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Graduate School in Social, Economic and Political Sciences

PhD in Economics – XXV Cycle

Settore Scientifico Disciplinare: SECS-P/01

# Does diversity matter?

## Essays on Cultural Diversity and Economics

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A.Y. 2011/2012



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# Introduction

The idea that culture is a determinant of economic outcomes has regained in recent economic literature its full recognition.<sup>1</sup> Neoclassical economics, in its assumption of rationality of economic agents, has excluded any role for values and beliefs in determining economic behavior of individuals. In recent years, however, academic literature devoted increasing importance to cultural economics, trying to disentangle cultural roots of economic outcomes such as economic growth (see, for instance, Fukuyama, 2001), regional development (see, for example, Tabellini 2008), diffusion of innovations (see, among others, Spolaore and Wacziarg, 2009; Capello, Caragliu and Nijkamp, 2011), labour market performance (see, for instance, Algan and Cahuc, 2007, Casey and Dustman, 2010), trade and economic exchange (see Guiso, Sapienza and Zingales, 2009; Disdier et Mayer, 2007). The main obstacles to rigorous analysis of cultural economics have been the a priori vague notion of culture and the difficulty in measuring it. Such obstacles are increasingly overcome. On the one hand the concept of culture has been formalized in its different facets in the economic literature. On the other hand the availability of richer datasets<sup>2</sup> allows quantitative analysis defining the importance of cultural aspects in economic phenomena (see Throsby, 1994, for a comprehensive discussion). More specifically, Throsby (1995) proposes a twofold definition of "Culture". On the one side it is considered "a set of activities, including all those activities undertaken within the so called *cultural industries*. [...] Culture in this functional sense can be thought of as being represented by the *cultural sector* of the economy."<sup>3</sup> This first definition of culture is based on the UNESCO (2009) definition of *cultural goods* as those "Consumer goods that convey ideas, symbols and ways of life, i.e. books, magazines, multimedia products, software, recordings, films, videos, audio-visual programmes, crafts and fashion". On the other side "Culture" is defined as "a set of attitudes, practices and beliefs that are fundamental to the functioning of different societies. Culture in this

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<sup>1</sup>See Ninth Luca D'agliano Lecture in Development Economics (Nov., 28th 2011), "The Role of Cultural Diversity in Growth and Development: What do Economists Have to Say about This?", Thierry Verdier, Paris School of Economics. The concept of culture was widely used by classical economists, but it was put aside by neoclassical paradigm.

<sup>2</sup>See for example the European Social Survey, the European Values Study, which represent the two databases used in the analysis that follows.

<sup>3</sup>See Throsby (1995), as reported by Thorsby (1999), p. 6.

constituent sense is expressed in a particular society's values and customs".<sup>4</sup> The analysis that follows considers both sides of culture: its "functional sense" (in chapter 1 and chapter 2) and its "constituent sense" (chapter 3). In doing so this study aims at discussing the impact of cultural diversity on economic outcomes and disentangling the mechanisms through which economic forces of globalization (trade, migration and capital flows) interplay with local cultural identities. Note that the analysis has a specific geographical focus, i.e.: European countries. The choice of Europe as target of the analysis depends on 2 main considerations: cultural issues are particularly important for the socio-economic success of European Union and cultural diversity is a funding element of Europe. Indeed, a recent Eurobarometer survey on "European Cultural Values"<sup>5</sup> highlighted that, regardless of how it is defined, culture holds a prominent place in the lives of Europeans: 77 %<sup>6</sup> of respondents answered that culture was important to them. This percentage is even higher when measured among people educated at least until the age of 20 (over that sample of surveyed persons the percentage rises to 89 %). At the same time, 84.8% of respondents believe that "Cultural diversity is a value that is best embodied in Europe". Moreover, an other Eurobarometer round on National and European Identity<sup>7</sup> show that over 63% of respondent have a connection with foreign cultures,<sup>8</sup> either because of personal experience or because of foreign friends or relatives. The importance of cultural diversity has been recognized more generally also by UNESCO in its Universal Declaration on Cultural Diversity (2001), stating that "Culture takes diverse forms across time and space. This diversity is embodied in the uniqueness and plurality of identities of the groups and societies making up human kind. As a source of exchange, innovation and creativity, cultural diversity is as necessary for human kind as biodiversity is for nature" (see UNESCO, 2001, Article 1).

Culture and cultural diversity are thus two important elements of European societies, but why should they matter in an economic perspective? The analysis that follows gives three main answers

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<sup>4</sup>See Thorsby (1995), as reported by Thorsby (1999), p. 6.

