration and emigration on the extensive and intensive margins of trade, drawing on the model applied in Peri and Requena-Silvente (2010). The availability of a very rich database originally at the transaction level

provided by ISTAT allows for this kind of analysis and for a few extensions distinguishing between different types of countries (old markets and new markets, as in Murat and Pistoiesi (2009)), different types of goods (differentiated, reference-priced or standardized, as in Rauch (1999)) and different degrees of technological intensity (as defined by Eurostat).

4.3 Data

In this paper, I exploit a rich database of micro-data provided by the Lab for Elementary Data Analysis of the Italian Statistical institute (Laboratorio ADELE, ISTAT) upon formal request for authorization; for data sensitivity reasons, the data can exclusively be accessed within the ISTAT offices using the equipment provided by the institution. The datasets used in this paper are derived from the aggregation, by province-country pair and by year, of the information about individual transactions in goods that are collected monthly from customs and are articulated into two categories: (i) Sales/Purchases with EU countries (Intrastat System) ("*Cessioni-Acquisti beni con i paesi UE (Sistema Intrastat)*") and (ii) import-export with non-EU countries ("*Commercio speciale esportazione-importazione extra-UE*")[7]. Because of the greater developmental relevance of the "information" and "enforcement" effect as opposed to the "preference" effect, it was opted to focus on the side of the exports only. The procedure followed is similar to that described in Peri and Requena-Silvente (2010) for the analysis of the migration-trade link in the case of Spain. The main advantage deriving from such procedure is that it yields data about the number of transactions corresponding to each province-country pair and year, i.e. a measure of the extensive margin of international trade; this information, coupled with the aggregated data about the value of trade, allows computing the average value per transaction, i.e. a measure of the intensive margin of trade, for each province-country pair and year (the same measures were used by Peri and Requena-Silvente (2010) for Spain) and of quality (Van Biesebroeck, 2011; Giovannetti and Lanati, 2014).

The micro-data contain information about the sectoral classification of the transactions at the 8-digit level of the Combined Nomenclature classification (NC8) and at the 5-digit level of the NACE classification (in Italian, Ateco). In order to exploit this information, three different datasets were produced:

1. The first database aggregates all information by province-country pair and year;
2. The second database aggregates the information by product type according to the

[7]Due to the large amount of information contained - each database contains about 6 million records - the information is typically not available by year, but rather in more disaggregated time units which could not be opened with the version of Stata available at ISTAT. Thus, the data had to be partitioned in SAS and re-aggregated to be analysed in Stata.

classification in Rauch (1999) by homogeneous goods, reference-priced goods and differentiated goods[8], and then by province-country pair and year; however, as the Rauch classification is based on the SITC4 classification and the data are available by the NC8 classification, a two-step conversion had to be performed (from NC8 to SITC5 through the correspondence tables available at the RAMON-Eurostat website[9], and then from SITC5 to SITC4). This conversion procedure led to some information loss by missing correspondence in the conversion table from NC8 to SITC5 and from SITC4 to Rauch classification. Two subtypes of the resulting database were produced, corresponding respectively to Rauch's "conservative" and "liberal" classification.

3. The third database aggregates the information by technological intensity of the manufacturing industry and services sector based on Eurostat classification of the 3-digit NACE rev.2 classification[10]. The classification leads to four categories of technological intensity in manufacturing industries (high, medium-high, medium-low, and low).

The province-country export data just described, either aggregate or articulated by product type or technology level, constitute the dependent variables of the model. Each of the three databases described above has been merged with a pre-prepared dataset articulated by province-country pair and year and containing information about immigrant stocks, emigrants stocks, country and province population, country GDP and per capita GDP, province income and per-capita income distance, belonging to Eurozone, EU, European Economic Area, OECD, trade tradition with Italy ("Old" vs "New" markets, as in Murat and Pistoiesi (2009), past colonial ties with Italy, contiguity with Italian border provinces and other gravity-relevant variables derived from publicly available sources (see table 4.1). The main variables of interest are those relating to immigration and emigration; they derive respectively from the publicly available demographic statistics of the ISTAT and from the AIRE (Anagrafe Italiana Residenti all'Estero, i.e. the Italian Registry of Residents Abroad). The correlation between the absolute values of the two variables is very low (0.0006) and is not significant (the p-value of the correlation coefficient is 0.8949).

As in the Spanish case, the migration variables should be viewed as imperfect proxies of immigrant and emigrant stocks. Following the literature on the migration-trade link, throughout this paper I refer to "immigration" in a province as the stock of residents in that province who hold a non-Italian citizenship. Hence, the portion of foreign-born people that have acquired the Italian nationality is neglected. It also only refers to formally residing people, neglecting undocumented immigrants, and it furthermore neglects

[8]The classification by SITC4 code can be downloaded at `http://www.macalester.edu/research/economics/PAGE/HAVEMAN/Trade.Resources/TradeData.html#Rauch`

[9]Available at `http://ec.europa.eu/eurostat/ramon/relations/index.cfm?TargetUrl=LST_REL`

[10]Available at `http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/Annexes/htec_esms_an3.pdf`

the intra-national mobility that is not registered in changes of residence. Similarly, the emigration variable used here is imperfect as it refers to the stock of people that have moved their residence outside Italy but are still recorded in the election registries in Italy. These data are not informative as to the country of birth of these emigrants, and thus in principle one cannot distinguish return migrants from the native Italian diaspora: only the portion of former residents in Italy who have expatriated and who still vote in Italy is represented. Yet, maintaining one's voting rights in Italy implies the persistence of strong ties to Italy. It is thus relatively safe to assume these data to more closely reflect the dynamics of the Italian emigrant population than the dynamics of return migration. Furthermore, neither immigration nor emigration data at the province level allow distinguishing between economically active and inactive migrants; consequently, it cannot be elicited from these data whether migrants' contribution to trade is "active", e.g. as entrepreneurs, intermediaries or labour force who sell primarily to their home country, or whether it is an "indirect" one that goes through familiarization and trust-building in the destination context with the home countries. This is a consequence of the sub-national level of analysis: at the NUTS 3 level, the availability of detailed data on immigrants' characteristics, especially on skills, employment status and length of stay is severely constrained: the results of the Labour Force Survey are only considered as reliable at the NUTS 2 level.

In constructing the dataset, the length of the panel was determined by the availability of data about immigration and emigration[11]. Because the data about emigration are only available from 2006 on, while data about immigration are available from 2002 to 2010, this constrained the time period of the joint analysis of immigration and emigration effects on trade to the 2006-2010 period[12]. For data availability reasons of the emigrant variable, this period includes the period of the burst of the global financial crisis. This procedure has also implications about the structure of the data, as it leads to a panel of 14,595 country-province dyads (139 countries and 105 provinces) over five years[13] and no zero

[11] As it is common practice, in empirical estimation one unit is added to immigration and emigration and two dummies, one for no immigration from country n to province i and one for no emigration from country i to province n, are included in the estimation to account for the original structure in the data. Because however most pairs have at least one immigrant or emigrant in each province, the information content of these dummies is limited and will not be discussed in details. These dummies were included in all specifications even where not explicitly reported.

[12] Most analyses reported in section 4.5 have also been tested separately for emigration and immigration, with similar results.

[13] The large number of observations resulting caused computational difficulties, especially with the Poisson estimator; in many cases the Poisson estimation required the sample to be reduced in order to achieve convergence within the opening times of the ISTAT offices. This was done by selecting the exports of 103 Italian provinces (excluding the ones founded after 2005 for data availability reasons) towards the 51 most representative countries for Italian trade as in Murat and Pistoiesi (2009), leading to a sample of 24250 observations (see table 4.1). For comparability, the regressions on this subsample were also run by OLS. Because the results on this subsample are analogous but more precise than those on the whole of the database, in the Results section I report these, with the only exception of table 4.2, where the results for the whole database are reported. The analysis should be viewed to primarily seek for an explanation on the

trade flows.

Table 4.1: **Main Data Sources**

Variable	Description	Source
X_{nit}	Nominal value of the exports from province i to country n at time t	ISTAT micro-data on bilateral exports: "*Cessioni-Acquisti beni con i paesi UE (Sistema Intrastat)*" and "*Commercio speciale esportazione-importazione extra-UE*"
NT_{nit}	Number of transactions between province i and country n at time t	
AVT_{nit}	Average value per transaction between province i and country n at time t	
$Immi_{nit}$	Foreign residents in province i with country n citizenship in year t	Demo-ISTAT database, `http://demo.ISTAT.it/` for 2002-2010.
NID_{nit}	No Immigrants Dummy	
Emi_{nit}	Emigrants from province i to country n in year t	Registry of Italian Citizens Residing Abroad of the Ministry of Interior - AIRE (Anagrafe Italiani Residenti all'Estero
NED_{nit}	No Emigrants Dummy	
X_{nt}	Partner country GDP in year t	IMF World Economic Outlook database, `http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/index.aspx`. Missing data were integrated with the World Bank World Development Indicators, `http://databank.worldbank.org/data/home.aspx`
Y_{it}	Province income in year t	ISTAT website for 2002-2008, `http://www3.ISTAT.it/salastampa/comunicati/non_calendario/20110105_00/`. Data for 2009-2010 from Istituto Tagliacarne (`http://www.tagliacarne.it`).
D_OM_n	Italy's long-lasting trade partner ("Old" market)	Murat and Pistoiesi (2009): Argentina, Australia, Austria, Brazil, Canada, Chile, Denmark, France, Germany, Greece, Ireland, Libya, Luxembourg, Mexico, Netherlands, Norway, Portugal, South Africa, Spain, Sweden, Switzerland, UK, USA, Venezuela.
D_NM_n	Italy's recent trade partner ("New" market)	Albania, Algeria, Bulgaria, China, Croatia, Czech Rep., Egypt, Hungary, India, Indonesia, Iran, Israel, Japan, Malaysia, Morocco, Philippines, Poland, Romania, Russia, Singapore, Slovakia, Slovenia, South Korea, Thailand, Tunisia, Turkey, Ukraine.

role of immigration and emigration for Italy's the most relevant trade partners. This bears the implication that some countries, such as sub-saharan African countries, which are relevant for Italian immigration flows, but not much for Italian trade, are excluded from the analysis. This implies a reduction in the magnitude of the effects but allows focussing on the most economically relevant countries for Italian trade and may have more interesting policy implications; in any case, the results are most often qualitatively the same in the whole dataset and can be provided if requested.

4.4 Proposed Econometric Strategy

The basic theory-consistent model to analyse the immigrants' and emigrants' effects on the volume of trade of Italian provinces with each of their trade partners is the following:

$$X_{nit} = \alpha X_{nt}^{b_1} Y_{it}^{b_2} \text{Immi}_{nit}^{\beta_1} \text{Emi}_{nit}^{\beta_2} e^{(\gamma_1 \theta_{\mathbf{nt}} + \gamma_2 \omega_{\mathbf{it}} + \gamma_3 \eta_{\mathbf{ni}} + \varepsilon_{nit})} \tag{4.5}$$

Where:

X_{nit} = Nominal value of the exports from province i to country n at time t;

X_{nt} = Total expenditures by country n, approximated by country GDP,

Y_{it} = Total production by province i, approximated by province gross product;

Immi_{nit} = Stock of immigrants from country n living in province i at time t;

Emi_{nit} = Stock of emigrants from province i living in country n at time t;

$\theta_{\mathbf{nt}}$ = vector of the importer-time effects, corresponding to country-time dummies;

$\omega_{\mathbf{it}}$= vector of the exporter-time effects, corresponding to province-time dummies;

$\eta_{\mathbf{ni}}$= vector of the trading-pair specific fixed effects, corresponding to province-country dummies

ε_{nit}=random error term

When investigating whether the effects of immigration and emigration change when focusing on the extensive and intensive margin, the dependent variable X_{nit} can, according to Peri and Requena-Silvente (2010), be substituted by NT_{nit}, i.e. the number of transactions between province i and country n in year t, representing the extensive margin, and by AVT_{nit}, i.e. the average value per transaction between province i and country n, representing the intensive margin.

This basic specification can be estimated separately for different types of goods (differentiated, homogeneous and reference-priced; see Rauch, 1999) and for the different levels of technological intensity described in section 3.3.

As seen in Chapter 2, the right-hand side of the equation is generally log-linearised in the estimation. As mentioned, the selection of data aiming to ensure that data about the immigrants and emigrants were available led to eliminating the province-country pairs with zero trade flows. Thus, according to Head and Mayer (2014) the appropriate estimation method should be selected from among OLS, Poisson and Gamma regression in a "robustness-exploring ensemble". Unfortunately, it was not possible to run a systematic comparison between the three estimators to identify the most suitable estimation method

for the data at stake as was done in Chapter 3. Gamma regression with dummy variables was not a viable option in the version of Stata available at ISTAT[14]. While the computational time involved in OLS estimation proved long yet acceptable within reasonable limits, fixed-effects Poisson regression with importer-time and exporter-time effects faces drastic convergence problems which in many cases render estimation impossible, as already noted among other by Bratti et al. (2014). Thus, only the OLS estimates can be comprehensively reported here. To account for the possible bias due to heteroskedasticity by log-linearization noted by Santos-Silva and Tenreyro (2006), the diagnostic tests proposed in Head and Mayer (2014) were run on the aggregate OLS and Poisson estimates and are reported in section 4.5.

The log-linear empirical model corresponding to equation 4.5 and to be estimated by OLS is the following[15]:

$$ln(X_{nit}) = b_1 ln(X_{nt}) + b_2 ln(Y_{it}) + \beta_1 \ln(\text{Immi}_{nit} + 1) + \beta_2 \ln(\text{Emi}_{nit} + 1) + NID_{nit} + \\ + NED_{nit} + \gamma_{\mathbf{1}} \theta_{\mathbf{nt}} + \gamma_{\mathbf{2}} \omega_{\mathbf{it}} + \gamma_{\mathbf{3}} \eta_{\mathbf{ni}} + \varepsilon_{nit} \quad (4.6)$$

Where, as in the previous chapters, besides the already described regressors, two binary variables, NID_{nit} and NED_{nit}, have been added. The reason is that, because the log of the immigrants' and emigrants' stocks would be indeterminate in case the immigrant or emigrant population is zero, we add one unit to these stocks and account for this modification through these dummies. So, NID_{nit} ("No Immigrants Dummy") equals 1 if at time t there are no immigrants from country n in province i, and zero otherwise; and NED_{nit} ("No Emigrants Dummy") equals 1 if at time t there are no emigrants from province i residing in country n, and zero otherwise. The standard errors are clustered at the trading pair level. By Poisson estimation, the left-hand side is in levels and is scaled by the value of the importing country GDP to compensate for the greater weight attributed by the estimator to larger trade flows (Eaton and Kortum, 2002) and the standard errors are heteroskedasticity-robust. To reduce the number of dummies, estimation by the method of "tetrads" proposed in Head et al. (2010) was attempted. This methods allows algebraic elimination of the importer-time and exporter-time effects by computing a "ratio of ratios". First, the observed exports from country i to country n are divided by the exports of

[14]This seems particularly unfortunate. Indeed, while Gamma regression with dummy variables may in principle be affected by the incidental parameters problem, it proved a very precise and consistent option in the estimates on the exports of Spanish provinces which I estimated with a more recent version of Stata in Chapter 3; it cannot be excluded that it could have been an important integration to the present chapter, too.

[15]As previously mentioned, in practice, including time-varying fixed effects together with the income terms gives rise to perfect collinearity; hence, X_{nt} and Y_{it} are excluded in the estimation, unless the relevant set of fixed effects is removed.

exporter i to a reference importer k; then, the exports to n from a reference exporter ℓ are divided by the exports from ℓ to k. Finally, the ratio of these two ratios is be computed. This way, the "monadic terms", i.e. the income terms and the multilateral resistance terms, are eliminated; the trade cost terms are similarly "tetraded". To account for autocorrelation, the standard errors are clustered at the importer, exporter and pair level. I applied the tetrad method both using the codes made available by the authors on the web appendix of their paper and by applying the tetrad approach to Poisson estimation. However, the results of the estimates, in the Italian case, change substantially by variations in the reference countries adopted; thus, they were not considered as reliable and are not reported here[16].

The steps followed in the estimation were the following:

1. Test the migration-trade link hypothesis with the proposed specification on total trade, number of transactions and average value per transaction.
2. Test the underlying distribution of the errors in each model according to the procedure suggested in Head and Mayer (2014) and applied in Chapter 3.
3. Highlight the effect of including different sets of fixed effects by comparing each model with:
    - a specification excluding province-time dummies and including local income terms, similarly to Peri and Requena-Silvente (2010), to have a direct comparison with their model and to show whether the elasticity of trade to immigration changes;
    - a specification including region-time instead of province-time effects, to be compared with the estimates of Bratti et al. (2014) and to highlight the role of pair heterogeneity vis-à-vis local economy specificities.

    These steps are identical to those followed in the chapter focusing on Spain (although they are applied not only to total trade but also to the two trade margins) and allow a direct comparison of the effect of sub-national heterogeneity in the multilateral resistance term on model fit and on the effects of migration. Also, these tests allow a direct comparison with key papers in the migration-trade link literature adopting subnational units, with potentially interesting insights. Furthermore, this series of tests could, as noted in section 4.2.1, provide a first indication about the possible role of migration on province-level wages. If the estimates on the immigration effect are affected by the elimination of the province-time effects, this can be considered as an indication that the immigration effect is not solely channelled through the bilateral costs term

[16]The instability in the results can only be considered as an indication of the lack of a systematic positive effect of immigration on trade.

and may be included in the exporter-side monadic term through a wage effect. If, instead, the result will be basically unchanged, the role of immigration in affecting wages will have to be discarded as a determinant of trade.

4. Articulate the basic specification into one which distinguishes the immigrants by their countries of origin, i.e. "New" vs. "Old" Markets as in Murat and Pistoiesi (2009). This specification pursues a similar objective as the ones exploring language and institutional proximity in the Spanish case, i.e. distinguishing between markets where the trade flows are facilitated by institutional similarity and long-lasting trade partnerships (Old Markets) from those where the barriers to trade are likely to be higher (New markets). The advantage of focussing on such a measure is that it admits lower bilateral trade costs could be endogenously determined by long-term trading ties deriving from factors other than institutional similarity. e.g. past emigration, and, applied to the Italian case, is likely to be a more synthetic indicator of the effect of trade barriers than a more standard distinction based on regional agreements.

5. Articulate the basic specification into one that distinguishes the provinces by the shares of immigrants they host. This specification is the same as the one tested in the Spanish case.

6. In order to highlight ethnic and sub-national heterogeneity, run the basic specification by allowing the elasticity of immigration and emigration to vary by region and by country. The specification allowing for province-specific elasticities is identical to the one run for the Spanish case. The one on country-specific elasticities applies a similar procedure.

   The last two specifications are enabled by the availability of disaggregated data at the transaction level that provide information about the sector of firm activities.

7. Articulate the basic specification into one that distinguishes the exports by technological intensity (as in the Eurostat definition).

   Different levels of technological intensity are likely to be associated with different patterns of information diffusion. High-tech production is less likely to be heavily reliant on migrant networks to promote export than low-tech production - the skills required to operate as a boundary broker in high-tech production may be more difficult to find within the immigrant and emigrant communities than those required to promote the exports of lower-tech productions.

8. Articulate the basic specification into one that distinguishes the goods by their levels of differentiation (Rauch, 1999; Rauch and Trinidade, 2002).

   The authors assume that immigrants' "information effect" will affect differentiated goods more strongly, while the "enforcement effect" will affect all products equally.

Since their work, many empirical works on the migration-trade link have found evidence that the trade-facilitating role of immigrants is mainly driven by the information effect.

The results are reported in section 4.5.

4.5 Results

In general, the results of the empirical estimation do not provide much support to the hypothesis of a positive effect of immigration on trade in the case of Italian provinces. Table 4.2 reports the results of the aggregate model. No significant effect on total trade can be identified for immigrants nor for emigrants when all sectors and types of products are considered; the effects are also not significant when looking at the intensive and extensive margins. While not significant, the sign of the effect of immigration on the extensive margin of trade actually results negative. As regards emigration, the elasticity of trade value results null and not significant because of the combination of two opposite effects: a positive effect on the extensive margin of trade (number of transactions) and a negative effect of on the intensive margin (average value per transaction) of almost the same magnitude[17].

Table 4.3 reports the results for the countries of greatest relevance to Italian trade as in Murat and Pistoiesi (2009). Here, the directions of the effects are the same, but the significance and the absolute values of the immigration effects increase, leading to a highlighting a negative and highly significant effect of immigration on the total value of trade, which appears to be mainly driven by a negative and significant effect of immigration on the extensive margin of trade. The effect of emigration on total trade is less neatly defined, while the mutually offsetting effects of emigration on the extensive and the intensive margins of trade are confirmed.

The results from the Poisson estimation are completely different. In this case, immigration results only to affect the intensive margin of trade and not its value, while emigration results to (negatively) affect the extensive margin of trade and thus its value, but only at a 10% significance level. In this case, immigrants would increase product quality while emigrants could be contributing to trade-substitution through horizontal FDI.

To select the more appropriate estimation method between OLS and Poisson, in tables 4.4 and 4.5, I report the results of the diagnostic tests on the underlying distribution of the errors proposed in Head and Mayer (2014).

[17] The results are the qualitatively same when the analysis is performed excluding the provinces of Rome and Milan as suggested by Bratti et al. (2014). The rationale for excluding Rome and Milan from the analysis is, according to them, that the most production firms are located there and that they export abroad irrespective of the presence of immigrants. The tables are not reported here for brevity but are available upon request.

Table 4.2: Regression results: OLS estimates on log-linear model, all countries

Dependent variable	$ln(X_{nit})$	$ln(NT_{nit})$	$ln(AVT_{nit})$
$ln(\text{Immi}_{nit}+1)$	−0·023	−0·009	−0·012
	(0·014)	(0·007)	(0·011)
$ln(\text{Emi}_{nit}+1)$	0·003	0·027***	−0·024*
	(0·013)	(0·009)	(0·012)
NID	−0·006	−0·009	0·004
	(0·027)	(0·013)	(0·018)
NED	−0·004	0·0243*	−0·030*
	(0·022)	(0·013)	(0·018)
Const	1·487***	−1·057***	2·487***
	(0·469)	(0·0515)	(0·469)
province-time effects	Yes	Yes	Yes
country-time effects	Yes	Yes	Yes
province-country effects	Yes	Yes	Yes
N	73165	73165	73165
r2	0·0856	0·122	0·0596

Clustered standard errors in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Table 4.3: Regression results: OLS estimates on log-linear model. Countries of greatest relevance to Italian trade (Murat and Pistoiesi, 2009)

	OLS estimates			**Poisson estimates**		
Dependent var.	$ln(X_{nit})$	$ln(NT_{nit})$	$ln(AVT_{nit})$	$ln(X_{nit})$	$ln(NT_{nit})$	$ln(AVT_{nit})$
$ln(\text{Immi}_{nit}+1)$	−0·070***	−0·049***	−0·021	0·055	0·022	0·187***
	(0·031)	(0·0176)	(0·025)	(0·037)	(0·024)	(0·072)
$ln(\text{Emi}_{nit}+1)$	0·027	0·036 **	−0·008 **	−0·056*	−0·023*	−0·063
	(0·031)	(0·021)	(0·026)	(0·032)	(0·013)	(0·105)
NID	−0·005	−0·041	0·036	−0·066	0·007	0·288
	(0·064)	(0·038)	(0·052)	(0·070)	(0·034)	(0·194)
NED	−0·050	0·025	−0·0752*	−0·118*	−0·073 **	−0·334 **
	(0·055)	(0·033)	(0·043)	(0·063)	(0·030)	(0·137)
Const	15·59 ***	6·293***	9·295***			
	(0·364)	(0·188)	(0·292)			
Effects						
prov.-time	Yes	Yes	Yes	Yes	Yes	Yes
country-time	Yes	Yes	Yes	Yes	Yes	Yes
prov.-country	Yes	Yes	Yes	Yes	Yes	Yes
N	24250	24250	24250	24250	24250	24250
r2	0·138	0·175	0·103			

Clustered robust standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01

Table 4.4: Manning and Mullahy test on the underlying distribution of the errors

OLS residuals			
Dependent variable	$ln(X_{nit})$	$ln(NT_{nit})$	$ln(AVT_{nit})$
$ln(\hat{\mu})$	0·443***	1·432***	0·997***
	(0·021)	(0·030)	(0·011)
Constant	26·03 * **	4·294***	10·40 * **
	(0·342)	(0·191)	(0·115)
N	24250	24250	24250
r2	0·021	0·085	0·253
Poisson residuals			
Dependent variable	$ln(X_{nit})$	$ln(NT_{nit})$	$ln(AVT_{nit})$
$ln(\hat{\mu})$	0·265***	2·122***	0·186***
	(0·091)	(0·123)	(0·022)
Constant	32·005***	12·756***	19·563***
	(0·032)	(0·042)	(0·015)
N	24250	24250	24250
r2	0·001	0·018	0·003

Standard errors in parentheses
* p<0.1, ** p<0.05, *** p<0.01

The MaMu test in table 4.4 examines the relationship between the conditional mean and the variance of the errors. Because the MaMu test on OLS is essentially a modified test for heteroskedasticity, the first implication of the statistical significance of the coefficients of $ln(\mu)$ in table 4.4 is that the OLS estimates on total trade and the extensive margins of trade are indeed affected by some heteroskedasticity which, by log-linearisation, may generate bias. On the other hand, no substantial omitted variable bias emerges from the Ramsey RESET test reported in table 4.5.

Table 4.5: RESET tests on the estimation methods

OLS estimates			
Dependent variable	$ln(X_{nit})$	$ln(NT_{nit})$	$ln(AVT_{nit})$
P-values: Square of the fitted values	0·490	0·556	0·455
P-values: Cube of the fitted values	0·478	0·416	0·403
P-values: Joint	0·748	0·446	0·630
Poisson estimates			
Dependent variable	X_{nit}	NT_{nit}	AVT_{nit}
P-values: Square of the fitted values	0·003	0·004	0·609
P-values: Cube of the fitted values	0·005	0·068	0·082
P-values: Joint	0·009	0·000	0·000

According to Manning and Mullahy (2001), the distribution of the errors should be analyzed

on the basis of the MaMu test run on the residuals from the PML estimators, in this case the Poisson PML. As regards the residuals from the Poisson estimations on $ln(X_{nit})$ and on $ln(AVT_{nit})$, the MaMu tests does not support a functional form of the residuals that is especially compatible neither with a Poisson, nor with a log-linear or Gamma distribution. The coefficients of the conditional mean, i.e. the λ in the MaMu test, are closer to zero than to one. Hence, while in principle consistent (Wooldridge, 2002), the Poisson estimator would not necessarily be the most efficient in estimating the effect of immigration and emigration on total trade and on the intensive margin. The Poisson regression on the number of transactions, instead, leads to a value of λ that is very close to 2 and would thus be compatible with a log-linear or Gamma distribution in the residuals. Hence, as regards the extensive margin, the test provides clear evidence in support of the OLS estimator. Furthermore, the results of the Ramsey RESET test show evidence of omitted variable bias in all three models estimated by Poisson.

Overall, the tests do not unambiguously lead to selecting one single estimation method over the other. The consistency in the Poisson estimator (Wooldridge, 2002) is, within the present specification, questioned by the results of the RESET test; its greater efficiency with respect to OLS is not assured. OLS estimation results clearly to be preferred for the estimation of the extensive margin. Thus, contrarily to what argumented in Santos-Silva and Tenreyro (2006), there seems to be no strong reason to prefer the Poisson estimator over OLS for the data at stake. An additional argument against applying the Poisson estimator to these data is that, by database construction, there are no zeros in the dependent variables of the three models. Furthermore, the large number of fixed effects in the model is likely to attenuate the bias in the OLS estimator due to heteroskedasticity (Santos-Silva and Tenreyro, 2006), while it generates substantial convergence problems in the Poisson estimator. Hence, OLS is selected here as the most suitable estimator and is applied in the following sections.

4.5.1 Subnational variation in the multilateral resistance term

Table 4.6 compares the results of different specifications of the basic model that include different sets of fixed effects, in order to test for the role of sub-national heterogeneity in the multilateral resistance term (MRT). These specifications, respectively, include the province-time effects (fully accounting for sub-national heterogeneity in the MRT), substitute the province-time effects with region-time effects (assuming that the MRT does not significantly change within the same region, similarly to Bratti et al., 2012, who, however, account differently for province-level heterogeneity), and omits province time effects (assuming that the MRT is mainly defined by country-lvel determinants, as in Peri and Requena-Silvente, 2010). The results of the three are remarkably similar from the qualitative point of view to those of the main specification as regards their signs: the effect of immigration on total trade value is negative; the effect of emigration on trade value is not significant because of

mutually offsetting dynamics at the level of the intensive and extensive margins. However, a series of useful insights can be drawn from the comparison of these estimates.

Table 4.6: Regression results: Heterogeneity in the Multilateral Resistance Term

Dependent variable	$ln(X_{nit})$	$ln(NT_{nit})$	$ln(AVT_{nit})$
With province-time effects			
$ln(\text{Immi}_{nit}+1)$	−0·070***	−0·049***	−0·021
	(0·031)	(0·018)	(0·025)
$ln(\text{Emi}_{nit}+1)$	0·027	0·036 **	−0·008 **
	(0·031)	(0·021)	(0·026)
N	24250	24250	24250
r2	0·138	0·175	0·103
aic	37170·5	6966·3	28384·8
Region-time instead of province-time effects			
$ln(\text{Immi}_{nit}+1)$	−0·057*	−0·039*	−0·018
	(0·031)	(0·018)	(0·026)
$ln(\text{Emi}_{nit}+1)$	−0·024	0·075***	−0·099***
	(0·033)	(0·025)	(0·033)
N	24250	24250	24250
r2	0·096	0·128	0·064
aic	37653·1	7637·7	28747·7
No province-time effects			
$ln(\text{Immi}_{nit}+1)$	−0·051*	−0·031*	−0·021
	(0·031)	(0·018)	(0·025)
$ln(\text{Emi}_{nit}+1)$	−0·026	0·079***	−0·105***
	(0·033)	(0·026)	(0·033)
N	24250	24250	24250
r2	0·087	0·109	0·057
aic	37748·7	8006·2	28784·6

Clustered standard errors in parentheses;* p<0.1, ** p<0.05, *** p<0.01

First, comparing the results of the three specifications, the inclusion of controls for sub-national heterogeneity in the MRT finds clear support. As in chapter 3, the R-squared statistics increase and the AIC statistics decrease by the inclusion of exporter-time effects; the effects are jointly significantly different from zero (all p-values of the parameter test < 0.001); these results imply better fit of the theory-consistent model.

Differently from the Spanish case, however, the inclusion of time-varying exporter effects is also associated with non-negligible changes in the coefficients of immigration and emigration, implying that their effect goes beyond the bilateral costs term. More precisely, comparing the coefficients of the three fixed-effects specifications, the coefficient of the

log immigrant stocks increases in absolute value by about 20% in the theory consistent specification with respect to the one including region-time effects: when controlling for province-level differences in the exporting capacity, the *ceteris paribus* effect of immigration is more strongly negative. Hence, immigration seems to correlate with, and possibly to affect, the exporting capacity of provinces (cfr. section 4.2.1). The reason why the corresponding analysis run on the Spanish case did not lead to this result may be that immigrants in Italy are more often employed in the manufacturing sector than they are in Spain; due to their greater integration in the manufacturing sector, they are more likely to affect the exporting capacity of the host provinces.

As regards the coefficients of the log emigrant stocks, too, the coefficients of the specification including the three sets of effects are about 50% lower in absolute value than those in the other two specifications. This implies that the effect of emigration on trade is not only channelled through the bilateral cost term ϕ_{nit} in equation 4.2 but also through the monadic terms. This effect is most likely to be due to an increase in production caused by emigrants' increased demand of the home province products. The change in magnitude from one specification to the other is very likely to imply that emigrants' preferences are, to a non-negligible extent, province-specific. Overall, these results provide clear support to the empirical relevance of including time-varying exporter effects at the province-level, in line with the implications of the gravity theory.

A second insight deriving from the comparison of the estimates in table 4.6 derives from the comparison with the model in Peri and Requena-Silvente (2010), which is very similar to the one with no province-time effects[18]. This model leads them to identify, in the Spanish case, a positive and significant effect of immigration on trade that is mainly due to increases in the extensive margin. As shown, in the Italian case, the effect of immigration on trade results also to be mainly driven by effects on the extensive margin, but in a negative sense. These quite different results for two comparable countries suggest there may be an important role for country specificities.

A third insight derives from comparing these results with those in Bratti et al. (2014) who, instead, found a positive effect of immigration on the trade of Italian provinces: hence, conclusions can be drawn on how the immigration effect is obtained. Because the main differences between the model with region-time effects and the one in Bratti et al. (2014) lies in the inclusion of pair-level effects at the province level[19], I conclude that the significance of the immigration effect in their specification crucially depends on the substitution of

[18] The main differences lie in the use of non-lagged covariates, in the inclusion of the log of emigrant stocks in the specification and in the elimination of the country income term which is redundant due to collinearity with the country time effects (Head and Mayer, 2014). The results are qualitatively the same when lags are used and when emigrant stocks are removed, but all coefficients loose significance. The results are available upon request.

[19] And on the inclusion of non-lagged covariates, which however do not make a difference in the direction of the estimates

the pair-level effects at the province-country level with pair effects at the region-country level. This bears the question of whether what they address as a MAUP (Modifiable Areal Unit Problem) is not actually an issue of heterogeneity at the province-country vs. region-country level. Incidentally, it is also worthwile to note that immigration does not result statistically significant when the model is estimated with random effects instead of with fixed effects[20].

The results of the baseline specification are not radically different when the full time dimension available for the immigration variable is exploited, and the emigration variable is omitted to allow a longer panel (1995-2010) to be considered. Also in this case, immigration results to have a negative and significant effect on total trade (the magnitude of the elasticity is -0.047), with no signficantly different results obtained when splitting the sample into a pre-crisis and a post-crisis component[21].

4.5.2 The effect of the duration of trade partnerships

Turning back to the main specification and distinguishing the sample between the countries with which Italy has a longer-lasting trade relationship from those that have more recently become trade partners (Table 4.7), i.e. distinguishing between what Murat and Pistoiesi (2009) labelled "Old" and "New" Markets (Table 4.1), the above results find some further specification.

While the effect of immigrants results quantitatively similar in both the cases of New and Old markets, with a negative elasticity of ca. -0.07, suggesting that the negative effect is not substantially depending on the length of the trade partnership with the partner country, the effect of emigration is clearly different in the two cases. Towards Old markets, emigrants result to have an unambiguous trade-promoting effect which is mainly driven by increases in the extensive margin, compatibly with Peri and Requena-Silvente (2010) hypothesis that emigrants reduce the fixed costs of trade. The effect of emigration on the trade with New Markets, instead, results negative and (weakly) significant.

A tentative explanation of this result could be the following: the negative effect of immigration on trade is due to trade-substituting FDI, i.e. FDI oriented to gain market access. Market-access FDI can be promoted by immigrants as well as by emigrants, and, being a relatively knowledge-intensive activity, require a non negligible level of qualification and,

[20] While the Hausman test cannot be run on specifications with robust standard errors, a Hausman test was run on a specification with default standard errors and, not surprisingly, led to selecting the fixed effect specification. Assuming random effects seems inappropriate within trade models, where individual characteristics of the trading pairs are most likely to be associated with either the monadic terms or the bilateral trade costs, hence this option is not further explored

[21] The results are unreported here for brevity, but are available upon request. I would like to thank Giovanni Pegoretti for suggesting this additional ckeck.

Table 4.7: Regression results: OLS estimates on log-linear model. Old and New Markets

Dependent variable	$ln(X_{nit})$	$ln(NT_{nit})$	$ln(AVT_{nit})$
$ln(\text{Immi}_{nit}^{NM}+1)$	−0·0692∗	−0·057∗∗	−0·012
	(0·037)	(0·023)	(0·030)
$ln(\text{Emi}_{nit}^{NM}+1)$	−0·055∗	−0·025	−0·030
	(0·033)	(0·020)	(0·027)
$ln(\text{Immi}_{nit}^{OM}+1)$	−0·072	−0·035	−0·037
	(0·045)	(0·023)	(0·040)
$ln(\text{Emi}_{nit}^{OM}+1)$	0·101∗∗	0·090∗∗∗	0·011
	(0·050)	(0·032)	(0·044)
Const	15·20∗∗	5·986∗∗∗	9·215∗∗∗
	(0·345)	(0·175)	(0·324)
province-time effects	Yes	Yes	Yes
country-time effects	Yes	Yes	Yes
province-country effects	Yes	Yes	Yes
N	24250	24250	24250
r2	0·139	0·177	0·103

Clustered standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01

thus, are not especially depending with institutional similarity with the partner country. However, in the relation with Old markets, i.e. those which presumably host a larger population of Italian expatriates, the quantitative effect of the expatriates' preferences for home country products, is larger and more significant than the trade-substitution effect. Notice that, if this preference would focus on products with a lower value added, this could be the reason why, on aggregate, the effect of emigration on the intensive and the extensive margin result to mutually offset each other.

More generally, these results suggest that immigration and emigration networks operate through different dynamics. However, one could approach the issue differently and argue that any migrant linkages, in one direction or another, could promote trade, or, alternatively, that the net change in the stock of individuals able to create a bridge between the two countries matters more to trade than the stocks of immigrants and emigrants separately. Hence, in a series of unreported regressions, the migration variables were combined to check for interactions and net effects. Comparison of the related AIC support the interpretation that the two variables operate through different dynamics and no specific insight is drawn from their combination[22].

[22]The results are unreported here for brevity, but are available upon request. I would like to thank Francesco Quatraro for suggesting this additional check.

4.5.3 Province-level immigration shares

In table 4.8, the sample has been split into low immigration provinces, high immigration provinces and intermediate immigration provinces according to whether the total immigrant population is below the lowest 33%, above the highest 67% or between the two in the distribution of immigrant shares in Italian provinces.

Table 4.8: Regression results: OLS estimates on log-linear model. By province-level immigration shares

Dependent variable	$ln(X_{nit})$	$ln(NT_{nit})$	$ln(AVT_{nit})$
Low immigration shares			
$ln(\text{Immi}_{nit}+1)$	$-0{\cdot}143**$	$-0{\cdot}060*$	$-0{\cdot}082*$
	(0·058)	(0·032)	(0·049)
$ln(\text{Emi}_{nit}+1)$	0·085	0·057	0·029
	(0·068)	(0·036)	(0·058)
Intermediate immigration shares			
$ln(\text{Immi}_{nit}+1)$	0·037	$-0{\cdot}014$	0·051
	(0·044)	(0·025)	(0·036)
$ln(\text{Emi}_{nit}+1)$	$-0{\cdot}046$	$-0{\cdot}004$	$-0{\cdot}042$
	(0·038)	(0·027)	(0·038)
High immigration shares			
$ln(\text{Immi}_{nit}+1)$	$-0{\cdot}015$	$-0{\cdot}008$	$-0{\cdot}006$
	(0·034)	(0·022)	(0·028)
$ln(\text{Emi}_{nit}+1)$	0·008	$-0{\cdot}007$	0·015
	(0·023)	(0·014)	(0·019)

* p<0.1, ** p<0.05, *** p<0.01
Clustered standard errors in parentheses

The table shows that the negative coefficient of the log of immigration stocks resulting in the aggregate model is due to the combination of non-significant effects of immigration in intermediate and high immigration provinces with a relatively strong and significant negative effect of immigration in low-immigration provinces. The finding that, irrespective of the sign, the effect of immigrants on trade is stronger in low-immigration provinces is consistent with the findings on the Spanish case. It could imply that, either in a positive or in a trade-substituting direction, the effect of immigrants on trade is stronger in provinces with a comparatively low immigrant population. As the overall foreign immigrant population increases, immigrants may find it more profitable to establish import-substituting activities, in which they would have an advantage with respect to the native population,

in order to serve the tastes of the local immigrant population. To verify this hypothesis, however, it would be necessary to collect complementary evidence on the other side of trade as well, i.e. the import side.

4.5.4 Country and region-specific elasticities

In table 4.9 the immigration and emigration elasticities are allowed to vary by region. The immigration elasticities result negative and significant in most regions in the South of Italy (Abruzzo, Basilicata, Calabria, and Sicily), which are also marked by the lowest immigration rates, in coherence with the results of section 4.5.3. In addition to their low immigration shares, it must be noted that the Southern regions are the first landing destinations of many immigration routes coming from the African continent, thus low immigration shares and Southern regions may actually proxy for immigrants' length of stay. In the first phases of their migration experience, it may be more difficult to establish or to activate networks of relationships with co-ethnics, as found for example by Gould (1994) and Herander and Saavedra (2005). However, this mechanism would explain a non-significant effect more than a negative one.

Table 4.9: Regression results: OLS estimates on log-linear model. Region-specific elasticities

	Immigration elasticities				Emigration elasticities		
Dep. variable	$ln(X_{nit})$	$ln(NT_{nit})$	$ln(AVT_{nit})$		$ln(X_{nit})$	$ln(NT_{nit})$	$ln(AVT_{nit})$
Region				**Region**			
Abruzzo	−0·195**	−0·125**	−0·575	Basilicata	0·320	0·299*	0·008
	(0·090)	(0·054)	(0·075)		(0·252)	(0·149)	(0·166)
Basilicata	−0·265*	0·006	−0·271**	Lazio	−0·292**	−0·083	−0·206**
	(0·161)	(0·087)	(0·135)		(0·131)	(0·061)	(0·091)
Calabria	−0·324***	−0·194***	−0·112	Liguria	−0·271***	−0·069	−0·195**
	(0·114)	(0·069)	(0·104)		(0·090)	(0·108)	(0·080)
Campania	0·112	0·085**	0·022	Sardegna	−0·018	0·069**	−0·0856**
	(0·069)	(0·039)	(0·075)		(0·040)	(0·028)	(0·040)
Emilia Romagna	−0·006	0·112***	−0·116**	Trentino/A. Adige	0·133	0·187***	−0·054
	(0·052)	(0·041)	(0·047)		(0·111)	(0·070)	(0·089)
Sicilia	−0·211***	−0·131***	−0·069	Valle d'Aosta	−0·655***	0·093	−0·758***
	(0·081)	(0·039)	(0·062)		(0·253)	(0·175)	(0·263)
Valle d'Aosta	0·347	0·232*	0·096				
	(0·301)	(0·138)	(0·227)				

* p<0.1, ** p<0.05, *** p<0.01

Clustered standard errors in parentheses

Note: For brevity, only the results for regions with significant immigration or emigration coefficients are reported.

Thus, again, a possible explanation could be that, in low-immigration regions, the export-substitution effect operates more strongly because of the absence of other significant op-

portunities of import-substitution.

The region of Campania, where a positive effect of immigrants is identified at the level of the extensive margin, is an exception in this framework which should be carefully interpreted. The importance of the Naples harbor for international trade flows may account for this in the sense of increasing the number of transactions registered as exports from the province of Naples while their production location is different: reporting issues and the use of warehouses may account for this (Head and Mayer, 2014). On the other hand, geographic agglomeration of trade-relevant activities *per se* is likely to reduce the transaction costs of trade and enhance the potential trade promoting effect of immigrants.

Besides Southern regions, the immigrant stocks result to promote an increase in the extensive margin but a decrease in the intensive margin in the case of Emilia Romagna and a weakly significant increase in the extensive margin in the case of Valle d'Aosta.

As regards emigration, the region-specific elasticities result very heterogeneous across regions, with strong variation within the same geographic macroareas; in the regions for which the effect of emigration on trade values results negative (Lazio, Liguria, Valle d'Aosta) the emigrant effect results to operate through reductions of the intensive margin, which implies that emigrants shift the exports mix towards lower-value added goods. Emigration results to promote trade in the cases of Basilicata, Trentino Alto Adige and Sardegna, while in the latter case the effect is offset by a reduction in the intensive margin of trade.