<sup>5</sup>See Eurobarometer 67.1 (2007)

<sup>6</sup>The exact question of the poll was: "How important is culture to you personally?" and the percentage represent people who answered either "Very important" or "Fairly important".

<sup>7</sup>Eurobarometer 73.3 on "National and European Identity, Electromagnetic Fields and Health" (2010)

<sup>8</sup>In particular this percentage refers to the persons surveyed that had either "relatives living abroad" or "friends living abroad" or "lived abroad" or a "partner of a different citizenship" or "worked abroad" or "studied abroad".

to this question. First of all, some of our economic choices and actions as consumers can have an important fallout on cultural diversity and on the possibility of cohabitation of different cultures. Secondly, some economic phenomena can have a cultural content, such as trade in cultural goods. For this reason they can become a vehicle for intercultural exchange, fostering tolerance towards immigrants and easing the success of multicultural societies. Finally, different local cultural identities can act as a filter for economic phenomena such as foreign investments, magnifying or destroying the growth enhancing effect of economic globalization. These three explanations are discussed and analyzed in the three chapters of the thesis.

The first chapter, indeed, starts from the following research questions: do trade in cultural goods and immigration threaten national culture, promoting worldwide homogenization? Is there, on the contrary, a “preference for diversity” that we can leverage to preserve the heterogeneity of cultures? Can the production and consumption of heterogeneous cultural goods lead to a more tolerant society? In answering to these questions, it proposes a theoretical model where globalization, in the form of greater cultural goods’ trade integration, can increase cultural diversity, leveraging the "love for diversity" of open minded individuals. Higher cultural diversity in production/ consumption patterns can decrease integration costs for all individuals of the society. A lower integration cost fosters positive attitudes towards immigrants in the hosting society. The paper describes a simple two-countries model, where the economy is composed of two cultural sectors (local culture and ethnic culture) and a non cultural sector. There exist only one factor of production, i.e. labor, and the model concentrates on the cultural goods industry (see UNESCO, 2009). The innovative and crucial ingredients of the model are mainly two. First of all there exist 2 possible types of consumers: "open-minded" individuals, who are characterized by love for cultural variety in their utility function, and "closed-minded" individuals, who instead consume only local goods. The two types of persons differ not only in the way they value consumption, but also social exchange. While closed-minded individuals experience a positive cultural externality only when they match with people of their same type and culture, open-minded individuals enjoy a positive externality when they match with other open-minded individual of all cultures. This second element links

closed-minded individual to a geographical identity, while open-minded individuals have a cross-geographic identity characterized by the taste for diversity. The second crucial ingredient of the model refers instead to the production side of the economy. While production settings largely draws from the seminal work of Krugman (1980), the only difference lies in the idea that fixed cost of production of ethnic cultural goods is decreasing in the number of people consuming the good: cultural goods are indeed "credence goods" for which quality is "dependent on what other people think" and "socio-psychological effects favour products that have already become known in some way" (see Choi et al., 1999, p. S63). Leveraging the "love for variety" of open minded individuals (that split their consumption among the highest possible number of varieties) and considering the special cost structure just described for the production of foreign cultural goods (where fixed cost are lower the larger the consumer base) leads to a framework where, under free trade, the number of varieties increases, increasing cultural diversity. In a comparative static exercise it is possible to see that, if the increase in the number of varieties is sufficiently high, the integration cost decreases enough that the overall impact of immigrants on social welfare is positive. Indeed, if the number of immigrants exogenously increases, welfare of open minded individuals depends on the interplay between the increase in their positive cultural externality (which increases in the number of open minded immigrants present in the country) and the increase in the integration cost. Welfare of closed minded individuals instead always decreases with the increase in immigration inflows. However, if the number of varieties is sufficiently high, the integration cost (which decreases with the number of varieties produced) becomes negligible and social welfare can increase with the increase in immigration. Thus, to the initial question of whether cultural diversity matters in an economic perspective, this chapter answers that cultural diversity is strongly tied to economic choices because some of our actions as consumers can influence the cultural dimension of the society we live in, having an important impact on our broad understanding of other cultures. Moreover, this paper offers a theoretical framework to analyze the potential welfare increasing effects of cultural globalization. Indeed, it argues that multiculturalism can succeed without necessarily reducing diversity in the integration process. This is possible if multicultural societies cultivate a new kind of identity that transcends geographical borders and is grounded on openness towards different

cultures and love for diversity.