Table 4.10 shows that the individual-country dynamics are quite differentiated, while they largely mirror the results found when testing for the role of the length of trade partnerships. The negative effect of immigration on the trade with New Markets is mainly driven by the significant and negative effects found for some key "New markets" such as Bulgaria, China, Croatia and Tunisia. The country-specific elasticities of trade to immigration, when they are significant, are negative, with the single exception of Argentina. The evidence is more mixed on the emigration side, where the trade elasticities to emigration result positive for Australia, Switzerland, Greece, Spain, Sweden and and UK, and negative for Denmark, South Africa, USA, Hungary, Japan and Slovenia; where significant, the coefficients result negative for most "New Markets". Overall, the explanation for the mutually countervailing effects on the intensive and extensive margins found in table seem 4.7 not to be explained by specificities at the country level. As we will see in the next section, the explanation is more likely found in the sectoral composition of the exports.

4.5.5 The effect of technological intensity

Table 4.11 report the results of the regressions run separately by different levels of technological intensity of firms' sectors. The tables show that the effects of emigrant networks are positive on the low-tech sectors only. These results are consistent with the interpretation

Table 4.10: Regression results: OLS estimates on log-linear model. Country-specific elasticities

	Immigration elasticities				Emigration elasticities		
Dep. variable	$ln(X_{nit})$	$ln(NT_{nit})$	$ln(AVT_{nit})$		$ln(X_{nit})$	$ln(NT_{nit})$	$ln(AVT_{nit})$
Country				**Country**			
Old Markets				*Old Markets*			
Argentina	0·161	0·414**	−0·253	Argentina	0·181	−0·456**	0·638
	(0·318)	(0·173)	(0·309)		(0·428)	(0·199)	(0·541)
Ireland	−0·339*	0·062	−0·400***	Australia	0·502***	0·339***	0·163**
	(0·184)	(0·118)	(0·152)		(0·082)	(0·051)	(0·067)
Spain	−(0·009	−0·406***	0·396*	Switzerland	0·316***	0·088	0·228***
	(0·225)	(0·114)	(0·206)		(0·112)	(0·130)	(0·059)
USA	−0·100	−0·240**	0·140	Chile	0·197	−0·266**	0·463***
	(0·217)	(0·113)	(0·168)		(0·197)	(0·129)	(0·166)
South Africa	0·127	−0·124	0·139 * *	Denmark	−0·243**	0·0263	−0·269***
	(0·097)	(0·059)	(0·062)		(0·118)	(0·068)	(0·101)
				Greece	0·365**	−0·371**	0·006
					(0·170)	(0·155)	(0·090)
				Netherlands	0·110	0·265***	−0·155**
					(0·069)	(0·052)	(0·066)
				South Africa	−0·570***	−0·260***	−0·310***
					(0·128)	(0·061)	(0·104)
				Spain	0·142*	0·124***	0·018
					(0·084)	(0·048)	(0·083)
				Sweden	1·076*	0·263	0·813*
					(0·598)	(0·261)	(0·417)
				UK	0·154***	0·028	0·126
					(0·067)	(0·063)	(0·088)
				USA	−0·840***	−0·151***	−0·690***
					(0·120)	(0·053)	(0·103)
New Markets				*New Markets*			
Bulgaria	−0·486**	−0·302	−0·184	Hungary	−0·295**	−0·100	0·194
	(0·209)	(0·261)	(0·117)		(0·127)	(0·095)	(0·119)
China	−0·520	0·030	−0·550 * *	Indonesia	−0·114	−0·163**	0·049
	(0·364)	(0·214)	(0·255)		(0·116)	(0·077)	(0·082)
Croatia	−0·248***	−0·042	0·207 * *	Japan	−0·180**	−0·022	−0·157*
	(0·101)	(0·096)	(0·087)		(0·086)	(0·059)	(0·081)
Romania	−0·014	−0·260***	0·246*	South Korea	−0·084	−0·152***	0·068
	(0·161)	(0·079)	(0·140)		(0·123)	(0·058)	(0·109)
Singapore	0·080	−0·146**	0·226*	Slovakia	0·085	0·165**	−0·080
	(0·141)	(0·062)	(0·115)		(0·161)	(0·083)	(0·121)
Tunisia	−1·504*	−0·776	−0·728 * *	Slovenia	−0·190**	0·017	−0·207*
	(0·836)	(0·693)	(0·331)		(0·095)	(0·072)	(0·116)

Clustered standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01.
Note: For brevity, the table only reports the countries whose estimated coefficients result significant at least at a 5% significance level.

that emigrants mainly promote trade in lower-value added sectors (which are proxied here

as low-tech sectors).

Table 4.11: Regression results: OLS estimates on log-linear model by technological intensity in manufacturing

	Manufacturing sector					
	High-tech manufacturing			Mid-high-tech manufacturing		
Dependent variable	$ln(X_{nit})$	$ln(NT_{nit})$	$ln(AVT_{nit})$	$ln(X_{nit})$	$ln(NT_{nit})$	$ln(AVT_{nit})$
$ln(\text{Immi}_{nit}+1)$	−0·064	−0·047	−0·005	0·008	−0·023	0·025
	(0·077)	(0·029)	(0·063)	(0·055)	(0·026)	(0·034)
$ln(\text{Emi}_{nit}+1)$	0·038	−0·022	0·061	0·019	0·020	−0·005
	(0·054)	(0·023)	(0·042)	(0·043)	(0·021)	(0·031)
NID	0·156	0·032	0·105	0·226*	−0·043	0·176**
	(0·151)	(0·060)	(0·121)	(0·102)	(0·049)	(0·083)
NED	0·094	0·014	0·080	0·027	0·004	0·031
	(0·123)	(0·049)	(0·090)	(0·083)	(0·039)	(0·067)
Const	11·51***	2·911***	9·077***	13·16***	3·729***	9·515***
	(0·657)	(0·318)	(0·465)	(0·289)	(0·238)	(0·227)
N	18682	18682	18682	20726	20726	20726
r2	0·121	0·250	0·098	0·099	0·125	0·081
AIC	52563·5	17798·6	44526·3	50010·2	17605·3	40338·3
	Mid-low tech manufacturing			Low-tech manufacturing		
Dependent variable	$ln(X_{nit})$	$ln(NT_{nit})$	$ln(AVT_{nit})$	$ln(X_{nit})$	$ln(NT_{nit})$	$ln(AVT_{nit})$
$ln(\text{Immi}_{nit}+1)$	−0·013	0·008	−0·021	−0·038	−0·011	−0·027
	(0·045)	(0·022)	(0·035)	(0·039)	(0·023)	(0·028)
$ln(\text{Emi}_{nit}+1)$	−0·021	−0·016	−0·007	0·0575*	0·0312*	0·026
	(0·045)	(0·023)	(0·030)	(0·031)	(0·018)	(0·022)
NID	0·022	−0·040	0·057	0·023	0·019	0·010
	(0·111)	(0·047)	(0·084)	(0·080)	(0·046)	(0·056)
NED	−0·178**	−0·033	−0·149 * *	0·044	0·015	0·030
	(0·078)	(0·037)	(0·057)	(0·058)	(0·035)	(0·039)
Const	14·030***	4·466***	9·661***	14·05***	5·003***	9·112***
	(0·274)	(0·139)	(0·229)	(0·196)	(0·115)	(0·142)
N	22539	22539	22539	22539	22539	22539
r2	0·107	0·151	0·080	0·108	0·151	0·086
AIC	52267·4	13693·7	43064·8	40761	14798·4	27154·4

* p<0.1, ** p<0.05, *** p<0.01

Clustered robust standard errors in parentheses

In the high-tech sectors, no significant effects of migration stocks, either immigrants nor emigrants, can be identified. Here, the explanation that other dynamics than immigration account for trade seems appropriate: high-tech firms are likely to be comparatively highly productive; transactions are likely to rely on highly skilled partnerships in a highly glob-

alized market. The scope for trade facilitation through co-ethnic networks is likely to be limited: while high-tech goods are likely to be highly differentiated, the information content is not necessarily more accessible to immigrants or emigrants as it is likely not to be so much culture-related but rather related to highly complex and product-specific knowledge. Transnational communities of practice, not necessarily mediated by regular physical proximity (Breschi and Lissoni, 2001), are likely to play a stronger role in mediating exports. Similar arguments can apply to mid-high tech sectors.

As regards the manufacturing of goods with low levels of technology, the usual explanations in the migration-trade literature seem to apply to expatriates networks. By low levels of technology, higher emigration stocks result to positively affect the number of transactions as well as trade volumes (though with significance levels of 10% only). The effect of emigrants in promoting low-tech exports, however, is stronger towards "Old markets"[23], as hypothesized before: the elasticity of trade value to emigrant stocks is 0.099 and is significant at the 5% probability level; the elasticity of the number of transactions to emigration stocks is 0.083 and is significant at the 5% probability level. Overall, there is some evidence of a positive effect of emigration in promoting exports in the lower-tech ends of manufacturing, which by the way correspond to the *Made in Italy* sectors, and especially towards countries that are established trade partners. As found by Peri and Requena-Silvente (2010) for immigrants in Spain, the network effect results to affect trade only through the extensive margin; this is compatible with a reduction in the fixed costs of trade. Hence, while no proper "network effect" could be attributed to immigrants in any of the manufacturing sectors, expatriates would promote trade mainly by reducing the fixed costs of trade and opening up new business transactions in the low-tech industry.

4.5.6 Product differentiation

While the results presented seem to be consistent with the interpretation that immigration has the effect of substituting trade with FDI, while emigration promotes trade mainly due to the demand for lower-tech goods in Old Markets, it is not quite clear why the effect of immigrant networks should be so skewed towards import-substitution and not to export promotion, which applies to the majority of other countries that have been studied in the literature. The results provided in table 4.12 suggest that the answer may be found in Italian production structure.

Table 4.12 reports the coefficients of $ln(\text{Immi}_{nit}+1)$ and $ln(\text{Emi}_{nit}+1)$ for different levels of product differentiation, classified according to Rauch (1999) conservative classification (differentiated, reference-priced and homogeneous goods). Precisely where the literature predicts a stronger trade-promoting effect by immigrants, i.e. by highly differentiated goods, our estimates find a stronger trade-diverting effect of immigration.

[23]The relevant table of results is unreported for brevity but available upon request

Table 4.12: Regression results: OLS estimates on log-linear model. Product differentiation

Dependent variable	$ln(X_{nit})$	$ln(NT_{nit})$	$ln(AVT_{nit})$
All goods			
$ln(\text{Immi}_{nit}+1)$	−0·070***	−0·049***	−0·021
	(0·031)	(0·018)	(0·025)
$ln(\text{Emi}_{nit}+1)$	0·027	0·036 * *	−0·008 * *
	(0·031)	(0·021)	(0·026)
Differentiated goods			
$ln(\text{Immi}_{nit}+1)$	−0·0878**	−0·0539**	−0·034
	(0·035)	(0·021)	(0·027)
$ln(\text{Emi}_{nit}+1)$	0·012	0·007	0·005
	(0·026)	(0·019)	(0·025)
Reference-priced goods			
$ln(\text{Immi}_{nit}+1)$	−0·030	0·009	0·124
	(0·045)	(0·027)	(0·032)
$ln(\text{Emi}_{nit}+1)$	0·078*	0·069 * *	−0·009
	(0·040)	(0·030)	(0·030)
Homogeneous goods			
$ln(\text{Immi}_{nit}+1)$	0·123	−0·001	0·124
	(0·118)	(0·064)	(0·099)
$ln(\text{Emi}_{nit}+1)$	−0·014	−0·012	−0·002
	(0·062)	(0·036)	(0·044)

Clustered standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01

The greater informational content embodied in differentiated products, which according to Rauch and Trinidade (2002) constitutes an informal trade barrier which immigrants are able to overcome, is associated in our estimates with a stronger and statistically significant negative effect of immigration. Again, the effect of immigration on trade value is mainly channelled through a reduction in the number of transactions. The effect of immigrants is found to be stronger on more differentiated products, as predicted by the literature, but in the opposite direction. Immigrants are found to play a statistically significant role in the substitution of exports in differentiated goods. All the *Made in Italy* sectors are included in this subgroup. Italian production structure has historically been marked by highly export-oriented firms specialized precisely in these sectors. Hence, one could argue that, *ceteris paribus*, immigrants' information effect makes a greater difference in promoting FDI rather than in promoting exports, and drives estimates to the negative domain.

Instead, emigrants' trade-substitution effects in the *Made in Italy* sectors are overall offset by non-redundant contributions to trade driven by their preference effect. This interpretation is supported by the results found for reference-priced goods. A "reference price" is defined by Rauch (1999) as "*a price that is quoted without mentioning a brand name or other producer identification. Commodities that possess reference prices are taken to*

be sufficiently homogeneous that if traders see the price differential between two countries' markets is large enough to cover customs and transport costs, they know it is profitable to ship the product." (p.1187). The estimates reveal that a 10% increase in emigration would generate an increase in the trade of reference-priced goods by approximately 0.7%. If the horizontal FDI promoted by immigrants are associated with complementary trade of intermediate goods, this trade is most likely to fall to a large extent into the reference-priced category. And emigrants result having a positive effect in promoting trade precisely in these goods.

4.6 Discussion and Conclusions

In this chapter, a theory-consistent gravity model linking immigration and emigration to trade has been tested for the Italian case; the structure of the data allowed disaggregating trade values into the intensive margin and extensive margins. Poisson and OLS estimation methods have been confronted based on the procedures suggested by Head and Mayer (2014) and Santos-Silva and Tenreyro (2006). The analysis led to concluding that OLS is a preferrable estimator for the data at stake. As in Chapter 3, the Poisson PML estimator applied to the model including the three set of theory-consistent fixed effects led to radically different estimates than the OLS, it revealed convergence problems and resulted affected by omitted variable bias. Its usefulness as a "workhorse" for gravity equation seems questionable.

In spite of the large differences in the coefficients, neither of the two estimators led to identifying a positive effect of immigration on trade and both resulted in a few negative coefficients. The efficiency of the estimates performed on the full sample of countries resulted very low; for this reason and for convergence problems in the Poisson estimator, the chapter reports the estimates that relate to the main "New" and "Old" markets of Italian trade according to Murat and Pistoiesi (2009). Thus, the results summarized here should be taken as representative for the subsample of countries listed in table 4.1 only, and should be considered in the light of the peculiar period to which the data refer, i.e. the five-year period immediately preceding and following the burst of the global financial crisis. A further caveat relates to the fact that, while the OLS estimates resulted preferable to the Poisson, the estimates on total trade were found to be affected by heteroskedasticity, so the estimates could be affected by some bias - yet, the evidence for heteroskedasticity in the specifications on the extensive margins of trade as dependent variables was much less strong. Furthermore, the high number of fixed effects included is likely to mitigate this effect in practice.

With these caveats, the estimates in the basic specification report a negative effect of immigration on total trade mainly driven by a negative effect of immigration on the extensive

margin of trade. The effect is stronger, but negative, for differentiated products. As in the case of Spain, the effect is stronger for provinces with lower immigration shares. Hence, the channels through which the immigrants' effect operates are compatible with the predictions of the literature and with the findings on the Spanish case; however, they operate in the direction of reducing rather than increasing trade.

Dunlevy and Hutchinson (1999) have hypothesized that negative effects on trade depend on trade-substitution dynamics. However, the channel suggested by them, i.e. the establishment of import-substituting activities, cannot apply to explaining a trade-substituting effect on exports. Hence, this paper proposes two additional mechanisms which could account for such a negative effect. First, taking into account that immigrants are often assumed to be relatively less skilled than natives in economic models (De Arcangelis et al., 2014; Accetturo et al., 2012), their lower skills could account for a reduction in productivity in firms, which would decrease the ability of firms to reach the productive threshold required for exports and thus have the effect of destroying trade opportunities. The second possible explanation explores the dimension of trade substitution, proposing that the same information-brokering mechanisms that account for immigrants' effects on trade could also facilitate horizontal FDI initiatives promoting market access, rather than trade. The salience of the immigration effect on the internationalization of Italian provinces could be greater in relation to FDI, rather than to trade, given the peculiarly low reliance of Italian firms on FDI.

The two interpretations imply different channels through which the immigrants' effect operates. The former implies that immigrants' effects, beyond the trade costs term, affects the productive capacity of provinces and thus goes through the exporters' "monadic" term. The latter goes exclusively through the trade costs term and should display a similarly stronger role by greater product differentiation as the standard information effect.

The findings show that the immigrants' effect goes primarily through the trade cost channel, but some change occurring in the magnitude of the estimates when manipulating the level at which the time-varying exporter effects are included suggests that there may be some interaction between immigration and the province exporting capacity.

The effect of immigrants on trade proceeds mainly through the extensive margin of trade as in Peri and Requena-Silvente (2010), though in the opposite direction, i.e. by reducing the number of transactions. Compatibly with the information effect, the effect is found to be stronger for more differentiated products. The stronger (negative) effect on the trade of differentiated goods is found to associate with trade complementarities with reference-priced goods, most likely to represent the intermediate goods required in the foreign plants, in line with Markusen (1984); these exports are mainly driven by expatriates' trade-facilitation effects. In turn, the latter seems to apply more strongly to the trade with relatively recent trade partners, i.e. those countries where production outsourcing motives are more likely to be coupled with market access motives. Indeed, the country-specific elasticities

show that the information effect is stronger in the trade with key new trade partners like Bulgaria, China and Croatia. If one could confirm that immigrants promote FDI not just for market access but also for production outsourcing, the policy implications could be important.

Being a relatively knowledge-intensive activity, FDI require a non negligible level of qualification. Accordingly, they are not especially depending on the institutional similarity with the partner country and the magnitudes of the trade-substituting immigration effect do not significantly change when New markets are distinguished from Old markets. The distinction, however, is relevant when expatriates are considered. Indeed, towards New markets, emigrants' effect on trade is negative as well as the immigrants' effect. Instead, in the relation with Old markets, i.e. those which presumably host a larger population of Italian expatriates, the quantitative effect of the expatriates' preferences for home country products is larger and more significant than the trade-substitution effect. Indeed, the effect of emigrants on the trade with old markets becomes positive and significant and of a magnitude of ca. 0.10, comparable with the findings of other studies on the migration-trade link and with those of the chapter on Spain.

This increase in trade flows, also due to a reduction in the fixed costs of trade, is concentrated in the lower-tech export sectors, and it contributes to *ceteris paribus* reduce the average value per transaction with overall neutral effects on total trade value.

The proposed explanation is only tentative and should be subject to a more rigorous test including controls for FDI. If confirmed, it would support a quite novel finding for the migration-trade link literature. Unfortunately, it was not possible to include controls for FDI in the present work as access to outward FDI data disaggregated by province and destination country is restricted on confidentiality grounds.

What certainly emerges from comparing the findings in this chapter with those in the previous one is that there are country-level specificities that account for quite different economic effects of immigration in Italy compared with Spain. As suggested above, the low reliance of Italian firms on FDI could account for these differences. Another possible interpretation for the different patterns of immigrants' contribution to internationalization is in terms of the cultural composition of Italian and Spanish immigrants' population: while Spanish immigrant population is mainly composed of EU, Latin-American and Moroccan immigrants, the Italian immigrant population is characterized by *super-diversity* (Bratti et al., 2014; Vertovec, 2007), i.e. a complexity of "new, small and scattered, multiple-origin, transnationally connected, socio-economically differentiated and legally stratified immigrants who have arrived over the last decade"(Vertovec, 2007, p.1024). In the Spanish case, the commonality of language was found to magnify the immigrants' information effect. In the Italian case, the lack of a common language could be seen as a factor that leads to reducing the ability of immigrants to exert a trade-facilitation effect - while it should not *per se* destroy trade opportunities. However, comparatively greater cultural

distance from the native population of immigrants in Italy than in Spain associates with higher costs of long-distance export transactions and strengthens the incentives for establishing plants abroad. Greater cultural distance could in other words increase the relative advantages from being proximate to the destination markets with respect to concentrating the production activities in Italy (Markusen, 1984, cfr. the proximity-concentration trade off in) and motivate a stronger reliance on market-access FDI in the immigrants' countries of origin with respect to exports.

A more detailed discussion of the main directions for future research in this regard is proposed in chapter 9.

Part II

Migration flows and the reorganization of local production systems

Chapter 5

Immigration in local production systems: theoretical background and methodology

5.1 Introduction

Local systems in Italy and Spain have in the last decades seen unprecedented increases in the immigrant population which, in some cases, have contributed to the reorganization of local production processes (such as in the cases of Prato and Carpi in Italy and of Elche in Spain). Immigration flows have contributed to redefining the local production specialization even in what has been defined as an "exemplary case" of the industrial district as Prato (Becattini, 2001; Dei Ottati, 2009a,b). Industrial districts and local agglomerations of firms, generating labour demand in labour-intensive manufacturing, attract high shares of the immigrant population (Zanfrini, 2004; Murat and Paba, 2003; Barberis, 2008). The previous part of the thesis has highlighted that, at least in the Spanish case, there is a potential for immigrants to contribute to the internationalization of provinces. The findings on the Italian case were not conclusive but suggest that the effect of immigration on trade in Italy is at least not neutral. We have suggested that the interpretation that immigrants promote FDI is the one that best suits the data.

Becattini (1990) has defined the industrial district as "a socio-territorial entity which is characterized by the active presence of both a community of people and a population of firms in one naturally and historically bounded area"(p.38). Considering that an important component of the districts' comparative advantage is considered to derive from the widespread trust and predictability in transactions derived from cultural homogeneity and

frequent interactions, the inflow of a culturally different labour force into such systems is likely to have not only social but also economic implications (Mistri, 2001; Costa and Kahn, 2001; Alesina and Ferrara, 2000; Alesina and La Ferrara, 2002). Zanfrini (2004) has envisaged immigration as a factor that contributes to the end of the industrial district development model. On the other side, academic literature on immigration has highlighted different benefits that local firms could draw from a diverse labour force: these range from labour cost savings to increased innovation and creativity and to easier access to foreign markets. These factors could actually contribute to improving the districts' ability to upgrade and better face global competition. In spite of the challenges faced by the district model for development, district-like production structures remain important components of the economic structures in both Italy and Spain. Thus, the issue has also policy-relevant social and economic implications.

In particular, the districts' capacity to reap the benefits from diversity is likely to depend on the extent by which immigrants access the core of the local industry (Barberis, 2008) or are confined in the relatively self-contained *ethnic business* (Waldinger et al., 1990). This in turn is related to the extent of the embeddedness of the local production system into the social structure (Granovetter, 1985).

Pursuing the main research question of whether immigrants' can contribute to internationalization and innovation in the host local production systems, this part of the thesis focuses on the employers' perceptions about the benefits that local firms can derive from employing foreign workers. In particular, it investigates whether local employers recognize the potential role of immigrants as brokers in international transactions or whether they rather resort to immigrants as labour replacement. Because the value that the firm attributes to diversity is likely to depend on its knowledge intensity and openness to external knowledge and business, we focus on whether this recognition depends on firms' characteristics. This leads to the first two research questions of this part of the thesis:

- ***RQ1: What firms' characteristics are associated with greater immigrant shares in the workforce?***
- ***RQ2: What are the main reasons for hiring immigrants in local manufacturing firms?***

We see two ways through which immigrants may be enabled to play a role in the internationalization and innovation of local systems. One way may be that the advantages deriving from cultural heterogeneity among employees are an actively pursued value added by employers. The social capital of immigrants and in particular their access to co-ethnic networks may be among the reasons leading entrepreneurs to employ them: as seen in part I, these can actively reduce transaction costs in international business.

If employers do not explicitly pursue access to immigrants' social capital when hiring them, these can still play a role in promoting internationalization and innovation of the district if

they have access to the core sectors and are not confined in the lower-skilled manual tasks. This is more likely to occur if immigrants enter the local systems' networks, adapt to the key elements of the local culture and values and correspond to the reciprocity expectations of the local system's actors (cfr. Barberis, 2008). Once they have gained access to the core sectors of the local system's production, the distinctiveness (Williams, 2007) of the transnational dimension of their knowledge can emerge. In other words, immigrants may be able to exert a positive role on internationalization and innovation once some degree of homogeneity in their human and social capital with respect to the natives' is ensured (see also Boschma, 2005, on organizational proximity). These considerations lead to the third research question of this part of the thesis:

- ***RQ3: Do local entrepreneurs pursue homogeneity or heterogeneity in the social capital when hiring immigrants?***

The last question shifts the focus from the level of the firm to the level of the local system, and relates to the interaction of local social capital, considered in the literature to facilitate local economic transactions (Becattini and Rullani, 1993; Trigilia, 2001), and the role of immigrants in promoting internationalization and innovation. It may be that it is not only the presence of social capital, but the type of social capital that affects immigrants' capacity to promote trade.

- ***RQ4: How does local social capital interact with immigrants' capacity to promote internationalization and innovation?***

The theoretical framework for answering the above questions is discussed more in details in section 5.2.

As we will see, the study explores "how" and "why" questions, i.e. the more and the less quantitatively apparent modalities of the economic integration of immigration in local systems, and it looks at an issue that is highly context-specific. For this reason, following Yin (2003), it was decided to opt for case study analysis, as we will discuss in section 5.3. The chosen case studies, one in Italy and one in Spain, refer to prominent mechanic clusters in their respective economies: the cluster of Elgoibar in the Basque Country in Spain and the industrial district of Reggio Emilia in Emilia-Romagna in Italy. The study has been conceived as a multi-method study (Yin, 2003) in order to capitalize on the insights deriving from the integration of quantitative analysis based on firm-level survey data with qualitative interviews collected in two local contexts.

The research focuses on the manufacturing sector, which on the one hand is a less obvious sector for immigrants to get involved in and on the other hand is more representative of the production core of industrial districts of both Italy and Spain. Both the selected districts are characterized by peculiarly high employment concentration in the manufacturing sector, and in particular in mechanic works, and are located in regions that are strongly marked by this specialization (Boix and Trullén, 2010; Bigarelli and Russo, 2012). The production

of machine tools and mechanic equipment is the main specialization in both Reggio Emilia and Elgoibar. Both regions and local systems are also characterized by comparatively high per capita income levels with respect to the national average. We will deal with immigrant workers in general and will not limit the analysis to immigrant entrepreneurs. The choice of the case studies is motivated more in details in section 5.4.

5.2 Immigration in industrial districts: theoretical framework

Among the peculiarities of industrial districts is the compenetration of a production structure with a network of social relations and values (Becattini, 1990). In its classical definition, the industrial district is described as a local agglomeration of small and medium-sized enterprises where firms specialise in different production phases of a core industry. This leads to economies of scale and scope that are external to the firm but internal to the district. Geographical proximity among firms allows for repeated interactions and the arising of trust; the interaction between the social, institutional and economic sphere allows contextualised, and often tacit, knowledge to dynamically integrate with codified and technical knowledge (Becattini, 1990). Tacit knowledge is mainly shaped by firms' individual experiences and by the related reflection process, by the firms' production routines, relationships and by the sharing of norms and rules (Belussi et al., 2008, p.186). The interaction of proximity, interdependent production and tacit and codified exchanges leads to collective learning processes. Production knowledge becomes a collective good diffused "in the air" in what Marshall (1890) has called "industrial atmosphere" .

Networks of specialised producers can be seen as distinctive governance solutions, intermediate between market and hierarchy, to minimise transaction costs while allowing for informal exchange of knowledge and know-how, and for a rapid way to create connections without formalizing them (Powell, 1990). The vertical disintegration of production phases, coordinated in flexible specialization systems, allows for a "light" governance solution maintained dynamic and able to rapidly adapt to changing economic conditions by persisting competitive pressures (see Piore and Sabel, 1984). The repeated interactions and long-lasting relationships occurring in inter-firm networks, together with a common business culture and the sharing of common social spaces, generate cooperative solutions, trust and predictability in the transactions at the local level (Powell, 1990). This emphasis on the social relationships in shaping the way economic transactions are carried out makes the industrial district paradigm closely linked with the sociological literature on embeddedness (Granovetter, 1985).

In the face of globalisation, industrial districts are faced with the challenge to valorise the local production tradition while accessing new markets. This requires focussing on quality

production and educating consumers to variety, but also increasing capabilities at the local level, resorting to ICT and intermediaries (Chiesa et al., 2004).

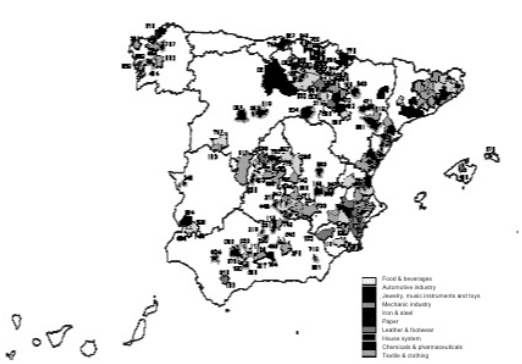
More recent works inspired by evolutionary theory assume heterogeneity in knowledge among boundedly-rational actors instead of a homogeneous knowledge endowment and "fuzzy social relationships and ill-defined spillover mechanisms as the basis of knowledge flows and learning processes within territory-bounded communities" (Giuliani and Bell, 2005, p.48). Firms' knowledge depends on a complex and path dependent process of cumulative learning (Dosi, 1997). Some actors, thus, will have a wider knowledge base, which will co-determine their capacity of absorbing wider knowledge from external actors and of applying it to commercial ends (Cohen and Levinthal, 1990). Knowledge will concentrate in firms with higher "absorptive capacity", and will circulate and be reproduced mostly within "epistemic communities" (Breschi and Lissoni, 2001) and "communities of practice" (see Belussi et al., 2008, on the use of the concept in industrial districts).

Firms also behave differently depending on their cognitive role within a cluster (Giuliani and Bell, 2005). Some firms, i.e. the "technological gatekeepers" (Allen, 1977; Cohen and Levinthal, 1990; Giuliani and Bell, 2005) are more able to access external and codified knowledge and to canalyze it into the local system. The extent to which they access and apply external and codified knowledge is likely to affect the type of gains they can derive from a cognitively diverse workforce.

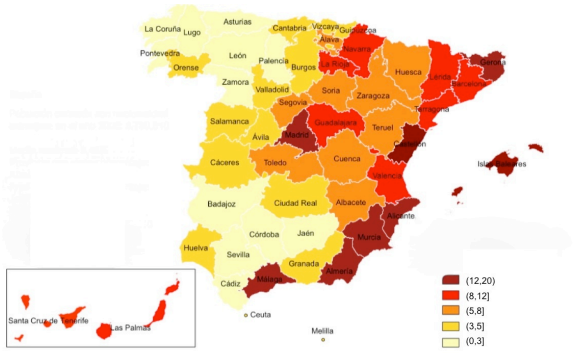
Portes and Bach (1985) noticed that immigrants' employment is characterized by a "segmented assimilation", i.e. a polarization between employment opportunities in high skilled tasks leading to high status and power for some immigrants, and low-skilled, manual, even "dirty, dangerous and demanding tasks" for others. Abella et al. (1994) emphasize that immigration mainly provides replacement labour force substituting native workers in low-skilled manual jobs in the manufacturing sector that natives are reluctant to accept[1]. Indeed, in Italy, industrial districts providing job opportunities in manual and mid-low-qualified tasks have been found to constitute popular destinations for labour immigrants (Murat and Paba, 2003). In Italy, the prevalence of small and medium-sized firms with a labour-intensive production core has in the last decades contributed to relatively scattered residential pattens of immigrants in a number of small-sized industrial areas (Zanfrini, 2004; Ambrosini, 1999)[2]. In Spain, the analysis of case study literature on immigration in industrial districts (Cachón Rodriguez, 2005; Narotzky, 2006; Viruela Martínez and Bernat

[1] Piore (1980), synthesizing studies on labour migrations, has noted that industrial societies systematically generate a variety of scarcely secure jobs, with limited promotion opportunities and limited stance. With the development process of industrialized countries, native full-time workers increasingly refuse to enrol in such jobs, or only accept them in especially difficult times. Thus, an important determinant of migration flows is the development process of the industrialized countries, especially the number and the characteristics of the available workplaces.

[2] An extensive analysis of immigration in Italian industrial districts is provided in Barberis (2008); such a comprehensive treatment for the Spanish case is lacking.



(a) Industrial Districts in Spain.
Source: Boix and Trullén (2010)



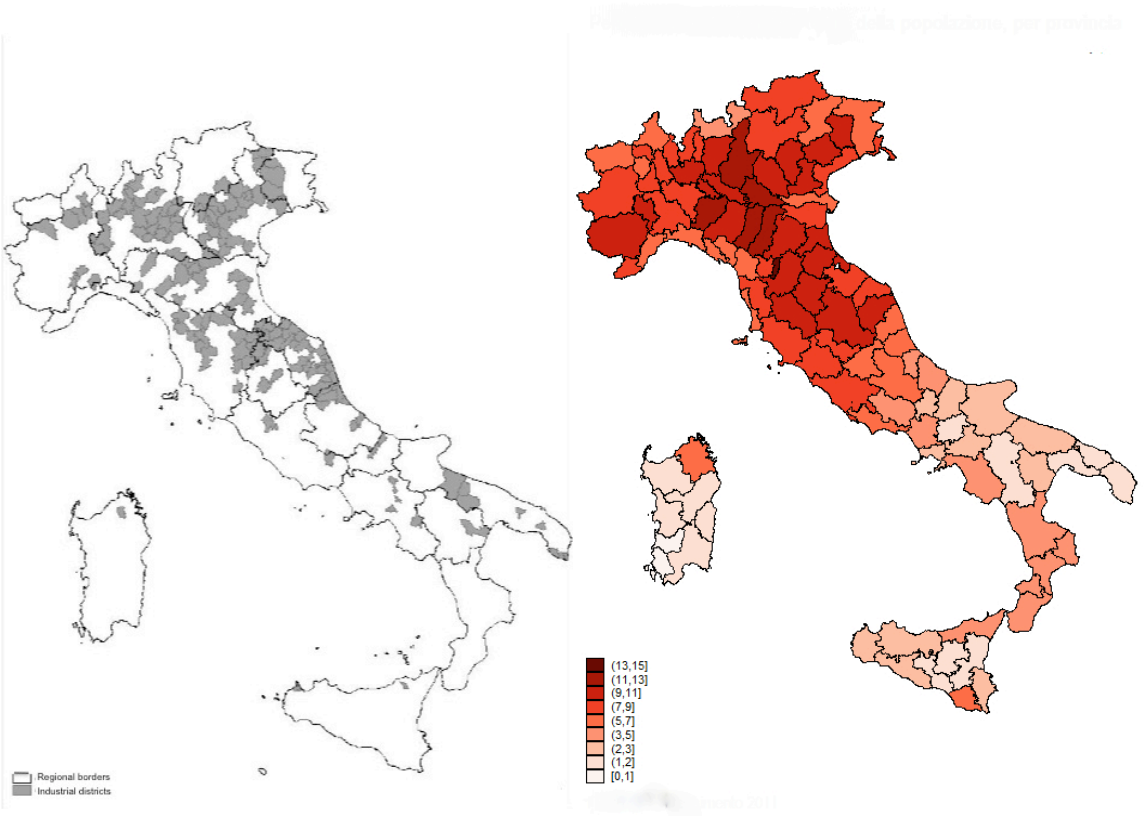
(b) Immigrants as a share of total province population.
Source: INE (2005)

Figure 5.1: Immigrants and industrial districts in Spain.

Martí, 2013) suggests that similar dynamics apply. This interpretation is reinforced when comparing the map of industrial districts in Boix and Trullén (2010) with the one on immigrants' concentration by province (INE, 2005; cfr. fig. 5.1 with fig. 5.2).

The Italian academic literature has mainly seen immigration as one of the possible survival strategies for district firms facing the reluctance of the native workforce and the effect of structural change on local economies: according to this literature, immigrants have supplied low-cost labour to core and contractor industries which would have otherwise had to offshore production or undergo substantial restructuring to upgrade to higher-value added phases of the value chain (Zanfrini, 2004; Murat and Paba, 2003; Gavosto et al., 1999; Venturini, 1992). Immigration uniquely allows maintaining control over production within the local areas while at the same time remaining competitive on costs (Stocchiero, 2009). In this sense, some authors (Venturini, 1992; Murat and Paba, 2003) have envisaged a threat to district competitiveness and to the development of local human resources and innovation capacity. The causal relationship could also be reversed. Highly locally-embedded firms that are unable to offshore due to their dependence upon local relationships, and local firms that are unable to innovate due to lack of human and financial resources could be seen to have no other options but hiring immigrants to keep costs under control (Barberis, 2008; Failla, 1993). In all cases, immigration would be negatively associated with innovation and internationalization. Accetturo et al. (2012) show that, in the short term, immigration could even lower productivity: the low levels of qualification of immigrant labour force draw productivity down and need to be complemented by increases in capital expenditures.

Furthermore, it could be argued that immigrants are more likely than natives to remain excluded from tacit knowledge flows within local collaborative networks or within firms.



(a) Industrial Districts in Italy.
Source: ISTAT (2005a)

(b) Immigrants as a share of total province population.
Source: ISTAT(2011)

Figure 5.2: Immigrants and industrial districts in Italy

On the one hand, access to local knowledge may entail comparatively higher costs for immigrants. If firms are embedded in networks where flows of knowledge have a strong tacit component, there may be barriers for immigrants to participate in such networks, at least in the short run. Williams (2007), based on Blackler (2003) taxonomy of knowledge[3], argues that there are types of knowledge which are more difficult to acquire by immigrants than by natives. These relate to having experienced physical presence in a given locality, and are referred to as *encultured* and *embedded* knowledge. Encultured knowledge refers to "meanings that are shared understandings, arising from socialization and acculturation"; embedded knowledge is "set within contextual factors and is not objectively pre-given [and is] generated in particular language systems, (organizational) cultures and (work) groups".

[3]See also Blackler (1995).

These definitions basically emphasize the cognitive implications of institutional and organizational proximity described by Boschma (2005). Where encultured and embedded knowledge are required for sharing technical and professional knowledge, immigrants may be unable to fully participate in knowledge transactions, especially those involving tacit knowledge exchanges, until they have incurred the costs that the acquisition of these types of knowledge implies. Also, if local knowledge is highly concentrated in "communities of practice" (Breschi and Lissoni, 2001), this may prevent immigrants from accessing the local network or sub-groups of it. Breschi and Malerba (2001) have recognised that "tacitness is not an inherent characteristic of knowledge, but refers to the way knowledge itself is transmitted within an epistemic community. When conceptualised this way, tacitness may become a powerful exclusionary means, which can be wilfully manipulated to prevent a number of actors from understanding the content of scientific and technical messages" (p. 829). Yet, the acquisition of these types of knowledge is likely to occur over time through spatial proximity and exposition to the local "buzz" (Bathelt et al., 2004). On the other hand, local entrepreneurs embedded in local collaborative networks may find it comparatively more costly to start economic transactions with immigrants, either as employees or as business partners, if the local networks strongly draw on tacit agreements, trust and reciprocity. This is likely to apply when immigrants are embodying a redically different business culture (Hofstede, 1983; Trompenaars and Hampden-Turner, 1997) and the costs of "codifying" and making expectations and business routines explicit are deemed too high. In these conditions, immigrants may remain excluded from the local knowledge flows in industrial districts even more than it would be the case in less socially embedded production systems. Their employment would be confined in very low-skilled manual jobs in less knowledge-intensive firms and in the ethnic business sectors.

A few works in the Italian literature oppose to this rather pessimistic view. First, demand for low-skilled immigrant labour is not restricted to low-tech firms. Borzaga (1993) has noted that the demand for immigrant labour also comes from technologically advanced and innovative firms in core sectors of the industrial district economy; a research report by the Associazione Piccola Impresa (API, 2000) proposed that the demand for immigrant labour would not be the result of a cost-saving strategy but rather of firm dynamism in terms of investments and growth: firm growth implies enlarging the production department as well as the R&D and technical departments, thus increases firm demand for immigrant labour - especially if the native labour force is not too keen to work in manual tasks. By a similar token, Pellow and Park (2002) noted that the high-tech Silicon Valley firms generate a sizeable demand for manual work, both within the production core of semiconductors, the supplier industries and in the auxiliary services. In these conditions, even if immigrant employment would remain in the lower-skilled jobs due to low qualification levels and labor market segregation (Portes and Bach, 1985), immigration would not imply a downgrading of the overall district human capital endowment. Also, there would be more opportunities for immigrants to be exposed to process and product innovations introduced in the production

compartments as a consequence of firms' R&D efforts. Through learning-by-doing, they would improve their skills and understanding of the production process. This in turn potentially enables them to play a more active role in reshaping it. Taking into account the ever-growing immigration flows within industrial districts, Barberis (2008) suggests local systems can benefit from immigration if they manage to "districtualize" immigration flows (p.63). This is more likely to occur and to provide opportunities for novel development paths for innovation and internationalization in industrial districts if the skills of foreign workers are valorized beyond the exploitation of their weaker social status as lower-cost labour with less bargaining power (Andall, 2007). Their employment in dynamic and R&D-oriented firms, even if in the production compartment, is more likely to contribute to this.

Furthermore, studies focussing on countries of more consolidated immigration such as Germany, Denmark, UK and US, have highlighted the opposite relationship: diversity within the labour force contributes to productivity and innovation. This relationship has initially been proposed by corporate managers. Lew Platt, former CEO of Hewlett-Packard, explained the "business case for diversity" as follows:

> "I see three main points to make the business case for diversity:
>
> 1. A talent shortage that requires us to seek out and use the full capabilities of all our employees.
> 2. The need to be like our customers, including the need to understand and communicate with them in terms that reflects their concerns.
> 3. Diverse teams produce better results.
>
> This last point is not as easy to sell as the first two-especially to engineers who want the data. What I need is the data, evidence that diverse groups do better."(cit. in Kochan et al. (2003), p.5)

Cultural diversity is intended as a factor that increases psychic or cognitive distance between groups of people (Kilduff et al., 2000). Studies in the field of business management have analyzed how cultural values affect professional behaviour as well as corporate culture. The attitudes of a given culture towards hierarchy and power, uncertainty, individualism and masculinity, according to Hofstede (1983), influence the workplace behaviour, attitudes and values of the employees socialized in that culture. Trompenaars and Hampden-Turner (1997) identify seven dimensions along which national cultures differ. Five of these relate to the cultural attitudes on the relationships with people. The first dimension, i.e. universalism vs. particularism, distinguishes cultures where rules are clearly defined and are considered to apply in most circumstances; particularist cultures give more importance to obligations in personal relationships and unique circumstances. The second dimension relates to the dychotomy between individualism and communitarianism, i.e. whether people

regard themselves primarily as individuals or as part of a community. The third dimension (Neutral vs. Emotional) relates to the attitudes towards emotions and whether they are displayed or not. The fourth dimension (Specific vs. diffuse) is about how separate private and working lives are kept. The fifth one relates to attitudes towards achievements vis-à-vis ascription and defines the extent by status, credibility and power are based on merit or on personal characteristics. The last two dimension refer to the attitudes towards time (Sequential vs. synchronic), which has implications on whether present or past achievements are emphasized and on whether punctuality or management of multiple tasks in parallel is emphasized, and towards the external environment, i.e. whether the view that prevails is that people think that they should adapt to the external environment or that they have the power to control and change it. The encounter of different business cultures at the workplace increases coordination costs (Lazear, 1999); however, once specifically acknowledged, it produces "better results" according to Platt.

Platt's statement has stimulated research in the field of organizational studies about the link between ethnic diversity, productivity and innovation. The main channel by which diversity has been found to contribute to innovation is through providing a "cognitively differentiated pool of problem solvers to identify optimal solutions to complex problems"(Hong and Page, 1998, 2004; Cox and Blake, 1991; Alesina and La Ferrara, 2005; Niebuhr, 2010), especially in the high-tech sector (Richard et al., 2002; Brunow and Nijkamp, 2012). The empirical evidence from firm-level studies has shown the complexity of the relation, highlighting that, because of a trade-off between increased creativity and higher communication difficulties (Lazear, 1999; Alesina and La Ferrara, 2005; Østergaard et al., 2011), the benefits from diversity more easily emerge in connection with "enabling conditions", primarily proactive diversity management policies (Kochan et al., 2003; Garfinkel, 2004), conducive firm environments (Richard et al., 2007), larger firm size and higher qualification of employees (Buche et al., 2013; Venturini et al., 2012). The benefits from immigration and diversity, however, have found full confirmation in regional-level studies, which address the important problem of potential reverse causality through instrumental variable approaches (Ottaviano and Peri, 2006; Niebuhr, 2010; Brunow and Stockinger, 2013) and highlight positive effects of diversity on productivity, performance and innovation. While positive evidence on the higher innovation propensity of skilled immigration has been found for the U.S (Hunt and Gauthier-Loiselle, 2008; Kerr and Lincoln, 2008), there is still surprisingly little empirical evidence in the field of economics on the links between diversity and innovation, productivity and performance aside from the U.S. (Niebuhr, 2010); some more recent works have addressed the issue in Germany (Audretsch et al., 2010; Niebuhr, 2010; Brunow and Stockinger, 2013). Should we assume that a positive relation between diversity and innovation is an exclusive feature of regions and countries with a more mature immigration experience? Or is there some scope for a positive effect of immigration on innovation and productivity in local systems marked by more recent immigration as well? Firms that more closely resemble the profile of a "technological gatekeeper" and have a knowledge base that

more extensively relies on external knowledge are more likely to benefit from diversity as a driver for innovation.

As extensively seen in the first part of the thesis, the potential benefits from diversity are not limited to productivity and innovation gains. Further potential benefits from immigration relate to the immigrants' transnational capacities: Rauch (2001) speaks about the "deep knowledge" that immigrants have not just of the home language but of the home institutions and customs, which brings them in an advantageous position to act as brokers in international transactions. Williams (2007) provides an additional argument about the distinctiveness of immigrants' human capital: this refers to the "critical reflexive capacity" of migrants linked with their transnational experience and with their "*potential* role as boundary spanners and brokers" (pp. 367-368). According to the author, immigrants could have an advantage in developing an in-depth understanding of the "assumptions and beliefs that shape practice", deriving from their familiarity with the different ways in which knowledge is embedded in different locations: comparing different work experiences in different places, they can in principle draw conclusion on the performance implications of a given organizational culture. The author recognizes that this reflexivity is not an exclusive feature of immigrants, but "international migrants bring an additional dimension to this, because of the significance of national boundaries in the map of encultured knowledge (...) Boundary spanners (Tushman and Scanlan 1981) are individuals who can work across such boundaries, and leverage external knowledge into organizations. They perform three key roles: accessing external knowledge, interpreting it and refining it. Crossing an international boundary does not necessarily make a migrant a boundary spanner, but if international borders constitute significant barriers to acquiring external knowledge, then migrants potentially have a distinctive role to play."(Williams, 2007, pp.367-368). Parrilli (2012) argues that heterogeneous social capital born by immigrants has the potential to catalyze tacit knowledge flows, which can bring about innovation and change in local systems. The transnational dimension of the immigrants' skills is a complex interconnection of human and social capital skills. Rauch and Trinidade (2002) highlight the role of co-ethnic networks in promoting international trade; Bandyopadhyay et al. (2008); Peri and Requena-Silvente (2010); Bratti et al. (2014) show this applies to subnational units of analysis as well. The contribution of immigrants to transnational activities is stronger by higher skills level of immigrants (Gould, 1994; Blanes-Cristóbal, 2008), it need not be an exclusive feature of more advanced sectors, as seen in chapter 4. However, immigrants' transnational skills, primarily foreign language skills (Antonietti and Loi, 2014) and intercultural skills, but also their potential boundary-breaking role in international transactions, are more likely to be pursued in firms that access and apply external knowledge to a larger extent.

Attempting an exploration of the ways in which foreigners are integrated economically in local systems is a complex task. First, while labour replacement may remain the quantitatively more apparent dimension of the inclusion of immigrants in the labour force, an effort

to explore the quantitative relevance of the link between diversity and innovation, i.e. a less visible but more promising contribution of diversity to local development, is necessary to set the argument into an appropriate framework. Second, a positive relation between diversity and performance may be difficult to identify in the quantitative analysis because it is not necessarily linearly associated with larger immigrants' shares within the local system, and not even within firms. Larger shares of immigrants employed are quite likely to reflect a stronger production orientation of the firm, and the effects of immigration are likely to be highly heterogeneous by different skills levels both of immigrants themselves, of their colleagues in the firms, and of the local system as a whole. The availability of firm-level data on the skills levels of both immigrant and native employees is very limited. We could expect to find transnational skills and expected productivity gains from diversity to be more frequently among the determinants of immigrants' employment of more knowledge-oriented firms. At the same time, because of the relatively low skills intensity of district economies, research attempting to draw conclusions of relevance to local development must appropriately take into account the integration of immigrants in relatively low-qualified tasks: if firms do not hire immigrants as part of a cost-saving strategy but rather as a result of growth in the production capacity, as argued in Borzaga (1993), API (2000) and Pellow and Park (2002), this could definitely contribute to the "districtualization" of immigrant flows and have a positive effect on the local system.

The above considerations about data shortages and methodological limitations led us to choose case study analysis (Yin, 2003) as a research methodology, to adopt a multi-method approach, and to identify the following set of propositions as the guiding elements for empirical investigation. Propositions define the expected patterns to be explored in case study analysis. They are not hypotheses to be tested but rather theoretical interpretations that underlie and structure case-study analysis. Depending on the type of case study, they pursue exploratory, descriptive or explanatory purposes.

P1. Diversity, internationalization and innovation in knowledge intensive firms. As seen before, if diversity spurs innovation and internationalization, this is more likely to occur in firms that are better able to access external knowledge and to apply it to economic ends. We expect that these firms are more R&D, export and innovation-oriented and employ a more skilled labour; we will refer to them as "knowledge-intensive" firms:

P1.1: ***Knowledge-intensive firms hiring foreign workers are characterized by comparatively higher innovation, productivity or exports than those hiring no immigrants***

Among knowledge-intensive firms, those that rely on less tacit and more codified knowledge[4] are more likely to recognize the potential gains from diversity:

[4] A comprehensive analysis of the firms' cognitive roles within the district was beyond the capacity of this research. Further research could better qualify these assumptions and confirm whether firms benefiting more from diversity are the "technological gatekeepers" (Allen, 1977; Giuliani and Bell, 2005).

P1.2: ***The reasons for hiring immigrants in knowledge-intensive firms relate to productivity gains from diversity and to exploiting immigrants' transnational skills in firms applying a less tacit and more codified knowledge base***[5]***.***

P2. Diversity and labour replacement in production-oriented firms. The second set of propositions refers to the other side of labour market segmentation for immigrants. We define production-oriented firms as those having a larger share of workers employed in the production compartment. Immigrants' employment in more-production-oriented firms is generally considered to be driven by the need to substitute native labour force unwilling to undertake manual and even "dirty, dangerous and demanding" tasks, thus they are more likely to concentrate in these kinds of firms. We first of all need to confirm this assumption.

P2.1: ***The employment of foreign workers reflects the higher reliance of firms on non-qualified manual work.***

Second, employment of immigrants within production-oriented firms may be driven by rival strategies. On the one side, a firm could hire immigrants as part of an overall labour-cost-saving strategy oriented to avoid costly investments in R&D, innovation and delocalization, as suggested by Murat and Paba (2003).

P2.2a: ***Hiring immigrants is an alternative to investing in R&D***

On the other hand, a firm could be forced to hire immigrants in the production compartment due to the exogenous reluctance of the native labour to enrol in manual tasks irrespective of the firms' strategies. This would not necessarily associate with lower R&D investments and could even be compatible with growth in the firms' productive capacity. This interpretation is compatible with a reduction in productivity in the short term due to immigrants' lower skills, as in the Accetturo et al. (2012) framework, or simply by substitution of the native with the foreign labour force with no remarkable productivity effects.

P2.2b: ***Hiring immigrants is complementary to investments***

The two strategies can obviously coexist within a local system; it seems interesting to investigate which one is prevailing quantitatively and in the perceptions of the employers.

P3. Heterogeneity vs. homogeneity in immigrants' social capital. The third set of propositions relates to the interaction between the local system of social and economic relations and the networks of relations where foreign workers are embedded. In particular, it explores whether employers pursue homogeneity or heterogeneity in social capital in the recruitment process.

[5]We assume tacitness and codification to be two extremes of a single continuum (Gerard, 2003)

Immigrants carry with them their own networks of relations which can in principle enlarge the range of opportunities available to the local system. The heterogeneity of social capital is seen as a potential asset for local systems by Parrilli (2012), who argues that heterogeneous social capital born by immigrants has the potential to catalyze tacit knowledge flows, which can bring about innovation and change in local systems threatened by lock-in due to excessive homogeneity. Saxenian (2006) has shown that coethnic networks can also be channels through which community services are provided, including among other the collection of venture capital. Employers may recognize the potential benefits deriving from having access to the immigrants' heterogeneous social capital, for example co-ethnic networks, to thrive into international markets, recognizing their potential as boundary brokers for facilitating international transactions either as employees or as intermediaries (Williams, 2007; Coe and Bunnell, 2003; Rauch and Trinidade, 2002; Rauch, 2001)[6]. Accessing different sources of tacit knowledge through immigrant employees may in turn have a positive effect on the firms' problem-solving capacity and creativity Parrilli (2012, cfr.). This awareness could in principle apply to all kinds of firms.

P3.1 ***Employers hire immigrants to gain access to transnational co-ethnic networks and to immigrants' social capital.***

As mentioned earlier, a cohesive social structure has traditionally been considered to be an asset of local systems such as industrial districts. However, as newcomers, immigrants are likely to experience disadvantage because they lack social assets, such as social and professional networks linking them to information about job opportunities, as well as to assistance in finding jobs. This is likely to affect their ability to find a "good job" (Reitz, 2007). Foreign workers' access to the natives' social networks is likely to contribute to their employment and to their ability to exert a role in promoting the local system's capacity to access and absorb to external knowledge. In his work on immigrant entrepreneurship in Italian local systems, Chiesi (2010) has shown that ethnically heterogeneous social capital, proxied by the ethnic diversity of the network and in particular by the share of Italians within it, is an important factor of economic success for immigrant entrepreneurs. This was explained by the author through Granovetter (1985) argument about the strength of weak ties. Similarly, it is likely to be easier for immigrants to access local employment opportunities in the district core sector if they have more social ties with natives. Simmel (1982) and Pizzorno (1999) have recognized that spatial proximity and duration of the ties can substitute for strong ties in creating the basis for trust. These considerations are more

[6]The underlying mechanism can be identified in what Portes and Sensenbrenner (1993) defined a "hightened sense of community" within the co-ethnic group, that can be generated in different ways from the interaction with the out-group, leads individuals to comply with the expectations of the community and to replicate the preferential treatment for the members of the in-group. This occurs either due to "bounded" solidarity, a principled preference for the members of one's own group, or "enforceable" trust, a form of instrumental trust in the group's behaviour that is grounded in the community sanctioning of the non-compliant. The two potentially result in easier access to business opportunities and information, as well as to contract enforcement, for coethnics and facilitate the development of transnational business transactions.

likely to play a role in firms that are more embedded in social networks; where, instead, the economic transactions are more market-like or where the local system is undergoing a "disembeddedment process" (Mingione, 2004), as may be the case for districts facing the implications of the global financial crisis and of global competition, the selection of employees is more likely to rely exclusively on human capital considerations (see Bowles, 1998):

P3.2 ***Immigrants' social ties with natives facilitate their access to employment in more embedded district firms.***

The last aspect of the economic integration of immigrants in local systems that this study will attempt to investigate regards the broader effects of immigration on local social capital, and in particular on the reproduction of the conditions of trust and predictability in transactions considered to be part of the competitive advantage of industrial districts and of some clusters. According to Bowles (1998) and Ostrom (2007), it should be expected that the mechanisms accounting for the reproduction of "nice traits" (i.e. "behaviors which in social interactions confer benefits on others," Bowles, 1998, p. 92) would be discouraged by the entering into play of agents belonging to a different culture and the scope for cooperation among firms could be expected to decrease. According to Putnam (2007), increased ethnic diversity according erodes the pre-existing levels of trust and reciprocity and generates "hunkering down" among the native population that reduces the overall level of trust even towards other natives. A different view is proposed by Laurence (2011) and Huijts et al. (2014) on the basis of "contact theory" and on the empirically supported argument that more diversity increases the probability of encounter and the development of trust between different ethnic groups.

Barberis (2008) notes that the outcomes from the encounter of a "We-group" of natives and a "They-group" of foreigners depends on their respective levels of over/underembeddedness. Underembeddedness defines a weak relationship between economy and society, possibly deriving from a dynamic process of disembedding, where the social relations relevant for economic transactions have weakened and economic relationships are mainly defined by market transactions. Overembeddedness is defined as a strong self-containment of socio-economic ties within social groups which makes the development of new ties across groups more costly. Different levels of embeddedness of the two groups define different social configurations in the relationships between the "We-group" and the "They-group" that are associated with economic outcomes. Where the levels of embeddedness of both groups are moderate, and especially when the potential gains from cooperation are high, trust and reciprocity may be extended to the group of newcomers and cooperation may actually increase as a result of increased ethnic diversity. In this context, the local system may be able to grasp the opportunities offered by the global sourcing of talents for increasing its own levels of human capital, by attracting talents from other countries, and by capitalizing on the immigrants' transnational skills. Instead, asymmetries in the level of embeddedness

of the two groups are more likely to generate socially disintegrated structures that lead to less efficient allocations of the human resources locally. From the side of the host society, this implies that more efficient allocation of human resources, including the exploitation of the potential brokering role of immigrants in transnational business, is more likely to occur in local systems characterized by bridging, rather than bonding, social capital (Portes and Sensenbrenner, 1993) and more inclusive institutions.

P4: ***Transnational skills and productivity gains from diversity are stronger in local systems that are characterized by more inclusive formal and informal institutions.***

The above propositions will be operationalized in the next section.

5.3 Methodology: the rationale for case study analysis

Several features of the research questions and of the propositions of this study motivate the choice of case study analysis (Yin, 2003).

First,Yin (2003) recommends case study analysis should be applied when the research questions are "why" and "how" questions, and particularly when the aim of the study is to explain decisions or set of decisions: here, we want to understand the reasons why native firms decide to cooperate with immigrants either as employees or as business partners and how the relationship between immigrants and natives takes place considering the specific reality of the local system. Second, case study analysis may be the only way to study phenomena that haven't (yet) reached a numerically relevant dimension to make them mainstream (Rubin and Rubin, 2011): in spite of their rapid growth in recent years, immigrants remain a small share of the population of both Italy and Spain; the majority of firms (around 80%) in both regions considered don't hire any single immigrant. Yet, it seems impossible to counteract the phenomenon and to stop immigration flows from increasing in the future and, as mentioned above, the phenomena under scrutiny potentially bear important implications for the redefinition of the development model of industrial districts. Moreover, in both Italy and Spain, the inflows of immigrants in some local systems have been associated with high media attention and in some cases with social tensions (Dei Ottati, 2009a,b; Cachón Rodriguez, 2005; Narotzky, 2006; Viruela Martínez and Bernat Martí, 2013). Third, case study analysis is especially suited for cases where "the boundaries between phenomenon and context are not clearly evident". This is clearly the case for this research question: the number of different actual configurations of the district model in the local systems of Italy and Spain *per se* makes it very difficult to expect that the dynamics of the integration of immigrants within a given industrial district can be safely generalized to the whole population of industrial districts as they are likely to be heavily reliant on the specific context.

These characteristics make the kind of inference that can be derived from such an analysis an *analytic* rather than a statistical generalization. In case study analysis it is not expected that generalizations are drawn to a wider universe of cases, but to *theoretical propositions* (Yin, 2003). Each case must be seen as an experiment; multiple cases are to be viewed as multiple experiments. Because "case study analysis copes with the technically distinctive situation in which there will be many more variables of interest than data points [...]","it relies on multiple sources of evidence with data needing to converge in a triangulating fashion [...] ". The latter is the rationale for the choice of the combination of different methods in a multi-method study that relies on both quantitative and qualitative data[7]. In this research, the case study design is, in Yin's terminology, an embedded one, where the two case studies are constituted by the two local systems, but in turn incorporate firm case studies as "experiments" on the propositions of interest.

As regards internal validity of the study, case studies aiming to explain a phenomenon must make the logic linking their arguments explicit and appropriately distinguish their explanations from rival explanations. This implies basing their propositions and explanations on a logic model(Yin, 2003). The logic model links data to propositions and explains the criteria for interpreting findings; it associates each proposition with a corresponding expected pattern, to which the empirical evidence will be compared, as in Campbell (1975)'s "pattern matching" methodology. Each pattern, where appropriate, must be contrasted with rival patterns. The logic model also strengthens the external validity of the findings, i.e. the ability to generalize the specific findings of the case study: making the boundaries of the arguments explicit helps clarifying the extent to which a particular set of findings can be generalized to other contexts. The logic model for these case studies is summarized in section 5.3.1.

Two complementary research methodologies will contribute to the case study analysis: quantitative analysis and qualitative analysis. As will be discussed more in details later, the availability of two very similar datasets in the two case studies allow for a fruitful symmetry in the quantitative analysis. The information from these sources will be integrated and complemented with secondary literature on each cluster and with the data collected in a series of semi-structured interviews. The purpose is to combine a quantitative assessment of phenomena with insights on the causal interpretation provided by the interviews.

Due to the lack of systematic data on firms' characteristics at a lower level of disaggregation, the quantitative analysis employs firm-level data about firm characteristics for the NUTS2 regions corresponding to the case studies, i.e. Emilia Romagna and the Basque country. Because of the exploratory nature of this study, and of its interest in the characteristics of firms hiring immigrants within local systems of production, cluster analysis and discrimi-

[7]Yin (2003) and Rubin and Rubin (2011) clarify that, while the two terms are often confused, case study analysis does not mean qualitative analysis; case study analysis can be based on a mix of quantitative and qualitative research, as in this case.

nant analysis were chosen as the statistical methodologies to address the hypotheses of the study from the quantitative side.

The purpose of cluster analysis is to identify "natural" groupings among individuals, maximising homogeneity within each group and distance with individuals in other groups. Here, the interest is on whether firms hiring immigrants tend to cluster with other firms hiring immigrants on the basis of a series of firm characteristics[8]. The purpose of linear discriminant analysis is "to investigate differences between groups on the basis of the attributes of the cases, indicating which attributes contribute most to group separation. The descriptive technique successively identifies the linear combination of attributes known as canonical discriminant functions (equations) which contribute maximally to group separation. "(Burns and Burns (2009):p.591). Analysing the differences among groups will allow identifying different strategic orientation of firms and elaborating on the role of immigration in them[9]. This focus on the differences between group characteristics, rather than on the identification of effects, makes Linear Discriminant Analysis a more appropriate tool than similar tools like logit or probit models. No underlying structural model is specified; rather, the information from a series of observable firm characteristics is exploited in order to maximise the distance between groups and to identify the variables that best distinguish among them. Also, discriminant analysis is recommended when the dependent variable is a categorical variable with more than two categories, as is likely to be the case when grouping firms in local systems.

5.3.1 Logic model

The first proposition, i.e. P1.1: *Knowledge-intensive firms hiring foreign workers are characterized by comparatively higher innovation, productivity or exports than those hiring no immigrants*, will explore whether quantitatively important associations exist between shares of foreign workers in the firms and innovation, exports and productivity indicators. Analysis of the correlations will be the first step in this regard. Positive and significant correlations between variables relating to knowledge intensity and foreigners' shares implies empirical the relationship has the expected direction; comparison of the two local systems could provide insights on the prevalence of local-specific "enabling factors". In order to explore which variables systematically associate with different immigrant shares within firms, cluster analysis will be performed. Absence of a positive correlation can still be

[8]Because a number of firm characteristics of interest are binary or categorical (e.g. whether the firm has introduced innovations; the extent by which the firm is indebted), it was opted to run Two-step cluster analysis using the feature in SPSS which has precisely the advantage to allow cluster analysis with both categorical and continuous variables.

[9]The other key purpose of discriminant analysis is classification: based on the characterizing variables, discriminant analysis allows assigning individual cases to the groups without prior knowledge of the groups belonging.

compatible with the business case for diversity if diversity and knowledge-intensity variables are found to cluster together in the cluster analysis. This could be the sign that, while not prevailing, diversity is a relevant feature of a subset of firms.

To the ends of P1.1, discriminant analysis will be applied to test whether firms employing smaller shares of immigrants can be distinguished from firms hiring higher shares of immigrants based on their exports and innovation performance, i.e. whether exports and innovation result among the discriminating variables. Joint discriminating power of variables associated with diversity and knowledge intensity implies a distinctiveness of firms hiring foreign workers in this regard and is compatible with firm strategies aiming at maximising the benefits from diversity. The lack of such a result implies that diversity does not make a quantitatively important difference in firms' procedures and routines. It should be noted that, because no inference can be drawn on the direction of causality, innovation and exports should be seen as proxies for the firm innovation and export orientation and not as effects of immigration. It may well be that export orientation generates opportunities of accessing new more culturally distant markets that in turn highlight the need to employ coethnic employees to support new internationalization activities. Similar arguments could apply to productivity and innovation: innovative firms are more likely to have global stance and to access international labour markets and to hire the most qualified people even if they have foreign origin in a worldwide quest for talent.

The causal ambiguity implied in the relationship between immigration, productivity, exports and innovation is addressed in proposition P1.2: *The reasons for hiring immigrants in knowledge-intensive firms relate to productivity gains from diversity and to exploiting immigrants' transnational skills in firms applying a less tacit and more codified knowledge base*. Because of its focus on causal relationships, P1.2 is addressed through qualitative interviews to qualified informants and entrepreneurs in both local systems. The reasons provided by the interviewees for hiring immigrants will be compared with an expected pattern as suggested by Campbell (1975)'s "pattern matching". The recognition of the potential benefits from diversity relies on the precondition that the profile of foreign workers corresponds to the one required by the firms and that the knowledge relevant for business is not too localized and tacit: reliance on strongly localized and tacit knowledge can generate segregated epistemic communities (Breschi and Lissoni, 2001) and become an exclusionary feature against immigrant workers. Instead, if the knowledge base of firms is relatively codified, or the production process requires access to tacit components of non-local knowledge, such as tastes of foreign consumers, there will be more scope for immigrants to contribute to knowledge development and innovation. This will apply in particular if the foreign workers are highly skilled. The extent of knowledge tacitness will be approximated by an indicator, expected to reflect the relative importance of the firms' specific knowledge compared to more codified knowledge: the time that a new worker takes on average to become autonomous at work. This was found to differ quite importantly across firms with similar requirements in terms of the formal qualification of the employees. With this

premises, we expect interviewees from knowledge-oriented firms to report that immigrants are employed in sales offices or R&D departments and motivate the choice with immigrants' specific skills. Statements in support of this view should be considered as supportive of the proposition. If the interviewees recognize the potential benefits from diversity and can report cases where this potential has been applied, it can be assumed that the benefits from diversity are an actively pursued asset in firm recruitment process. If the interviewees hire immigrants in knowledge-intensive posts but don't motivate this through the benefits from diversity, foreigners should be assumed to be considered in no different ways as other workers. If the interviewees can't report cases of foreigners in knowledge-intensive posts but recognize their potential, it could be that there are hindering contextual factors (e.g. inability of the system to attract qualified foreign labour, inability of the system to develop the required skills). If immigrants result not to be involved in such tasks, it may be for lack of recognition of the immigrants potential or because of lack of immigrants' qualifications.

Proposition P2.1: *The employment of foreign workers reflects the higher reliance of firms on non-qualified manual work* will, similarly to P1.1, be addressed through correlation analysis, cluster analysis and discriminant analysis exploring associations between variables relating to immigrant shares and variables relating to production orientation such as share of non-qualified workers, share of workers involved in production, share of non-tenured contracts in the firm to identify whether firms hiring immigrants result to be characterized by higher reliance on manual work. Lack of such a result implies that the status of immigrants does not make a difference in the recruitment process.

The underlying strategies leading more production-oriented firms to hire immigrants can, however, be quite different: immigrants' labour may be needed because of the natives' rejection of manual works in any kind of firms, including well-performing ones (P2.2b) or it could be the a defensive strategy oriented to keeping costs as well as investments low (P2.2a) that are not willing or able to undertake more substantial productivity enhancing investments. Discriminant analysis, allowing to explore which characteristics, if any, distinguish firms with a strong production orientation hiring immigrants, will provide the verification of these hypotheses: the emergence of joint discriminating power of high levels of diversity and comparatively low levels of knowledge intensity would be considered to be in favour of P2.2a. If, instead, within the subset of production-intensive firms, variables associated with higher shares of foreign workers and larger production capacity,firm growth and investments result having joint discriminating power, this will be interpreted as evidence in favour of the causality running from firm dynamism to employment of foreigners. However, in case the discriminating power is limited to variables relating to immigration and investments, rival explanations could apply based on the Accetturo et al. (2012) hypothesis that firms hiring non-qualified immigrants need to increase their investments to sustain productivity. Lack of discriminating power of production and investment-related variables would not provide support to the hypothesis. The insights collected through the

quantitative analysis will be matched with the interviews, where the same pattern will be matched with firms' own experiences and motivations.

As regards proposition P3.1, *Employers hire immigrants to gain access to transnational co-ethnic networks and to immigrants' social capital*, interviews will explore whether employers report positive assessments about foreigners' social capital, which could be considered to enlarge the local systems' range of opportunities and to bear positive implications for the social inclusion of the immigrants' communities locally. If, to the contrary, the firms only hire immigrants based on their human capital (i.e. neutral considerations about their social capital) immigrants would have to be considered as any other employees. If the firms negatively value the relationships of foreign employees with their coethnics, it can be considered as a sign of social disgregation leading to lost opportunities.

Also proposition P3.2, *Immigrants' social ties with natives facilitate their access to employment in more embedded district firms* is addressed through interviews due to the lack of reliable data and to the subjectivity of the issue. Interviews will investigate the recruitment process of the firms as well as the role played by social ties in facilitating access to information about employment opportunities. It is expected that employers in firms that are highly embedded in the local system of social relations will report considerations about foreigners' access to their social networks as assets in the selection of foreign workers. In this case, trust and reciprocity mechanisms can be considered to play a role locally and employers could be seen to extend the district type of relationships to foreigners. However, if the firm is strongly embedded but immigrants are perceived to stay out of the employers' networks, the district types of relationships would exclude foreigners. At the other extreme, if firms are operating mainly through arms-length transactions or with firms located out of the locality, the distinctiveness of immigrant culture is less likely to affect the recruitment process and their inclusion within employers' networks should be irrelevant.

Finally, the empirical investigation of proposition P4: *Transnational skills and productivity gains from diversity are stronger in local systems that are characterized by more inclusive formal and informal institutions*, will shift the analysis from the firm level to the local level and will combine the insights deriving from interviews, desk research and data analysis in the two local systems to identify the more inclusive local system among the two (in terms of policies, informal institutions and firm practices). The comparison between the characteristics of firms hiring immigrants in the two contexts and in particular the comparison between the evidence collected on the benefits from diversity and on institutional discrimination will be combined to verify whether the more inclusive system is associated with greater evidence of benefits from diversity. If, instead, the benefits from diversity would be observed to be more relevant in the less inclusive system, or if benefits from diversity are observed in both contexts, it could be interpreted that the benefits from diversity occur independently of the action of local institutions and are mainly driven by market opportunities. If both systems result not to benefit from diversity, it could be attributed to the

lack of maturity of the systems in terms of immigration policies that are unable to attract qualified labour.

5.4 Choice of the case studies

The rationale guiding the choice of the two case studies was to identify local systems marked by industries of mid-high level of technology with an important role for their respective countries, which have experienced rapid increases in their immigrant population in recent years. Priority was not given to the local systems with highest immigrant flows because this would have biased the choice towards local systems marked by comparably lower-tech and more labour-intensive productions, such as the textiles and clothing or the leather and footwear sectors (see for example Andall, 2007; Dei Ottati, 2009a,b; Salom Carrasco and Albertos Puebla, 2012; Narotzky, 2006; Cachón Rodriguez, 2005); in such sectors, it may be more difficult to find evidence of integration dynamics other than the traditional low-skilled labour replacement. It was chosen to focus on the mechanic sector, which was considered to offer a wider range of possible dynamics and explanations.

Both the selected districts are characterized by peculiarly high employment concentration in the manufacturing sector, and in particular in mechanic works, and are located in regions that are strongly marked by this specialization (Boix and Trullén, 2010; Bigarelli and Russo, 2012). The production of machine tools and mechanic equipment is the main specialization in both Reggio Emilia and Elgoibar. Both regions and local systems are also characterized by comparatively high per capita income levels with respect to the national average.

In Italy, mechanic production is concentrated in a few the northern regions (Piemonte, Lombardia, Veneto, Emilia Romagna); among the northern regions there is a great deal of interconnectedness (Bigarelli and Russo, 2012). Emilia Romagna is strongly specialized in the mechanic sector, particularly in the provinces of Reggio Emilia, Modena, and Bologna. Among these, the relative specialization is stronger in the machine tools and mechanic equipment sector as regards Reggio Emilia, and more oriented towards the automotive sector as regards Modena and Bologna. These areas are also high shares of immigration, as well as by an inclusive tradition by local political and economic institutions (Rinaldini, 2011; Barberis, 2008). In Spain, the mechanic industry is concentrated in two *Comunidades Autónomas*: the Basque Country and Catalonia (Ahedo, 2006). Among these, the Basque country has a comparatively much more specialized production structure: 80% of the Spanish employment in the mechanic sector within either industrial districts or local systems of large enterprise is concentrated in this region (Boix and Trullén, 2010). On the other hand, Catalonia is more diversified, with a variety of manufacturing productions together with a strong orientation to services and tourism (Ahedo, 2006). Hovewer, while the strong

manufacturing intensity and the high levels of per capita income would make it seem to be an an attractive area for immigration, the Basque country has relatively low levels of immigration. The Basque country and Elgoibar have high levels of inter-firm cooperation framed in a consolidated policy of cluster promotion (Aranguren et al., 2012).

In Portes and Sensenbrenner (1993) terms, Reggio Emilia could be considered to constitute a case of a local system characterized by bridging social capital in the relations between the native and the immigrant community. Elgoibar could instead be seen as a local system characterized by certainly high levels of bonding social capital, while it seems to be characterized by lower levels of bridging social capital towards local immigrant communities. Taken together, these two case studies can provide insights about how differing types of social capital interact with the ability of immigrants to exert a positive effect on internationalization and innovation.

5.5 Data collection: micro-data and interviews

As discussed above, the case study adopts a multi-method perspective. In order to ensure reliability, from the selection of the nominations for the interviews to the choice of the data, similar procedures were followed in collecting data on the two studies.

5.5.1 Quantitative analysis

The quantitative side of the work is based on the availability of two similar firm-level surveys that allow comparing firm characteristics in the two NUTS2 regions where the local systems of Reggio Emilia and Elgoibar are located, i.e. Emilia Romagna and the Basque country.

As regards Emilia Romagna, the MET (Monitoraggio Economia Territorio) survey on industrial firms and production services is a among the most comprehensive surveys on firms' characteristics in Italy, with almost 25,000 observations nation-wide and representativity at the regional and sectoral level for all firm sizes. This characteristic allowed selecting the sub-sample of 3,020 firms based in Emilia Romagna to use it for the comparative analysis, out of which 2,392 can be classified as manufacturing firms according to their NACE codes[10]. The 2008 edition of the survey was made available for the present study. It covers both general aspects such as firm size, age, location, NACE 3-digit sector, turnover, functional composition of the firm employment, self-assessments about firm performance in terms of exports, growth, as well as investments in material and immaterial aspects, R&D, innovation, indebtedness, but also on the firms' strategic orientations. The database

[10]Firms with NACE codes between 100 and 400 were considered as manufacturing firms.

includes information about the share of foreign workers operating within the firm. The data of the MET have also been matched with an external database about firm balance sheets (the AIDA database)[11].

As regards the Basque country, the analysis of the relationship between immigration, firm characteristics and firm performance is addressed through the analysis of the "Censo del Mercado del Trabajo" (CMT) a firm-level database developed by the Basque statistical office EUSTAT, which contains information on 6,646 the firms operating in the Basque country, out of which 1,232 can be classified as manufacturing firms based on their relevant NACE codes. The CMT database, too, contains information about firm characteristics, location, core business, exports, internationalization strategies, competitive and financial constraints, firm perfomance, innovation, investments and R&D, personnel characteristics and employment strategies, as well as on the share of foreign workers hosted by the firm. Pursuing comparability with the Italian case, also in this case the 2008 cross-section of the database was used. Access to the microdata was restricted, on data sensitivity grounds, to the EUSTAT offices in Vitoria-Gasteiz (Araba/Alava); the author analysed the database during a series of visits to the EUSTAT premises[12].

In both databases, the information about the diversity at the workplace is limited to a quite raw measure, i.e. the percentage of non-nationals working in the firm. While this kind of diversity measure is used in a sizeable amount of studies, some authors (e.g. Harrison and Klein, 2007; Lee, 2011) argue that other more articulated measures of diversity are more likely to reflect cognitive complementarities between co-workers. These include the ethno-linguistic fractionalization index (Easterly and Levine, 1997; Alesina and La Ferrara, 2005) and the Shannon–Weaver entropy index (Østergaard et al., 2011; Van der Vegt and Janssen, 2003). Unfortunately, comparably wide databases on the firms of the Basque country and Emilia Romagna crossing information about firm characteristics, firm performance and firm diversity using such more sophisticated measures are not available.

A second limitation of the both data sets is that, for a number of performance variables of interest (e.g. production capacity, investments), no continuous variables are available, but rather self-assessments or binary indicators. For other variables (e.g. exports) the quantitative information is only available in percentage terms. These limitations clearly constrain the ability of the analyst to carry out quantitative analyses; yet the availability of such a database provides a valuable starting point to address an issue that has so far not been addressed. As regards productivity measures, these could be constructed in the case of the MET as measures of turnover and value added per employee (which has been standardized with respect to the mean productivity of the sector); instead, they could not

[11]The dataset has been accessed in the framework of a cooperation with prof. Sandro Arrighetti and prof. Andrea Lasagni of the University of Parma who have access to the database and provide restricted access to the micro-data to students within the University premises.

[12]The author gratefully acknowledges the kind supervision, availability and support by Dr. Luis Sanzo

be constructed in the case of the CMT because no continuous measure of turnover nor matching with balance sheets was available.

5.5.2 Qualitative analysis

The qualitative side of each case study, aimed to shed some light on the relations of causality and on the ambiguities arising from the quantitative analysis is based on a series of semi-structured and open-ended interviews which the author administered to human resource managers and chief executives from local enterprises and to qualified informants from local institutions (see table B.2.1). 7 representatives of firms based in the Elgoibar area and 7 officers from local institutions were interviewed during the author's stay in the Basque country from 3rd of June to the 18th of July 2014; 8 firm representatives and 5 qualified informants from the mechanic district of Reggio Emilia were interviewed between the 15th of August and the 30th of September 2014.

The selection of the firm candidates for the interviews was the result of a mixed strategy, aiming to maximise the variation in relation to the percentage of foreign employees hired by the firms. In both cases, the firms with high shares of immigrants were selected from the available databases based on their higher-than-median share of foreign employees, their location and their sectoral specialization. In Elgoibar, those with lower shares of immigrants were in part selected from the database, and in part thanks to the references of qualified informants who greatly facilitated access to the human resources managers and chief executive officers of leading firms in the area. In Reggio Emilia, the majority of firms were selected from the MET database on the basis of their immigrant shares, location and sectoral specialization; institutional representatives and interviewees contributed to enlarging the number of firm nominations with own contacts to trade union representatives and knowledge-intensive firms. Pursuing maximum reliability of the study, a case study protocol was prepared for each case study where the different steps in the nomination of candidates were recorded, together with summary reports and, were appropriate, recordings about the interviews.

When approaching firms and institutions in the Elgoibar cluster, it became evident that, in spite of some public attention to the topic of immigration in the sectors of construction and elderly care, it was the first time an academic study focussed on the effects of immigration within the manufacturing sector, in spite of the high industrial specialization of the Basque country. A few firms' and institutions' representatives admitted they hadn't previously carried out an in-depth reflection on the determinants of immigrants' employment locally. This limited the ability of firm and institutional representatives to support the study. Among those who were contacted but could not cooperate are representatives from major business associations, trade unions and local governmental representatives. As a result, out of 31 nominations, only 16 decided to cooperate in the interviews. In Reggio Emilia,

the interviewees showed a good deal of previous reflection on the issues of immigration and on the potential role they could play, and out of 18 nominations, interviews were collected with 13 contacts.

The information collected through the interviews was integrated by research on additional official data sources as well as by visits to the institutions' and firms' websites and consultation of reports and other material provided or indicated by the interviewees.

The interviews to firms were based on the questionnaire structure reported in Appendix B.1; the questionnaire focused on the determinants for hiring immigrants and on aspects of the experience of firms with foreign employees. It investigated the profiles of the employees within the firm, how well the immigrants correspond to the required profiles, as well as the interviewees' views on the average time taken by new employees to reach autonomy at work, on the procedures followed in the recruitment process, and on the main benefits and difficulties arising from diversity. In order to analyze the relationships of the firm with its local system, a section of the interviews focused on the relationships of the firm with other local firms and enquired on the prevailing dimension of the firm linkages - whether they are predominantly localized or delocalized, as well as on the perceived effects of immigration at the district level. When applicable, the interview touched aspects of the transnational relations of the firm with representative offices or plants abroad. These information were complemented with basic information about the firm profile, embeddedness in the local system, approaches to innovation and internationalization, history and guiding principles.

The interviews to firms constitute the core of the qualitative analysis. The information collected therein was integrated through interviews to qualified informants from local and regional institutions. These were focussing on the same questions - determinants for hiring immigrants in local firms, match between the local economy's needs and immigrants' qualifications, embeddedness of local firms in the social structure, effects of immigration in the local system, transnational relations of the firms - with more emphasis on the areas of specific expertise of the qualified observers.

In all cases, at the beginning of the interviews, the research objectives and questions were briefly presented. The interviews were conducted in Spanish in Elgoibar and in Italian in Reggio Emilia.

industrial

Chapter 6

The case study of Reggio Emilia (Emilia Romagna)

6.1 Immigration in Emilia Romagna and in the local system of Reggio Emilia: setting the framework for the case study

A distinguishing feature of immigration in Emilia Romagna, and particularly in Reggio Emilia, is its concentration in areas characterized by high density of small and medium-sized manufacturing firms (Mottura and Rinaldini, 2003; Rinaldini, 2011). In these areas, immigrants' employment is especially high in the manufacturing sector and is considered to set the main "pull" factor for immigration.

6.1.1 The mechanic sector in Emilia Romagna and Reggio Emilia

The production structure in Emilia Romagna is characterized by district systems (e.g. agromechanic industry in Reggio Emilia and Modena, textile and clothing in Carpi and Correggio, ceramics in Sassuolo). These are based on small and medium-sized firms with a strong export orientation, which has historically ensured relatively high income and employment levels; local institutions have traditionally been active in promoting equal access to local resources (Rinaldini, 2011). The mechanic sector is the largest manufacturing sector in Emilia Romagna; in 2011, it accounted for about a half (48.5%) of the regional exports, contributing to the 73.7% of the trade balance surplus (Bigarelli and Russo, 2012). The three main provinces in Emilia Romagna, i.e. Bologna, Modena and Reggio Emilia, are all involved in mechanic production, with partially different specializations - the machine

tools sector is significant in all the three provinces, while the automotive sector is nowadays more concentrated in the province of Modena. Production in the mechanic sector focuses on final industrial goods, a feature that differentiates the composition of its exports and imports with respect to other sectors. At present, the sector has managed to achieve a good market penetration in a number of different OECD countries, but also, increasingly, in emerging countries, and in particular China and India. As regards its imports, mechanic firms increasingly source from foreign markets, where again Asia stands out as particularly important, and to an extent that is again much greater than in other sectors. This strong openness of the sector coexists with a local division of labour that is characterized by a high disaggregation of production into phases and components, where three main types of firms can be identified: firms producing final industrial products, contractor firms, and firms providing services. In the sub-sectors where the final industrial product is highly complex, production may be substantially disintegrated along the value chain - with firms outsourcing between 80% and 100% of their production. These, in turn, rely on the ability of their contactors to master the production of highly complex components. Contractors often have a diversified portfolio of clients, which on the one hand reduces risks, while on the other hand allows contractors to play a more proactive role in the introduction and diffusion of innovations (Bigarelli and Russo, 2012). Global competitive pressure has led during the 90s to increasing industrial concentration, to a stronger role played by larger firms and multinationals and to more frequent offshoring to save on labour costs. In parallel, local institutions have lost power. These dynamics have led some observers to fear the structural crisis of the districts even if welfare levels, income and employment have remained high until the years of the crisis. The sector production and turnover, as well as its exports, were actually booming by the burst of the global financial crisis, which affected it heavily (Venuti, 2009; Bigarelli and Russo, 2012). The recovery has been relatively rapid on aggregate, but with significant differences along the value chains, with contractors having been most heavily affected.

District firms in the different sectors, before the crisis, were also among the most dynamic and export-oriented firms with respect to the national averages well as in production and turnover indicators. The mechanic sector and the construction sector have been particularly heavily affected. As a consequence, per capita income levels have dropped and unemployment rate has increased, even if unemployment remains lower than the Italian average (in 2009, the unemployment rate reached 5% in the Reggio Emilia province while the Italian average was 7.8%). Resort to social safety nets such *cassa integrazione* is among the highest in Italy Rinaldini (2011). Thus, while the local system still reports above-average performance indicators, it also shows signs of significant stress which according to some observers point to the need to restructure the local socio-economic context. In particular, the crisis has disproportionately affected those workers with more flexible contracts, where immigrants are quite likely to be represented. Bigarelli and Russo (2012) notice that, if immigrants would tackle the crisis period by leaving the region, they could contribute to

worsening the labour shortages that were affecting the sector before the crisis. This outcome which could entail serious consequences at the local system level, considering that in this sector, competences are acquired in a long process of mutual training and fine-tuning between the workers and the firm.

These arguments certainly apply to the case of the mechanic sector in Reggio Emilia. The mechanic sector in Reggio Emilia has over time articulated into a variety of specializations, among which the agromechanic sector, the oleopumps sector, the industrial packaging sector, and the industrial electronics sector (mechatronic) have been the most dynamic. The mechanic districts in Reggio Emilia have traditionally drawn on high levels of qualification. This is importantly linked with the historical presence in the area of "Officine Meccaniche Reggiane", a large-scale factory devoted to mechanic works in the railways sector. When the factory closed in the Fifties, a wide pool of highly qualified labour became available. These workers, to a large extent, became self-employed in craft-like small-sized firms serving local factories producing machines for the agricultural sector. In a continuous branching process, these firms specialized in components, such as engines and oleopumps. The growth of such sectors and their remarkable innovation performance were nurtured, rather than by the technical offices of a single firm, by the tight cooperation in advanced projects between small-sized firms. In the Eighties, faced with the crisis of the agromechanic industry due to Japanese competition in the Eighties, they diversified thriving into new specializations, such as industrial packaging and mechatronics (Rinaldi, 2008), which is nowadays among the leading sectors of the district.