The second part of the analysis takes one step further and shows in an empirical analysis that some economic phenomena, such as trade in cultural goods, can become a vehicle for intercultural exchange, fostering tolerance towards immigrants. The following research questions are the starting point of this second chapter: can cultural factors emerge in economic choices? Can the experience of foreign cultural goods act as a bridge among cultures, favoring coexistence of different ethnic groups in a multicultural society? Can trade in cultural goods foster positive attitudes towards immigration? To answer these questions the paper proposes an empirical analysis on the role that cultural factors can have in shaping attitudes towards immigrants. Results provide evidence that enhanced "active exposure" to cultural goods imported from abroad can significantly increase the probability of being pro-immigration. The analysis is based on data from the European Social Survey on individual attitudes towards immigration and data from UN-Comtrade on cultural goods' imports. In particular, exposure to foreign cultural goods is measured as the average number of trading partners from which each country imported at least one cultural good in the 3 years preceding the interview. Moreover, by using the expression "active exposure" I want to underline the importance of considering the individual specific ability to enjoy foreign cultural goods that may reach a country. For this reason the analysis focuses on the effect of imports mediated by years of education of each individual, following the econometric strategy proposed by Facchini and Mayda (2009). Results show that, controlling for individual relevant characteristics and country level unobserved heterogeneity, exposure to higher cultural diversity increases people's tolerance towards immigration. More specifically, an "active exposure" to foreign cultural goods can have a positive effect on attitudes towards immigrants because heterogeneity in consumption patterns can lead to higher tolerance towards a more heterogeneous population. This effect is stronger, indeed, when considering attitudes towards immigrants of a different race/ethnicity as the majority of the native population. Moreover, this effect is explained by an increased awareness of the cultural enrichment that immigrants bring along, leading to an increase of welfare of natives. Results are robust to more disaggregated regional controls and in particular, the positive effect of active exposure to

foreign books and newspapers is driven by individuals living in big cities, where such goods are more widespread. The positive effect of active exposure to foreign movies and works of art, instead, is more pervasive in the whole population. Results are also robust to possible endogeneity arising from omitted variables bias or reverse causality. Indeed, although in principle unobserved individual heterogeneity should be mitigated by the use of country level variables, when studying their impact on individual behavior and opinions it is difficult to avoid possible reverse causality due to the fact that the relationship between consumption of cultural goods and attitudes towards migration could be a self reinforcing process. For this reason, I introduce instrumental variable techniques in the analysis: the index of exposure to foreign cultural goods is instrumented using the overall number of museums present in the country, specialized stores selling newspapers and books' retailers. Results are confirmed also in this case. Having said that, why should cultural diversity matter in an economic perspective? This second chapter shows that cultural diversity is important in economics because some economic phenomena can have a cultural content. Cultural goods, indeed, can become a vehicle for intercultural exchange, fostering tolerance towards immigrants and easing the success of multicultural societies.

The concept of cultural diversity in its constituent sense is introduced in the last chapter of the thesis, which presents an empirical analysis arguing that the variety of attitudes, practices and beliefs characterizing different societies within European regions are crucial for the success of local economies in taking advantage of globalization. Indeed, different local identities can magnify or destroy the growth enhancing effect of foreign direct investments, one of the main vehicles of economic globalization. The main research questions this last chapter discusses are: what is the role played by FDI in fostering economic growth at the sub national level (EU27-NUTSII regions)? Does FDI structural characteristics (sector affiliation and origin) matter for regional growth? Is this relationship linear? Can an element of regional identity, purely local, such as territorial capital, shape the impact of global forces, such as FDI, on local development? The traditional approach to discuss the relation between FDI and regional growth is based on theoretical arguments regarding the likely sources of knowledge and technological spillovers from foreign direct investment (FDI)