6.1.2 Local institutions and the promotion of immigrants' integration

A distinguishing feature of the local systems of Modena and Reggio Emilia in relation to immigration is considered to be the role of local institutions as active promoters of immigrants' integration[1] . Since the early years of immigration in the '80s, immigration flows have been addressed through a "structural integration approach" which included the capping of specific resources and the establishment of institutional bodies devoted to tackling the issues raised by the increasing immigration flows. This policy approach benefited in particular from the national framework set by law nro. 40/1998 (known as "Turco-Napolitano" law), which in 1998 established a dedicated budget line to the social integration of immigrants, the 1999-2003 National Fund for Migration Policies (Mottura and Rinaldini, 2003). At the beginning of these integration initiatives, provinces were the leading actors, but, over time, local authorities at the municipality, and even at the zonal level, took responsibility and active steps in establishing representative structures for immigrants, as well as consultative groups on immigration issues. This allowed the elaboration of coordinated and

[1] A key reference on this matter is the comprehensive introduction to the issue of immigration in the industrial districts of Modena and Reggio Emilia offered in Rinaldini (2011).

decentralized Regional Integration Programmes financed by national and regional funds. The programmes prioritized school integration, decentralized access to relevant information and intercultural mediation (Stuppini, 2010). Following the new immigration law nro. 189/2002 (known as "Bossi-Fini" law), the Emilia Romagna region launched a consultation process to modify its own immigration regulations. This resulted in the Regional Law nro. 5/2004, which allowed the Region to substantiate its role as a coordinator of policies and interventions at different institutional levels, including public and private stakeholders. Over the 2008-2011 period, the related action plans set information collection and social cohesion as objectives and conveniently avoided fragmentation of interventions by defining three priority areas: alphabetization, mediation and anti-discrimination (Stuppini, 2010). As a result, most interventions of non-governmental organizations, including immigrants' associations, result strongly interlinked with local administrations (Mottura et al., 2011).

Early recognition of the changes deriving from immigration must be ascribed to trade unions as well, and in particular to the CGIL, leading to the result that in Emilia Romagna the inscription rates of immigrant population is the highest in Italy. Trade unions provide opportunities for social gathering for both members and non members and have constituted an important channel for the representation of the interests of the immigrant population locally. Employers' associations have also been involved in the elaboration and implementation of integration policies but they have been less active in undertaking own restructuring initiatives (Rinaldini, 2003).

Mottura and Rinaldini (2003) argue that the combination of economic wealth and political continuity of left-wing parties account for the fact that, to a large extent, in the areas of Modena and Reggio Emilia, immigrants are not only "wanted", but also "welcome". But one could ask how sustainable this governance model will be in the face of the global downturn and of the continuing immigration flows, with the cultural changes in the leftist parties and while increasing consensus to right-wing parties, primarily Lega Nord, has emerged in recent elections, in some cases especially due to political slogans associating immigration with criminality and addressing the potential conflict between immigrants and natives in access to local welfare (Rinaldini, 2011).

6.1.3 Immigration dynamics in the industrial district of Reggio Emilia

The early phases of immigration in Emilia Romagna can be situated in the Seventies, when small-scale immigration flows mainly from Northern Aftica countries added up to immigration flows from the Southern Regions of Italy. During the Eighties and early Nineties, the municipalities of Parma, Modena, Reggio Emilia and Bologna begun experiencing labour shortages in their small-sized manufacturing firms and became attraction poles for immigration flows, with rapid increases after the first immigration amnesties in 1986 and 1990,

which also partially regularized irregular immigrants already residing. The foreign population in Reggio Emilia has increased at an extremely fast pace in between the Nineties and early 2000s, growing from 3,813 units in 1990 to over 30,000 in 2003. This booming growth is to a large extent related to the amnesties associated with the adoption of the two laws on immigration, the "Turco-Napolitano" and the "Bossi-Fini" laws. Since 2003, the immigrants' rates over the local population in Reggio Emilia have been among the highest in Italy and grew to 59,429 units, corresponding to a 12% of the population in the province, in 2009. The province of Reggio Emilia is also characterized, together with the province of Modena, by the highest absolute (17,873) and relative (18.6% of the total immigrant population with regular residence permits) numbers of long-term residence permits in the Emilia Romagna region (Rinaldini, 2011). Reggio Emilia is also characterized by the highest shares of naturalized immigrants over the foreign population in Italy. The main countries of origin in 2011 were Morocco, Albania, India, China and Romania.

Reggio Emilia is also characterized by a high share of foreign minors over the locally resident foreign population (25.7% in 2008), corresponding to a 6.85% of the minors integrated in the school system of the province.

Immigrants in Reggio Emilia also play an active economic role in the local production system. In 2006, 227,000 foreign employees, corresponding to a 15.3% of total employment, were occupied in Emilia Romagna. Such shares are among the highest in Emilia Romagna and in Italy. As regards the manufacturing sector, Reggio Emilia has, since the early phases of immigration, stood out for its very high absolute and relative number of incriptions of foreign workers to the social social security system. In the first decade of 2000, the inflow of foreign workers in the social security system continued, but the profile of workers changed, with an increasing relative importance of female foreign workers and of the employment in the services sector (Rinaldini, 2011). Non-EU citizens in Emilia Romagna were mainly occupied in manufacturing, construction, hospitality, in services to manufacturing firms and in agriculture. The academic literature has recognized the large number of job opportunities offered by small and medium-sized manufacturing firms as a strong pull factor for immigration in the province of Reggio Emilia (as well as of Modena). Yet, inclusion at work seems to strongly rely on immigrants' flexibility and keeness to accept less guaranteed jobs. Indeed, non-standard contracts are quite common among immigrants, especially in the industrial sector. In 2006, an analysis on employment agencies data showed that only about 44% of non-EU workers were employed with an open-ended contract; about 50% were employed with a determined contract and about 6% with other temporary contracts - shares that draw a marked distinction from the treatment of native population in terms of contracts(RER, 2006). In 2009, Reggio Emilia was ranking second in Emilia Romagna for its number of non-EU interim workers (RER, 2010). Based on a survey on ca. 1,654 foreign residents mainly in the areas of Modena and Reggio Emilia, Mottura (2002) showed that the immigrants count on differentiated previous work experiences in the home country, have heterogeneous professional skills and an educational level that, while not high, cannot

be easily defined as low qualified. The research highlighted the systematic downgrading of immigrant qualifications in the workplace.

In 2002, the Association of Small and Medium-Sized Firms (Associazione Piccola e Media Industria, API) in Reggio Emilia run a survey on 300 SMEs members of the API, aiming to understand the quantitative dimension, the characteristics and the entrepreneurs' perspectives on the intergation of immigrant workers in the local production system. The sample was representative by sector, size and municipality. The average size of the firms resulted to be of 28.4 employees; 163 out of 300 firms declared to employ immigrants. Of 8,507 employees in the considered industries, 656 were immigrants and were occupied mainly in medium-sized firms. The highest number of immigrant employees were registered in the metalmechanic, ceramic and construction sector. 99% of immigrants were employed as non-qualified workers while only 1% as clerks. 85.1% of immigrant workers were employed with an open-ended contract while only 18.5% with a non-standard contract, while employers reported an increasing tendency to employ immigrants as interim workers. The employers declared that, mainly, employing immigrant workers was a decision deriving from the unavailability of natives to enrol in manufacturing. Informal channels were the main ways to employ immigrants. The survey also noted that immigrants were employed by firms that had introduced innovations or had grown in their size, falsifying the correlation between employment of immigrant workers and lack of innovative potential by firms; at the same time, the study indicated that immigrants were almost exclusively employed in the less-qualified jobs whose need grew as a result of the growth of the firm.

6.2 Reggio Emilia within the firm immigration patterns of the region: The characteristics of firms hiring immigrants

Given the lack of systematic data on firm characteristics and immigrant labour at the province level, the regional-level analysis will be taken as a benchmark for the analysis of the local labour system in this chapter and in the following one.

6.2.1 Basic data

According to the MET sample (see a summary of the variables used in the analysis in Table B.3.1), in 2008 21.85% of firms in Emilia Romagna hired immigrant workers, a share that is higher than the national one (15.99%) and is comparable with the Basque country data discussed in section 7. This data reminds us that, in spite of the fast dynamics and important relative dimension of the phenomenon of immigration in the region, almost four fifths of the firms still don't hire any immigrant. As just discussed, however, both

nation-wide and especially in Emilia Romagna, the share of firms hiring immigrants is higher for the subset of manufacturing firms, reaching respectively 18.08% and 24.41% of the total.

Firms that hire immigrants in the manufacturing sector employ a median of 14.28% of foreigners, which due to the average small size of the firms (the median size of firms hiring immigrants is 21.5 employees; 75% of the firms hiring immigrants employs less than 50 employees) corresponds to an absolute median number of 3 foreign workers per firm. Firms hiring immigrants in the manufacturing sector are relatively mature, with an average age of 27 years, and employ a 5.5% of their labour with non-standard contracts. The distribution of firms reflects the prevalence of an economic fabric mainly composed of small-sized locally-oriented and relatively conservative firms vis-à-vis a minority of larger, more dynamic, and export-oriented firms: 50% of the firms export less than 5% of their production, while the more internationalized 10% of them exports at least 60% of their production. Similarly, 50% of the firms invested less than 3% of their turnover in material or immaterial investments between 2005 and 2007, while the most dynamic 10% invested at least 27% of their turnover. This structure affects also the extent by which firms apply non-standard contracts: 50% of the firms hires less than 6% of their labour force with non-undetermined contracts, and 0% of interim or consultancy contracts; the share increases to respectively 50% and 43% in a minority of firms corresponding to a 10% of the total but more likely to be investigated due to their larger size and greater participation in business associations. Using the data about the value added in 2008 obtained from matching a subset of the MET database with the AIDA database on balance sheets, a raw measure of productivity was computed as the average value added per worker, which was standardized with respect to the average productivity of the main sectoral categories. It should be born in mind that, because registration within AIDA is not mandatory, this subset is likely to reflect a subset of more established, healthy and large firms. Among these, those hiring immigrants have productivity levels ca. 17% lower than the average of their sectors. This datum, again, reflects the polarization in the production structure, considering that 50% of the manufacturing firms hiring immigrants have productivity levels at least 24% lower than their sectoral average, while less than 25% of firms is equally or more productive than the average of their respective sectors.

Looking at the Pearson correlations of immigrants shares with some firm characteristics, it seems that the decision of whether to hire immigrants or not marks a change in patterns (Table B.3.1 in Appendix). Within the sample of all manufacturing firms, the share of immigrants is negatively correlated with firm size; the correlation becomes positive in the subset of firms hiring immigrants. The correlation between the immigrants' share and the log turnover is negative for the total of manufacturing firms but positive for the subset of firms hiring immigrants. Hence, it seems that firms hiring immigrants are smaller than the average, but, within the subset of firms hiring immigrants, higher shares of foreign labour force are associated with larger sizes and turnover.

Other correlations suggest some self-selection of firms within the subsample of those hiring immigrants. Looking at the sample of all manufacturing firms, immigrant shares are positively correlated with variables relating to firm self-assessment about employment and turnover performance in the 2005-2008 period as well as with the forecasts for the 2009-2011; however, the correlations are non-significant within the subsample of firms hiring immigrants. Correlations with the share of non-undetermined contracts is negative and significant for the whole of manufacturing firms and non-significant among firms hiring immigrants; similarly, the correlation of the share of immigrants with a binary indicator of whether the firm has invested or not, as well as with the log of the investment value and with productivity indicators, is positive and significant for the total of manufacturing firms and non significant for the subset of firms hiring immigrants. These patterns suggest that one could gain insight from looking at the binary choice of hiring/not hiring immigrants as well as from looking at the decision of how many immigrants to hire. This kind of non-linearity will be investigated through cluster analysis in the next section.

Limiting the analysis to firms in the mechanic sector (NACE codes between 271 and 297; table B.3.1 in Appendix), instead, the effects seem to be more linear: the share of immigrants is negatively related with firm size, log turnover, share of non-standard contracts, relative productivity as well as with indicators of whether the firm has undertaken R&D investments in the 2005-2007 period, has exported, as well as and with the share of firm exports over total production.

6.2.2 Cluster Analysis

As discussed in chapter 5, two-step cluster analysis was run on a series of variables reflecting the firm strategic choices. The set of predictors included primarily a binary variable *NID* indicating whether the firm hires at least one foreign worker and a continuous variable *ForPerc* indicating the share of immigrants employed. Further included predictors are: an indicator variable *Exporter* equalling 1 if the firm is an exporter and 0 otherwise; a continuous variable *Exports* indicating the share of turnover exported, indicator variables *InvRD* and *RD* summarizing whether the firm had invested in material and immaterial assets and in R&D in the 2005-2007 period, and the binary variable *inno*, indicating whether in the same period it had introduced product or process innovations; measures of share of temporary non-standard contracts employed *NStContr2* as well as firm characteristics, such as log size, log turnover, indebtedness and age, were also included.

The purpose was to identify how the choice of hiring immigrants, and of what share of immigrants to hire, associated with other firm characteristics. The analysis was performed on all manufacturing firms of the MET sample and on the subsample for which also productivity indicators were available[2]. The results are similar in both cases, as productivity

[2]Unfortunately, due to data incompleteness, variables indicating the share of workers employed in the

Table 6.1: Cluster Analysis: summary

Cluster	Percent	Observations
1	46·71	659
2	28·28	399
3	25·02	353

does not emerge as having key clustering importance.

Three clusters emerged (Table 6.1 and Fig. 6.1), with an average silhouette measure of cohesion and separation of 0.2, indicating fair cluster quality. Predictor importance is highest for the indicator variable *InvRD*, summarizing whether the firm has invested in R&D in the previous year or not, and for the indicator variable *NID*, indicating whether the firm has no immigrants or not. Predictor importance was also high for the variables indicating the share of turnover invested in R&D *RDPerc* and the share of foreigners employed *ForPerc*.

Clusters 1 and 3 are composed of firms that, in their majority, don't invest in R&D. These firms are comparable as regards their size (on average, Cluster 1 firms hire 21 employees while Cluster 3 firms hire 20 employees) and their orientation to innovation (52.2% of firms in Cluster 1 and 53.5% of firms in Cluster 3 declare they haven't recently introduced any kinds of innovation). The two are mainly distinguished by whether they hire immigrants or not (*NID*=0 or *NID*=1); among the firms that hire immigrants, the share of foreigners employed is on average 25.7% of total employment. Thus, comparing the two clusters provides some insights about the implications of the choice of hiring immigrants within more production-oriented firms. Inspection of the clusters (Fig. 6.1) suggests the decision to hire immigrants is associated with lower turnover (on average about 3.3 vs. 4.7 million Euros), and higher indebtedness (the majority of firms in Cluster 1 declare their being financially sound, while the majority of firms in Cluster 3 declare their liabilities represent between 0% and 20% of their turnover); at the same time, it is also associated with more frequent investments (55.5% of the firms not hiring immigrants, against 61.5% of the firms hiring immigrants, declare to have introduced investments in the 2005-2007 period). In both clusters, the majority of the firms (57-59%) are not direct exporters; firms hiring immigrants export slightly less often and slightly lower shares of their turnover.

As regards the firms that invest in R&D (Cluster 2), instead, the cluster analysis is not able to identify a relevant distinction between the firms that hire immigrants and those which don't. These firms are innovative and export-oriented firms with high employment and turnover levels, an average share of 9.40% of their turnover invested in R&D activities and an average 29% of their production exported. They also more frequently invest in material and immaterial assets other than R&D and are less indebted than the firms in the

production and R&D departments could not be included in the analysis

other two clusters. Because this cluster involves both firms that hire immigrants and firms that don't (the majority, 64%), the average immigrant share in these firms is 4.17%.

According to these results, hiring immigrants would not seem to constitute a strategy as such for more innovative and export oriented firms, which may be driven to do so based on other firms characteristics, primarily their openness and innovation orientation. Instead, hiring immigrant emerges as a distinctive feature of non-R&D-oriented firms, which appears associated with worse performance indicators but also with more investments. This analysis, *per se*, does not allow establishing whether worse performance lead to employing immigrants as a "last resort" strategy, or whether it is the costs or the lock-in associated with firm's choices to hire immigrants that causes lower turnover and investment. Still, a "last resort" cost-reduction strategy should in principle not be associated with higher level of investments, and the high average shares of foreigners employed within these firms suggest immigration could have causal implications on firm characteristics. Thus, the idea that there are productivity costs associated with immigrants' lower qualifications, which in turn generate the need for higher investments (Accetturo et al., 2012), could apply[3]. The same analysis performed on the smaller sample including data on productivity showed that low productivity is also among the distinctive features of cluster 3 to a much larger extent than in the other two clusters, ranking fifth in predictor importance for this cluster. The discriminant analysis reported in the next section attempts at answering these questions.

6.2.3 Discriminant Analysis

In order to identify which firm characteristics best discriminate between the identified groups, discriminant analysis can be run. We may want to know whether, with a given level of foreign labour force, the firm is more likely to belong to the subgroup of highly innovative and export oriented firms or whether it is more likely to fall in the category of firms resorting to immigration as a "replacement strategy", as well as what other variables are necessary to classify the firm. Also, we may want to classify other firms according to the three groups once the key discriminating variables have been identified.

The first column of table 6.2 reports the results of the discriminant analysis on the three groups identified with the cluster analysis. Because we are especially interested in predicting group membership of firms hiring immigrants, columns 2 and 3 report the results of the discriminant analysis restricted to cluster 2 vs. cluster 3. The third column of the table reports the results of the discriminant analysis between cluster 1 vs. cluster 3: what variables best discriminate between non-innovative firms hiring and not hiring immigrants?

[3]Unfortunately the MET data on the average share of workers in the production compartments is too incomplete to be used here as a proxy for low qualification and production orientation of the firm

Table 6.2: Discriminant analysis

	(1)	(2)	(3)	(4)
Cluster	**1 vs. 2 vs. 3**		**2 vs. 3**	**1 vs. 3**
Discr. function	*1*	*2*		
Summary of Canonical Discriminant Functions				
Wilks' lambda	0·022	0·262	0·112	0·515
Canonical correl.	0·956	0·859	0·942	0·696
Chi-square	5334·384	1879·730	1635·487	668·129
Significance	0·000	0·000	0·000	0·000
Standardized Canonical Discriminant Function Coefficients				
RDPerc	0·118	0·070	0·137	0·099
inno	0·008	0·087	–	–
InvRD	0·992	−0·021	0·903	–
Exporter	0·117	0·107	0·211	–
NID	−0·057	0·892	0·314	–
ForPerc	−0·207	−0·293	−0·275	0·951
lnTOver	0·073	0·038	–	–
lnEmpl	–	–	0·152	–
NStContr2	–	–	–	−0·269
lnAge	–	–	–	0·123
Structure matrix				
InvRD	·961	−0·061	0·849	0·224
RDPerc	·173	0·005	0·159	0·177
inno	·095	0·038	0·093	0·002
lnTOver	·089	0·068	0·120	−0·094
lnEmpl	·084	0·024	0·157	−0·078
Exporter	·077	0·017	0·107	−0·046
ExpPerc	·062	−0·019	0·067	−0·032
Indebt3	−·010	−0·005	−0·008	−0·027
NID	−0·027	·943	0·326	–
ForPerc	−0·042	−·512	−0·229	0·952
NStContr2	−0·008	·137	0·079	−0·271
Investor	0·038	−·060	0·001	0·018
lnAge	−0·009	·021	0·019	0·038
Functions at group centroids				
1	−2·178	1·398		−0·709
2	5·196	0·122	2·645	
3	−1·807	−2·747	−2·990	1·324

In all cases, the discriminating functions are highly statistically significant. The canonical correlations, i.e. the multiple correlations between the predictors and the discriminant functions (Burns and Burns, 2009), whose values, squared, provide a measure of the proportion of variance explained by the model, are highest for the functions discriminating cluster 2 from cluster 3, i.e. those which are representing more polarized types of firms. The converse of the squared canonical correlation is the Wilks' lambda, which indicates the proportion of total variability not explained. It is highest for the discriminating function 2 (column 2), which distinguishes cluster 1, the one of non R&D-oriented firms with no immigrants, from cluster 3, the one of non-R&D oriented firms hiring immigrants. The predictors selected in the stepwise procedure are *RDPerc, inno, InvRD, Exporter, NID, ForPerc, lnTOver, lnEmpl, NStContr2, lnAge*; weighted differently in functions 1 and 2, they allow discriminating Clusters 1, 2 and 3 correctly in 97.6% of the cases.

Besides variables about foreigners employment (no-immigrant dummy and foreigners' share), the variables identified from the stepwise procedure of the first discriminant analysis (columns 1 and 2) relate to knowledge production (R&D orientation, share of turnover invested in R&D, introduction of product or process innovations), exports and turnover. Higher levels of the latter variables characterize cluster 2 (positive coefficient of the function at group centroid), which definitely profiles as the knowledge-intensive one in discriminant function 1 (column 1), mainly defined by R&D intensity in terms of both the canonical correlation coefficients and of the loadings in the structure matrix[4]. Clusters 1 and 3 are defined in opposite terms as firms that less frequently invest in R&D and can be profiled as relatively more production-oriented ones, if we assume that the quite incomplete data on the shares of labour force employed in the production compartment apply to the larger set of firms[5]. Within discriminant function 1, the share of foreigners has a negative coefficient, implying that higher shares of foreigners are negatively related with knowledge orientation. Yet, also the indicator variable *NID* has a negative sign in both the matrix of canonical coefficients and in the structure matrix, while it indicates the opposite phenomenon, i.e. that the firm hires no single immigrant: this can be interpreted as an indication that being totally closed to diversity is also negatively related with knowledge production, exports and turnover. The coefficients of this variable in both the canonical correlation matrix and in the structure matrix are quite small, though, indicating that this effect is relevant to a minority of cases. The results in terms of R&D and shares of foreign labour force are confirmed in the discriminant analysis reported in column (3), i.e. the one that compares clusters 2 and 3 only. The results of the discriminant analysis run on all variables are con-

[4]The coefficients in the structure matrix can be interpreted as discriminant loadings, just like factor loadings in factor analysis, and correspond to the correlations of each variable with the corresponding discriminant function (Burns and Burns, 2009).

[5]According to the available data, the share of personnel employed in production is on average 68% in cluster 2 firms, while it is respectively 73% and 71% in clusters 1 and 3; the personnel employed in R&D departments is 5.57% in Cluster 2 and only 1.74% in Cluster 1 firms. Instead, it is 4.53% in cluster 3 firms. Unfortunately, the data on the internal distribution of tasks are especially incomplete for cluster 3.

firmed, but more variables result having a discriminating power in this case: besides R&D and migration variables, also variables relating to firm employment and its orientation to exports result in relatively high coefficients in the discriminant functions and also in the structure matrix. The negative effect of NID on knowledge intensity, instead, disappeared, proving that it mainly was defined in relation to the worse R&D performance of firms in cluster 1. Another result that seems worth noticing is the one relating to the sign of the coefficient of *Exporter*, that is always opposite to the one in the function at groups centroid for cluster 3. This implies that production-oriented firms hiring immigrants are in general less likely to be exporters. This is compatible with the results found in Chapter 4.

Discriminating function 2 (column 2) allows discriminating cluster 1 from cluster 3, while it is almost irrelevant in discriminating cluster 2 (the function at group centroid for cluster 2 is close to zero). In this discriminant function, the variables relating to migration, i.e. NID and ForPerc, are by far the ones with the largest coefficients and greatest loadings, implying that firms in Cluster 3 are discriminated from Cluster 1 mainly on the basis of whether they employ immigrants and of how large the immigrant shares are. While the other variables have much smaller loadings, inspection of the structure matrix shows that firms that hire immigrants are also characterized by comparably lower shares of non-standard contracts. These emerge as a relevant discriminating variable in the discriminant analysis conducted in column (4), i.e. the one limited to clusters 1 and 3. At first sight, this result would seem to contradict the literature showing that immigrants are more often employed with non-tenured contracts. Closer analysis of the relationships between variables shows that firms in cluster 3 are concentrated in the production of final industrial goods[6]. Production of final industrial goods, in turn, is characterized by more stable contracts: in this subsector, the average share of precarious contracts is 11.7%, almost ten points below the regional average of 20.2%. This subsector actually also corresponds to the core of the district mechanic production. On the whole, this apparently surprising result suggests that immigrants, rather than remaining relatively marginalized in niches of the "ethnic business", are actually quite well integrated in the core of the industrial fabric of the industrial district of Reggio Emilia. While these data obviously have to neglect all informal employment, the result seems to reflect the inclusive institutional framework sketched in the introduction.

Another result of the discriminant analysis that is worth noticing is that migration variables, when limiting the analysis to Clusters 1 and 3 and in particular in column (4), are found to move together with the variable indicating whether the firm regularly invests in R&D. The coefficients are small in the discriminant function and in the structure matrix in column 2, but they are relatively large in the structure matrix of column (4). This implies that, in relative terms, production-oriented firms hiring immigrants result to be

[6]Firms in cluster 3 are, compared to the regional average, strongly concentrated in the production of final industrial goods and less representative of the production of consumer goods.They are also slightly more concentrated in the production of components

more dynamic than firms hiring no immigrants.

Table 6.3: Structure matrix. Specification including firm dynamism measures and productivity.

	Clusters 1,2,3 Function		Clusters 1,3
	1	2	
InvRD	.949	-0.073	0.278
RDPerc	.192	0.002	0.170
inno	.105	0.039	-0.060
lnTOver	.097	0.074	-0.143
lnEmpl	.091	0.029	-0.036
Exporter	.085	0.019	-0.068
ExpPerc	.073	-0.016	-0.034
NStContr	-.040	0.033	0.003
Indebt3	-.012	-0.006	-0.021
Pys	-.005	-0.002	-0.078
NID	-0.026	.944	-
ForPerc	-0.046	-.493	0.961
Togwth	0.036	-.091	0.073
Investor	0.029	-.061	0.028
Emplgwth	-0.032	-.048	0.033
lnAge	0.004	.022	0.050
Tofcast	-0.014	-.016	0.074

Table 6.3 reports the structure matrix of another specification of the discriminant analysis. This was run on the subset of firms for which productivity data were available and included a measure of productivity as well as of variables reflecting entrepreneurs' self assessments about turnover, employment and investment growth. Because these variables overall are not selected in the stepwise procedure, only the structure matrix is reported. While firms in Cluster 3 have lower productivity and higher self-assessment records, all their coefficients result remarkably low and are not considered as significant predictors for discrimination. In particular, productivity results in negligible loadings within the structure matrix of the discriminating function including all clusters, and in small loadings within the structure matrix of the DA limited to cluster 1 and 3. Table 6.3 also shows that, in discriminating between Cluster 1 and 3, the lower productivity in Cluster 3 associates with lower exports, though again with small coefficients.

Overall, the results of the quantitative analysis have provided some insights on propositions P1.1 and P2.1. As regards P1.1, the cluster analysis has shown that highly knowledge-oriented firms cluster as a single group regardless of the share of immigrants they hire. This group of firms contains a 35.8% of firms hiring positive shares of foreigners, mainly under

20% of total firm employment, which considering the average size of these firms implies that only in a few cases the absolute number of foreigners is above 10. Either because of the relatively low number of foreigners or because of the prevalence of firms' own strategies over the immigrants' potential contribution to innovation and exports, there appears to be no distinctive feature discriminating knowledge-oriented firms hiring immigrants from those who don't. It would seem that the immigrants' contributions are substitutable with those of natives. Thus, proposition P1.1 is found not to apply to the case of Emilia Romagna.

Table 6.4: **Emilia Romagna: Main findings from the quantitative analysis**

Proposition	**Evidence**
P1.1: Knowledge-intensive firms hiring foreign workers are characterized by comparatively higher innovation, productivity or exports than those hiring no immigrants	**Not supported in the data.** A 35.8% of highly innovative firms are hiring immigrants. Diversity could be among the factors that contribute to their high innovativeness and exports, though it does not emerge as a distinctive feature of these firms.
P2.1: The employment of foreign workers reflects the higher reliance of firms on non-qualified manual work.	**Supported in the data, with an important qualification.** Firms hiring immigrants are highly production-oriented, yet lower qualification and skills do not emerge as characterizing features of these firms. Indeed, firms hiring immigrants are characterized by lower shares of non-standard contracts, reflecting their comparatively high concentration in the core sectors of the district producing final industrial goods. While highly production-oriented, this sector is also relatively R&D intensive.
P2.2a: Hiring immigrants is an alternative to investing in R&D	**Not supported in the data.** Firms hiring immigrants were found to be relatively more R&D intensive than comparable firms hiring no immigrants.
P2.2b: Hiring immigrants is complementary to investing in R&D	**Supported in the data.** Firms hiring immigrants were found to be relatively more R&D intensive than comparable firms hiring no immigrants.

As regards P2.1, the results of the quantitative analysis suggest that firms hiring immigrants, on average, are characterized by a higher concentration within the production core of the district, i.e. production of final industrial goods, which is associated with lower shares of non standard contracts. Within the subset of firms for which data on the shares of workers involved in production and R&D activities, firms of cluster 3 result comparably production-oriented as firms in cluster 3 (71% of their employees vs. 73% in cluster 1 are employed in the production compartment). However, their share of workers involved in R&D, 4.53%, is closer to the levels of cluster 2(5.57%) than of cluster 1(1.74%). In short, the cluster of firms hiring immigrants is composed of relatively R&D-intensive production-oriented firms. This finding is confirmed when looking at the other variable that emerges from the discriminant analysis: R&D orientation. While the average lower levels of turnover, productivity and exports in these firms don't emerge as significant dis-

criminating variables, their greater R&D orientation results a significant discriminating variable. Thus, it does not seem that firms hiring immigrants are so easily profiled as intensive in manual work and low qualification and the evidence in favour of hypothesis 2.1 is not full. it would also seem that firms in this cluster are not driven to employ immigrants as a "last resort" reaction to bad performance, but that these firms are relatively dynamic from the point of view of their investments. Hence, P2.2b is preferred over P2.2a. Because, however, performance measures did not emerge as significant predictors, it cannot be said whether investments are oriented to balance the lower productivity of immigrants or are the drivers of a dynamic firm performance.

Table 6.4 summarizes the main findings from the quantitative analysis.

6.3 Immigration in the local system of Reggio Emilia: Evidence from the interviews

The typologies identified in the previous section from at the level of the Emilia-Romagna will be taken here as a benchmark for framing the findings of the interviews collected in the local system.

6.3.1 Immigrants in knowledge-oriented firms

The interviewed firm managers and HR representatives generally recognize the greater transnational abilities of foreign employees.

> The greatest advantage from having foreign employees in the sales department and locals in our foreign offices relates to their ability to enter into a dialogue with clients' cultures in their mother tongue. This enables us to translate and de-codify the clients' needs, preferences and tastes, so it also contributes to innovating and improving our products. [RE10]

This quote comes from the manager of an agromechanic firm exporting 90% of its production, investing about 10% of its turnover in R&D every year, and having been a pioneer in the employment of foreigners in the sales and customer care area. Nowadays, in the firm there are 10 foreign employees from Russia, Uzbekistan, Spain, Turkey, Morocco who have been sought and selected for their cultural and linguistic competences. The manager admits that the sector of activities has played a role in the recognition of the immigrants' potential: producing milking components worldwide implies coming into contact with a production that is highly culture-specific but benefits a lot from standardization.

In this sense, diverse teams are recognized to also contribute importantly to productivity and innovation:

> Culturally diverse teams are able to look at problems from different angles. You should note that Italy is not among our main markets and that every culture produces a different milking culture; in every culture, stables are conceived differently. On the other hand, we try to produce inter- changeable components, that means that we do not exclusively produce dedicated products. Thus, it is very important for us to be able to look at solutions from a multiplicity of perspectives that could be adapted to different cultures. If I would perceive the stables only in the way we have them in Trentino or Emilia Romagna, that would be a very limited perspective. I would only look at them in one way and I would loose a lot of opportunities. The way you treat animals, the design of stables and of their equipment is important to our clients and is very culture-specific. Only looking at things from within a culture you can provide answers and solutions to specific problems. A multi-cultural working team can synthesize appropriate solutions. [RE10]

By a similar token, the manager of an oleopneumatic firm producing jacks for lifting heavy vehicles considers that

> foreigners can contribute to production with their open-mindedness, with their knowledge of different cultural contexts. For instance, they can contribute importantly to developing a design that is more attractive for their origin culture - and this is potentially important even in a sector like ours. At present, however, it is difficult to find foreigners for the right qualification to perform such a role. But in perspective it may have important costs but it can also have quantitatively important effects.[RE08].

Also in this case, the firm is strongly export-oriented. On the other hand, managers also highlighted the conflict potential in multicultural teams:

> Balancing the potential conflict in ethnically diverse teams is a delicate issue. I can see there is some potential for synergy building from different cultural perspectives, but so far we did not observe it in our firm. Some degree of separation along ethnic lines has prevailed so far. You probably need more knowledge of the local culture and possibly a higher educational level to grasp the potential for innovation and productivity from diversity. [RE07]

> I can see there is a potential for increasing productivity through diversity, but I haven't observed this in my work experience in this firm or in my previous experience. I imagine this effect is more often observed in the USA, or in contexts where the immigration experience is longer, where you can count on second and third generation immigrants who have been educated within the

> host system and can better combine the diversity in origins and perspectives with a basic mutual understanding (...) From my own experience in this firm and in previous firms with more immigrants, I would say that yes, more ethnic diversity can generate more communication difficulties and even potential conflicts. The potential for conflict can arise from alliances among immigrants against Italians, or it could arise between immigrants, from legacies in the origin cultures. You better don't put an Indian and a Pakistani in the same team if you want to ensure smooth working relations and good levels of productivity. We also observed that conflict can both potentially arise within the working team and towards team managers. Other potential diffculties arise especially from religious differences, for instance from the need to respect the precepts of the Ramadan. [RE09]

The trade-off identified by Lazear (1999) between productivity and conflict in multi-cultural teams is noted by another HR manager. Besides the potential for conflict, he highlighted the role of the management in composing well-assorted teams in a holistic perspective, matching personality and human capital characteristics as well and features associated with origin and culture:

> We observe a tendency towards grouping between co-ethnics; and not always easy relationships with co-workers of different origins. Our foreign workers are not appearing to be very open towards dialogue. (...) HR managers' role in the process of selecting human resources is crucial for matching complementarities within teams to make them more innovative and productive [RE06].

As regards transnational skills, language knowledge is the most obvious transnational skills and is appreciated especially if it is in combination with other skills or if it relates to very distant languages [RE08]; indeed, highly export-oriented firms require knowledge of languages and transnational skills to nationals, too, in parallel with task-specific abilities:

> We have been employing a Siberian engineer since 4 years. We selected her based on her engineering skills but her transnational skills and particularly her knowledge of foreign languages is seen as an important advantage by us and by our clients in case of foreign business.[RE05];

> (...)Another advantage from hiring immigrants is their native knowledge of foreign languages (especially Russian and Chinese) that are very diffcult to find among Italian employees; and speaking foreign languages is extremely important, within our firm, especially the knowledge of English. Because of our strong export orientation, we need native speakers in Russian, Chinese, Spanish. Our levels of Export and internationalization make it important to know such languages at an excellent level. 4 people are hired in administration and technical

> offces where we regularly apply their linguistic skills in Russian and Chinese. [RE06]

The manager of a firm involved in the production of pharmaceutical machines:

> Our main exporting markets are in English language; knowledge of French is a crucial asset as well. We require knowledge of English to all our employees, including those working in the workshop, because they are directly involved in technical assistance activities abroad (...). When foreign clients come to the office, we try to give them the opportunity to communicate in their own language speaking with our foreign employees.[RE07][7]

More general intercultural skills are also considered as important:

> (...)While we try to approach international transactions in a professional way, (...) culture affects the way of doing business, the open-mindedness and the expectations about hierarchy. For this reason, the more distant the culture, the more important it is that the agent be local[RE08],

and foreigners can help access foreign markets: "One of our engineers is a Moroccan and is employed in the technical offce. We value very much the fact that he both has technical skills and linguistic/cultural skills useful in one of our strategic markets in the near future, i.e. Northern Africa. "[RE10]. These characteristics, however seem to be more decisive for the employment of locals in foreign offices than for the employment of foreigners to deal with international affairs in local offices. Cost considerations play a role in the choice of maintaining employment local.

> Why establishing international offices? Across countries, and in within countries, there are differences in both the technical specifications and in the norms to comply with. There are bureaucratic hindrances in accessing foreign markets as well as diffculties in ensuring that payments are fully enforced. For this reason it is important to count on native distributors who can provide the bridge towards the importing country. The main advantages relate to being guaranteed access to foreign markets with the related opportunities. [RE07]

The main problem mentioned in the relations with international relations with foreign agents relates to the risk of the agents' moral hazard.

> You need to ensure fidelization in your collaborators abroad. This is not always easy. In some countries, the "volatility" of the sales officers is much higher than in other countries. To ensure that they pursue our interests, they have to be

[7] Language affinity also plays a role: "We have regional heads of unit from different countries who are responsbile for the different markets and are regularly travelling abroad (e.g. our Russian head of unit is responsible for the area of Russia and Ukraine, the Spanish head of unit for Brazil, Portugal and Latin-American countries)"[RE10].

> happy to work for you, just as your employees here in Italy: you try to offer them competitive conditions and to maintain regular and positive relationships with the mother firm.[RE09]

"Our agents must have strong competences in our sector which take time to develop. We rely on incentive systems by which the agents themselves are incentivized to sign new contracts. Our clients frequently deal mainly with them. [RE07] "

Managers in the oleopneumatics and in the agromechanic sector also highighted a specific feature of the transnational skills in highly technical environments, i.e the local differences in the technical jargon:

> Knowledge of foreign languages is very important, particularly for the employees of the sales department, but not only for them. English and Spanish are crucial considering our main markets. French is also increasingly important. Knowledge of other languages is considered as a plus. Russian has also a strong potential in our firm. (...) Employees of the sales department are required to have excellent linguistic skills and to be able to deal in different cultural environments. Knowledge of the culture besides language skills is useful because the technical jargon is very specific and is not exactly the same in different countries, so the same term may be used differently. Thus, experience in this niche of the market and open-mindedness are crucial. [RE08]

Also, the ICT and the web can contribute to standardizing the technical jargon:

> We manage international activities from our headquarters with regular travels abroad (...). The online catalogue, coupled with the online orders, makes us able to overcome at least part of the difficulty involved in the management of orders with foreign clients. Indeed, the techni- cal language is not exactly the same in different countries. Through the online catalogue, we in a way "force" our clients to refer to our own codes and this greatly simplifies operations. In addition, we have an experienced team; for instance, they are aware of complementarities between products and propose them to potentially interested clients. [RE10]

Summarizing, the interviews have primarily shown both theoretical recognition and practical cases of employment of foreign workers based on considerations of their transnational skills that facilitate international transactions of firms.

As regards the gains from diversity in terms of innovation and productivity, instead, the interviewed employers recognized the potential but only in one case could report a practical example of innovation-enhancing cooperation within ethnically diverse groups [RE07] - while others highlighted the role of mediating factors to promote a shared basis for mutual understanding. This firm is highly innovation and R&D oriented; according to the

marketing manager, the employees must have both a mechatronic background and strong linguistic skills. The time required to become autonomous at work, thanks to the high qualification of the employees, is only 3-6 months. If the time to become autonomous is assumed to reflect the extent of localization and tacitness of the knowledge within the firm, this would imply a high level of codification in this case. Overall, this firm confirms the expected pattern that, by a relatively codified knowledge base, the benefits from diversity can more easily arise. In addition, the emphasis put by the marketing manager on the need to adapt to foreign milking cultures and to learn foreign technical jargon the suggests foreign tacit knowledge could actually play a more important role in business than local tacit knowledge.

The expected relation between tacit knowledge and benefits from diversity was also confirmed from the opposite side: the managing director of a firm reporting to have had difficulties in dealing with the foreign labour force because of their low levels of qualification (see below) said it takes between 2 and 5 years to become autonomous at work [RE10]. The president of another firm reporting some difficulties with foreign employees and the importance of the mediating role of the management reported it takes 3 years to become autonomous in the departments where these workers are employed [RE06]. The only firm in Reggio Emilia reporting not to hire any foreigners said it takes at least 2 years to become autonomous at work, and motivated the fact that they don't hire any foreigners by saying that "Because of the strong craftwork and teamwork component in our production, we need to count on a strong mastery of the technical language which is usually not guaranteed by foreign candidates. [RE05]".

In general, the expected pattern proposed in P1.2 was confirmed as regards transnational skills and found some support also in relation to the innovation and productivity gains from diversity.

6.3.2 Immigrants in production-oriented firms

Employers share the idea that relying on foreign labour reflects a stronger production orientation of firms. In the cases where firms hire immigrants both in production and an R&D or sales departments, the relative dimension of the phenomena is very different: most immigrants are hired in the production department and only a few of them in the offices. This is motivated with considerations - and strong concerns - about immigrants' low qualifications. "Their average lower qualification forces us to invest a lot of time in training them in mechanic topics to enable them to carry out production tasks. We need to start training them from the absolute basics [RE09]". Some firms, rather than reporting difficultires in filling posts in the production line report that the diffculties in the past relate to the need to find people with a quite specific specialization, which neither locals nor foreigners possess.

For this reason, "until recently, the main advantages from hiring immigrants were exclusively perceived to be in relation to their greater keenness to work in the production compartment. This remains the main advantage, yet the crisis has brought natives to reconsider the attractiveness of a job in production"[RE09]. The manager of an agromechanic firm producing machines for food processing employs immigrants mainly in the production department highlights that the kind of work posts that she has more difficulties in covering, such as assembly and finishing, are not in particularly "dirty" but rather quite demanding because they require a great deal of work intensity and great flexibility to adjust production with short notice[RE06];

> For this reason, the department is characterized by high turnover and there have been cases where the employees were all foreigners. In these cases, it may be difficult to maintain good levels of productivity. These are the areas where very few Italians are willing to work and where the potential for conflict with the head of department is highest. While problems apply to both Italians and natives and we generally are able to tackle them, I may say that in general foreigners are less keen to do tasks that require more flexibility and identification with the firm, those which lie outside the basic job description.

According to her, resorting to foreign labour is a matter of production orienation of local firms:

> The area has a strong orientation towards production, which is the area were there are most diffculties in filling vacancies. Many other firms have diffculties in finding workers. Thus, as a locality, we offer many job opportunities. It is not so much a matter of keeping costs low. It's a matter of orientation towards production. If you manage to grow, your employment requirements grow as well. [RE06]

The interviewees further reported that, to a certain extent, the level of qualifications varies by nationality (cfr. the argument about matching between offered and demanded skills in Grappi and Spagni, 1981):

> Foreigners are on average less qualified for work in production. We can also observe, to some extent, that there are national differences in the levels of training. We are less satisfied about northern-african personnel, who have on average lower productivity levels. We are quite satisfied about Indian personnel, whose training is better suited to the kind of tasks we need.

This perception applies also to relatively low-skilled tasks where, however, a certain national industrial culture contributes to ensuring the respect of safety norms and reducing risks. The following is the perception of the HR manager of a small subcontracting welding firm:

> I can identify differences between Arabs and Europeans in the way they approach work. However, I am not sure whether the differences are due to the young age or to cultural differences. They are less sensitive to security issues and risk, possibly because of a less developed industrial culture. It may be also a matter of how they conceive the rules. What is written in the Coran is what you need to respect, the rest you can also disrespect. Romanian people, possibly because they have a more developed industrial culture, are more sensitive to security issues.
>
> (...) There is this issue of risk that can become really serious in particular times. During Ramadan, for instance, a person who has not eaten nor drunk anything during the whole day is really undergoing important dangers when mobilizing heavy machines or climbing above 2 meters of height. There can be solutions to this: if the firm is sufficiently large, they could work at night; alternatively, technology can help: they could take food integrators; they could take their holidays during Ramadan times. As an employer, you can induce some variation in the origins of your workers, whenever hiring a high share of people from Arab countries may become a problem. Our moroccan worker is good, he tries to come to work earlier during Ramadan to be able to leave work early. But I would really be worried if I had to manage a construction firm during Ramadan, the risks are important. The problem is that in Italy you simply cannot allow yourself to suspend production during the Ramadan times. [RE11]

As regards the underlying firms strategies, the three proposed mechanisms all found recognition in the interviews. The association between foreign labour and cost-saving strategies, in line with interpretations *à la* Murat and Paba (2003), seemed quite obvious to interviewees but was in general attributed to third firms and not to the interviewee's own: "Firms that hire many immigrants are often active in the area of mechanic manufacturing. They are de facto subcontractors; their main strategy is based on cost reduction; they are likely employ immigrants just because you can pay them less."[RE10]. It was highlighted that the same objective can be pursued by employing Italian employees as well, plausibly by exploiting non-standard forms of contracting:

> (...), if the entrepreneur has as a priority the reduction of costs, he may choose to hire many immigrants exploiting their flexibility just to save on costs; this may actually lead to a worsening of the culture and know-how within the firm. But such a loss of know-how and culture of quality may actually occur by such a cost-reduction strategy also in case the firm would hire only locals. [RE08]

Within interviewees' firms, strong emphasis was put on the fact that hiring foreigners, rather than representing a cost-saving strategy, would be the only way to carry out production. Because of their low qualification, rather than reducing costs they would actually

reduce productivity and require greater efforts in training. The manager of a mechanic firm producing machines for the regeneration of plastic materials and insulation reported that the low levels of qualification of the immigrant workforce caused the internal reorganization of production:

> Within our firm, we both engineer and produce our machines. The immigrants' levels of qualification on average were below the levels we were expecting. We actually had to revise our production structure and to concentrate those who were suffciently qualified to work in the set-up and programming of the machines, while we reserved our foreign labour force in the use of the machines. (..) In other firms I worked in previously, I could observe an association between higher shares of foreigners and more investments in capital goods and automation, which partially counteracted the reduction in human capital associated with the average low qualification of the immigrant workers. This also depended on the nature of the production, which was more easily standardized. In this firm, production is more customized and less standardized, quantities produced are smaller and this argument applies less. (...) I can see that beyond a given threshold in the share of foreigners the quality of the product may decline, because what basically declines is the share of people working in the offices with respect to those working in the production line. (...) Hiring foreign labour certainly involves important investments in training.[RE09]

Another interviewee,too, noticed these productivity losses could affect the firms' ability to export and innovate.

> Hiring foreigners implies important investments in on-the-job training. Depending on the sector, your ability to export and innovate may be hampered by high shares of foreigners. It may also depend on the destination country of your exports and on your business goals.[RE11]

On the other hand, another interviewee proposed that hiring immigrant labour is the consequence of firm the market opportunities generated by firm growth and dynamism in terms of R&D investments:

> Talking of our company, export and R&D oriented, we can see that the focus on new products and markets leads to the creation of new tasks we have to cover. When possible, instead of hiring people from outside, we prefer to move internal people (already knowing the dynamics of our company and with good skills) to the new tasks. This leaves room to new positions on the lower-profile side, covered with both Italian and foreign workers [RE06].

Overall, the perception that hiring immigrant labour reflects higher production orientation and firm strategies is well rooted in the interviewees' perceptions, and is mainly attributed to the immigrants' low qualifications which according to some can actually translate into

serious safety implications at work. The idea that immigrants are hired as part of cost-saving strategies is also shared but, as regards own firms, employers recognized more often the association between higher immigrant firms and greater investments. In general, one cannot conclude that firms hire immigrants exclusively on the basis of a cost-saving strategy and support from the interviews seems to be more in favour of P2.2b.

6.3.3 Homogeneity vs. heterogeneity in immigrants' social capital

Personal relations in foreign countries are deemed crucial for business development by all exporting firms. Success in business transactions abroad is considered to depend on the knowledge of the local context. Yet, no employer reported that considerations of the foreigners' social networks or social capital play a role when selecting candidates for sales posts abroad.

In general, instead, managers stated that their selection of foreign workers was based on considerations of their skills as well as for any other employees. According to most observers, human capital considerations predominate over social capital considerations in the recruitment process and firm routines are considered to prevail on individual cultures: "In the beginning they may have had some cultural difficulties. But our firm has routines and practices which are now quite established. Foreign workers have now fully integrated in the firm culture which now prevails. " "(...) a big part is played by those who manage them, in the selection process, in the internal training provided to them and in transmitting them the business culture prevailing within the firm."

> (..) Those who leave this firm have great opportunities for professional growth elsewhere; in many cases they have become team leaders. This is because this is a place where you first of all learn a culture of work. It is hard work, performed with strong quality and precision standards under constant control. We had cases of literal social rehabilitation through work: guys who were half drug addicted when they came here and are now competently managing teams in other firms.(...) Qualifications are not high, but our firm is a place were you learn how to work. As in the case of our Moroccan worker, you may not know how to do the job but if you are disciplined and motivated you can become the best. [RE11]

Hence, P3.1 was not supported in the interviews.

As regards P3.2, in one case, the access of candidate employees to the social network of relations of the employer was found to play an explicit role in the selection of candidates. This is the case of a small-sized contractor firm in heavy metal carpentry sector. In particular, the interviewee, who is at the same time involved in HR management and in

welding, reported that the reputation mechanisms applying to the relationships with Italian firms and workers also apply to the recruitment of foreign workers:

> We select our candidates by personal contacts developed through sports and by personal references. The Moroccan guy is a runner as well as my father. He needed to work and my father positively valued the self- discipline that you gain through sports. My father taught him how to do the job; now, he's the best of our welders. I also noticed, among our Romanian suppliers, a guy from Moldova who is particularly smart. I would like to hire him, but so far I couldn't manage.[RE11].

According to the interviewee, the reputation and trust mechanisms applying to local inter-firm relationships are also relevant in the relations with foreign entrepreneurs and subcontractors:

> We value precision, quality and short delivery times to our clients. We can guarantee this by a careful selection of our clients, based on careful considerations on their reliability. The main relationships are with suppliers and clients. However, because we have a range of products that is wider than our competitors, our competitors from time to time become our clients; we also regularly exchange technical information - but to a limited extent: you need to protect yourself by removing critical reserved information. Reputation still counts very much and leads to the exclusion of those who look too closely into someone else's business. This reputation mechanism extend to foreign entrepreneurs, too. We are supplied painting services by a firm that is composed and led by Romanians. They were once a single firm; recently, they have separated. We advertise their good services to other firms. And as well as we do for locals, we also try to put foreign entrepreneurs into competition with each other to get better conditions for us. But because we are all interconnected in the value chain, at the same time we recognize it is best that everyone works. So when a firm has difficulties, we try to help each other out by providing some work. [RE11]

The interviewed firm is a relatively small subcontracting firm, which does not export directly but through its large-sized clients. It can thus be considered to be relying on local relations to a larger extent than other larger-sized and more export oriented firms.

Among these, rather than the reliance on reputation and trust mechanisms within the employers' social network, there seemed to be consideration about the mediating role of local institutions in providing references on the quality of the employees, which motivate in some cases the preference for locals candiates over foreign ones. The manager of a firm producing pharmaceutical machines reported to be more keen to employ local young people selected in collaboration with the local parish, with a view to promote local employment

and development. Besides being a way to contribute to local development, according to this manager, having been born in the area adds to the knowledge base of the candidate

> (...) people who come from the local area of Reggio Emilia are immersed in a culture of labour that is marked by a strong orientation to production. Even people who are not very scholarized have some degree of technical preparation, have heard something of production, they are exposed to a culture of work. But besides this I think differences are more about personality than about culture. [RE08].

The extent by which this "diffuse economy" (Rinaldini, 2003) or "industrial atmosphere" actually currently affects the economy is, however, subject to different perceptions. Another manager sees more relevance in the local level of technical training:

> The district of Reggio Emilia is characterized by vanguard firms in the mechanic sector, especially in oleodynamics, reducers, agricultural machines. The main advantage I can see is in the presence, locally, of professional training institutions such as the ENAIP; once completed the training, the high quality standards of firm allow further professional growth at work. I don't see such an important role in what has been defined the "industrial atmosphere", i.e. the idea that knowldege relevant to production is somewhere in the air, that everyone knows something about industrial production since birth. My impression is that the kind of knowledge that is "in the air", which relates to basic mechanics skills, is of a relatively basic level and is relatively easy to acquire also for foreigners and newcomers. What is less obvious and more useful for a firm is the kind of more advanced knowledge that you can get through professional training institutions, such as the ability of reading a technical drawing. [RE09].

Some preference for natives may be motivated by the bureaucratic complexity involved in hiring immigrants:

> Another problem associated with hiring immigrant workers is the time they loose through bureaucratic practices. They need to stay in queues for absurdely long times to renovate their stay permits. Whenever a firm hires a foreign worker, it should become a sort of substitute for the immigration office. I agree the firm should inform the immigration office about when the worker breaks its relation with the firm, either because he is dismissed or because he leaves. But during the time the worker is hired, the employer should be enabled to carry out all bureaucratic procedures internally on behalf of the worker. The same way as we are *sostituti d'imposta* and we pay taxes on behalf of the worker, we should become *sostituti dell'ufficio immigrazione* and be able to deal with of the renovation of the stay permits as well as of their bureaucratic procedures on their behalf.[RE11]

Another argument in favor of preferring local people that was often observed also in the Basque country relates to the costs and benefits of training: where it takes longer to a new employee to become autonomous at work, firms tend to prefer local workers: "Because of the important investment in internal training, it is in our interest to keep turnover rates very low. For this reason we also tend to employ people who are residing in the area and are willing to remain in the area; we recently hired younger people [RE07]". If time-to-autonomy is a good proxy for the tacit component of knowledge in the firm, this would be again a confirmation that firms relying more on tacit knowledge rely less on foreign workers.

Summarizing, no evidence was found on P3.1 and immigrants' own social capital was not found to be pursued as such in the recruitment process even in firms that reported proactive efforts to create ethnically diverse work teams. Human capital considerations and firms' routines were found to prevail over social capital considerations in the larger and more export-oriented firms that were interviewed. This seems to be due to a relatively limited importance of the embeddedness in the social structure for these firms. In the smallest and most locally embedded firm, reliance on social capital was found to apply also in the recruitment of foreign workers, in line with the expected pattern in P3.2. The interviews also highlighted the integrating role of local institutions such as training centers in facilitating access of immigrants to employment in larger firms.

6.3.4 Embeddedness and the gains from immigration

As seen in the previous paragraph, while the considerations guiding the decision to hire immigrants or not admittedly include some degree of rationalized discrimination, firms resulted quite aware of the potential gains from diversity and mainly lamented the lack of suited qualifications. The possibility that local reputational mechanisms relevant to more embedded firms extend to the relationships with foreigners, and the indications collected about the integrating role of local institutions, particularly training institutions, suggest there are multiple entrances for foreigners in the economic core of the system. This was also one key finding of the quantitative analysis: immigrants are very concentrated in firms of the core of the industrial district. Furhermore, the firm emerged in some cases as an integration factor.

These considerations are framed within a quite proactive and inclusive institutional framework, as seen in the introduction (Mottura and Rinaldini, 2003). According to one of the interviewees, economic institutions also have a role to play in promoting integration:

> I don't believe in the social integration policy of the authorities towards foreigners. I don't think that the publicly provided social safety nets contribute to integrate immigrants at work. Rather, I think that foreigners in this area get integrated at work through cooperatives and trade unions.[RE11]

Perceptions on the effects of foreigners on the local context are quite varied and seem to be associated with the ethnic minority of greatest salience in the everyday environment of the interviewee:

> My perception is that immigrants, especially Chinese immigrants, are modifying quite radically the retail trade sector, by taking over a massive proportion of retail shops. They are also more generally undertaking services activities. However, I do not see such a strong impact at the production level. The entrepreneurial activities they undertake are rather the response to their inability to get employed elsewhere; to play a role in the industrial sector, they are still lacking some industrial maturity and the ability to understand what product corresponds to the market needs. [RE07]

"They are not having a very strong impact on the local economic fabric. The local culture is quite strong. We tend to be quite stubborn and rigid in doing the things the way we like them to be done. [RE08]"

> (...)Africans are well integrated in the chemical sector; Romanians and other people from Eastern Europe are more qualified and talented for industrial tasks. Arab people have a different entrepreneurial culture, which does not allow for investment, nor speculation. The context is changing. [RE11]

While the empirical analysis over P4 will be dealt with more in details and in comparative terms in chapter 8, it seems that the relative inclusive performance of the system and the recognition of the benefits from diversity could profile the system as a moderately embedded and relatively inclusive one, which could however translate these benefits into more innovation and productivity if it was able to attract more foreign labour force.

Table 6.5 summarizes the main findings from the interviews.

6.4 Synthesis

The quantitative and the qualitative evidence, in connection with each other, allow concluding that the reasons for employing immigrants in firms remain mainly relating with the need to replace native labour force that is not willing to enrol in production tasks. The main feature that results to distinguish firms hiring immigrants from the others is their comparatively lower share of non-tenured contracts. This reflects a feature of the production structure of these firms: they are comparatively more concentrated in the production of final industrial goods, i.e. the production specialization of the industrial district of Reggio Emilia. Hence, a first conclusion deriving from this case study is that, while firms mainly hire immigrants to work in production tasks and to maintain production levels, they are quite well integrated in the production core of the district (cfr. Barberis (2008)).

Table 6.5: **Reggio Emilia: Main findings from the interviews**

Proposition	**Evidence**
P1.2: The reasons for hiring immigrants in knowledge-oriented firms relate to productivity gains from diversity and to exploiting immigrants' transnational skills in firms applying a less tacit and more codified knowledge base	**Compatible pattern in the interviews.** The interviews findings were compatible with the idea that, where the time-to-autonomy is longer (interpreted as a proxy for the extent of tacitness in the firms' knowledge base), the firm is less able to convert the potential benefits from diversity into productive purposes. More export-oriented firms reported both awareness and cases of foreigners employed in the sales offices of the firm. The firm where the knowledge is more codified both recognized and could provide concrete examples of proactive recruitment policies aiming at creating innovation-enhancing synergies in multi-ethnic working groups.
P2.2a: Hiring immigrants is an alternative to investing in R&D	**No strong support in the interviews.** Cost-saving strategies were attributed to firms other than the interviewee's own.
P2.2b: Hiring immigrants is complementary to investments	**Some support in the interviews.** Firms reported that hiring immigrants in some cases increases the training costs and the investments in capital goods; in other cases hiring immigrants is reported to be the consequence of firm growth which generates increased labour demand in low-skilled tasks.
P3.1 Employers hire immigrants to gain access to transnational co-ethnic networks and immigrants' social capital.	**No support in the interviews.** No consideration of the immigrants' own social capital was reported in the interviews
P3.2 Immigrants' social ties with natives facilitate their access to employment in more embedded district firms	**Compatible pattern in the interviews.** The interviews findings were compatible with the idea that, where the firm is smaller and more locally embedded, the trust and reciprocity mechanisms applying to the relations with local workers and entrepreneurs are extended to the relationships with foreigners. This applies to social networks and also to local training institutions.

Production orientation in the firms hiring immigrants, however, does not exclude a relatively higher R&D intensity than comparable firms. Indeed, discriminant analysis has identified a relatively weak but positive association between immigrant shares and investments in R&D in production-oriented firms. This seems to exclude the interpretation that immigrants be employed in the framework of an isolated cost-saving strategy and, rather, to point at entrepreneurs' need to sustain their production compartments in the face of the reluctance of natives to enrol in manual tasks. This interpretation has been confirmed in the interviews. Some interviews have further suggested that higher investments in R&D be complementary in sustaining productivity in the face of the lower qualification of immigrants. Another interview pointed out that larger immigrant shares are a feature of growing firms, and that export and innovation dynamics generate internal restructuring in

the firm and create jobs in lower-skilled tasks. These interpretations, however, find only weak correspondence in the data.

In general, firms employing higher immigrant shares result also associated with lower exports than comparable production-oriented firms. According to the interviewees, this mainly depends on the position of these firms in the value chains. In general, interviewees consider that firms that hire more immigrants have a comparatively stronger orientation towards production. Furthermore, because firms hiring immigrants are also comparatively more representative of firms producing components, their lower export performance could also be due to the fact that they are not direct exporters but supply foreign market indirectly through their clients.

As regards the potential gains from diversity in terms of innovation and productivity, the quantitative analysis led to exclude the prevalence of distinctive patterns associated with higher immigrant shares, while it showed that immigrants are to an important extent (35.8% of the cases) employed in knowldge-oriented firms. Knowldege-oriented firms profiled as a single homogeneous group regardless of the share of immigrants hired. While some productivity and innovation gains from diversity cannot be excluded, considering that 35.8% of the innovation-oriented firms hire some foreign workers, there seems to be no distinctive strategy in these firms.

The conjunction between the quantitative and the qualitative analysis suggests that more mediating factors are necessary in order for it to reach a quantitatively sizeable dimension. Indeed, the interviewed entrepreneurs have shown in some cases a very articulated awareness of the potential from diversity. Primarily, these relate to foreigners' greater transnational skills, which are recognized and also applied to economic ends in the interviewed firms: often, sales officers are native speakers in the language of the countries they are in charge of. In these cases, higher shares of foreign workers can be expected to contribute to exports, but require good levels of qualifications among the foreign labour force; by low levels of qualification in the foreign labour force, foreigners' transnational skills are relatively cheaply substitutable by Italians with the corresponding language skills and knowledge of the foreign markets. Further recognized benefits from diversity relate to the cooperation within culturally diverse teams. These are considered to arise mainly in relation to designing innovative products that can flexibly adapt to different tastes and preferences in different countries. Only one of the interviewed firms reported direct experience of a proactive recruitment policy oriented to enhance productivity through diversity, but could name a few other firms employing the same strategy in a quite diversified set of sectors. The awareness of this potential seems to be driven by the strong export orientation of firms, which is pre-existing to the firms' decision to hire foreign workers in the interviewed firms. In relation to the potential from cooperation within culturally diverse teams, other interviewees highlighted the need for more "mediating factors" to allow diversity turn into an advantage: longer time and integration mechanisms such as schooling

are considered to contribute to a common basis for mutual understanding.

The interviews findings were compatible with the idea that, where the time-to-autonomy is longer (interpreted as a proxy for the extent of tacitness in the firms' knowledge base), the firm is less able to convert the potential benefits from diversity into productive purposes. More export-oriented firms reported both awareness and cases of foreigners employed in the sales offices of the firm. The firm where the knowledge is more codified both recognized and could provide concrete examples of proactive recruitment policies aiming at creating innovation-enhancing synergies in multi-ethnic working groups.

As regards the relationship between embeddedness and the potential gains from migration, the pattern identified in the interviews is compatible with the idea that immigrants' access to the employers' social networks facilitate their employment in more embedded firms. Also, integrating mechanisms like schooling, as well as political and economic institutions like cooperatives and trade unions suggest the system is potentially able to improve the match between supplied and demanded skills. A few cases of fruitful transnational cooperation driven by immigrants have already been observed between local systems in Emilia-Romagna and the origin countries, such as the famous case of the immigrant-led cooperative Ghanacoop selling fruits grown in Ghana to firms in the Modena area; local training institutions could play a more active role and launch transnational training programmes tailored to the local industry, which could later lead to formal contracts in Reggio Emilia and other industrial districts. This could contribute to the development of a manufacturing culture in key countries of origin and contribute to stronger exploitation of the benefits from diversity in the local system.

Figure 6.1: Clusters of firm characteristics

Clusters

Input (Predictor) Importance
1.0 0.8 0.6 0.4 0.2 0.0

Cluster	1	2	3
Label			
Description			
Size	46.7% (659)	28.3% (399)	25.0% (353)
Inputs	NID 1 (100.0%)	InvRD 1 (100.0%)	NID 0 (100.0%)
	InvRD 0 (100.0%)	inno 1 (82.7%)	RDPerc 0.32
	lnEmpl 3.06	lnEmpl 3.97	ForPerc 25.67
	Investor 1 (55.5%)	RDPerc 9.40	InvRD 0 (91.5%)
	ExpPerc 14.36	lnTOver 16.17	lnTOver 15.01
	inno 1 (52.2%)	Exporter 1 (69.4%)	lnEmpl 2.97
	Exporter 0 (57.2%)	ForPerc 4.17	inno 0 (53.5%)
	lnTOver 15.36	ExpPerc 28.78	ExpPerc 12.72
	lnAge 3.06	Investor 1 (75.7%)	Exporter 0 (59.2%)
	Indebt3 1 (46.4%)	lnAge 3.17	Indebt3 2 (40.2%)
	ForPerc 0.00	Indebt3 1 (40.4%)	Investor 1 (61.5%)
	RDPerc 0.00	NID 1 (64.2%)	lnAge 3.11
Evaluation Fields	NStContr2 0.17	NStContr2 0.09	NStContr2 0.06

Chapter 7

The case study of Elgoibar (Basque Country)

7.1 Immigration in the Basque Country and in the local system of Elgoibar: setting the framework for the case study

7.1.1 Mechanic sector and clusters in the Basque country

Due to its export-oriented industrial sector, the Basque economy represents approximately 6.5 percent of Spain's GDP, 8–9 percent of Spain's industrial GDP, and 10 percent of Spain's exports. Industry accounts for approximately 34–36 percent of Basque GDP, much higher that the average 21–22 percent of GDP in Spain. The Basque economic fabric is composed of a number of local systems both of a Marshallian kind and organized around a main leading firm, in the context of a highly interconnected geography and of a dense small-scaled urban system (Ahedo, 2006). The three provinces, Araba/Alava, Bizkaya and Gipuzkoa, are characterized by different production structures (Ahedo, 2006). Bizkaya, with capital Bilbao, is composed of a system of large-scale firms closely interconnected with the main banks and traditionally operating in heavy industrial sectors such as iron and steel, ship building, capital goods, and metal manufacturing; many of them have recently undertaken an upgrading process towards medium and high technology intensity. Gipuzkoa is marked by a collaborative system of small and medium-sized firms, which evolved, thanks to public and private training schools and capital inflows, from craft firms into industries producing consumer goods (primarily household appliances) and engineering-intensive machinery (in the machine-tools, automotive, and applied electronics sector). These SME agglomerations

over time have developed inter-firm collaboration and grouping dynamics. The cooperative system also plays an important role in the area. Established in the 1960s, cooperatives in the Mondragon and Deba Valley have evolved into the world's largest industrial cooperative conglomerate, the Mondragon Cooperative Corporation (MCC). Araba/Alava is characterized by a combination of large-scale enterpises and networks of small firms. Key large-scale firms are the foreign multinational firms in the automotive sector, supplied by a number of SMEs. The three provinces are well inserted in the global economy.

Boix and Trullén (2010) have applied the ISTAT methodology for the identification of local labour systems and industrial districts to the Spanish case[1]. According to this methodology, 68% of the employment in local production systems of large firm results concentrated in the automotive industry (73,500 employees and 43.3% of total national employment in the sector) and in the mechanic industry (42,500 employees and 25% of total national employment in the sector). The procedure also highlights the strong geographic concentration of the mechanic sector, which constitutes the core industry in 14 industrial districts and 13 local production systems of large industry in the whole of Spain. Of these, the Basque Country concentrates 29% of the districts, while another 21% is concentrated in Valencia and Cataluña. However, the Basque Country hosts 72% of the employment in this core industry within industrial districts (25,012 over 34,665), and an 82% of the core industry employment in local production systems of large firm (34,964 over 42,585 employees). Other works highlighted that local production systems of large firm and especially industrial districts account for more than half of the country's exports (Trullén, 2006), and have a higher innovation capacity than the other local labour systems (Boix and Galletto, 2008). In the Basque case, this can be attributed among other to the regional governments' proactive cluster and innovation policy (see below). The 4 industrial districts in the Basque country (Eibar-Elgoibar, Tolosa, Zarauts and Gernika-Lumo) are all active in the mechanic industry; in turn, Eibar-Elgoibar employs about 56% of total employment in the core industry of Basque industrial districts. Of the 8 local production systems of large industry in the Basque Country, 6 (Vitoria/Gasteiz, Irun, Azpeitia, Bergara, Arrasate/Mondragon) are specialized in the mechanic sector and 3 (Salvatierra/Agurain, Llodio) in the related iron and steel sector (see table 7.1)

Such a dense fabric of manufacturing firms in the mechanic sector allowed for technological externalities (Bustillo Mesanza, 2003) and for high levels of growth of the sector until the crisis period. This allows for relatively high levels of per capita income in the region,

[1]With this procedure, 205 (25% of the local labour systems) local labour systems resulted industrial districts according to the Marshallian definition; 66 (8% of the total) resulted local production systems of large enterprise. Industrial districts and local systems of production of large firm cover an important share of Spanish employment and production plants in the country. Industrial district employ the majority of the Spanish workers active in the leather and footwear (82.2%), textile and clothing (50.4%), jewelry and musical instruments (42.3%). The local systems of large firm employ a high share of the total employment in iron and steel (27.2%) and automotive (26.4%) production.

Table 7.1: Industrial districts and Local production systems of large firms in the Basque country

			Employment		
Province	Local System	Specialization	Core Industry	Tot. Manuf.	All sectors
Industrial districts					
País Vasco			25,012	46,199	106,011
Guipúzcoa			23,069	40,739	87,772
	Eibar-Elgoibar	Mechanic	14,021	22,586	44,968
	Tolosa	Mechanic	6,729	12,899	29,588
	Zarautz	Mechanic	2,319	5,254	13,216
Vizcaya			1,943	5,460	18,239
	Gernika-Lumo	Mechanic	1,943	5,460	18,239
Local production systems of large firm					
País Vasco			37,389	78,839	428,492
Álava			15,228	42,202	130,305
	Vitoria/Gasteiz	Mechanic	12,803	32,970	111,170
	Salvatierra/Agurain	Iron&Steel	379	1,273	2,725
	Llodio	Iron&Steel	2,046	7,959	16,410
Guipúzcoa			22,161	36,637	83,941
	Irun	Mechanic	2,199	4,963	25,550
	Azpeitia	Mechanic	2,682	5,512	10,345
	Bergara	Mechanic	2,935	4,411	7,827
	Zumarraga	Mechanic	3,175	6,082	11,662
	Arrasate/Mondragón	Mechanic	11,170	15,669	28,557

Source:Boix and Trullén (2010)

compared with the EU average (ca. 40% higher, Aranguren et al. (2012)).

Small- and medium-sized firms, whose number is still increasing since the start of the industrial reconversion process in 1975, have constituted the backbone of the region's innovation and exports and have not been limited by size constraints mainly thanks to a "dense" and highly federated institutional framework. The regional government pioneered the introduction of cluster and innovation policies, provinces have tax collection responsibilities and policy competences regarding innovation and local development, and municipalities have grouped to create "local development agencies", in charge among other of networking policies for innovation and competitiveness (Aranguren et al., 2010; Parrilli et al., 2010). The policies actively promoted industrial specialization in strategic sectors, both capitalizing on the existing capacities (including in the mechanic sector) and by diversifying into critical new specializations, as well as sustaining inter-firm cooperation, sectoral associations as well as joint innovation and applied research initiatives(Ahedo, 2006; Valdaliso, 2010; Aranguren et al., 2010, 2012). In the first decades of the XXI century, "smart specialization strategies" into new innovation-intensive strategic sectors such as biosciences, nanosciences and renewable energy sources have been launched and the focus has also moved towards promoting basic research in the regional research centers; with the launching of a new innovation policy in 2004, the universities are increasingly integrating into the regional

innovation system (Aranguren et al., 2012; Valdaliso, 2013).

These policies were initiated with Spain's accession to the European Community in 1986, when it was recognized that the traditional competitive advantages, i.e. protectionist policies, low salaries and a weak *peseta*, with the regional innovation processes depending mainly on the incorporation of innovations developed abroad, were not going to be sustainable in the new context of an internationally integrated economy. Thus, the regional government promoted the shift towards a more R&D-intensive and innovation-oriented production structure, which according to most observers is responsible for the good technological endowment of local firms nowadays. This included the promotion of contacts with specialized training centers as well as of joint R&D initiatives of local firms, which is an ongoing characteristic of the approach to R&D and innovation of Basque firms. (Aranguren et al., 2012; Valdaliso, 2010; Aranguren et al., 2010; Parrilli et al., 2010). This translates also in relatively high levels of qualification of the local employed labour force and in improved management systems. Another indicator of the improvement of the management in Basque firms is the diffusion of quality management systems certifications, in particular ISO 9000 and the EFQM model, by which the Basque country ranks among the highest places in Europe. The adoption of quality management certifications was introduced by firms producing intermediate goods who were requested such certifications as a mandatory requirement by their large clients; as regards the levels of informatization of firms, this has also radically increased in the last two decades, to the point that in 2009 a 95% of firms were equipped with some ICT (Valdaliso, 2010).

The cluster policy established ad hoc institutions to promote inter-firm cooperation, the *asociaciones-clúster*, in charge of promoting competitiveness of the cluster they represent through cooperation; they are composed of firms but also of technology centers as well as training centers and are financed by the Basque Government (Valdaliso, 2010) and also play an important role as interfaces between the local level of business and the regional level of policy-making (Ahedo, 2006). In the case of the machine tool sector, the cluster association AFM (*Asociación de Fabricantes de Máquina-Herramienta*) coincides with the sectoral center which was created in 1954.

These initiatives and institutions, as well as proactive innovation policies such as Innobasque, oriented towards developing the innovation infrastructure of the country, have translated into appreciable increases in cooperation among other in human capital training, in the promotion of exports and in R&D. Up to now, the levels of cooperation in the Basque country are still remarkably high compared to the Spanish average and with the EU average (see the references in Valdaliso (2010)). According to some observers, this increased performance in innovation, internationalization and competitiveness(Aranguren et al., 2013). The extent of the coherence and coordination between firms and public authorities is also remarkably high (Ahedo, 2006) as well as the matching between the specific needs of firms and the supply of training within local vocational training institutions

(Fernández de Lucio, 2004).

As a result, in spite of the relatively low technological level of the mechanic production *per se*, the R&D and technological intensity of Basque firms is remarkably high (Aranguren et al., 2012). This, and the increasing trend towards customization and selling "solutions" to clients (Velasco and Olaskoaga, 2005), counterbalances one major vulnerability of the industrial structure in the Basque country, i.e. is its heavy reliance on intermediate goods with high price elasticity, and allows for very high export orientation (Bustillo Mesanza, 2003). According to Valdaliso (2010), the majority of internationalized Basque firms are SMEs, predominantly in the manufacturing sector,endowed with strategic and intangible assets. Many of them establish foreign representative and sales-promoting offices. Conversely, according to Ahedo (2006), the "endogenous and non-diversified character" of the Basque industrial structure is mirrored in the limited presence of multinational companies of the sector, as well as of Foreign Direct Investment (FDI) operating in the territory.

In sum, to a large extent, those which Valdaliso (2013) describes as the traditional assets of the Basque economy in the 1980s have largely survived: entrepreneurial spririt, qualified labour force, vocational training system, universities and firm-institutions as well as inter-firm collaboration. Thanks to a proactive policy which combined top-down measures with adaptation to the local collaborative tradition, the absorptive capacity of the cluster has increased through innovation and internationalization.

7.1.2 The machine-tools cluster of Elgoibar

Cooke (2002) reports the narrative about the origins of the mechanic cluster of Elgoibar: in the XV century a royal armaments establishment was founded in Eibar, a few kilometers from Elgoibar. The production of weapons was developed and maintained until the XIX century, when Estarta & Ecanarro founded a sewing machines factory under licence from Singer. In the absence of local suppliers, the firm started producing its own components and the machine tools to produce them. The local market stimulated entrepreneurship and vertical disintegration and the area increasingly specialized into machine tools production.

Nowadays, the machine tools sector is critical for the Basque country, being one of the more technologically advanced sectors in which the region is operating. Today, Spain is the third producer and exporter of machine tools in the EU, and the nineth of the world (AFM, 2014a,b). About 80% of the production originates in the Basque country, and about 50% in Elgoibar, a municipality of about 11,000 inhabitants (Aranguren et al., 2012). The sector is characterized by an extremely high export orientation and by high innovation orientation: more than 80% of the sectoral production is exported in international markets, providing an important contribution to the trade balance in Spain, and about 5% of turnover is

devoted yearly to R&D and Innovation activities. Spanish production of machine-tools is growing and have as major destination countries Germany, China, France, Mexico, Brazil, Russia, UK, USA, India, Portugal.

The organizational structure of the sector is marked the decentralization in production(see also Velasco and Olaskoaga (2005)). Thanks to the high levels of trust between the firms and their subcontractors, some production phases, especially those with lower value added or those requiring specific production plants such as iron components, can be passed on to the subcontractors, with the firm concentrating more and more on critical processes of higher-value added. In this way, both the firm and its contractors can exploit economies of scale, focus on the core business and improve the quality of their products to a much larger extent than they would do in absence of these relationships (Calabrese, 1993).

In 1993, Calabrese analyzed the machine tool cluster of Elgoibar in an account that is to a large extent still valid. According to the author, the assets of the local system in the early nineties were the following: long production tradition, translating into high level of knowledge and competences locally; concentration, leading to the emergence of external economies, information flows and coordination for joint objectives; low labour costs; and inter-firm cooperation. The flexibility obtained in this highly interconnected production system allows more easily adapting to the clients' specific needs. The machine-tool cluster association has promoted the selection of critical products such as milling machines, which have remained until today the most profitable market (Calabrese, 1993; AFM, 2014a). While labour costs have increased, these remain relatively low in the Basque country with respect to the rest of Europe; the other asset remain to a large extent relevant until today. The cluster and innovation policies mentioned above have addressed the weaknesses identified by Calabrese (1993): small size, small turnover, median productivity, limited R&D investments and limited internationalization, all characteristics that have been addressed by industrial policy.

The author also noted the important role of the research centers promoted by the Basque Government in promoting technological advances that enable firms to sustain their competitiveness, as well as of inter-firm cooperation as an alternative to acquisition of other firms or closure. Production and commercialization agreements and joint research projects constituted the main content of this cooperation, which usually joined together firms that were not directly competing with each other. Leading firms joined together to also promote innovation projects for their subcontractors lacking human and technical resources (such as in the Fatronik R&D center, joining together key firms of the sector). The Danobat group promoted balanced development of firms by coordinating and planning the different businesses of the sector and to maximise the productivity of joint investments and joint production projects.

More recently, with a view to compete in the "high road" of development and to avoid cost competition with emerging economies, the production has been restructured towards

tailor-made production and "selling solutions"away from standardization, a production structure which itself requires high innovative capacity and qualification. Yet, in spite of the crisis and of the 25% rate of unemployment, the required qualifications were not always available in the labour market. This has increased the firms' awareness of the importance of developing knowledge locally and of shaping the training curricula to the profiles required by firms. These considerations have materialized into a training center called *Instituto de Máquina-Herramienta*, which also provides services to firms in terms of mapping and suggesting strategic management solutions to improve SMEs innovation capabilities. Similar objectives are pursued in other training institutions such as IDEKO, working closely with the cooperative sector and with the Mondragon cooperative. IDEKO aims to promote technological innovation and applied research projects aligned with their clients' strategy, needs and technological development. According to Calabrese (1993), in no other country such an extensive inter-firm activity had been observed; the presence of this tight network of firms and training institutions has led Aranguren et al. (2012) to talk of "collaborative advantage" in the local area.

Another important feature of the embeddedness of the local system into a network of social, professional and institutional relationships is the high diffusion of the cooperative system (Calabrese, 1993): the majority of Spanish machine-tool firms have been founded as family firms or cooperatives. These property systems similarly contributes to firm growth in a traditional sense, as it promotes the intergenerational transfer of know-how within the firm and the reinvestment of the profits into production assets.

7.1.3 Immigration in the local system of Elgoibar

Contrarily to the case of Reggio Emilia (cfr. Chapter 6), and quite surprisingly, the cluster of Elgoibar, in spite of its very high industrial intensity and of its relatively high standards of living, does not appear to constitute a major attraction pole for the immigrant population.

The immigrant population in the Basque Country in 2013 amounted to 148,877 people, corresponding to a 6.8% of the total resident population, a relatively low percentage compared to the Spanish average of 11.8%. Among the three provinces of the Basque country, those with the highest concentration of mechanic manufacturing, i.e. Guipuzkoa and Bizkaya, have lower shares of immigrants (respectively 6.4 and 6.5%) than Araba/Alava (8.8%) (Ikuspegi Observatorio Vasco de Inmigracion, 2013). Table 7.2 summarizes the main origin countries and shares of total immigrant population in the Basque country and in Gipuzkoa in 2013. The table clearly shows that a few countries in Maghreb (Morocco and Algeria), EU (Romania and Portugal)and Latin America (Bolivia, Colombia, Paraguay, Brazil, Ecuador) account for almost 60% of the foreign population.

Table 7.3 summarizes, by main regions of origin, the sex of the foreign population residing in

Table 7.2: **Immigrant Population in the Basque Country and in Gipuzkoa by Country of Origin (2013)**

Basque Country			**Gipuzkoa**		
	N	*(%)*		*N*	*(%)*
TOTAL	148,877	100	TOTAL	46,684	100
Morocco	18,214	12·2	Morocco	5,512	11·8
Romania	17,375	11·7	Romania	5,066	10·9
Bolivia	11,319	7·6	Portugal	3,956	8·5
Colombia	9,757	6·6	Nicaragua	3,094	6·6
Portugal	8,014	5·4	Colombia	2,378	5·1
Algeria	5,807	3·9	Ecuador	2,044	4·4
Paraguay	5,458	3·7	Honduras	1,728	3·7
China	5,280	3·5	Pakistan	1,707	3·7
Brazil	5,077	3·4	Bolivia	1,356	2·9
Ecuador	4,716	3·2	Brazil	1,351	2·9
First 10 nationalities	*91,017*	*61.1*	*First 10 nationalities*	*28,192*	*60.4*
Other nationalities	*57,860*	*38.9*	*Other nationalities*	*18,492*	*39.6*

Source: INE, in Ikuspegi Observatorio Vasco de Inmigracion (2013)

the Basque country. As the table shows, almost 40% of the foreign population is composed of by Latin-American immigrants, who are also predominantly females. EU immigrants and migrants from the rest of Asia, where Pakistan plays a particularly important role are also relatively more frequently females. The groups of immigrants from Maghreb, China and Rest of Africa, are instead prevalently males.

Table 7.3: **Immigrant Population in the Basque Country by world region and sex (2013)**

			Males	*Females*
	N	*(%)*	*%*	*(%)*
TOTAL	148,877	100	51·0	49·0
EU	36,745	24·7	41·8	58·2
Maghreb	25,037	16·8	63·9	36·1
Rest of Africa	12,072	8·1	67·1	32·9
Latin-America	57,636	38·7	37·9	62·1
China	5,280	3·5	53·1	46·9
Rest of Asia	6,355	4·3	41·8	58·2

Source: INE, in Ikuspegi Observatorio Vasco de Inmigracion (2013)

Immigrants are also not particularly active in the manufacturing area. In the Basque country, the vast majority of the foreign population (76.2%) is employed in the services

sector, particularly domestic services (21.3%), hospitality services (16.8%) and retail shops (11.7%). Besides services, the construction sector employs about 14.2% of total immigrant population. About 11% of the immigrant population in the Basque country is employed in the industrial sector; within the manufacturing sector, metal-related production and machinery employ respectively 2.1 and 2.4% of the foreign population (EPIE, 2010). The concentration of the immigrant population in the industrial sector is are comparable with the national average; it is, instead, much lower as regards the hospitality sector (GETS, 2007).

According to the survey on the working conditions of immigrants promoted in 2007 by the Spanish government (GETS, 2007), immigrants working in the manufacturing sector are predominantly males (79%), in 55.7% of the cases they are aged between 30 and 45 years; mainly, they originate from Africa. More frequently than those working in other sectors, they are employed with undetermined contracts, and more frequently are owners of a household; at the same time, industry is a sector with a particularly high share of foreigners employed with no contracts. The shares of immigrants with higher university studies is slightly below the national average (8.2 vs 8.9%). Immigrants in the Basque country are more concentrated in the area of basic or no education and a 77% of those aged 16 or highe are non-qualified according to EPIE (2010): a 8,2% reports no studies, 28,7% primary studies and 40,1% post-primary non qualified studies (35,4% secundary studies and 4.7% basic vocational training). There are substantial country-level variations in this respect. African and Chinese immigrants result less qualified on average, while foreigners from the majority of the Latin American countries have good levels of secundary education but low levels of tertiary education; Argentina, Chile and Uruguay, however, have shares of immigrants holding tertiary education above 30%, higher than the other Latin-American countries and close to the levels of EU immigrants, who are among those with the highest levels of education (EPIE, 2010).

According to EPIE (2010), the immigrants consider that their posts correspond to their levels of qualifications in 69,9% of the cases. In a 26,7% of the cases (mostly originating from Romania and Eastern Europe, Latin America and Senegal), the post is below the qualification; and it is above in 3,4% of the cases.

According to the immigrants, problems at the workplace relate in almost one third of the cases (31.2%) to aspects relating to the workday, the salary and the contract, mainly overtime hours and longer workdays than what foreseen in the contract (in 15.6% and 12.6% of the cases) as well as to a lower remuneration than the rest of the personnel (9.2%). Between 5 and 6% denunciates lower remunerations than what foreseen in the contract, the non-compliance with the right to rest and employers' requests to work irregularly. About 2.5% mentions the contrary: higher than agreed wages and shorter working times (EPIE, 2010). According to GETS (2007), being a foreigner is perceived in the Basque country to be more frequently associated with more risks and lower possibilities to get the same levels

of labour inclusion in 25.9% of the cases; the level of awareness about risks involved in work is particularly high in the industrial sector. The quality of work and the kind of contract, according to this survey, mainly depends on the access of immigrants to a work permit [2]. While substantial differences are observed across different national groups, on average, the regular immigrant population with both a stay and working permit or not in working age, constitutes 86.8% of the total; 5.1% has only a residence permit; 8.1% is irregular (EPIE, 2010). Among the interviewees of the GETS (2007), being an immigrant was a more frequent reason for having difficulties in finding a job in the Basque Country than in the rest of Spain, particularly among the Africans who are more frequently employed in the industrial sector; other reasons related to lack of papers, difficulties with the language and discrimination.

As regards the cluster of Elgoibar, the available data are relatively basic. In 2008, the share of foreigners in Elgoibar was 4,90%, relatively high compared with the share in Gipuzkoa (4.1%) and the Basque country (4.6%) in the same year. In the *comarca* of Deba, to which Elgoibar belongs, immigrants come mainly from Morocco (24.3%), Portugal (ca. 12%) and Latin American countries. While still limited in absolute numbers, the local population has increased 9.5 times in the period 2000-2008. Yet, the participation of immigrants in local cultural, associational and entertainment activities is still limited; the different agents relating with the immigrant communities in the area are still quite uncoordinated and the immigrants' associations play, still, a very limited role (Sociedad para El Desarrollo Economico de Debabarrena, 2010). In Elgoibar, the immigrant population is predominantly feminine (54%). Main origin countries are Bolivia (25.4%), predominantly female domestic workers, Portugal (17.1%), Brazil, Pakistan and Morocco. Almost 50% of the local immigrant population only counts on basic studies or no studies. Women are more represented among those with basic studies (77.7%, 36.3% of the local immigrant population) while men are more represented among those with no studies at all (61.3%, 32% of the local immigrant population). This shows that the local immigrant population is on average less qualified that the immigrant population in the whole of Spain. 28% of the local immigrant population are children or young people enrolled in the local educational system; 57.2% of them in the compulsory schooling system, among which the mayority are from Bolivia and Morocco (Sociedad para El Desarrollo Economico de Debabarrena, 2010).