and issues concerning the role these spillovers can play in fostering growth and development at regional level. The impact of FDI on growth is expected to go beyond its contribution to local production capacity, stimulating productivity gains resulting from spillovers to local firms. While technology may widespread through several channels, FDI is one of the main mechanism through which host economies can gain access to advanced technologies as well as managerial knowledge and skills. This may help in increasing development opportunities for regions. These arguments are very common in the literature based on country level evidence and do not consider that, at sub-national level, the FDI-growth relationship becomes more ambiguous. What this last chapter argues is that at the regional level there exist important local factors that can undermine or reinforce the growth enhancing effect of FDI. The analysis concentrates on the role of a combination of informal factors characterizing local cultures recently defined in the literature as the soft components of territorial capital (See Camagni, 2008). The paper starts from a simple model that defines the theoretical mechanism through which territorial capital influence the FDI-growth relationship in a neoclassical framework. Then it assesses the impact of FDI on economic growth empirically, testing and controlling for possible endogeneity. Additionally, it introduces those soft components of the territorial capital that may exert an impact on the transmission of FDI induced spillovers to the local economy, such as social capital and relational territorial capital and closeness of the region. Territorial capital in this context is viewed as a “non traditional” absorptive factor. In particular, "generalized morality" (see Tabellini, 2008) is considered to potentially improve the business environment, reducing transaction and contract-enforcement costs. Moreover, relational capital (see Capello et al., 2011) may facilitate the diffusion of information, thus reducing information asymmetries. In addition, closed(/open) social capital is defined as the lack of openness of a region towards external and diverse contributions<sup>9</sup> and it can make foreign firms embeddedness more difficult (/easier). The paper also considers separately the effect of different types of FDI inflows, decomposed according to macro-sectors of activity and broad geographic origin. The empirical analysis is based on a variety of datasets. Data on foreign direct investments are available from the FDIRegio database, a database built up from Amadeus database (Bureau Van Dijk). FDI flows are defined as newly

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<sup>9</sup>both in terms of other regions, other European countries and production factors coming from abroad.

created firms whose percentage of assets owned by non-residents was at least 10%. The number of new foreign firms undertaken in all EU27 NUTS II regions has been further disaggregated by sectors of activity (manufacturing and services) and origin of the investors (intra- and extra-Europe FDI). The European Values Study database (1999/2000 wave of the survey), following Van Schaik (2002), Capello et al. (2011), and Caragliu and Nijkamp (2012) has been used in order to estimate territorial capital indexes and Eurostat regional database for all other controls. The empirical analysis also takes into account possible endogeneity that may derive from a variety of reasons: persistency of FDI variable, reverse causality and omitted variable bias. In doing so specific controls have been introduced, such as initial regional gdp, while instrumental variable techniques have been applied. In particular, the set of instruments introduced in the analysis and are: number of newly established firms in European regions in the period 1997-1999 (i.e. 8 year before the period of interest), second and third order spatial lag of GDP inflows in 2005-2007 (built using a contiguity matrix). Their exogeneity and relevance are confirmed by first stage diagnostic. Results show that regions with a higher concentration of FDI yield a growth premium. Moreover, regions' identity is conducive for FDI-growth effect: indeed, generalized morality/ trustworthiness amplifies the FDI growth effect, while relational capital exert more ambiguous effect on the impact of FDI on regions' growth, the network effect being inclusive and "exclusive" at the same time for different actors. These results are very important in a policy perspective, as they imply first of all that FDI can be a significant source of growth for local economies: such aspect of globalization is crucial also for local policy makers. Moreover, the analysis shows that foreign investment's impact is affected by local conditions and in particular by the cultural dimension of local business environment: investments on building a solid social capital in a region may be very important also for its economic returns.

To conclude, this analysis shows that culture and cultural diversity can be very important in economics and ignoring this dimension in economic analysis may prevent a full understanding of some economic phenomena. Indeed, on the one side some choices of economic agents can have a cultural content and this can be leveraged for social welfare increases and on the other hand cultural dynamics can shape the consequences of economic phenomena.

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# 1 Trade in cultural goods, cultural diversity and integration costs: can multicultural societies succeed?

This paper studies the role of cultural factors in shaping protectionist attitudes towards trade and immigration. In particular it provides a simple theoretical framework where globalization, in the form of greater cultural goods' trade integration, can increase cultural diversity and reduce the costs of immigration. The fundamental feature the model attempts to capture is that by leveraging the taste for diversity in consumption of foreign cultural goods, globalization can increase cultural diversity and foster positive attitudes towards immigrants and the cultural enrichment they bring along.

## 1.1 Introduction

Fear of threats over national identity are intensifying in Europe, fuelled by rising xenophobic parties that claim globalization is eroding national cultures. Indeed, the increasing support of anti-globalization movements appears to be grounded more on concerns over national identity and culture than on economic cost-benefit analysis. "Culture matters more" (The Economist, Aug 11th 2010) and the success of far right movements in Europe lies in their fight against multiculturalism to preserve indigenous traditions. Indeed, these movements are gaining ground "in spite of their inability to provide a coherent economic message".