Thus, immigration in the Basque Country and the Elgoibar area seems quite unrelated with the extremely high concentration of industry and quite insensitive to the high standards of living in the area. Considering that in areas with a comparable manufacturing specialization in Italy and Spain (but with lower levels of industrial concentration) immigrants

[2]Immigrants in Spain get access to fundamental rights such as healthcare, schooling and basic social assistance, including basic income support such as the *Renta Básica* and the *Ayudas de Emergencia Social*, by registering at the local municipalities (*empadronamiento*). These registries are independent from the issuing of stay permits and work permits and thus allow a basic estimation of the share of regular vs. irregularly residing or working immigrant population (cfr. EPIE (2010))

are a high share of the local population, it seems interesting to investigate, besides the research questions sketched in chapter 5 whether there are local specificities at play that discourage immigration of foreign workers. For instance, the local system may be unable to attract sufficiently skilled foreign labour, or local development priorities and the tightly collaborative fabric of firms in the area may have *de facto* become exclusionary mechanisms and hamper the access of foreign workers to information and opportunities.

7.2 Elgoibar in the context of the Basque Country: characteristics of firms hiring immigrants

Due to the lack of systematic data collection on firms' characteristics at the province level, the regional context of the Basque country will be taken as a benchmark for the analysis of the interviews referring to the local system.

This section aims at identifying whether, in the Basque Country, employing immigrants is systematically associated with firm characteristics. To this end, and pursuing comparability with the Italian case study, the 2008 data on the Basque Census of the Labour Market (Censo del Mercado del Trabajo, CMT) will be used. As mentioned in chapter 5, it is a priori difficult to hypothesize a causal relation between presence of immigrants among the employees and firm characteristics such as innovation and export orientation. Thus, the relationships between these variables will be explored here in terms of associations and explanations about the causal relationships will be left to the qualitative interviews.

In spite of the potential role of diversity at the workplace in promoting exports and innovation, immigrants remain a reduced share in the total population. While the immigrants share in the Basque population in 2013 was 6.7%, five years before, when the data were collected, immigrants constituted a 4.6% of the labour force. Thus, it is not surprising that only a 15.6% of the Basque firms hired immigrants in 2008, with an average immigrant share over total employment of 3.08%. In accordance with the data reported above, the share is lower in the manufacturing sector, where the average share of foreign workers over total employment is 1.99%. In the industrial sector the share of firms employing immigrants amounts to 19.7%.

Table B.3.2 reports the correlations between the share of foreigners in the firms and some firm characteristics in the whole of the Basque economy, i.e. for all sectors including services (column 1), for the subgroup of firms hiring immigrants (column 2), for the manufacturing sector as a whole (column 3) and for the firms hiring immigrants in the manufacturing sector (column 4). A short description of the variables is provided in table B.4.2 in the Appendix.

The correlations do not provide much support to the hypothesis of a strong association

between the share of immigrants employed and the synergies in problem solving, creativity and innovation in the Basque country; instead, the data indicate that proposition P2.1 may apply to the Basque country case. Indeed, looking at all sectors, higher shares of immigrants are negatively correlated with the innovation, R&D and quality certification indicators; these relations loose significance in the manufacturing subset. The negative correlation with the levels of informatization of the firm, instead, resists in the manufacturing sector as well. Within the subsets of firms hiring immigrants, either in the manufacturing sector or in all sectors, the share of immigrants is also negatively correlated with the share of exported production and positively correlated with the share of turnover originating from the *Comarca*. Firms hiring immigrants are on average smaller and younger; they employ a higher share of non-standard contracts and of qualified and non-qualified manual workers - although in the latter some non-linearity emerges by larger shares of immigrants. The share of highly qualified professionals and administrative officers is smaller in firms hiring more immigrants and coherently, the overall technology level is lower within these firms than in the average of all Basque firms (but not compared with the manufacturing subset).

7.2.1 Cluster analysis

The first step to identify whether immigrant shares in employment "naturally" associate with other firm characteristics is to run a cluster analysis. As in Chapter 6, due to the high number of categorical variables in the dataset, it was opted for a two-step cluster analysis which allows combining categorical and continuous variables. As a measure of immigration, it was opted to use a categorical variable *StrClass* articulated in three classes constructed according to the shares of immigrants employed: zero, low or high. They are identified as described in table 7.4[3]

Table 7.4: Share of foreigners: classes

Class	Share of immigrant	description
Class 1	zero	*Share of foreign employees* $= 0\%$
Class 2	low	$0\% <$ *Share of foreign employees* $\leq 4\%$
Class 3	high	$4\% <$ *Share of foreign employees* $\leq 100\%$

The threshold between Class 1 and Class 2 corresponds to the median share of immigrants for the whole population of the manufacturing firms, i.e. zero. The threshold between Class 2 and Class 3 corresponds to the median of the share of foreign employees within the

[3]Including this measure instead of continuous variables in a way "forced" the cluster analysis to yield results of relevance to the immigration issue, overcoming the problem of the low numerosity of the immigrant population with respect to the total, while at the same time taking into account possible non linearities in the relationships among variables.

Table 7.5: Cluster Analysis: summary

Cluster	Percent	Observations
1	30·08	240
2	18·17	145
3	26·69	213
4	25·06	200

subset of firms with a share of foreign employees above zero.[4]

Two-step cluster analysis including *StrClass6*, as well as a series of variables relating to knowledge inputs (*Info,CertifQual,RD,Prof*), variables more likely to reflect the production orientation of the firm (*PrecP3,TNQual,Cmc*) and firm size and age (*lnEdad_1,lnEmpl*) was performed on the subset of manufacturing firms (1232 firms) in the Basque country. The clusters were evaluated on innovation (*InnoProd,InnoProc*) and exports (*Exports*) measures. Table 7.5 and Figure 7.1 report the results.

The analysis led to identifying 4 clusters, with an average silhouette measure of cohesion and separation of 0.2, indicating fair cluster quality. According to the results, important clustering variables are *StrClass6*, *CertifQual*, *lnEmpl*, and *RD* (fig. 7.1).

Cluster 1 is composed of more knowldge-oriented firms,which invest regularly in R&D activities, have a quality certification and are completely informatized. Coherently, they innovate more frequently than firms in other clusters. Their size is relatively large (on average 144 employees) and the share of their turnover originating locally is very low, below 4%; to the contrary, they export on average 41.27 percent of their production. They employ a high share of highly qualified professionals, but also relatively high shares of non-qualified workers, which reflects that these highly knowledge-intensive firms also have a sizeable production compartment. They also show more varied contract typologies. The share of firms hiring foreigners in this cluster is tiny: only 3.3% of these firms hire at least one immigrant, and those who do belong to Class 2, i.e. have shares of immigrants over total employment below 4%, i.e. on average less than 6 foreign employees.

The opposite case is Cluster 2, which is composed by small firms (15 employees on average) that are heavily reliant on the local market (32% of their turnover originates from the *comarca*. These firms have not been quality-certified nor have applied for quality certification. Adoption of ICT is still partial in the majority of these firms; the wide majority of them (86.2%) does not invest regularly in R&D. Consequently, these firms innovate much less frequently than all other firms.The lack of quality certification and their heavy reliance

[4]The thresholds were tested through a series of univariate analysis of variance controlling for firm size using the UNIANOVA command in SPSS, which confirmed that the means of the classes differ for most variables of interest.

on the local markets is associated with very low levels of exports, representing on average less than 8% of their turnover. Because of their small size they probably don't have a large production department, thus their share of non-qualified manual workers is relatively low. Within this group of highly localized firms, those hiring immigrants are, again, a minority; only 4.5% of these firms hire immigrants; because of the average small size of these, however, the firms in this class that do not belong to Class 1 hire a comparatively high share of immigrants and most of these are included in Class 3.

Clusters 3 and 4 include similarly sized, quality-certified firms of ca. 60-80 employees on average, with a comparable -and relatively low- orientation towards the local economy (in both cases the share of turnover originating in the comarca is between 9 and 10%), as well as a comparable low share of highly qualified professionals employed (8-9%). However, all firms in Cluster 4 hire immigrants while no firm in Cluster 3 does. Hence, the comparison of the two clusters is indicative of the firm characteristics that seem to be more macroscopically associated with immigrant workers: higher share of non-qualified manual workers (27% vs 18%), probably reflecting higher production orientation, relatively higher shares of non-standard contracts(on average 22% vs. 17% of all contracts) and higher export shares on total production (29.35% vs 23.84%). Another less obvious characteristic associated with immigration appears to be a higher propensity to invest in R&D. This high propensity to R&D is, however, not reflected in comparatively higher innovation rates. Indeed, firms hiring immigrants declare that they regularly invest in R&D in 56.5% of the cases, while firms in Cluster 3 do so only in 23.5% of the cases. Yet, the share of firms reporting that they have introduced or are going to introduce innovations is identical in the two groups as regards process innovation, and is very similar as regards product innovation (39% vs. 33%). Thus, there is not much evidence of a positive association between immigration and innovation. Rather, there seems to be some mismatch between inputs in R&D and output in terms of innovation within firms hiring immigrants. This could be due to the firms' lower productivity. Unfortunately, it is difficult to elaborate more on this point, considering that the data on capital investment are quite incomplete within the CMT and measures of productivity are not available.

7.2.2 Discriminant analysis

The results of the discriminant analysis performed in the clusters described below are reported in table 7.6. The first three columns report the results of the joint discriminant analysis on all clusters; the last three report binary analyses discriminating between cluster 4, the one containing firms hiring immigrants, and the other three.

I will focus, first, on the discriminant analysis performed on all clusters (CA1, all clusters, columns 1-3). Here, discriminant function 1 mainly defines the extent by which a firm is quality-certified, a feature that is increasing as we saw in the introduction to the case study.

Table 7.6: Discriminant analysis

	(1)	(2)	(3)	(4)	(5)	(6)
Cluster	**DA1: All clusters**			**DA2: 3,4**	**DA3: 1,4**	**DA4: 2,4**
Discr. function	*1*	*2*	*3*			
Summary of Canonical Discriminant Functions						
Wilks' lambda	0·053	0·400	0·767	0·615	0·688	0·185
Canonical correl.	0·931	0·692	0·483	0·620	0·527	0·903
Chi-square	2195·449	686·215	198·553	184·386	261·744	543·156
Significance	0·000	0·000	0·000	0·000	0·000	0·000
Standardized canonical discriminant function coefficients						
PrecP3	0·009	0·261	−0·067	0·167	0·197	·
Info	0·033	0·541	−0·036	0·437	0·380	·
TNQual	0·018	−0·042	0·336	0·168	−0·245	0·127
RD	0·021	0·826	−0·025	0·513	0·571	·
ProdCapac	0·017	0·065	0·286	0·318	−0·208	·
lnEmpl	0·109	0·137	0·087	0·175	·	0·231
ForPerc	0·057	−0·003	0·934	0·614	−0·499	0·236
CertifQual	0·967	−0·276	−0·060	−0·463	·	0·897
Prof					0·216	·
InnoProd					0·183	·
lnEdad_1						−0·209
Cmc						−0·150
Structure matrix						
CertifQual	0·991	−0·072	−0·061	−0·307	0·219	0·928
lnEdad_1	0·130	0·100	−0·008	0·019	0·187	0·050
RD	0·194	0·753	0·065	0·462	0·578	0·237
Info	0·135	0·457	−0·123	0·166	0·596	0·110
lnEmpl	0·274	0·320	0·025	0·164	0·288	0·422
InnoProd	0·091	0·242	0·066	0·174	0·338	0·134
PrecP3	0·007	0·215	−0·038	0·168	0·163	−0·004
Exports	0·151	0·212	−0·009	0·065	0·227	0·230
Prof	0·062	0·171	−0·049	−0·077	0·355	0·077
Cmc	−0·039	−0·115	0·017	−0·090	−0·044	−0·166
ForPerc	0·016	−0·037	0·901	0·556	−0·477	0·164
TNQual	0·049	0·011	0·240	0·189	−0·128	0·132
ProdCapac	0·053	0·169	0·235	0·305	−0·019	0·069
Functions in groups centroids						
1	1·485	1·215	−0·322		0·851	
2	−5·282	0·070	−0·112			−2·402
3	1·295	−1·319	−0·430	−0·761		
4	0·782	−0·130	0·944	0·818	−1·048	1·821

From the structure matrix, quality certification results to be associated with larger firm size, as well as with older age and more investment in R&D and information technology; within the canonical correlation coefficients, besides *CertifQual*, only employment results to have a significant discriminating power. Discriminant function 1 mainly distinguishes firms in cluster 2 from the other; *ForPerc* has a relatively small coefficient; yet, with respect to the quite low standards of firms in cluster 2, it seems that hiring more immigrants increases the probability of being quality certified, though to a small extent. This results is more strongly highlighted in DA4 (column 6), where firms in cluster 4 are compared only with firms in cluster 2. The share of foreigners is associated with more quality certification, rather than less, higher maturity and less reliance on local markets. In short, immigrants are generally not involved in the smaller, lower-tech, less dynamic and more locally-oriented firms.

As regards discriminant function 2 (column 2), the structure matrix suggests that this function relates to knowledge-intensity features of the firm (mainly R&D intensity, informatization, product innovation), which are associated with size-related components (log employment and production capacity) as well as with exports (the loadings of *RD,Info, InnoProd, Exports, Prof*, as well as of *lnEmpl,ProdCapac* are all relatively high and have the same sign). Two features are worth noticing: the share of non-standard contracts is associated with more, rather than less, knowledge intensity; and quality certification is not a feature of more R&D-intensive and innovative firms. The share of foreign workers has a small negative loading in the structure matrix; its standardized canonical coefficient is zero. There seems to be no significant relation between the share of immigrants in a firm's employment and its knowledge intensity. Accordingly, this function more strongly discriminates cluster 1 from the others, while the coefficients of the groups centroids for this function in cluster 4 is close to zero. The comparison of these results with those of the discriminant analysis run solely on clusters 1 and 4 (DA3, column 5), provides stronger evidence on proposition P1.1. Compared with the subset of highly knowledge-intensive firms, firms hiring immigrants are characterized by significantly lower orientation towards R&D, informatization, innovation and by lower shares of qualified professionals involved. The prevailing characteristics of the group of firms hiring foreigners in the Basque country, in general terms, are not innovation, exports and knowledge-intensity.

This basically means that the most knowledge-intensive and innovative firms don't hire foreign workers or do so to a negligible extent. Thus, rather than disconfirming P1.1 on the distinctiveness of firms in this regard, this finding more radically highlights that the benefits from migration in relation to promotion of innovation and exports apply in the Basque country to a very limited extent.

Within DA1, cluster 4 results mainly identified from discriminant function 3 (column 3). From the comparison between the standardized canonical discriminant function coefficients for this function and the structure matrix, the variables having the greatest discriminating

power in this context are *ForPerc*, *TNQual* and *ProdCapac*. Thus, primarily, these results confirm that firms hiring immigrants are characterized by both higher shares of manual workers, in line with P2.1, in line with the labour replacement hypothesis. These firms result also characterized by a positive dynamic in their production capacity, in line with the idea that hiring immigrants is complementary with investments (P2.2b) rather than of a cost-saving strategy (P2.2a). DA1 shows that, with respect to all other firms, the R&D intensity associated with this cluster is a consequence of their relatively large size and is not associated with the higher shares of immigrants employed: both the standardized canonical coefficients of *RD* and its loading in the structural matrix are small, and even have different signs; R&D, thus, is not a significant discriminating factor in this function. The cost-reduction hypothesis, however, would imply a negative and significant relation of R&D with the share of foreigners employed. Thus, the result that foreign labour force is systematically associated with a positive trend in production capacity, but not significantly with R&D, seems not to refute P2.2b. This idea is more strongly confirmed in DA2 (column 4). Here, cluster 4 is compared only with cluster 3, i.e. the one that contains firms that are more similar to those in cluster 3. With respect to the subset of comparable firms, the most powerful discriminating factors are the share of immigrants, the perceptions about the trends in production capacity, but also, and most prominently, the orientation towards R&D and informatization. The share of non-qualified manual workers results significant, but much less discriminating than in relation to the whole population of firms. Overall, firms investing in R&D and informatization may not turn out to be very innovative, but certainly are not pursuing an overall cost-reduction strategy as hypothesized by Murat and Paba (2003). This result seems more in line with proposition P2.2b, that firms hiring immigrants are not driven by cost-reduction motives but rather complement their greater dynamism and production capacity, which generates demand for labour, including non-qualified. In line with this interpretation, the share of turnover exported does not emerge as a significant discriminating predictor in either case.

Overall, the discriminant analysis has identified the prevailing patterns for distinguishing the characteristics associated with positive shares of immigrant employees in Basque firms. In general, firms that hire foreigners in the Basque country are not characterized by a cost-saving strategy nor by a high knowledge orientation. They are relatively large firms, characterized by a high share of non-qualified manual workers and by positive trends in their production capacity. In relation to comparable firms, they are also profiled as relatively more R&D and information technology-intensive. This suggests that the main motives guiding the employment of immigrants relate to greater (manual) labour force demand generated by positive firm performance. Clearly, this does not exclude other, less quantitatively apparent, reasons, to be identified in the qualitative analysis below.

Table 7.7 summarizes the main findings deriving from the quantitative analysis, which set the benchmark for the following qualitative analysis deriving from the interviews.

Table 7.7: **Basque Country: Main findings deriving from the quantitative analysis**

Proposition	**Evidence**
P1.1: Knowledge-intensive firms hiring foreign workers are characterized by comparatively higher innovation, productivity or exports than those hiring no immigrants	**Not supported in the data.** A 4% of the highly innovative firms are hiring immigrants. Diversity does not seem to play a quantitatively remarkable role in contributing to firms' innovativeness and exports.
P2.1: The employment of foreign workers reflects the higher reliance of firms on non-qualified manual work.	**Supported in the data.** Firms hiring immigrants are relatively large and characterized by higher shares of non-qualified manual workers.
P2.2a: Hiring immigrants is an alternative to investing in R&D	**Not Supported in the data.** Firms hiring immigrants are also characterized by more positive trends in their production capacity, as well as by comparatively high levels of informatization and R&D. While highly production-oriented, they are also relatively R&D intensive.
P2.2b: Hiring immigrants is complementary to investing in R&D	**Supported in the data.** (see above).

7.3 Immigration in the local system of Elgoibar: Evidence from the interviews

The typologies identified in the regional analysis of the previous section will be taken here as a benchmark for framing the interviews' findings.

7.3.1 Immigrants in knowledge-oriented firms

The word "immigrant" in the area of Bajo Deba is associated with recent arrival, low qualification, Muslim religion, dependence from social security contributions and closure within the community of co-ethnics. In a few cases, after some interview time it turned out that the firm actually employed foreigners with adequate qualifications who had spent some years in the Basque country and within the firm, so that the interviewee doesn't "even consider him/her as an immigrant anymore". Section 5.2 presented some literature suggesting that a different motivation for hiring immigrants could be the intention to generate synergies among different cognitive approaches to problem solving and creativity (Kochan et al., 2003); proposition P1.1 proposed that diversity contributes to productivity, innovation and exports in knowledge-oriented firms. The analyses in section 7.2 above, however, did not provide much support to this hypothesis from the quantitative point of view: only 3.3% of highly knowledge-oriented firms can be said to associate higher levels of immigration with higher levels of innovation; the subset of firms hiring immigrants is characterize precisely by the relative inability to convert R&D investment into innovation. Coherently, none of the interviewees, not even in the firms that were insisting more in

the global sourcing of talents and on team work, could recognize specific synergic effect deriving from diversity at the workplace:

> "It is hard to say whether diversity in the origins brings innovation. In our firm, the most diverse team I have in mind, the R&D team, has been expressly selected to maximize the complementarities between the co-workers, and to maximise the innovation potential: because it is their task to produce innovation, particularly proactive people were selected; the balance of competences in the group was sought to be between people who are differentiated and complementary from the point of view of their professional specialization, and from the point of view of their tenure and experience at work. The team was carefully developed over the years through a gradual incorporation of new people to the team. That they are also differentiated from the cultural point of view (Basques, Colombians, *Madrileños* and *Andalusos*) was not an intended outcome. We tried to compose a group with a good balance of competences and personalities; that they come from different places is the result of chance".[EL07]

This quote seems interesting for at least two reasons. First, it does not provide much support to the academic hypothesis that diversity breeds innovation in this specific context: rather, it seems to support an opposite causality running from firm characteristics and particularly propensity to innovation and R&D which induces the firm to look for suitable employees. Diversity and complementarity in the profiles may be correlated with ethnic diversity, even if this was reportedly not an intended outcome. Second, this quote is extracted from the interview to the HR manager of a strongly export-oriented firm which stated that language skills in German and English are much more important than those in Euskera: yet, the quote seems to imply that "ethnic diversity" in the Basque country may be increased by people from Madrid as much as by people from La Paz, in spite of the quite long industrial tradition of the area which has been attracting migration flows since decades. This could bear some implications in terms of the extent of the embeddedness of economic relations within identity-related groupings.

The CEO of a small and highly internationalized mechanic firm hiring a high share of immigrants supported the argument of causality running from firm characteristics to diversity by emphasizing the role of management in promoting synergies and innovation within teams:

> It's all about the managing team, about keeping your workers informed about the market opportunities and the decisions of the management: a good team is made by committed people, and you get commitment by informing your people. You get commitment by providing opportunities for sharing and for developing team cohesion. The origin of the people does not matter, nor it matters whether they are males or females. And a good team is made by the high quality of the workers, on which we invest with regular training[EL12].

Firms that are more oriented towards quality and innovation will in principle also be able to proactively look for more qualified workers abroad. Yet, the interviewees considered the level of professional training and higher education supplied by regional specialized training institutions and universities to be suited to their needs, with the additional advantage that the collaboration with local training institutions allows tailoring curricula to the needs of firms; global sourcing of talents comes into play where the local supply does not correspond to the firms' demand:

> I have told you that I stock my talents up from the Instituto de Maquina Herramienta, here in Elgoibar. They provide me with a "tailor-made" engineer, like a tailored suit, and I can have him as a trainee for some time. But the IMH produces, say, 200 engineers per year. What happens if you need 400? Where do you look for good mechanics and technicians? You send your director and HR people to Romania to seek qualified people. But you don't bring them to Spain at a Rumanian salary: you integrate them in your firm at a Spanish salary. [EL12]

It is a rather common perception in the Basque country that Romanian people be particularly suited for work in the manufacturing sector. However, the capacity of the Basque country to attract foreign qualified professionals is limited by the lower salaries and relatively worse working conditions compared to other European countries, according to a professional trainer in one of the vocational training institutions [EL05].

The search for talents is admittedly an expensive process - "Who told you that we keep costs low? Talent must be paid" [EL07]- and it is proactive: "We have been monitoring this Mexican person who worked in our Mexican representative office since the very beginning: we recognized he is a valuable resource so we proposed him to come and work in our Spanish headquarters. Now he is managing a team of 20 people" [EL07]. However, nothing suggests that firms pursue synergy building from diversity in their global quest for talents: "Among the people who came here from France to work as trainees, we noticed he was particularly smart, and we said: he's not going to leave. He happens to be Moroccan" [El12].

The potential competitive advantage of foreign workers as "boundary brokers" (Williams, 2007) in transnational operations, which could contribute to higher export levels of more ethnically diverse firms, is recognized in principle by some of the interviewees mainly in relation to language skills, where Basque and Spanish natives are commonly perceived to be weak, but is not reported to play a crucial role in practice. Familiarity with the foreign business culture does not appear as a crucial competitive asset and is considered as substitutable by a long enough work experience with the partner country; indeed, the interviewed firms which manage transnational operations do not systematically rely on foreign personnel to maintain the contacts with the representative offices and plants abroad. In most cases, HR managers in internationalized and knowledge oriented firms profile the employees in the commercial divisions as native Basques with strong selling and language

skills and long-lasting experience with the partner country; own expatriation experiences among the natives were never highlighted as pluses [EL07,EL04]. The facilitating role of co-ethnic commercials in transnational operations seems more decisive in the relationships with culturally more distant countries like China ("in China we always bring with us our Chinese commercial"[EL07]). Nonetheless, the importance to adapt to foreign business cultures is openly recognized: the commercial manager of a firm exporting 95% of its machining centers mainly to China and India considers it as "key" to be familiar with the culture of the trade partners [EL04], while the HR manager of a firm exporting worldwide a 90% of its production of numerical control centers and encoders, recognizes that the organization of the foreign office must adapt to the local culture and attitudes towards hierarchy: "In China, the boss must be a Chinese, while in the US they are used to have bosses from anywhere in the world" [EL09]; knowledge of German language is considered as critical in the course of the sales operations a highly technological firm exporting worldwide 100% of its production of machines producing transmission belts and rods: "Germans like it when you talk to them in their language"[EL07]. In general, however, the firms seem to be much more reliant on the capacity of their native employees to adapt and to extend their set of skills to include the ability to deal with foreign cultures than on the capacity of the newcomers to offer them. Language skills are considered as core, while "soft" intercultural skills can be learned and play an ancillary role with respect to technical qualifications and to a solution-oriented attitude to work, even in the firms with a very strong export orientation. Rather than on the immigrants' "reflexivity" proposed by Williams (2007), the interviewed firms seem to rely on their own ability "to reflect on the assumptions and beliefs that shape practice"(Williams, 2007, p.367) - but it must be admitted that the very low average levels of diversity within the firms would probably lead the HR managers to attribute the reflexivity more to the individual personality of the worker than to her immigration experience.

Resorting to expatriates is also limited in the foreign offices and plants, where human, cultural and economic costs considerations lead internationalized firms to hire employees from the foreign country. Among the interviews, the more R&D-intensive firms have representative offices abroad devoted to both sales and technical assistance [EL04,EL07,EL09] - typically the setup of the machines to correspond to the clients' specific requirements; firms producing more standardized products have established production plants abroad [EL10]. In these cases, the transnational operations are initiated by a training period of 3-6 months in the Basque country for the foreign employees, which is intended to provide an in-depth familiarization of the foreign employees with the headquarters and with the characteristics of the product. Once trained, however, foreign employees may be more inclined to work in their own interests and to develop their own networks than to promote the headquarters' interests. HR managers of highly knowledge-oriented firms report that the most common way to avoid opportunism and moral hazard is to promote the loyalty of their collaborators abroad with advantageous working conditions, attractive carrier plans

and, if necessary, by visiting the foreign offices more frequently [EL07,EL09]. "A Spanish expatriate to maintain control over the foreign representative office is only necessary in the case of more culturally distant countries like China"[EL09]. The fact that the sales manager of a highly internationalized firm hiring no immigrants suggests that "The ideal would be to have a Basque abroad, but the costs are too high" suggests that the natives are associated with higher trust and ability to maintain control on a native [EL04].

Summarizing with respect to proposition P1.2, the interviews could not identify explicit corporate strategies pursuing diversity and the gains from it. Recognition about the potential benefits from cultural diversity was mainly in relation to foreigners' language abilities. In culturally more distant countries, especially China, knowledge of the foreign regulations and familiarity with the foreign culture seem to play an economically more relevant role; in most other cases, natives can substitute these skills with knowledge of "medium" languages such as English; the more limited intercultural skills of natives seem to be compensated by their stronger industrial training. Hence, it seems that foreigners make a difference in firms' exports only in relation to transnational communications with more culturally distant countries. This pattern would seem to be compatible with the presence of contextual factors that don't allow further more complex benefits from cultural diversity to emerge. With respect to tacit knowledge, measured by the time that on average a new employee takes to become autonomous at work, the case study responses were less varied than in Reggio Emilia - in most cases about one year, with the exception of the foundry and of the moulding firm, reporting respectively one week and six months. However, one of the firms hiring no immigrants at all reported that the time to reach autonomy at work may be as long as 3-4 years [EL04], while those reporting to hire some immigrants in knowledge-intensive areas such as the sales offices mentioned it takes about 1-1.5 years [EL07,EL09]. From this point of view, the pattern is compatible with the assumptions about the role of tacit knowledge in altering the incentives to hire immigrants.

7.3.2 The qualifications of immigrants and their replacement of local labour force

Remarkable coherence among the interviewees emerged as regards the perception that the immigrant groups in the Comarca of the Bajo Deba be marked by serious underqualification with respect to the needs of the local industry. In the interviews, the mismatch between firms' requirements and foreign workers' profiles was attributed both to the average low levels of education and training among immigrant workers and to institutional discrimination. A researcher at the Basque Observatory on Immigration, considers the main reason to be a problem of bureaucratic validation of the qualifications [EL02]. On the other hand, the director of a local employment agency, stated that the problem of the recognition of foreign qualifications is automatically solved. Independently from the extent

of the institutional discriminations, the data of the survey on the immigrant population in the Basque country (EPIE, 2010) reported in section 7.1.3 show that the average levels of qualifications of the immigrant population are low. Furthermore, the 2011 reform of the Spanish immigration law actively channels lower-qualified immigrants into difficult-to-cover jobs, institutionalizing the spontaneous practice of immigrants' self-selection into DDD jobs: art.65 of the *Real Decreto* 557/2011, approving the *Reglamento de Ley Organica* 4/2000 about rights and liberties of foreigners in Spain and their social integration, after its reformation through *Ley Organica 2/2009* establishes that, with the exception of high-skilled foreigners and foreigners immigrating to undertake high directive tasks, entrepreneurs willing to employ a foreigner must either offer vacancies that are included in a catalgue of "difficult-to-cover tasks" elaborated quarterly in each province, or they must certify the job opening as difficult-to-cover with the help of the public employment agency. To do so, the vacancy must be submitted to the public employment agency, which will in turn publish it through its channels and, in case it is not successful, will issue a certification confirming the insufficiency of suitable or interested candidates [EL14].

The lack of qualification was reported as a serious hindrance to foreign workers' employment in the industrial sector especially for some nationalities (Morocco, Senegal, Ghana, Mali, Pakistan) with the exception of the lower-value added phases of the value chain, such as foundries and moulding factories. The required level of qualification is usually a secondary-level training degree (FPII), which immigrants reportedly don't comply with. Instead, flexibility is recognized by most interviewees as a characteristic of the immigrant workers that makes them more keen to work in "dirty" and manual jobs (e.g. [EL11]).

Those hiring immigrants and situated in lower-value added phases of the value chain in more production-oriented firms, such as foundries and moulding factories, confirmed the immigrants solved problems of labour shortage caused by the reluctance of natives to enrol in such "dirty, difficult and demanding" jobs during the times of "bonanza". In both the moulding factories and the foundry, the interviewed HR managers value characteristics of the personality such as an attitude to security and precision at work as very important due to the risks for physical security involved in the production process; professional qualifications are not crucial [EL10,EL11,El13]. Indeed all immigrants are employed in the production phase and none is in the administration or other departments. An interesting and peculiar case in point is the one of a cold moulding factory producing components mainly for the automotive and railway sectors. According to the HR Manager, production is relatively diversified and may change quite radically from one project to another. Thus, in spite of the relatively low technical competences required in the production line, it may still be more advantageous to hire workers with a secondary-level professional qualifications so that you can be sure that they are sensitive to security issues and more flexible to adapt to changes in the production process: "When you hire someone with no qualification at all, she will need a substantial investment from our side to become autonomous at work. And you have to balance whether you can afford this investment or not [EL10]". While this

point could hide some discriminatory attitude, it importantly shows that the skills acquired from professional training are valued to go beyond the technical qualifications.

The crisis has marked an important break in this context: on the one side, it has forced many firms to dismiss employees. The HR manager of a workers-led moulding factory which was founded after the crisis forced the previous factory to close, explains that immigrants were more heavily affected by the dismissions because they were more frequently employed with temporary contracts [EL13]. Indeed, the quantitative data show that firms hiring more immigrants are also having higher shares of non-standard contracts (see section 7.2). On the other side, the crisis has forced more lower-skilled natives to turn back and enroll in these jobs. Accordingly, the 2013 Barometer of the Basque Observatory on Immigration reports a decline in the agreement to a positive "utilitaristic" view of immigration as a means to help cover employment shortage. These dynamics, coupled with the institutional provisions giving preference to the natives, have caused the share of foreigners employed in the firms to drop substantially during the years of the crisis in the interviewed firms. Thus, those who maintained their jobs are likely to be the more established and integrated immigrants with an undetermined contract. Together with the perceived relatively open and fair treatment towards foreigners reported by qualified observers, the dynamics above probably play a co-determining role in the reported "no difference" between the contracts currently stipulated with immigrants and those of their natives co-workers.

As regards the negative side of the Lazear (1999) tradeoff, i.e. the communication problems associated with higher levels of diversity, according to the interviewees these are confined within the more "explicit" dimension of language. Yet, in lower-value added firms hiring immigrants as a residual strategy, the required levels of language skills in Spanish are not particularly advanced, so the problem of communication is easily solved with some basic Spanish knowledge. As regards the more sophisticated communication in higher-value added firms, none of the interviewees reported communication problems within more diverse teams: in all cases they reported that the hired immigrants are highly integrated, in many cases they acquired the Spanish nationality, are fluent in Spanish and even in Euskera and long-tenured.

Overall, Proposition P2.1 that immigrants are hired as replacement labour in production-oriented firms was not only confirmed in the interviews but even substantiated with institutional provisions. The interviews highlighted different underlying strategies. As regards their own firms, all interviewees reported that foreign workers are employed at exactly the same contractual conditions as other workers and would not employ them as part of a cost-saving strategy. On the other hand, there was a shared perception that foreign workers are hired in other firms exploiting their greater flexibility.

7.3.3 Homogeneity vs. heterogeneity in immigrants' social capital

The interviewees were in general reluctant to attribute a "distinctiveness" (Williams, 2007) to immigrants as a group within their firms or as potential labour force and never highlighted the objective of introducing some cognitive diversity in the firms by hiring immigrants. Neither do the social ties of immigrants with natives appear to contribute to their employment.

Rather, the interviewees agree that the decision to hire or not to hire immigrants is on the rule based on considerations of the matching between demanded and offered employee profiles. Independently of the level of technology and value added of the firm, the decision is about a defined professional profile to which the candidate is compared: "When selecting our collaborators, we look at professional profiles, not at ID cards", stated explicitly one of the interviewed HR managers [EL07]. Accordingly, the firms that do not to hire any immigrants, state that those who applied were rejected based on their mentioned lack of qualifications.

That the advantage from hiring foreigners be based on considerations of getting access to the immigrants' social and/or coethnic networks emerged only indirectly and with respect to countries that have a strategic commercial importance and that are culturally particularly distant, like China [EL09]. The potential advantages in terms of productivity and creativity from heterogeneous social capitals were not more explicitly recognized. Hence, the evidence on P3.1 was not very strong.

While all firms reported highly stable relationships with suppliers and clients, and some of them confirmed their participation in the *asociación clúster* AFM, social capital considerations were not reported to play a role in the recruitment of employees, neither natives nor foreign. This is likely to associate with the comparatively high R&D intensity of the interviewed firms and to their high levels of internationalization.

According to two professional trainers respectively from the Red Cross local offices and from a local training institution, who have been involved in training programmes targeted to immigrants, local employers are relatively open to hire foreigners based on relatively objective human capital considerations. According to them, the problem is to acquire basic elements of the local business culture:, in particular regarding attitudes to time, respect of rules and distinction between private and professional sphere (see section 5.2)

> "Their business culture may be quite different – less formalized, not relying so much on contracts: we had cases of people going for vacation and remaining in their home country two weeks longer than announced to their employer; in another case, if a worker was sick and could not go to work, he would send his brother as a substitute. We are used to more formality and personal commitment here. So since the early training we insist on values like punctuality,

> team work, reliability and commitment as much as we provide basic Spanish classes"..."In my opinion, local entrepreneurs are relatively open and value a positive attitude to work and a results-oriented attitude more than the origin of the worker"[EL08][5].

On the other hand, as in the Italian case, immigrants were attributed group characteristics that collectively discourage their employment:

> In the higher-value added phases of the machine tool production, the production is very differentiated and customized to single clients. Thus, it may take a very long time, typically years, to a new employee to become self-sufficient at work. Every new employee is an important investment for us; we prefer that our employees stay with us for a long time (...)
>
> Someone who is not from here would go away as soon as she finds a better opportunity closer to her home; instead, someone who is from here will stay till retirement [EL04].

Indeed, employees turnover rates in the area are very low. The R&D Manager of the same firm reinforces this view: "The idea is that knowledge should remain here".

Overall, there is no evidence in support of P3.1 nor of P3.2. The interviewed firms do not rely very much on social networks for the recruitment. The interviews also suggested that there are discrepancies between the business culture of natives and of immigrants, as well as preferences for locals, that discourage the creation of cross-cultural ties.

7.3.4 Embeddedness and the gains from immigration

The interviewed researcher at the Basque Observatory on Immigration declared himself reluctant to motivate the limited participation of immigrants in the manufacturing sector with a discriminatory attitude or to an habit to cultural homogeneity. He observes that in the culturally very homogeneous villages of the Basque coasts, other sectors such as the fishery sector attracted important inflows of foreign labour from culturally very different countries, typically from Sub-Saharan Africa. Rather, he attributes the problem to a pure

[5] A relatively neutral and pragmatic attitude towards immigration is also within the inspiring principle of the local training programmes targeted to immigrants: on the one hand, in the times of full employment up to 2007 there was shortage of workers in the industrial sector due to the ageing of the population and due to the fact that less and less people were willing to undertake a job in the more manual tasks of the industrial sector; on the other hand, the immigration flows were increasing steeply. Thus, it was hoped that immigrants could fill the gap in labour supply. Unfortunately, the levels of qualification of immigrants turned out to be below the levels of secondary school so they would not qualify for the standard professional training courses provided by training institutions, and entry-level courses as lathes and welding operators had to be provided to them [EL05, EL08]. Attendance was complicated by their often irregular situation which made them quite vulnerable to problems with papers and justice.

mismatch of qualifications. He is also not in favor of an explanation relating the limited inflow of immigrants in the Basque country to language barriers relating to the use of Euskera: he observes that "this is only an issue for Latin American immigrants, who by the way show a remarkable ability to learn the language as a working tool in elderly care" [EL01]. According to the data of the Barometer, a yearly publication of the Basque Observatory on Immigration, the majority of the Basque people are not feeling threatened by immigration in what concerns the use and further diffusion of the Euskera language. Only a minority of the Basques (0,8%) identifies immigration as a personal problem, and the share is decreasing over the years. More urgent personal problems include unemployment and economics-related issues. The trend of the tolerance index over the years of the crisis has closely followed the dynamics of the GDP; the signs of recovery in the economy are associated with the improvement of all tolerance and openness indexes of the Barometer, with tendencies to go back to pre-crisis levels.

There was no agreement about whether the prevalence in the use of Euskera be a discriminatory factor with respect to immigrants. An interviewed City Counsellor for Immigration in one of the Municipalities interested by the mechanic specialization explained that the extent of the use of Euskera changes very much from one valley to another [EL03]. Indeed, in some of the interviewed firms, Euskera is considered to be of marginal importance with respect to Spanish, English or even German. In other firms, including highly internationalized ones, the share of the people originating from within a radius of less than 20 km is close to 100%, Euskera is the current working language and internal recruitment criteria give an explicit preference to bilingual candidates [EL04]. Even in highly internationalized firms, ensuring that Euskera is a working language "is primarily an issue of ensuring equal opportunities to Euskera-speaking people" [EL09].

However, besides the mentioned debate about the recognition of the immigrants' qualifications, there seem to be other institutional hindrances to the integration of foreigners. The HR manager within a cooperative employing 400 people in an area where 80% of the firms has less than 20 employees, explains that the most important groups in the area, Fagor and Mondragon, are cooperatives. Alone, they employ about 6000 people in the Arrasate-Mondragon area, where about 22000 inhabitants reside. This means that virtually all residents in these areas have at least one relative within the cooperative. By statute, the cooperatives give priority to the relatives of their members in case temporary job opportunities open up. In turn, having worked occasionally within the cooperative makes it easier to become a member. According to the interviewee, this clause could have had an important effect in limiting the access of foreigners in the local economic system. "'It operated both directly, i.e. hindering foreigners' access to vacancies within the cooperative, and indirectly, by reducing the incentives for less motivated and qualified natives to upgrade their skills and to leave the least qualified posts to foreigners' [EL09]".

A researcher at Orkestra, the Basque Institute of Competitiveness, recognizes that the

diffusion of the cooperative form contributed to spreading a "bureaucrat-minded" attitude but had also a part in sustaining the diffusion of a culture of investing in education, information and training and has regularly sponsored courses and even training institutes such as the IMH itself, which in the case of some world-class firms are actually becoming the main channel through which young immigrants get integrated not just in society but also in the forefront of the economy [EL14]. Indeed, most interviewees are optimistic with respect to the capacity of the local educational system to provide the immigrants with the necessary tools to get fully integrated in society: the schooling rate of young immigrants in the area of the Bajo Deba is very high and Euskera language is part of their curricula; more generally, they are not worried about the immigrants' capacity to learn Euskera.

According to many observers, the local business culture is marked by a strong sensitivity to promoting local development. The cultural roots to this attitude are multiple, according to the Orkestra researcher. First, the catholic tradition, which is also responsible for the establishment of the first cooperatives in the area back in the XVI century, has always promoted a sense of commitment towards the local community. Second, the cooperative tradition in itself, which during the years of the Franquismo has constituted an institutional protection within an area whose local identity had been seriously challenged by the interdiction of the Euskera language, was based on the principles of solidarity and equality both during times of wealth and growth and in more difficult times. These add to a well rooted tradition of *auzolan*, i.e. "community work", dating back to the Middle Ages, by which members of a local rural community would provide gratuitous work to their neighbourhood; the content and the date of the task is determined by neighbours and strongly marked by reciprocity and solidarity ties within the community [6]. The social pressure on local entrepreneurs to maintain employment local is strong and this is partially responsible for the good employment record in the area during the crisis:

> "The resilience of employment during the crisis is not necessarily reflecting underlying economic growth or increasing productivity. The fact that firms tend to keep their employment levels high reflects social pressure on entrepreneurs, who are mostly originating from the Basque country and often are even from the very municipality where their firms are located. There are cases of entrepreneurs who prefer to get personally indebted than to go around his home town with the mark of the one who has dismissed his employees. Whether this is a successful economic strategy it can be discussed; it certainly maintains social cohesion within the firms"[EL14]

According to the interviewee, another reason for the resilience of the system to immigration is in the newly passed immigration regulation mentioned above, giving preference to local workers.

[6] `http://www.euskomedia.org/aunamendi/16620`

Table 7.8 summarizes the main findings from the interviews.

Table 7.8: **Elgoibar: Main findings from the interviews**

Proposition	**Evidence**
P1.2: The reasons for hiring immigrants in knowledge-oriented firms relate to productivity gains from diversity and to exploiting immigrants' transnational skills in firms applying a less tacit and more codified knowledge base	**Pattern is compatible with very limited role for diversity to promote innovation and internationalization due to high level of tacitness.** All firms except the one requiring no qualification at all (the foundry) reported significant time (typically one year or longer) and firm's own investment in internal training of new employees. This would imply that in all these firms, while the skills level is quite differentiated, the extent of the tacit knowledge involved is quite high. Accordingly, the recognition of the potential benefits from diversity was in all cases limited to relatively basic considerations of the immigrants' linguistic skills in relatively distant foreign languages.
P2.2a: Hiring immigrants is an alternative to investing in R&D	**No strong support from the interviews.** Interviewees recognized the common perception that cost-saving strategies associated with immigrant employment prevail in other firms than their own.
P2.2b: Hiring immigrants is complementary to investments	**Mixed support from the interviews.** More labour-intensive firms recognized foreign workforce was the only way to face labour shortages in growth periods. However, more often, firms report not to have a specific strategy leading to hire immigrants.
P3.1 Employers hire immigrants to gain access to transnational co-ethnic networks and immigrants' social capital.	**No support from the interviews.** No consideration of the immigrants' own social capital was reported in the interviews
P3.2 Immigrants' social ties with natives facilitate their access to employment in more embedded district firms	**Evidence of a different pattern in the interviews.** Firms' involvement in structures of inter-firm cooperation and in the social structure does not seem to have implications on the mechanisms for recruiting foreign labour. Human capital considerations are reported as the sole determinants of recruitment. Channels like the local training institutions would seem to provide a possible entry for foreigners.

7.4 Synthesis

The case study of the Basque country provides quite clear evidence in favour of Propositions P2.1 and P2.2b, that immigrants integrate in the Basque economy and within the cluster of Elgoibar as replacement labour force in those tasks that natives are not willing to undertake, and primarily because of firms' own growth in production capacity. This was

proven in the quantitative analysis, which showed that immigrants are more represented in firms with more non-qualified manual workers with more precarious contracts but also greater production capacity and R&D orientation than comparable firms. The interviews confirmed these results while also remarking the prevalence of cost-saving strategies in firms other than their own.

Instead, the case study did not provide any evidence on the part of proposition P1.1 relating to the connection between immigrants and higher levels of innovation and productivity. The quantitative analysis showed that highly innovative and export-oriented firms in general don't hire foreigners or do so to a negligible extent. As regards P1.2, the interviews highlighted a causality link running from firm dynamism and innovation to diversity, rather than the opposite. The immigrants' expected positive association with higher exports was motivated in the interviews with relatively basic arguments relating to immigrants' language knowledge of culturally more distant languages; firms relying more extensively on tacit knowledge were found to hire no immigrants.

The interviews did not mention considerations of social capital driving the recruitment of immigrants, neither in the sense of contributing to internationalization nor of contributing to differentiated capacities and know-how. Instead, the interviews suggested that social capital considerations, to some extent, drive preference to natives; also, they suggest and that there are discrepancies between the natives' and the immigrants' business culture that make foreigners' employment more difficult.

These results are not particularly surprising considering the small share of foreigners residing in the Basque country and in the local area as well as the low educational levels of foreigners in the territory. At the level of the immigrants' human capital endowment, the Basque country (but also to a lesser extent Emilia Romagna) differs substantially from territories where immigrants have been found to play a more decisive role, such as the Silicon Valley or Cambridgeshire. Though, the interviews also highlighted the embeddedness of economic relations into a tight fabric of institutions, firms and cultural traditions explain the relative impermeability of the local system to immigration in spite of its high standards of living. Indeed, to a large extent, immigrants' distance from the production core of the local system can be explained by the limited human capital supplied by them. However, they are also underrepresented in the less qualified jobs that lie close to the production core of the district. This could be explained by the institutionalized preference to local workers provided in the *Ley de Inmigración*, together with statutory preferences to cooperative members and relatives in employment, as well as the legacies of local rural culture strongly oriented to promoting local development and solidarity to a certain extent . However, the high levels of schooling of immigrants' children and the importance attributed to qualifications suggest that the channel for a virtuous inclusion of immigrants in the local system is already operational and is constituted by the local training institutions.

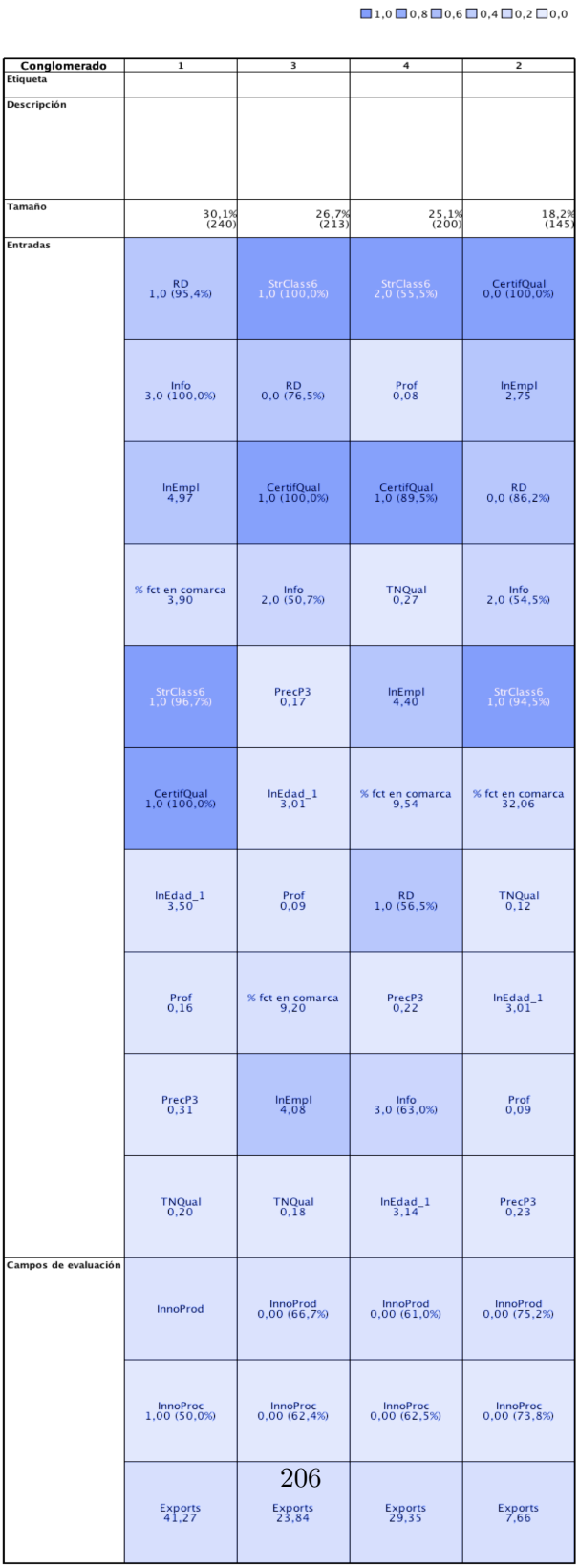


Figure 7.1: Results from cluster analysis

Chapter 8

Case studies on immigration in industrial districts: Insights from the comparative analysis

Table 8.1 summarizes the findings from the case studies in relation to each proposition. Neither of the case studies led to confirming proposition P1.1, that *Knowledge-intensive firms hiring foreign workers are characterized by comparatively higher innovation, productivity or exports than those hiring no immigrants*. In neither of the case studies, innovation and exports emerged as a distinctive feature of knowldege-intensive firms hiring immigrants. However, in Emilia-Romagna, the relatively high share of highly innovative firms are hiring immigrants (35.8%) suggests that a link between diversity and innovation and export exists. Diversity could be among the factors that contribute to the high innovativeness and exports of these firms, or highly knowledge intensive firms are driven to employ a more ethnically diverse labour force; this high share does not lead to exclude that composing cognitive and culturally diverse teams is among the strategies pursued by firms to promote innovation, even if it does not become one of their characterizing features. In the interviews, more support was found for causality running from firm characteristics (e.g. innovative mindsets in the management) to diversity. The share of highly innovative firms hiring immigrants in the Basque case is, instead, only 3.3%. While the two percentages can only be compared with great caution, considering that the results of the cluster analysis are strongly depending on the set of predictors, and the set of variables could not be exactly the same considering that the diversity of the two datasets, the difference is still striking. Diversity does not seems to play a quantitatively remarkable role in contributing to firms' innovativeness and exports in the Basque country, nor more innovative Basque firms appear to resort to foreign labour to a quantitatively remarkable extent.

In accordance with the quite different weight of ethnically diverse firms in the more knowledge-oriented segment of firms, the evidence collected in the interviews on proposition P1.2, that *he reasons for hiring immigrants in knowledge-intensive firms relate to productivity gains from diversity and to exploiting immigrants' transnational skills in firms applying a less tacit and more codified knowledge base*,was quite different. In both cases, the relatively basic consideration that immigrants have greater transnational skills, and in particular language skills, in their native language, and that this knowledge has a potential economic value, was recognized. In both cases more export-oriented firms showed higher awareness of the economic value of this potential and could provide some examples of foreign employees hired in the sales department to promote exports towards their countries of origin. In both cases, immigrants' transnational skills were mainly considered to make a difference for culturally more distant countries, and in many cases it was considered that natives with the corresponding language skills could substitute for them. In Reggio Emilia, it was recognized that foreign employees, if appropriately trained, have the potential to overcome and clarify the national specificities in the technical jargon. More variation was found in Reggio Emilia in relation to the link between intensity in tacit knowledge and awareness about the potential gains from diversity. The average time that a new employee takes to become autonomous at work was taken as a proxy for the extent of the tacitness and contextualization of the firm's knowlegde base. The proxy seems reasonably accurate at least for the case of Reggio Emilia, where it does not seem to reflect other factors, such as for instance higher investment in human capital. By similar levels of required qualification, i.e. engineering degree, time-to-autonomy was found to vary from 3 months to 2 years; in the firm that reported the shortest time, the HR manager explained that the high level of qualifications of their workers, mainly engineers, makes it possible to have them rapidly operational; in the small subcontractor firm where not all workers have a high-school degree, the HR manager reported that "you never really become autonomous, it's a patriarchal firm where all products are personally controlled by the boss". Overall, the interview findings were compatible with the idea that, by greater codification and less contextualization of the firm knowledge, the firm is more able to recognize the potential benefits from diversity in terms of innovation and to apply them productively. Indeed, the firm where the knowledge is more codified both recognized and could provide concrete examples of proactive recruitment policies aiming at creating innovation-enhancing synergies in multi-ethnic working groups. The findings were more homogeneous in Elgoibar, where all firms except the one requiring no qualification at all, i.e. the foundry, reported significant time and resources invested by the firm in the internal training of new employees: in these cases, before workers reach autonomy, at least one year is necessary. Because the levels of qualifications were also quite high in the majority of these firms, this would imply that the extent of the tacit knowledge involved is quite high, while the skills level is quite differentiated. In accordance with the hypothesis, the recognition of the economic value of diversity within these firms was limited to relatively basic considerations of the immigrants' linguistic skills in relatively distant foreign languages.

To the contrary, the two case studies yielded remarkably similar results with respect to the propositions relating to the more production-oriented firms. In both cases, the findings confirmed the part of proposition P2.1, that *The employment of foreign workers reflects the higher reliance of firms on non-qualified manual work.*, relating to production-intensity. However, in neither of the cases this was found to imply an overall lower level of skills intensity of the firm as a whole. Indeed, in both cases the firms hiring immigrants are characterized by both production orientation and relatively high orientation towards R&D. More specifically, in the Emilia-Romagna case, the discriminant analysis led to characterize firms hiring immigrants by their lower shares of non-standard contracts, reflecting their comparatively high concentration in the core sectors of the district producing final industrial goods. While highly production-oriented, this sector is also relatively R&D intensive. In the Basque case, firms hiring immigrants are relatively large and characterized by higher shares of non-qualified manual workers and by higher production capacity, as well as by comparatively high levels of informatization and R&D. As in Reggio Emilia, while highly production-oriented, they are also relatively R&D intensive. On the whole, the quantitative analyses on the two case studies suggested that the employment of immigrants is not predominantly concentrated within smaller-sized and less technology intensive contractor firms - even if the result may be different if the analysis could take into account the informal labour which is likely to be relatively more frequent, and relatively more important for immigrant workers, in smaller contractor firms.

The two cases also showed similarities in relation to the selection of the relevant explanation on the underlying strategies leading firms to hire immigrants: cost-saving strategy alternative to investments (P2.2a) vs. consequence of increasing demand for manual labour driven by firm dynamism in terms of growth and investments (P2.2b) The quantitative analysis in both cases suggested that labour replacement need not associate with a cost-reduction strategy. In the interviews, in both contexts, both proposed strategies were found to apply. Cost-saving purposes were commonly perceived to drive immigrant employment, but were in all cases attributed to firms other than the interviewee's own, who in turn regularly reported that native and foreigne workers are treated equally in contractual terms. The employment of foreign workers could not be associated with a single firm strategy in any of the contexts: in some cases, immigrants were reported to cause greater training costs and lower productivity; in other cases their employment was considered as the consequence of increased labour demand due to firm growth and investment. Comparing the interviews in the two contexts, the main difference that seems to emerge between the two contexts is in the profile of firms reporting to hire immigrants as replacement labour. In Elgoibar, the firms reporting to hire immigrants as replacement labour are mainly those involved in lower-value added phases of the value chain (e.g. the foundry and the moulders); the more knowledge-intensive firms, even those having significant production facilities, mainly react to the lack of qualification of foreign workers by not hiring immigrants. In Reggio Emilia, firms investing a significant share of their turnover in R&D and innovation re-

sult having no other option than hiring foreign workers in production. While any further statement should be substantiated with more data, it could be that in Elgoibar the native (or national) population is less reluctant to undertake production tasks than in Reggio Emilia.

As regards P3.1, in neither cases firms reported considerations of the immigrants own social capital and relationships in their selection of employees. Human capital considerations were reported as the sole determinants of recruitment. As regards P3.2, that *Immigrants' social ties with natives facilitate their access to employment in more embedded district firms*, the findings were again more varied in the Reggio Emilia case than in the Elgoibar case. In Reggio Emilia, the interviews findings were compatible with the idea that, where the firm is smaller and more embedded in social networks, the trust and reciprocity mechanisms applying to the relations with local workers and entrepreneurs are extended to the relationships with foreigners. This applies to social networks for smaller firms but also to local training institutions for larger firms. Channels like the local training institutions would seem to provide a possible entry for foreigners also in the Elgoibar case, but in some cases immigrants' business culture was found to be so distant from the expectations of local employers to discourage their employment.

Table 8.1: **Case studies: comparative insights from quantitative and qualitative analyses**

P1.1: Knowledge-intensive firms hiring foreign workers are characterized by comparatively higher innovation, productivity or exports than those hiring no immigrants	
Reggio Emilia	*Elgoibar*
A 35.8% of highly innovative firms are hiring immigrants. Diversity could be among the factors that contribute to their high innovativeness and exports, though it does not emerge as a distinctive feature of these fimrs	A 4% of the highly innovative firms are hiring immigrants. Diversity does not seems to play a quantitatively remarkable role in contributing to firms' innovativeness and exports.
P1.2: The reasons for hiring immigrants in knowledge-oriented firms relate to productivity gains from diversity and to exploiting immigrants' transnational skills in firms applying a less tacit and more codified knowledge base	
Reggio Emilia	*Elgoibar*
The interviews findings were compatible with the idea that, where the time-to-autonomy is longer (interpreted as a proxy for the extent of tacitness in the firms' knowledge base), the firm is less able to convert the potential benefits from diversity into productive purposes. More export-oriented firms reported both awareness and cases of foreigners employed in the sales offices of the firm. The firm where the knowledge is more codified both recognized and could provide concrete examples of proactive recruitment policies aiming at creating innovation-enhancing synergies in multiethnic working groups.	All firms except the one requiring no qualification at all (the foundry) reported significant time (typically one year or longer) and firm's own investment in internal training of new employees. This would imply that in all these firms, while the skills level is quite differentiated, the extent of the tacit knowledge involved is quite high. Accordingly, the recognition of the potential benefits from diversity was in all cases limited to relatively basic considerations of the immigrants' linguistic skills in relatively distant foreign languages.

P2.1: The employment of foreign workers reflects the higher reliance of firms on non-qualified manual work.	
Reggio Emilia	*Elgoibar*
The proposition is only partially confirmed: Lower qualification and skills do not emerge as characterizing features of these firms; yet, they are highly production-oriented. Indeed, firms hiring immigrants are characterized by lower shares of non-standard contracts, reflecting their comparatively high concentration in the core sectors of the district producing final industrial goods. While highly production-oriented, this sector is also relatively R&D intensive.	The proposition is confirmed with an important qualification: Yes, firms hiring immigrants are relatively large and characterized by higher shares of non-qualified manual workers . However, they are also characterized by more positive trends in their production capacity, as well as by comparatively high levels of informatization and R&D. While highly production-oriented, they are also relatively R&D intensive.
P2.2a: Hiring immigrants is an alternative to investing in R&D *vs.* **P2.2b: Hiring immigrants is complementary to investments**	
Reggio Emilia	*Elgoibar*
All the proposed strategies were found to apply in the interviews. Cost-saving strategies were attributed to firms other than the interviewee's own. The quantitative analysis also suggested that replacement labour is a consequence of firm production orientation which not necessarily associates with a cost-reduction strategy.	All the proposed strategies were found to apply in the interviews. Cost-saving strategies were attributed to firms other than the interviewee's own. The quantitative analysis also suggested that replacement labour is a consequence of firm production orientation which not necessarily associates with a cost-reduction strategy.
P3.1 Employers hire immigrants to gain access to transnational co-ethnic networks and immigrants' social capital.	
Reggio Emilia	*Elgoibar*
No consideration of the immigrants' own social capital was reported in the interviews	No consideration of the immigrants' own social capital was reported in the interviews
P3.2 Immigrants' social ties with natives facilitate their access to employment in more embedded district firms	
Reggio Emilia	*Elgoibar*
The interviews findings were compatible with the idea that, where the firm is smaller and more locally embedded, the trust and reciprocity mechanisms applying to the relations with local workers and entrepreneurs are extended to the relationships with foreigners. This applies to social networks and also to local training institutions.	Firms' involvement in structures of inter-firm cooperation and in the social structure does not seem to have implications on the mechanisms for recruiting foreign labour. Human capital considerations are reported as the sole determinants of recruitment. Channels like the local training institutions would seem to provide a possible entry for foreigners.

P4: Transnational skills and productivity gains from diversity are stronger in local systems that are characterized by more inclusive formal and informal institutions.	
Reggio Emilia	*Elgoibar*
The local system of Reggio Emilia seems profilable as the more inclusive one, considering the proactive role of its political and economic institutions, both in a planned and spontaneous way, in promoting immigrant integration. The inclusive environment has probably generated a cumulative dynamic of attraction of further immigrant population and further adaptation of the local context to the issues raised by immigrants..	In the local system of Elgoibar, the relatively small size of the immigrant population has so far been associated with non-systematic, while highly pragmatic, institutional interventions to promote immigrants' training and to attract skilled labour. At the same time, some institutional factors hindering the access of larger shares of foreign labour in the industrial sector are at play: immigrant law requiring employers to emply immigrants solely in difficult-to fill posts, cooperative regulations giving preference to locals, and more generally a strong commitment among local firms to promote local development as a corporate priority. While the situation is dynamic, the local system profiles as comparatively less inclusive.
In comparative terms, the quantitative evidence collected shows foreigners are more often employed in highly knowledge-intensive firms in the Reggio Emilia case than in the Elgoibar case. In neither case, however, diversity seems to be a distinctive feature of more knowledge-oriented firms. Reported perceptions about the business case for diversity were more articulated in the Reggio Emilia case than in the Elgoibar case. The findings are compatible with the proposition that in the more inclusive system there is more scope for the benefits from diversity to play an economically relevant role.	

Based on the analysis of the interviews, of the micro-data and of the literature on the two cases, a few conclusions can be drawn on the two systems overall integration capacity of immigrants, with a view to substantiate proposition P4, i.e. that *Transnational skills and productivity gains from diversity are stronger in local systems that are characterized by more inclusive formal and informal institutions.* The local system of Reggio Emilia emerges as the more inclusive one, considering the proactive role of its political and economic institutions, both in a planned and spontaneous way, in promoting immigrant integration: as was seen in chapter 6, since early times the local institutions have promoted representation of immigrants in political fora and proactive solutions to the social issues raised by them (Rinaldini, 2011); trade unions and cooperatives emerged as integrating bodies at the workplace (Mottura and Rinaldini, 2003) and were recognized as such in the interviews [RE11,RE03,RE04]. Overall, according to Rinaldini (2011), the system displays a remarkable "integration capacity", compatible with the high local levels of bridging social capital (Portes and Sensenbrenner, 1993). In Elgoibar, in spite of significant efforts in this direction, the contacted trade union representatives were not even able to identify a suitable contact person for an interview on immigration issues; other interviewees reported that, with the crisis times, immigration issues have lost priority in the trade unions' agendas [EL05,EL08]. At the same time, some institutional factors hindering the access of

larger shares of foreign labour in the industrial sector are at play: immigrant law requires employers to emply immigrants solely in difficult-to fill posts, and cooperative regulations by statute give preference to relatives of employees in temporary employment, with large-scale implications due to their centrality in the local economies [EL09]. Hindered by the immigrants' too low starting levels of qualifications, training institutions have for a long time not been able to intercept first-generation immigrants, and the initiatives to provide training to immigrant workers in industrial topics have so far been non-systematic [EL02,EL03,EL05,EL08]. Yet, these initiatives were highly pragmatically oriented to address the issues raised by the aging of the native population and the increasing supply of labour from the immigrants' side [EL03], and higher training institutions are increasingly enrolling young people of foreign origin and second-generation immigrants, with potential important implications for the ability of the system to integrate them economically [EL01,EL07]. Overall, the "dense collaborative networks" observed by Aranguren et al. (2012) between firms in the local system do not seem to include immigrants, suggesting that the prevailing type of social capital prevailing locally is "bonding", rather than "bridging" (Portes and Sensenbrenner, 1993). However, while the context is in comparative terms a less inclusive one, it appears to be dynamically changing. The different roles of institutions are certainly also a consequence of the comparatively very different shares of foreign residents in the two localities. In comparative terms, the quantitative evidence collected shows foreigners are more often employed in highly knowledge-intensive firms in the Reggio Emilia case than in the Elgoibar case; in neither case, however, diversity seems to be a distinctive feature of more knowledge-oriented firms. Reported perceptions about the business case for diversity were more articulated in the Reggio Emilia case than in the Elgoibar case. These findings are compatible with the proposition that in the more inclusive system there is more scope for the benefits from diversity to play an economically relevant role, in line with the findings of Barberis (2008).

In the local system of Reggio Emilia, two firms raised arguments about the innovativeness involved in team diversity. These emphasized the greater capacity of culturally diverse pools of creative people to synthesize technical innovations and solutions in the production of components that can be flexibly adapted to different cultural contexts, taking into account the cultural specificities of production and tastes, while at the same allowing for cost-saving standardization. In a way, this argument emphasizes "flexible specialization" not only in the production system but also, so to say, in the cultural content of production. Similar needs to combine standardization with flexible adaptability emerged in other firms, both in Elgoibar and Reggio Emilia. Interviewees often emphasized that their sectoral specialization in mechanics and machine tools implies a client-specific combination of standardized components into customized products, which implies relatively small amounts produced, greater value added, and increases the relative importance of the phase of setup and fine-tuning of the machine to correspond to the clients' specific requirements. Production is relatively intensive in the use of specialized technical abilities, acquired by the firm

and in the district thanks to local-specific experience and training, which are necessary to understand and satisfy the specific clients' requirements, including those of foreign clients. These reasons also make production delocalization difficult and indeed no single firms in the mechanic sector reported to have foreign plants, while many firms have established foreign technical assistance offices to accompany this phase with foreign clients. Hence, it seems that the arguments about achieving a certain standardization in production, while maintaining the ability to customize the final product to the tastes of different foreign clients, could apply to both contexts; according to the interviewees in Reggio Emilia, immigrants would be well-suited for these tasks. Thus, both contexts could in principle benefit from greater diversity, if properly managed. Because the local system assumed to be characterized by *bridging* social capital showed a greater awareness of this potential, it could be inferred that the type of local social capital has economic implications; because diversity has been seen as a factor that facilitates customization and fine-tuning of production with foreign clients, management of diversity can be considered as the management of a local collective good sustaining competition (LeGalès and Voeltzkow, 2001; Barberis, 2008). The interviewees emphasized in both contexts the importance of technical skills and the important role of local training institutions in preparing local workers to the needs of local firms. Hence, promoting the integration capacity of the local system, with a particular focus on facilitating the access of immigrants and of their offspring to local training, seems to be an effective way to promote a match between supplied and demanded technical skills which could effectively complement skill-selective policies.

Chapter 9

Conclusions

This thesis has analyzed the economic effects of immigration in local systems of production, with a focus on its contribution to internationalization. This research question is motivated by the observation that local production systems have become important destinations of immigration flows; increased ethnic diversity is likely to affect the social cohesion, trust and reciprocity that traditionally have been considered to contribute to the competitiveness of the local system. The academic literature on the issue is still limited.

The research question is also motivated by the observation of a theoretical mismatch between the emphasis put on the complementarities between natives and foreigners in the economic literature on diversity, innovation and internationalization, and the studies of the phenomenon of immigration in industrial districts which mostly emphasize the role of immigration as replacement labour in manual tasks in the manufacturing sector. Considering that the most urgent challenges faced by local systems of production in the process of globalization relate precisely to internationalization and innovation, an exploration of the potential for immigrants to contribute to internationalization and innovation in industrial districts was also carried out.

Throughout the thesis, emphasis was put on the role of local system specificities in codetermining the ability of immigrants to promote trade and internationalization.

The thesis has adopted a comparative perspective and compared the Italian and the Spanish cases. The two countries were selected on different grounds. Both countries have in a few decades turned from emigration countries to major destinations for immigration. Second, they have a similar production structure relying largely on SMEs and local production systems, as well as a similar composition of their exports, mainly based on low-and mid-tech products. However, the composition of their immigrant population is quite different - most immigrants in Spain are either Spanish-speaking, European or Moroccan, while

the composition of Italian immigration is more varied - and immigrants in Italy are more integrated in the manufacturing sector than they are in Spain. The structural similarity of the two countries allows for a comparative perspective and for highlighting the role of these differences in explaining different effects of immigration on internationalization and innovation. The comparative approach in the thesis is applied at two levels, each corresponding to one part of the thesis. In the first part of the thesis, a systematic, country-based comparison of the role of immigrants in promoting the trade of their host provinces is carried out. In the second part of the thesis, the comparative approach is applied at the level of a case-study-based, theory-seeking analysis of the specificities entailed by the interaction of immigration with the densely collaborative social and economic contexts of two local production systems, i.e. Reggio Emilia in Italy and Elgoibar in Spain. Each part starts with a methodological chapter reviewing the relevant literature and developing the empirical strategy to be applied to two subsequent empirical chapters. The second part adds to this a comparative chapter meant to systematize the insights derived from the two case studies.

Both parts of the thesis have offered contributions to the literature at the theoretical, methodological and empirical levels.

Part I, approximating local systems with provinces due to data availability reasons, analyzes the nexus between migration and the trade of provinces applying gravity models of international trade augmented with measures of migration stocks, that are assumed to reduce bilateral trade costs (Felbermayr et al., 2012). The main theoretical contribution of this part to the existing literature is the problematization of the role of sub-national heterogeneity in the multilateral resistance term. While the inclusion of controls for such heterogeneity directly derives from the micro-foundations of the gravity model, it has often been overlooked in practice. Both empirical chapters in part I apply the theory-consistent gravity model developed in the methodological chapter and show the implications from accounting for sub-national heterogeneity in the multilateral resistance terms for the estimation of the link between migration and trade. The inclusion of these controls is supported by statistical tests[1] and is found to affect the magnitude of the estimates in the Italian case.

The main methodological contribution of this part is in terms of applying to panel data

[1]In both cases, the empirical applications showed that controlling for multilateral resistance at the province-level leads to identifying a stronger effect of immigrants on trade in provinces marked by *lower* rates of foreign residents over the total population, in contradiction with the findings by Peri and Requena-Silvente (2010) who found a greater effect for trade in provinces with greater immigrant shares. We explain this result by the fact that immigration shares in a given province are likely to be correlated with time-varying competitiveness factors in the province, including its exporting capacity. Failing to account for time-varying exporter effects, i.e. for local system specificities, leads to wrongly attributing to immigrants a trade promotion effect that is in fact a feature of the local system. This result empirically confirms the theoretically founded importance of fully accounting for subnational differences in the analysis.

the econometric strategy recently developed by Head and Mayer (2014) to address the main econometric issues arising from the application of gravity models. These issues are considered to stand at the "frontiers of gravity research" (Head and Mayer, 2014). In both empirical applications, this led to discarding the Poisson PML as a suitable estimator, questioning its usefulness as a "workhorse" for gravity estimation (cfr. Santos-Silva and Tenreyro, 2006) at least with panel data. The application of this analysis led in the Spanish case to select the Gamma estimator as the optimal estimator, which is *per se* a novelty in the literature on the migration-trade link.

As regards the empirical contributions of this Part, besides country-level findings, the main addition to the literature comes from the comparative perspective adopted in the thesis, which allowed highlighting that the effects of immigration on trade can be radically different even in structurally similar countries. This is a non-trivial result, considering that the majority of studies, focussing mainly on countries with a relatively consolidated immigration experience, has highlighted positive effects on the trade of relatively similar magnitude across countries. In particular, while the estimates of the immigrants' effect on trade in the Spanish case are fully in line with the majority of the previous studies and suggest that increasing the immigrant population by 10% increases trade by between 1.26% and 1.44%, the estimates in the Italian case support a negative effect of immigrants on trade, by which the same increase in the immigrant population would decrease trade values by ca. 5%. This is not the first time that the Italian case profiles as a peculiar one in the literature on the migration-trade link - a precedent can be found in the country-level analysis by Murat and Pistoiesi (2009). A few tentative explanations for this result, as well as a number of checks aimed at comparing the underlying assumptions of the model with other literature, are offered in the relevant chapter. The tentative explanation that best fits the data is that immigrants promote trade-substitution by providing information that decreases the costs of market-access FDI, rather than of exports. The low reliance of Italian firms on FDI and the "superdiversity" (Vertovec, 2007; Bratti et al., 2014) in the origins of its immigrant population could be the specificities that increase the salience of the immigrants effects on FDI rather than trade.

As regards the role of the ethnic composition of the immigrant population, the comparison between the two countries again provides useful insights. The chapter on Spain has identified that the immigrants' effect on trade is stronger towards Spanish-speaking countries. This finding is relatively novel, considering that the factors that *per se* promote trade, such as institutional similarity and colonial ties, tend to decrease the immigrants' effect: when other factors decrease the barriers to trade, immigration effects are less significant (see Girma and Yu, 2002; Dunlevy, 2006). However, this result can be easily interpreted within the framework of the random encounter model proposed by Wagner et al. (2002) to explain the immigrants' effects on trade: sharing a common language may give the immigrant easier access to information on trading opportunities, not just in the origin country but also in the host country, and increase the capacity of the immigrant to successfully

realize the trading opportunity. Language similarity would in other words increase the probability that an immigrant has the capacity to facilitate the exchange. Notice that the other side of the argument, i.e. that less language similarity decreases the ability of the immigrants to promote trade, compared to immigrants share a common language, is compatible with a lower magnitude in the effects or with a non-significant effect, but not with a negative effect. The negative effect could arise from the need to counterbalance greater communication difficulties in trade by establishing branches abroad in order to gain from proximity. Indeed, the immigrants' negative effect is significant only towards new trade partners, towards which the barriers to trade are presumably higher.

Further empirical contributions of part I relate to the inclusion of emigrant stocks along with immigrant stocks in the analysis. The Spanish case showed that the width of information flows underlying the trade promotion effects are different for immigrant and emigrant stocks: immigrants' effect on trade mainly draw on local information flows, while emigrants' effects are led by the nation-wide stocks of immigrants having moved to the same destination country Herander and Saavedra (cfr. 2005).

Some asymmetry in the analysis of the two countries was introduced by the availability of a richer transaction-level set of data provided by ISTAT for the Italian case, containing detailed information about the sectors. This allowed computing measures of the intensive and the extensive margins of trade, as well as to disentangle the trade-promoting role of immigrants by different levels of product differentiation and of technological intensity. The distinction between the intensive and the extensive margins of trade was analyzed in relation to immigrants' trade-facilitation effect so far only by Peri and Requena-Silvente (2010); hence, this can be considered as an additional contribution of the chapter focussing on the Italian case. In particular, the distinction between the two margins of trade and the inclusion of the emigrants' stocks variable along with the immigrants' stocks, in connection with each other, show that the effects of immigration, attributable to a reduction in information costs, mainly proceed through the extensive margin of trade. The emigrants' effects, instead, are found to have an overall neutral effect on trade which results from mutually offsetting dynamics at the level of the extensive and the intensive margins of trade. The proposed interpretation, supported by the checks on technological intensity, is that emigrants mainly contribute to creating trade opportunities in lower-value added sectors; this channel is much more significant towards old markets.

The case study analyses carried out in part II concentrated on two local systems specialized in the mechanic sector, i.e. Reggio Emilia in Italy and Elgoibar in Spain, and marked by quite different capacity of integrating immigrant labour in the core sectors (cfr. Barberis, 2008). Once again, the structural similarity of the two cases allowed highlighting the role of local specificities in altering the capacity of immigrants to affect internationalization and innovation. It focused on the characteristics of firms hiring immigrants and the main determinants leading them to hire foreign workers. A quantitative assessment of the char-

acteristics of firms hiring immigrants based on firm-level microdata at the NUTS2 level was used as a benchmark for the interpretation of a series of semi-structured interviews collected in the two local systems. The potential contribution of employees' diversity to internationalization and innovation was highlighted and contrasted with labour replacement reasons.

The main contributions from part II relate to the theoretical and empirical insights deriving from the case study analyses carried out therein. Being based on case studies, the findings of the qualitative analysis cannot be generalized to a universe, but rather to propositions (Yin, 2003): we could call these "analytical propositions", to highlight that the case studies, while not representative in numerical terms, represent a relevant typology of cases, and allow the identification of patterns that could apply to other cases.

Yet, a methodological contribution of the comparative case study analysis, which could further be exploited in economic studies taking a regional perspective and pursuing a comparative perspective, is the adoption of two very similar firm-level databases collecting information on different dimensions of firm performance, internationalization, R&D orientation, as well as on the composition of the firms' employment. This enabled running parallel cluster analysis and discriminant analysis which enable setting a framework for comparison between the two local systems.

Also, the quantitative side of the case study analysis led to some empirical contributions to the literature. One contribution relates to the findings on the characteristics of firms hiring immigrants, which were investigated through cluster analysis and discriminant analysis at the regional level. Not surprisingly, these showed that immigrants, in both cases, are mainly hired in production-oriented firms rather than in knowledge-oriented firms. A less obvious finding, however, was that in both considered contexts, firms hiring foreign labour force result being in relative terms also more R&D-oriented. Furthermore, firms hiring immigrants in Emilia Romagna were found to be resorting to significantly lower shares of non-standard contracts than firms hiring no immigrants, and to be disproportionately representative of the production core of the district, i.e. the mechanic sector. In the Basque country, the firms hiring immigrants were found to be characterized by comparatively higher shares of non-qualified manual workers but also by more positive trends in their production capacity and by more informatization. Overall, these findings question the assumption that immigrants are primarily involved in "dirty, dangerous and demanding" jobs and that firms hire them as part of an overall myopic strategy of cost-reduction; hence, the thesis in Murat and Paba (2003) that district firms have maintained their competitiveness by drawing on low-cost labour to avoid costly investment and maintain competitiveness does not seem to apply to the considered cases.

The comparative perspective in the quantitative analysis also allowed identifying a quite striking distinction between the two regional contexts were the case studies are embedded. While the majority of firms hiring immigrants are production-oriented, and while hiring

immigrants does not emerge as a distinguishing feature in knowledge oriented firms, in Emilia Romagna more than one-third (35.8%) of the firms profiled as knowledge-intensive and innovative were found to employ foreign labour. In Elgoibar, the share of firms hiring foreign workers within the group of knowledge-intensive firms was only 3.3%. This difference is particularly striking considering that the overall shares of firms hiring foreigners are in both cases close to 20%. The distinction certainly relates to the qualifications of immigrants, considering that in Emilia Romagna the proportion of low-educated foreigners aged 15 or higher was not above 46% in 2012, while the corresponding share in the Basque country was 77% in 2007 (RER, 2014; EPIE, 2010). Assuming that such a distinction applies also to the sub-regional level, the opportunities for immigrants to contribute to innovation and employment seem to be quite different in the two cases.

Connecting the quantitative evidence with the analysis in the interviews and of secondary literature on the case studies led to identify the district of Reggio Emilia to be more compatible with a pattern of prevalence of *bridging* social capital in the relation of native with foreign communities, while the cluster of Elgoibar resulted to correspond to the prevalence of *bonding* social capital (see Portes and Sensenbrenner, 1993). The interviews highlighted the role of different institutional barriers in promoting the segregation of immigrants' employment (except the very highly skilled) in difficult-to-fill jobs as well as outside the production core of the district. This framework certainly does not to contribute to attract immigrants with medium levels of education and skills, who instead constitute the majority in Reggio Emilia.

Hence, a first analytic contribution of part II is in terms of highlighting a connection between the ability of immigrants to contribute to internationalization and innovation in industrial districts and the type of social capital prevailing locally.

The other main analytic propositions are drawn from the interviews.

In the Reggio Emilia case, pattern matching in the interviews (Campbell, 1975) revealed that tacit knowledge may be among the factors accounting for a distinctiveness of the immigrants' effect in local systems of production. This insight was obtained by confronting the interviewees' assessments on the potential for immigrants to contribute to innovation and internationalization with an indicator of knowledge tacitness within the firm, i.e. the average time necessary for an employee to become autonomous at work according to the employer. The employers in the firms where tacit knowledge plays a more important role were found to have more pessimistic perceptions about the immigrants' distinctiveness as employees, about their potential role as catalyzers of international transactions, and about the innovation potential of more culturally diverse teams. Conversely, the employers in firms where knowledge resulted more codified according to the indicator recognized the importance of diverse teams in the joint development of products and solutions that are at the same time standardized and customizable to different tastes in the export markets. The insights deriving from the Elgoibar case in this respect were less clear-cut but compatible

with the proposed interpretation: the interviewed employers reported a more homogeneous set of answers in relation to tacit knowledge intensity - in all cases relatively high; yet, the firms where the tacit knowledge intensity was highest (time to reach autonomy at work above 2 years) reported to hire no single foreign and to actually give preference to locals.

A further analytical contribution of the case study analysis relates to specific insights about the content of the immigrants' potential contribution to industrial districts' internationalization and innovation. Both in Elgoibar and Reggio Emilia, the interviewed firms often emphasized that their sectoral specialization in mechanics and machine tools implies that their products embody a client-specific tuning of general-purpose components into customized products, which implies relatively small amounts and relatively high value added. They emphasized the relative importance in the phase of setup and fine-tuning of the machines to correspond to the clients' specific requirements. These are among the reasons why production was in both contexts reported to be relatively difficult to delocalize, and why many firms resorted instead to foreign technical assistance offices: production is relatively intensive in the use of specialized technical abilities. These abilities are acquired in the district thanks to experience and training, which are necessary to understand and satisfy the specific clients' requirements, including those of foreign clients. In the context of Reggio Emilia, the interviewees who emphasized the potential for ethnically diverse teams to promote innovation highlighted a similar aspect: the pool of knowledge in ethnically diverse teams of skilled workers allows introducing new products and processes that are sufficiently standardized to serve multiple foreign markets, but also customizable to meet culture-specific tastes. This suggests that, at least in the mechanics sector, this specific type of contribution of diversity to innovation and internationalization could apply to both contexts, both marked by strong export orientation and that both could benefit from greater diversity, if properly managed.

Further, because the local system assumed to be characterized by *bridging* social capital showed a greater awareness of this potential, it could be inferred that the type of local social capital has economic implications; to the extent that ethnic diversity promotes the introduction of innovations that are dynamically able to adapt to clients' tastes in different countries, the management of diversity can be considered as the management of a local collective good sustaining competition (LeGalès and Voeltzkow, 2001; Barberis, 2008). The interviewees emphasized in both contexts the importance of technical skills and the important role of local training institutions in preparing local workers to the needs of local firms. Hence, promoting the integration capacity of the local system, with a particular focus on facilitating the access of immigrants and of their offspring to local training, could be an effective way to promote the local-specific match between supplied and demanded technical skills.

Having approached the research questions of this thesis as an exploration of the potential of

immigrants to contribute to innovation and internationalization in industrial districts, and having confirmed and to some extent articulated the contents of this potential, a variety of directions for future research emerge. Further research along these lines could address the limitations of the present work.

One set of research lines arises from the findings of part I and could be considered to contribute to the branch of the literature on the migration-trade link.

A first line of research relates to confirming the tentative explanation proposed in the first part of the thesis in relation to the trade-substitution effects promoted by immigrants through market-access FDI. While the patterns identified in chapter 4 were remarkably robust and coherent, the proposed explanation could not directly be tested due to the lack of access to data on outward FDI disaggregated by province of origin and country of destination. With the necessary data, the verification of this effect would be relatively straightforward; indeed, in his pioneering work on the migration trade link, Gould (1994) already included controls for FDI. Confirming the proposed explanation has potentially policy-relevant implications of particular relevance for the Italian case, and would contribute to the debate on whether immigration has a negative effect on firm internationalization (Murat and Paba, 2003).

A second open research line relates to identifying the determinants of the distinctive effects of immigration identified in the two countries. As mentioned above, the cultural distance of the immigrant population from the local seems to affect the ability of immigrants to promote trade as well as the direction of their effects. Tadesse and White (2009) have found, for US States, that immigration has the effect to decrease the cultural distance between the country of origin and that of destination. Cross-country comparative analysis based on sub-national units could shed more light on whether the ability of immigrants to promote trade is affected by cultural distance. The findings from the interviews suggested that this could be the case, as employers stated that they more crucially rely on foreign sales officers in the transactions with more culturally distant countries, while the transnational skills of immigrants are not crucial in the transactions with culturally closer countries.

A third open line of research which would combine the insights from the case studies together with those of the analysis of the migration-trade link could explore whether bridging social capital and integration capacity of the local system has a systematic effect on trade. This could be tested by distinguishing the effects of immigration according to territorial indicators for integration such as those yearly provided by the CNEL (Consiglio Nazionale dell'Economia e del Lavoro) in Italy. As seen above (see footnote 1), this should crucially include controls for subnational heterogeneity in the multilateral resistance terms.

Another set of research lines could test the analytic propositions derived from Part II with a view to contribute to the analysis of the specificity of the immigration phenomenon within industrial districts.

This would primarily involve a more systematic analysis, including more articulated measures of knowledge tacitness (e.g. Gerard, 2003; King and Zeithaml, 2001; Subramaniam and Venkatraman, 2001; Zander and Kogut, 1995), of the interaction between knowledge tacitness/ codification and immigration, as well as the effects of this interaction on innovation and internationalization. Such an analysis could take different units of analysis. Here, the focus was mainly on intra-firm relations; survey data could confirm the exploratory findings to a more systematic extent. Important insights could also be drawn also if the analysis could be run at the local system level. The empirical unit of analysis could be the local labour system. The extent of local knowledge tacitness could be proxied by whether a given local system is an industrial district or not. Currently, the lack of systematic data on innovation by local labour systems and the lack of disaggregation by destination country and nationality of immigrants in local systems would force such an analysis to focus on the aggregate exports of the local system and on the aggregate share of immigrants rather than on more sophisticated measures of local diversity, and would require an important effort to address potential endogeneity issues. Yet, the insights could be of policy relevance for the future of the district model.

Furthermore, as mentioned, the case study analysis carried out here mainly focused on the firm level. Extending the case study analysis to the networks between firms, including immigrant entrepreneurs, and exploring their roles within the networks, their patterns of relationships and the type of knowledge exchanged would be of interest but the financial requirements of such a systematic analysis were beyond the author's capacity (see also Kochan et al., 2003, on the costs of collecting data on cultural diversity).

Finally, the case study analysis mainly provided the perspectives of the entrepreneurs. Possibly new insights could be gained by directly interviewing the main subjects of this this thesis, i.e. immigrants, who could provide a more articulated analysis of the interplay between personal abilities and contextual enabling factors, as well as own assessments on the economic value of their own transnational skills for local development. In particular, their embeddedness in coethnic networks, which on the one hand has been proven to have key economic implications in transnational business (Rauch, 1999, 2001), was shown in the case study analysis to be a completely neglected consideration by employers. Building bridges between local firms' networks and coethnic transnational networks could have implications on internationalization capacity of local systems.