In this perspective, aside from purely economic considerations, the impact of globalization and market integration are increasingly discussed from the point of view of culture and national identity, both at the political and at the academic level. Two specific aspects of globalization are mainly relevant in this context: trade in cultural goods and immigration. Their importance lies in their ability to affect tastes and values of the hosting society, possibly undermining cultural diversity by contaminating and diluting local cultures. The question is thus: do trade in cultural goods and immigration threaten national culture, promoting worldwide homogenization? Is there, on the

contrary, a "preference for diversity" we can leverage to preserve the heterogeneity of cultures? Can the production and consumption of heterogeneous cultural goods lead to a more tolerant society?

Following the view developed by Cowen (2002), this paper argues that diversity can be preserved within the European society rather than across European societies: sometimes "cultural homogenization and heterogeneization are not alternatives or substitutes, rather they tend to come together" (see Cowen, 2002). Indeed, the potential for multicultural societies to succeed lies in their ability to preserve cultural diversity in the integration process. This is possible only if they cultivate a new kind of identity that transcends geographical borders and is founded on the respect of different cultures, openness towards them, freedom of expression and love for diversity.

This paper contributes to existing literature by providing a simple theoretical framework where globalization, in the form of trade integration, can increase cultural diversity and reduce the integration costs of immigration. The fundamental feature the model attempts to capture is that leveraging the taste for diversity in the consumption of foreign cultural goods, trade in cultural goods can increase cultural diversity and foster positive attitudes towards immigrants and the cultural enrichment their cultures brought along.

The most important difference between this paper and previous literature (see for instance Janeba, 2007, Olivier et al., 2008, Rauch and Trinidad, 2009) is the idea that welfare-increasing social exchange and network externalities can take place also between different cultures and not only within a given culture, depending on different tastes for cultural heterogeneity. The simple theoretical framework introduced here is a two countries-three sectors-one factor model where a cultural externality can take place either within each culture or across different cultures. The two countries differ in their population structure, i.e. initial endowments of different population types. In particular there exist 2 possible types of consumers: "open-minded" individuals are characterized by love for cultural variety in their utility function while "closed-minded" individuals consume only local goods. Another important difference in the two groups' preferences lies in the way they value not only consumption, but also social exchange. While closed-minded individuals experience a positive cultural externality when they match<sup>10</sup> with people of their same type and culture,

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<sup>10</sup>The random matching process is defined as in Olivier et al. (2008).

open-minded individuals enjoy a positive externality when they match with other open-minded individuals of all cultures. This second element links closed-minded individual to a geographical identity, while open-minded individuals have a cross-geographic identity characterized by the taste for diversity. The three industries are fundamentally different: one produces a homogeneous local cultural good, which is non tradable, the second produces a differentiated tradable cultural product that can be viewed as ethnic production and the third is a homogeneous non cultural tradable product, which can be seen as the rest of the economy. The model concentrates on the cultural goods industry. It combines a "love-for-variety" feature à-la-Krugman (1980) with the existence of cultural externalities introduced, for example, in Olivier et al. (2008)<sup>11</sup>. It also exploits the Armington (1969) assumption of good differentiation on the basis of the country of origin of production, but in this context the notion is slightly modified. In particular, since we are talking about cultural goods it is not the country of origin of the good that matters but the culture of origin that defines different varieties. Each country thus originates a culture, but the production of its corresponding cultural good can be located in any country, depending on the availability of factor endowments.

The idea that globalization breaks the deterministic link between geographical specification and cultural experience is recognized also by UNESCO: "One of the most far-reaching effects of globalization is a weakening of the usual connection between an event and its geographical location. [...] This weakening of the traditional ties between cultural experience and geographical location brings new influences and experiences into people's everyday lives" (UNESCO World Report, 2009). Think of any of the cultural goods mentioned before: from products of the audio-visual industry to books, from restaurants to works of art. These goods can potentially be produced anywhere, but they differ from each other depending on the culture that originated their content. Many books, for example, can be considered unequivocally the products of a specific culture because, through the main story, they give the reader a small taste of everyday life in the country the book's narrative is set. The book can tell something about that country's habits, values, beliefs, socioeconomic context and political situation. Everything, from the characters' names to the relationship between

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<sup>11</sup>In Olivier et al. (2008) a cultural externality is defined in the following way: agents who share a common cultural identity benefit from a positive group externality when they engage in actions deemed appropriate by their culture (as in Akerlof & Kranton, 2000), such as domestic cultural good's consumption.

parents and children, from the type of food people eat to the value they give to religion can be very different between a story written by an Italian and one written by a Japanese author. At the same time, though, this difference has nothing to do with the place where the book is physically printed and distributed. From the production point of view, indeed, the goods are identical as long as they have the same physical characteristics (length, cover size, etc...). However, from the point of view of the "consumer", i.e. the reader, they can be very different depending on their taste for cultural heterogeneity and their ability to appreciate it. Similarly, in the model individuals are homogeneous when considered as the unique production factor (i.e. labor), but when considered as consumers they can differ between the two types described above.