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Appendix A

Appendix to Chapter 3

Table A.0.1: **List of Countries**

Europe	Americas	Asia	Africa	Transition economies	Oceania
Andorra	Argentina	Bangladesh	Algeria	Bulgaria	Australia
Austria	Brazil	China	Angola	Croatia	
Belgium	Chile	India	Dem. Rep. of Congo	Czech Republic	
Cyprus	Dominican Rep.	Iran	Egypt	Hungary	
Denmark	Canada	Israel	Guinea	Lithuania	
Finland	Colombia	Lebanon	Morocco	Poland	
France	Cuba	Japan	Nigeria	Romania	
Germany	Mexico	Pakistan	Syria	Russia	
Greece	Panama	Philippines	South Africa	Slovakia	
Ireland	Peru	South Korea	Tunisia	Slovenia	
Italy	USA			Ukraine	
Luxembourg	Venezuela				
Malta					
The Netherlands					
Norway					
Portugal					
Sweden					
Switzerland					
Turkey					
UK					

Table A.0.2: **Total population, immigrants and emigrants by province (2010)**

Province	Population	Nationality		Province pop. share		Immigrant pop. share	Emigrants	Province pop. share		Emigrant pop. share
	(Persons)	*Spanish*	*Foreigners*	%	*Level*	%		%	*Level*	%
SPAIN	47,021,031	41,273,297	5,747,734	12.2	-	100	1,408,825	3.0	-	100
Alicante	1,926,285	1,459,186	467,099	24.2	high	8.1	21,371	1.1	low	1.5
Balears	1,106,049	863,793	242,256	21.9	high	4.2	14,328	1.3	low	1.0
Almería	695,560	544,401	151,159	21.7	high	2.6	27,772	4.0	high	2.0
Girona	753,046	590,799	162,247	21.5	high	2.8	9,884	1.3	low	0.7
Tarragona	808,420	658,106	150,314	18.6	high	2.6	10,087	1.2	low	0.7
Castellón	604,274	492,009	112,265	18.6	high	2.0	5,267	0.9	low	0.4
Lleida	439,768	359,278	80,490	18.3	high	1.4	11,471	2.6	mid	0.8
Málaga	1,609,557	1,334,530	275,027	17.1	high	4.8	33,211	2.1	mid	2.4
Madrid	6,458,684	5,378,740	1,079,944	16.7	high	18.8	174,819	2.7	mid	12.4
Murcia	1,461,979	1,220,114	241,865	16.5	high	4.2	19,607	1.3	mid	1.4
Guadalajara	251,563	212,359	39,204	15.6	high	0.7	2,247	0.9	low	0.2
S.C.Tenerife	1,027,914	874,587	153,327	14.9	high	2.7	72,454	7.0	high	5.1
Barcelona	5,511,147	4,705,660	805,487	14.6	high	14.0	104,302	1.9	mid	7.4
LaRioja	322,415	275,735	46,680	14.5	high	0.8	10,237	3.2	mid	0.7
LasPalmas	1,090,605	936,553	154,052	14.1	mid	2.7	25,548	2.3	mid	1.8
Zaragoza	973,252	845,610	127,642	13.1	mid	2.2	15,388	1.6	mid	1.1
Cuenca	217,716	189,747	27,969	12.8	mid	0.5	2,269	1.0	low	0.2
Segovia	164,268	143,194	21,074	12.8	mid	0.4	2,304	1.4	mid	0.2
Valencia	2,581,147	2,266,752	314,395	12.2	mid	5.5	36,944	1.4	mid	2.6
Huesca	228,566	200,756	27,810	12.2	mid	0.5	5,063	2.2	mid	0.4
Teruel	145,277	127,643	17,634	12.1	mid	0.3	3,656	2.5	mid	0.3
Toledo	697,959	613,984	83,975	12.0	mid	1.5	6,627	0.9	low	0.5
Melilla	76,034	67,161	8,873	11.7	mid	0.2	3,527	4.6	high	0.3
Navarra	636,924	565,555	71,369	11.2	mid	1.2	16,766	2.6	mid	1.2
Soria	95,258	85,388	9,870	10.4	mid	0.2	4,421	4.6	high	0.3
Burgos	374,826	340,260	34,566	9.2	mid	0.6	12,122	3.2	mid	0.9
Araba/Álava	317,352	289,142	28,210	8.9	mid	0.5	4,139	1.3	low	0.3
C. Real	529,453	483,452	46,001	8.7	mid	0.8	4,175	0.8	low	0.3
Huelva	518,081	475,328	42,753	8.3	mid	0.7	5,200	1.0	low	0.4
Albacete	401,682	369,277	32,405	8.1	mid	0.6	5,129	1.3	low	0.4
Ávila	171,896	159,283	12,613	7.3	mid	0.2	6,005	3.5	mid	0.4
Granada	918,072	853,738	64,334	7.0	mid	1.1	34,317	3.7	high	2.4
Cantabria	592,250	553,049	39,201	6.6	mid	0.7	25,170	4.2	high	1.8
Valladolid	533,640	500,984	32,656	6.1	mid	0.6	9,005	1.7	mid	0.6
Gipuzkoa	707,263	664,814	42,449	6.0	mid	0.7	19,313	2.7	mid	1.4
Bizkaia	1,153,724	1,085,014	68,710	6.0	mid	1.2	27,011	2.3	mid	1.9
León	499,284	473,321	25,963	5.2	mid	0.5	35,339	7.1	high	2.5
Ourense	335,219	318,508	16,711	5.0	mid	0.3	82,134	24.5	high	5.8
Ceuta	80,579	76584	3,995	5.0	low	0.1	2,132	2.6	mid	0.2
Salamanca	353,619	336,113	17,506	5.0	low	0.3	23,265	6.6	high	1.7
Asturias	1,084,341	1,035,055	49,286	4.5	low	0.9	83,041	7.7	high	5.9
Palencia	172,510	165,301	7,209	4.2	low	0.1	5,510	3.2	mid	0.4
Zamora	194,214	186,173	8,041	4.1	low	0.1	14,820	7.6	high	1.1
Pontevedra	962,472	922,678	39,794	4.1	low	0.7	106,279	11.0	high	7.5
Sevilla	1,917,097	1,840,007	77,090	4.0	low	1.3	22,326	1.2	low	1.6
Lugo	353,504	339,328	14,176	4.0	low	0.2	50,352	14.2	high	3.6
Cádiz	1,236,739	1,188,972	47,767	3.9	low	0.8	19,825	1.6	mid	1.4
Cáceres	415,083	399,767	15,316	3.7	low	0.3	12,705	3.1	mid	0.9
Badajoz	692,137	668,097	24,040	3.5	low	0.4	8,803	1.3	low	0.6
ACoruña	1,146,458	1,107,469	38,989	3.4	low	0.7	128,090	11.2	high	9.1

Córdoba	805,108	779,849	25,259	3.1	low	0.4	13,920	1.7	mid	1.0
Jaén	670,761	650,094	20,667	3.1	low	0.4	9,128	1.4	mid	0.6

Table A.0.3: **Top origin and destination countries in 2010**

A.Immigration: Top 15 origin countries, 2010

Country	Immigrants	Gender ratio	Age ratio	Education ratio	Employment ratio	Duration-of-stay ratio
1.Romania	831,235	.69	3.18	.61	1.99	3.25
2.Morocco	754,080	.62	2.89	.27	1.18	.64
3.Ecuador	399,586	1.05	2.51	.54	2.24	3.03
4.UK	387,677	1.04	2.35	.99	.56	.49
5.Colombia	292,641	1.48	3.31	.86	1.29	2.23
6.Bolivia	213,169	1.15	3.07	1.06	1.29	1.59
7. Germany	195,824	1.08	3.50	1.15	.75	.28
8. Italy	184,277	.58	3.81	1.37	1.00	.56
9. Bulgaria	169,552	.76	3.85	.64	1.75	2.19
10. China	158,244	.80	3.08	.44	1.66	.72
11. Portugal	142,520	1.07	3.19	.20	.87	.17
12. Peru	140,182	1.44	4.54	1.69	1.42	.74
13. Argentina	132,249	1.05	2.61	1.48	.95	.49
14. Francia	123,870	1.17	3.37	.915	1.10	.12
15. Brazil	117,808	1.86	3.32	.97	1.00	.57

B.Emigration: Top 15 destination countries, 2010

Country	Immigrants	Gender ratio	Age ratio	Education ratio	Employment ratio	Duration-of-stay ratio
1. Argentinaf	309,523	1.16	0.99	-	-	-
2. France	164,854	1.23	1.27	.47	.54	.04
3. Venezuelaf	139,830	1.00	1.23	-	-	-
4. Germany	85,700	.66	2.61	.40	-	-
5. Brazilf	80,285	0.94	1.21	-	-	-
6. Switzerland	73,277	.98	5.05	.60	2.56	.09
7. Mexico	70,173	.86	1.39	2.07	.95	-
8. Cubaf	70,106	1.30	0.46	-	-	-
9. USA	57,678	1.28	2.64	2.09	1.00	.20
10. UK	50,727	1.48	2.50	2.32	1.76	-
11. Uruguay	49,422	1.16	1.06	-	-	-
12. Belgium	36,222	1.14	2.68	.29	.61	.12
13. Chilef	33,056	1.06	1.17	-	-	-
14. Andorraf	21,319	1.02	3.02	-	-	-
15. Netherlands	15,262	1.09	3.35	1.37	-	-

Source: Own elaboration on INE and OECD-DIOC data.

Age ratio $= \frac{\text{Persons aged 25-64}}{\text{(Persons aged 15-24)+(Persons aged 65+)}}$;

Education ratio $= \frac{\text{(ISCED codes 3 to 6}}{\text{(ISCED codes 0-2)}}$;

Employment ratio $= \frac{\text{(Employed)}}{\text{(Unemployed)+(Inactive)}}$;

Duration-of-stay ratio $= \frac{\text{stays}\leq 5\text{years}}{\text{stays}>5\text{years}}$.

Table A.0.4: **Regression results - Province-specific elasticities**

Province	OLS	OLS2	PPML	PPML2	GammaPML	GammaPML2
Immigrants						
Albacete	-0.197	-0.142	0.042	-0.174	-0.214**	-0.187
	(0.137)	(0.182)	(0.161)	(0.168)	(0.095)	(0.116)
Alicante	-0.117	-0.006	0.094	0.237	-0.109	-0.014
	(0.155)	(0.188)	(0.126)	(0.279)	(0.089)	(0.118)
Almeria	0.570**	0.504	0.479***	0.350**	0.494***	0.389*
	(0.268)	(0.393)	(0.095)	(0.146)	(0.157)	(0.218)
Asturias	0.254	0.118	-0.334*	-0.214	0.141	0.003
	(0.275)	(0.254)	(0.176)	(0.235)	(0.146)	(0.170)
Avila	-0.297	0.783	-0.430**	-0.316	-0.951**	0.279
	(0.728)	(0.878)	(0.183)	(0.392)	(0.423)	(0.623)
Badajoz	0.196	-0.397	0.284	-0.547*	0.306**	-0.319*
	(0.277)	(0.315)	(0.175)	(0.313)	(0.154)	(0.190)
Islas Baleares	-0.341	0.212	0.047	0.852	-0.436	0.183
	(0.336)	(0.541)	(0.480)	(0.654)	(0.265)	(0.369)
Barcelona	-0.195	0.005	-0.209**	0.123	-0.223**	-0.025
	(0.149)	(0.167)	(0.092)	(0.114)	(0.090)	(0.105)
Burgos	0.167	0.222	0.228***	0.244*	0.149**	0.179*
	(0.106)	(0.165)	(0.088)	(0.126)	(0.068)	(0.092)
Caceres	0.338	0.180	0.217*	0.246	0.352*	0.248
	(0.304)	(0.310)	(0.117)	(0.197)	(0.193)	(0.217)
Cadiz	-0.414	0.153	-0.273*	-0.014	-0.352**	0.311
	(0.255)	(0.324)	(0.158)	(0.206)	(0.140)	(0.210)
Cantabria	0.345	0.333	0.099	0.161	0.248**	0.269*
	(0.233)	(0.277)	(0.092)	(0.117)	(0.109)	(0.150)
Castellon	0.038	0.180	0.050	0.283	-0.006	0.126
	(0.150)	(0.146)	(0.125)	(0.200)	(0.114)	(0.119)
Ciudad Real	0.181	0.121	0.291**	0.192*	0.171*	0.111
	(0.149)	(0.165)	(0.114)	(0.107)	(0.092)	(0.102)
Cordoba	0.279*	0.225	0.231	0.162	0.283***	0.235**
	(0.157)	(0.172)	(0.221)	(0.326)	(0.093)	(0.110)
A Coruna	0.182	0.177	0.185	0.087	0.192	0.274
	(0.168)	(0.270)	(0.126)	(0.179)	(0.118)	(0.175)
Cuenca	0.239	0.022	0.644**	-0.047	0.222*	-0.015
	(0.201)	(0.201)	(0.257)	(0.197)	(0.134)	(0.142)
Girona	0.519***	0.429**	0.163	0.336*	0.555***	0.463***
	(0.172)	(0.212)	(0.150)	(0.187)	(0.110)	(0.135)
Granada	0.159	0.079	-0.079	0.065	0.130	0.114
	(0.262)	(0.298)	(0.297)	(0.424)	(0.168)	(0.199)
Guadalajara	0.061	-0.178	0.133	0.333	0.012	-0.147
	(0.150)	(0.190)	(0.153)	(0.228)	(0.092)	(0.120)
Guipuzcoa	-0.016	-0.092	-0.107	0.014	-0.034	-0.127
	(0.155)	(0.161)	(0.132)	(0.159)	(0.109)	(0.128)
Huelva	0.042	0.122	0.349*	-0.042	0.014	-0.005
	(0.257)	(0.409)	(0.186)	(0.194)	(0.157)	(0.263)
Huesca	0.036	0.087	0.536*	0.518	-0.001	0.030
	(0.210)	(0.227)	(0.291)	(0.407)	(0.144)	(0.158)
Jaen	0.277	0.578***	0.033	0.184	0.254*	0.587***
	(0.221)	(0.221)	(0.278)	(0.448)	(0.130)	(0.131)
La Rioja	0.128	-0.002	0.154	-0.041	0.170	-0.007
	(0.336)	(0.360)	(0.125)	(0.111)	(0.195)	(0.202)
Leon	0.121	0.113	0.612**	0.650**	0.096	0.223

Continued...

	(0.283)	(0.317)	(0.280)	(0.279)	(0.197)	(0.223)
Lleida	0.224	-0.035	0.264**	-0.071	0.188**	-0.070
	(0.147)	(0.178)	(0.110)	(0.154)	(0.094)	(0.116)
Lugo	0.297	0.226	0.023	-0.576**	0.360**	0.253
	(0.249)	(0.307)	(0.162)	(0.244)	(0.161)	(0.185)
Madrid	0.161	0.398	0.207**	0.058	0.140	0.425**
	(0.159)	(0.261)	(0.083)	(0.178)	(0.105)	(0.173)
Malaga	-0.033	-0.136	0.389	-0.077	-0.090	-0.139
	(0.240)	(0.329)	(0.297)	(0.305)	(0.177)	(0.237)
Murcia	0.166	0.224	0.395***	0.432***	0.225**	0.315**
	(0.187)	(0.218)	(0.091)	(0.124)	(0.110)	(0.138)
Navarra	0.309	0.312	0.523***	0.341*	0.216*	0.162
	(0.196)	(0.203)	(0.184)	(0.197)	(0.121)	(0.128)
Ourense	0.582	0.458	0.415	0.858**	0.446**	0.291
	(0.460)	(0.572)	(0.363)	(0.412)	(0.192)	(0.224)
Palencia	0.208	0.243	0.326**	0.001	0.143	0.210*
	(0.218)	(0.251)	(0.157)	(0.097)	(0.114)	(0.121)
Las Palmas	0.802**	0.125	1.392*	1.915	0.912***	0.351
	(0.385)	(0.452)	(0.723)	(1.331)	(0.293)	(0.361)
Pontevedra	-0.021	-0.018	-0.112	0.071	-0.030	-0.048
	(0.227)	(0.268)	(0.117)	(0.235)	(0.169)	(0.212)
Salamanca	0.635*	0.389	0.579**	-0.340	0.583***	0.423*
	(0.367)	(0.404)	(0.230)	(0.287)	(0.192)	(0.221)
S.C. Tenerife	0.524	-0.385	-0.973	1.788	0.581	0.166
	(0.814)	(0.919)	(1.546)	(1.715)	(0.385)	(0.430)
Segovia	0.677**	0.789**	0.376***	0.289*	0.494***	0.614***
	(0.283)	(0.314)	(0.090)	(0.162)	(0.133)	(0.160)
Sevilla	-0.079	-0.447*	0.170	-0.412**	-0.088	-0.466***
	(0.200)	(0.237)	(0.178)	(0.179)	(0.128)	(0.147)
Soria	0.212	0.651**	-0.049	0.179	0.162	0.479***
	(0.302)	(0.291)	(0.161)	(0.244)	(0.137)	(0.143)
Tarragona	0.284	0.142	0.130	0.297	0.406***	0.317
	(0.182)	(0.264)	(0.102)	(0.184)	(0.133)	(0.204)
Teruel	0.031	0.076	-0.101	-0.206	-0.057	-0.102
	(0.218)	(0.239)	(0.105)	(0.153)	(0.133)	(0.139)
Toledo	-0.157	0.036	-0.203	0.089	-0.186*	-0.014
	(0.185)	(0.186)	(0.128)	(0.224)	(0.111)	(0.130)
Valencia	-0.222	-0.042	0.040	0.333**	-0.207**	-0.027
	(0.159)	(0.171)	(0.103)	(0.163)	(0.094)	(0.122)
Valladolid	0.245	0.319	-0.163	-0.062	0.137	0.228
	(0.231)	(0.322)	(0.199)	(0.289)	(0.125)	(0.163)
Vizcaya	-0.272*	-0.140	-0.147	-0.050	-0.226*	-0.119
	(0.161)	(0.145)	(0.149)	(0.174)	(0.123)	(0.123)
Zamora	-0.106	-0.171	0.122	-0.438**	-0.120	-0.179
	(0.291)	(0.330)	(0.172)	(0.186)	(0.188)	(0.211)
Zaragoza	-0.026	-0.219	-0.171	-0.305**	-0.019	-0.186
	(0.195)	(0.248)	(0.110)	(0.138)	(0.117)	(0.149)
Emigrants						
Albacete	0.146	0.204	0.256	0.273	0.153	0.212*
	(0.202)	(0.209)	(0.217)	(0.233)	(0.123)	(0.124)
Alicante	0.091	0.140*	0.006	0.044	0.109**	0.153***
	(0.064)	(0.072)	(0.077)	(0.068)	(0.047)	(0.054)
Almeria	0.680***	0.670***	0.509***	0.488***	0.614***	0.599***
	(0.263)	(0.237)	(0.133)	(0.134)	(0.163)	(0.159)
Asturias	-0.112	-0.161	0.771**	0.714**	0.052	-0.022

Continued...

	(0.193)	(0.207)	(0.352)	(0.343)	(0.115)	(0.131)
Avila	-0.347	-0.346	-0.162	-0.124	-0.200	-0.198
	(0.583)	(0.594)	(0.192)	(0.232)	(0.409)	(0.416)
Badajoz	-0.352	-0.741	0.615***	0.387**	-0.323	-0.684***
	(0.472)	(0.469)	(0.184)	(0.190)	(0.240)	(0.244)
Islas Baleares	0.090	0.295	-0.807	-0.539	0.309	0.495**
	(0.342)	(0.317)	(0.503)	(0.463)	(0.216)	(0.221)
Barcelona	-0.013	0.083	0.019	0.109*	0.012	0.112*
	(0.101)	(0.102)	(0.060)	(0.056)	(0.064)	(0.068)
Burgos	0.124	0.146	0.000	0.006	0.155	0.165
	(0.180)	(0.185)	(0.119)	(0.114)	(0.119)	(0.119)
Caceres	-0.081	-0.240	-0.131	-0.224	-0.136	-0.223
	(0.325)	(0.342)	(0.173)	(0.212)	(0.213)	(0.227)
Cadiz	-0.473**	-0.272	-0.439**	-0.478**	-0.583***	-0.321*
	(0.236)	(0.217)	(0.185)	(0.188)	(0.170)	(0.170)
Cantabria	-0.044	-0.050	0.105	0.077	-0.077	-0.065
	(0.169)	(0.172)	(0.150)	(0.150)	(0.104)	(0.103)
Castellon	-0.031	0.119	-0.045	0.040	-0.065	0.091
	(0.103)	(0.112)	(0.075)	(0.084)	(0.066)	(0.076)
Ciudad Real	0.071	-0.005	-0.058	-0.040	0.051	-0.010
	(0.221)	(0.229)	(0.261)	(0.313)	(0.139)	(0.144)
Cordoba	0.139	0.045	-0.052	-0.077	0.083	-0.007
	(0.201)	(0.239)	(0.206)	(0.228)	(0.132)	(0.147)
A Coruna	0.087	0.064	-0.166	-0.210	0.092	0.123
	(0.261)	(0.255)	(0.259)	(0.274)	(0.183)	(0.187)
Cuenca	0.284	0.039	0.269	0.191	0.354*	0.122
	(0.365)	(0.349)	(0.282)	(0.251)	(0.214)	(0.205)
Girona	-0.060	-0.075	0.030	0.056	-0.092	-0.100
	(0.163)	(0.162)	(0.109)	(0.124)	(0.113)	(0.117)
Granada	0.196	0.212	0.008	0.149	0.162	0.240*
	(0.193)	(0.204)	(0.259)	(0.310)	(0.139)	(0.141)
Guadalajara	0.214	0.103	-0.203	-0.159	-0.085	-0.182
	(0.302)	(0.305)	(0.250)	(0.286)	(0.182)	(0.181)
Guipuzcoa	0.009	0.022	0.052	0.222	0.037	0.065
	(0.174)	(0.216)	(0.209)	(0.193)	(0.128)	(0.134)
Huelva	0.028	0.088	0.017	-0.459*	0.129	0.070
	(0.479)	(0.471)	(0.339)	(0.263)	(0.303)	(0.339)
Huesca	0.118	0.101	-0.405*	-0.514*	0.069	0.051
	(0.254)	(0.261)	(0.245)	(0.288)	(0.182)	(0.187)
Jaen	-0.280	-0.016	0.210	0.197	-0.172	0.144
	(0.436)	(0.386)	(0.407)	(0.415)	(0.228)	(0.201)
La Rioja	0.005	-0.017	0.074	0.024	0.005	-0.020
	(0.039)	(0.045)	(0.074)	(0.061)	(0.028)	(0.031)
Leon	0.558**	0.565**	0.559	0.493	0.837***	0.852***
	(0.270)	(0.268)	(0.470)	(0.509)	(0.234)	(0.217)
Lleida	0.351*	0.222	0.156	-0.004	0.337***	0.219*
	(0.206)	(0.205)	(0.182)	(0.171)	(0.130)	(0.130)
Lugo	-0.200	-0.185	0.353	0.336	-0.406	-0.368
	(0.453)	(0.430)	(0.422)	(0.402)	(0.261)	(0.259)
Madrid	-0.045	0.054	0.154	0.094	-0.024	0.100
	(0.166)	(0.195)	(0.108)	(0.106)	(0.110)	(0.119)
Malaga	-0.035	-0.068	-0.087	-0.363**	-0.020	-0.032
	(0.167)	(0.193)	(0.214)	(0.177)	(0.122)	(0.134)
Murcia	0.014	0.040	-0.024	-0.031	-0.007	0.034
	(0.108)	(0.117)	(0.068)	(0.074)	(0.067)	(0.071)
Navarra	-0.013	-0.038	-0.050	-0.200	0.060	-0.002

Continued...

	(0.224)	(0.254)	(0.137)	(0.146)	(0.148)	(0.169)
Ourense	0.364	0.175	-0.335	-0.348	0.353	0.185
	(0.543)	(0.505)	(0.534)	(0.457)	(0.301)	(0.298)
Palencia	-0.356	-0.436	-0.019	-0.139	-0.267	-0.360
	(0.362)	(0.362)	(0.195)	(0.201)	(0.232)	(0.233)
Las Palmas	0.084	-0.266	0.242	0.390	-0.020	-0.315
	(0.380)	(0.393)	(0.454)	(0.508)	(0.272)	(0.331)
Pontevedra	-0.138	-0.172	0.111*	0.119	-0.090	-0.146
	(0.184)	(0.178)	(0.063)	(0.081)	(0.132)	(0.140)
Salamanca	0.028	-0.122	0.761*	0.712	0.013	-0.026
	(0.330)	(0.340)	(0.416)	(0.441)	(0.261)	(0.262)
S. C. Tenerife	0.438	-0.031	-0.055	0.555	0.386	0.066
	(0.478)	(0.485)	(0.216)	(0.557)	(0.292)	(0.356)
Segovia	-0.257	-0.266	-0.121	-0.124	-0.258	-0.326
	(0.490)	(0.492)	(0.236)	(0.239)	(0.226)	(0.225)
Sevilla	0.097	-0.051	0.366	0.174	0.048	-0.096
	(0.274)	(0.263)	(0.312)	(0.209)	(0.166)	(0.160)
Soria	0.186	0.628*	0.232	0.539	0.281	0.677***
	(0.356)	(0.329)	(0.318)	(0.409)	(0.228)	(0.226)
Tarragona	-0.042	-0.112	0.105	0.139	-0.094	-0.127
	(0.199)	(0.192)	(0.179)	(0.176)	(0.124)	(0.125)
Teruel	0.025	0.012	0.078	0.059	0.113	0.094
	(0.408)	(0.364)	(0.567)	(0.584)	(0.293)	(0.287)
Toledo	0.374	0.416	0.064	0.109	0.427***	0.473***
	(0.271)	(0.280)	(0.311)	(0.267)	(0.161)	(0.160)
Valencia	-0.251	-0.128	-0.348**	-0.373**	-0.213**	-0.093
	(0.179)	(0.192)	(0.151)	(0.151)	(0.099)	(0.109)
Valladolid	-0.155	-0.096	-0.321***	-0.337***	-0.189	-0.139
	(0.176)	(0.236)	(0.106)	(0.106)	(0.124)	(0.137)
Vizcaya	0.135	0.210	-0.095	-0.088	0.141	0.195
	(0.180)	(0.194)	(0.161)	(0.165)	(0.138)	(0.149)
Zamora	-0.606	-0.722	0.902	0.793	-0.239	-0.356
	(0.465)	(0.444)	(1.045)	(0.857)	(0.384)	(0.395)
Zaragoza	-0.095	-0.181	0.200	0.173	-0.090	-0.146
	(0.117)	(0.135)	(0.125)	(0.121)	(0.097)	(0.105)
NID	0.191*	0.219*	0.284***	0.218**	0.201***	0.221***
	(0.114)	(0.116)	(0.097)	(0.106)	(0.068)	(0.069)
NED	0.078	0.070	0.041	0.030	0.073*	0.078*
	(0.072)	(0.071)	(0.057)	(0.056)	(0.044)	(0.043)
Constant	7.622***	7.842***			13.665***	13.693***
	(0.309)	(0.333)			(0.071)	(0.060)
Country-time effects	Yes	Yes	Yes	Yes	Yes	Yes
Province-time effects	No	Yes	No	Yes	No	Yes
Pair effects	Yes	Yes	Yes	Yes	Yes	Yes
N	15195	15195	15195	15195	15195	15195
r2	0.091	0.130				

Appendix B

Appendix to Part 2

B.1 Interview structure

Interviewee:
Firm:

B.1.1 Enterprise Profile

1. Can you introduce the core business of the firm? Can you briefly summarize its history?
2. How would you summarize the firm philosophy and its main competitive advantages?
3. How many employees?
4. How many are foreign employees? From which countries are they? Since how long are they employed?
5. Does the firm export a significant share of its production?
6. Has the firm any foreign offices devoted to sales or technical assistance abroad? If so, how many? How many are the employees? What are the main nationalities?
7. Has the firm any plants abroad? If so, how many? How many are the employees? What are the main nationalities?
8. Does the firm regularly invest in R&D? Has it recently introduced product or process innovations?
9. What has been the experience of the firm with the crisis so far?
10. Do you perceive your firm as part of the mechanic sector of Reggio Emilia? If so, how would you define it? What are the main advantages deriving from belonging to the industrial district?

11. Does the enterprise maintain relationships with other firms in the district? If so, what is the main object of the relationships (e.g. information exchange, technical support, cooperation in R&D activities, supply)? What are the subject with whom the firm maintains the most intensive and stable relationships (e.g. suppliers, clients, institutions)?

B.1.2 Profile of the workers within the firm

1. What are the most important characteristics required to an employee in your firm? What formal qualifications are necessary? What are the personal characteristics?
2. How long does it take to a new employee to become autonomous at work?
3. In how far do your perceive that the competence acquired working within this firm are transferrable to other firms? Why?
4. How important is it to speak foreign languages in your firm?
5. What is the average tenure of a worker in your firm?
6. Has the firm ever had difficulties in covering vacancies, especially before the crisis? If so, have foreign workers proved to be more keen to work in tasks that natives were not keen to enrol in? Why, according to you?

B.1.3 Foreign workers

(If the firm currently does not employ foreign workers)

1. Have foreign jobseekers ever postulated for a job within the firm? Have they been hired? Why?
2. Has the firm ever employed foreign employees in the past? Why?

(If the firm hires foreign workers)

1. How have foreign employees been selected?
2. Can you identify systematic differences between foreign and italian workers? Which ones?
3. Do you think that differences in the origin culture translate into:
   - Differences in their attitude to problem solving, to work, in their technical qualification?
   - Linguistic competences in foreign languages? Better capacity to carry out transnational operations?
   - In social relationships with the co-worker?
4. Which tasks are foreigners usually enrolled in?
5. Do you think that foreigners in your firm are usually employed in tasks that correspond to their qualifications?

6. What are the main difficulties involved in employing foreign workers?
7. What are the main benefits deriving from employing foreign workers?
8. Does it seem to you that the teams that count with one or more immigrants result more productive or innovative?
9. Does it seem to you that the teams that count with one or more immigrants result having greater communication difficulties?
10. Do you think that having hired foreigners has affected your relations with other firms in the cluster? How?

B.1.4 Internationalization

(If the firm has foreign offices)

1. What are the main activities carried out in foreign offices of the firm?
2. What are the main difficulties implied in the international relationships with foreign offices of the firm?
3. What are the main advantages deriving from the relationships with foreign offices of the firm?
4. What is the profile of the sales officers in the foreign offices? What are the advantages/disadvantages deriving from employing local workers with respect to Italian expatriates?

B.1.5 Effects of immigration at the district level

1. Do you think that in general immigrants are integrated in the social and economic fabric of the district?
2. What do you perceive to be the main "pull factor" of the locality for foreign workers?
3. Do you maintain regular relationships with foreign entrepreneurs in the district? Which tasks do they usually carry out?
4. Do you think that foreigners are adapting to the local economic fabric or rather that they are modifying it? In which way?
5. Do you think that foreign workers in the district are generally employed in tasks that correspond to their qualifications?

B.2 Interviews

Table B.2.1: Interviews

Code	Firm/Institution	Position	Local System
EL01	Higher professional training institution specialized in the machine tools sector	Head of Unit	Elgoibar
EL02	Research institution specialized in monitoring immigration trends	Researcher	Elgoibar
EL03	Municipality	Immigration officer	Elgoibar
EL04	Engineering firm in the machine tool sector	HR Manager	Elgoibar
EL05	Higher professional training institution specialized in the machine tools sector and involved in immigrants' training	Trainer	Elgoibar
EL06	Employment agency	Director of local branch	Elgoibar
EL07	Engineering firm in the machine tools sector	HR Manager	Elgoibar
EL08	Welfare institution involved in training of immigrants for machine tool sector	Director of local branch	Elgoibar
EL09	Cooperative firm in the machine tool sector (engineering)	HR Manager	Elgoibar
EL10	Moulding firm in the automotive sector	HR Manager	Elgoibar
EL11	Foundry	HR Manager	Elgoibar
EL12	Subcontracting firm in the machine tools and automotive sector	Director	Elgoibar
EL13	Foundry	HR Manager	Elgoibar
EL14	Research institution	Researcher	Elgoibar
RE01	Research institution	Researcher	Reggio Emilia
RE02	Research institution	Researcher	Reggio Emilia
RE03	Municipality	Councillor	Reggio Emilia
RE04	Trade Union	Researcher	Reggio Emilia
RE05	Engineering firm in the mechanic sector	General Manager	Reggio Emilia
RE06	Firm in the agromechanic sector	General Manager	Reggio Emilia
RE07	Firm producing pharmaceutical machines	Marketing Manager	Reggio Emilia
RE08	Firm in the olepneumatic sector	General Manager	Reggio Emilia
RE09	Firm in the mechanic sector	HR Manager	Reggio Emilia
RE10	Firm in the agromechanic sector	General Manager	Reggio Emilia
RE11	Subcontracting firm in the mechanic sector	HR Manager	Reggio Emilia

B.3 Correlations

Table B.3.1: Correlations of main variables with *ForPerc*, Emilia Romagna

Sample	All firms	All firms, NID=0	Manuf sector	Manuf sector, NID=0—	Mechanic sector	Mechanic sector, NID=0
Empl	-0.043	-0.142	-0.049	0.763	-0.062	-0.227
	0.018	0.000	0.017	0.000	0.073	0.000
Age	0.048	-0.096	0.043	0.011	0.067	-0.070
	0.017	0.014	0.055	0.789	0.064	0.254
Emplgwth	0.046	0.001	0.041	0.028	0.091	0.056
	0.011	0.988	0.044	0.466	0.008	0.365
lnTOver	-0.125	-0.292	-0.145	0.104	-0.191	-0.267
	0.000	0.000	0.000	0.011	0.000	0.000
TOgwth	0.082	-0.032	0.084	-0.022	0.028	-0.151
	0.000	0.407	0.000	0.567	0.415	0.014
TOfcast	0.047	-0.051	0.051	-0.017	0.038	-0.078
	0.010	0.194	0.013	0.661	0.265	0.203
inno	-0.022	-0.095	-0.028	0.060	-0.020	-0.066
	0.238	0.014	0.168	0.125	0.563	0.287
NStContr	-0.080	0.039	-0.094	0.029	-0.055	0.055
	0.000	0.321	0.000	0.451	0.106	0.374
NStContr2	-0.154	0.039	-0.180	0.058	-0.185	0.026
	0.000	0.314	0.000	0.134	0.000	0.679
InvRD	0.011	-0.176	0.006	0.003	-0.039	-0.158
	0.557	0.000	0.768	0.939	0.261	0.010
RDPerc	-0.005	-0.111	-0.001	0.010	-0.037	-0.091
	0.770	0.004	0.959	0.796	0.284	0.137
RDgwth_r	0.010	-0.075	0.012	-0.002	-0.030	-0.110
	0.571	0.053	0.572	0.961	0.387	0.074
Exporter	0.004	-0.200	0.007	0.017	-0.097	-0.320
	0.809	0.000	0.719	0.658	0.004	0.000
ExpPerc	-0.012	-0.174	-0.013	-0.013	-0.115	-0.312
	0.503	0.000	0.538	0.747	0.001	0.000
Investor	0.048	-0.059	0.060	0.040	0.095	0.068
	0.008	0.127	0.003	0.302	0.006	0.272

Sample	All firms	All firms, NID=0	Manuf sector	Manuf sector, NID=0	Mechanic sector	Mechanic sector, NID=0
InvPerc	-0.004	-0.045	-0.004	0.020	0.020	-0.003
	0.846	0.305	0.866	0.658	0.612	0.963
lnInv_r	0.044	-0.130	0.057	0.071	0.049	-0.039
	0.033	0.003	0.013	0.101	0.211	0.590
Py	-0.053	-0.125	-0.053	-0.061	-0.077	-0.140
	0.045	0.007	0.045	0.197	0.069	0.042
Pys	-0.063	-0.146	-0.063	-0.064	-0.061	-0.099
	0.016	0.002	0.016	0.171	0.150	0.152

Table B.3.2: Correlations of main variables with immigrant shares, Basque Country

Sample		All firms	All firms, NID=0	Manuf sector	Manuf sector, NID=0
Empl	Pearson corr.	-.028	-.200	-.040	-.168
	Sig. (bilateral)	.020	.000	.156	.009
	N	6646	1037	1232	243
Exports	Pearson corr.	-.009	-.160	-.022	-.213
	Sig. (bilateral)	.453	.000	.438	.001
	N	6646	1037	1232	243
Turnover	Pearson corr.	-.056	-.024	.005	.032
	Sig. (bilateral)	.001	.479	.876	.634
	N	3369	869	857	226
Inv	Pearson corr.	-.015	.087	.061	.202
	Sig. (bilateral)	.429	.025	.118	.008
	N	2613	659	655	170
ProdCapac	Pearson corr.	.014	-.068	.050	-.005
	Sig. (bilateral)	.418	.045	.146	.944
	N	3439	875	860	229
PrecVent	Pearson corr.	.027	.074	.007	.032
	Sig. (bilateral)	.131	.030	.840	.628
	N	3234	859	854	225
Indebt	Pearson corr.	.061	-.039	.059	.058
	Sig. (bilateral)	.000	.215	.037	.366
	N	6646	1037	1232	243
InnoProc	Pearson corr.	-.031	-.058	.002	.034
	Sig. (bilateral)	.080	.096	.964	.615
	N	3116	824	816	217
InnoProd	Pearson corr.	-.050	-.105	.009	.091
	Sig. (bilateral)	.005	.003	.804	.184

Continued...

Sample		All firms	All firms, NID=0	Manuf sector	Manuf sector, NID=0
	N	3098	812	809	213
Inno	Pearson corr.	-.047	-.100	.015	.078
	Sig. (bilateral)	.009	.004	.666	.258
	N	3084	814	812	214
RD	Pearson corr.	-.096	-.177	-.014	-.074
	Sig. (bilateral)	.000	.000	.697	.269
	N	3014	794	824	223
PrecP3	Pearson corr.	.047	.306	.001	.234
	Sig. (bilateral)	.000	.000	.968	.000
	N	6643	1037	1229	243
FijosP2	Pearson corr.	-.049	-.315	.000	-.234
	Sig. (bilateral)	.000	.000	.999	.000
	N	6643	1037	1229	243
Dir	Pearson corr.	-.032	.406	.014	.571
	Sig. (bilateral)	.008	.000	.629	.000
	N	6643	1037	1229	243
MInd	Pearson corr.	.000	-.205	-.003	-.164
	Sig. (bilateral)	.968	.000	.905	.011
	N	6643	1037	1229	243
Prof	Pearson corr.	-.086	-.107	-.054	-.145
	Sig. (bilateral)	.000	.001	.059	.023
	N	6643	1037	1229	243
Admin	Pearson corr.	-.072	-.151	-.032	-.118
	Sig. (bilateral)	.000	.000	.259	.065
	N	6643	1037	1229	243
TQual	Pearson corr.	.100	.122	.009	.059
	Sig. (bilateral)	.000	.000	.746	.360
	N	6643	1037	1229	243
TNQual	Pearson corr.	.060	-.177	.021	-.162
	Sig. (bilateral)	.000	.000	.455	.012
	N	6643	1037	1229	243
tech3	Pearson corr.	-.102	-.123	.003	.008
	Sig. (bilateral)	.000	.000	.906	.903
	N	6538	1030	1232	243
% fct en comarca	Pearson corr.	.020	.322	.011	.239
	Sig. (bilateral)	.106	.000	.693	.000
	N	6646	1037	1232	243
Edad	Pearson corr.	-.061	-.168	-.062	-.197
	Sig. (bilateral)	.000	.000	.030	.002
	N	6602	1034	1228	243
CertifQual	Pearson corr.	-.068	-.225	.014	-.083
	Sig. (bilateral)	.000	.000	.678	.217

Continued...

Sample		All firms	All firms, NID=0	Manuf sector	Manuf sector, NID=0
	N	3041	800	833	222
Info	Pearson corr.	-.092	-.403	-.069	-.353
	Sig. (bilateral)	.000	.000	.015	.000
	N	6638	1035	1232	243

B.4 Variables

Table B.4.1: Variables, Emilia Romagna

Variable	Type	Description
Empl	Continuous	Total employment of the firm
ForPerc	Continuous	Share of foreigners over total employment of the firm
Age	Continuous	Years between establishment and 2008
Emplgwth	Categorical	Self-assessment on employment growth over the 2005-2007 period (1= declined; 6= increased very much)
lnTOver	Continuous	Log turnover
TOgwth	Categorical	Self-assessment on turnover growth over the 2005-2007 period (1= declined; 5= increased very much)
TOfcast	Categorical	Subjective prediction of turnover growth over the 2005-2007 period (1= declined; 5= increased very much)
inno	Binary	The firm has modified or intends to introduce important modifications in its production process or in its products (0=no, 1=yes)
NStContr	Continuous	Share of non-undetermined contracts over total contracts (includes fixed-term contracts)
NStContr2	Continuous	Share of part-time, consultancy and other a-typical contracts over total contracts (excludes undetermined and fixed-term contracts)
InvRD	Binary	The firm has undergone investment in R&D (1=yes, 0=no)
RDPerc	Continuous	Share of turnover invested in R&D
RDgwth_r	Categorical	Self-assessment on R&D expenses growth over the 2005-2007 period (1= declined; 5= increased very much)
Exporter	Binary	The firm exports at least 1% of its turnover abroad (1=yes; 0=no)
ExpPerc	Continuous	Share of production exported
Investor	Binary	The firm has undergone investment in material and immaterial assets (1=yes, 0=no)
InvPerc	Continuous	Share of turnover invested
Py	Continuous	Productivity, calculated as average value added per employee
Pys	Continuous	Standardized productivity, calculated as Py/mean of the sector

Table B.4.2: Variables, Basque Country

Variable	Type	Description
P18_4	Continuous	Share of Foreigners over total employment in the firm(31 october 2008)
lnFor	Continuous	Log of the share of foreigners over total employment
StrClass6	Categorical	Classification of firms according to the share of immigrants they host (1=none, 2=low, 3=high)
P18_2	Continuous	Number of Employees (31 octubre 2008)
lnEmpl	Continuous	Log of the number of employees
Exports	Continuous	Share of sales abroad
CifraNeg	Categorical	Forecasts on turnover next year (-1= decline, 0 = remain the same, 1 = increase)
Inv	Categorical	Forecasts on investments next year (-1= decline, 0 = remain the same, 1 = increase)
ProdCapac	Categorical	Variation in production capacity last year (1= declined, 2 = remained the same, 3 = increased)
Indebt	Categorical	Financial difficulty (1=none, 2=yes, but not important, 3= yes, but still moderate, 4=serious)
InnoProc	Binary	The firm has modified or intends to introduce important modifications in its production process (0=no, 1=yes)
InnoProc	Binary	The firm has modified or intends to introduce important modifications in its products (0=no, 1=yes)
Inno	Binary	The firm has modified or intends to introduce important modifications in its production process or in its products (0=no, 1=yes)
RD	Binary	The firm carries out R&D activities regularly or continuously (0=no, 1=yes)
PrecP3	Continuous	Share of non-undetermined contracts over total employment
FijosP2	Continuous	Share of undetermined contracts over total employment
Dir	Continuous	Share of directors and higher charges over total employment
MInd	Continuous	Share of intermediate-level charges over total employment
Prof	Continuous	Share of specialized technicians and professionals over total employment
Admin	Continuous	Share of administratives over total employment
TQual	Continuous	Share of qualified workers over total employment
TNQual	Continuous	Share of non-qualified workers over total employment
OrEusk_Plantas	Continuous	Share of plants in the Basque country over total number of plants
OrEsp_Plantas	Continuous	Share of plants in Spain over total number of plants
OrExtr_Plantas	Continuous	Share of plants abroad over total number of plants
Tot_Plantas	Continuous	Total number of plants
Tech3	Categorical	Technological intensity (Eurostat: 1=low, 2=mid-low, 3=mid-high, 4=high)
P1A_1 % fct en comarca	Continuous	Share of sales in the local area (*Comarca*)
Edad	Continuous	Firm age (2008 - year of establishment)
lnEdad_1	Continuous	log of Firm age
CertifQual	Binary	The firm has been awarded or has applied for quality certification (0=no, 1=yes)
Info	Categorical	The level of informatization in the firm is 1=null, 2=partial, 3=total