The last crucial ingredient of the model is the idea that the fixed cost of production of ethnic cultural goods is decreasing in the number of people consuming the good: because of the specificity of such goods, consumers need to learn to appreciate them (see Brito and Barros, 2005) thus an important fixed cost for producing these goods is likely to be represented by the costs to penetrate the market. Self-reinforcing socio-psychological network effects, however, will favour products which have already become known in some way, due to what is called 'herding behavior', 'information cascades' or 'bandwagons' (see Choi et al., 1999).

In open economy, when trade is allowed, individuals will access a wider range of varieties at a lower price, thus open minded individuals will be better off both because of increased competition and because of increased number of varieties. At the same time, differently from the standard Krugman framework, in the model presented in this paper the total number of varieties available worldwide increases, capturing the idea that globalization generates new cultural forms through a process of mixing and recomposing (Cowen 2002). The increase in the number of varieties produced/consumed eases the integration costs of immigration for all individuals.<sup>12</sup> This model thus proposes also a non purely economic channel through which favorable attitudes towards immigration are closely linked to trade-enhanced consumption of foreign cultural goods. Indeed, the presence of a wider range of varieties reduces cultural distance among countries, leading to a more tolerant

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<sup>12</sup>The idea that individual consumption of cultural goods has positive fallout on society as a whole, making the latter more tolerant towards other ethnicities has already been recognized in economic literature. Pething and Cheng (2000), for instance, propose a model where individual consumption of cultural goods can lead to accumulation of cultural capital that is then appreciated by all members of the society.

society.

This paper relates to the growing literature that analyses the specificities of cultural goods, and how standard trade theory may not apply in the case of such type of goods. Ethnic (or cultural) goods and services are defined as the products of those sectors that embody habits and values from a specific culture/society, such as, for example: the art sector, the audiovisual industry (music, movies, television programs) or the publishing sector (newspapers, books), the food industry (restaurants) or education (language and culture schools). Cultural goods are special because consumers must learn to appreciate them (see Brito and Barros, 2005) and network effects are particularly important: people prefer to consume what other people consume, because they want to be able to share social experiences (see Choi et al., 1999). Janeba (2007) also identifies cultural goods as network goods for which consumption decisions of individuals are interdependent and their consumption is an input to production of national identity. Contrary to the approach of this paper, though, in the existing literature network effects act only within cultures, leading trade integration to erode diversity. Rauch and Trindade (2009) consider the consumption externalities approach in a model of the home market effect, arguing that "increased sharing of consumption network externalities across countries exacerbates the home market effect", reducing cultural diversity. Eckel (2006) defines a framework where endogenous sunk costs and trade integration in horizontally differentiated goods can reduce diversity.

The paper draws also on recent contributions that discuss the link between cultural goods and individual preferences over national identity on the one side and the evolution of cultural identity on the other. Disdier et al. (2010a) analyze the importance of trade in cultural goods in overall trade arguing that the specificity of this type of trade flows lies in its ability to impact values and perceptions in the importing country. Disdier et al. (2010b) investigate how exposure to foreign media affects naming patterns in France, the latter being considered a proxy for national cultural traditions. Olivier et al. (2008) study the dynamic evolution of cultural identity, showing that trade in cultural goods can cause cultural divergence, but this effect can be counterbalanced by social integration. Maystre et al. (2008) build a model that links consumption and cultural identity. Using data from the World Value Survey, they show that bilateral trade reduces cultural distance

among countries, this effect being stronger the more differentiated the products considered.

The rest of the paper is organized as follows: section 2 briefly presents some stylized facts that motivate the need for a specific approach to globalization and attitudes towards cultural identity in Europe, section 3 introduces a simple theoretical framework that links cultural heterogeneity and attitudes towards immigration, section 4 solves the model under autarky, section 5 discusses the consequences of trade integration on cultural diversity and the welfare impact of immigration in this context and section 6 concludes.

## 1.2 Attitudes towards cultural heterogeneity in Europe

A 2007 release of the Eurobarometer survey suggests that the majority of European citizens value cultural heterogeneity and believe that globalization can preserve and enrich such cultural diversity.<sup>13</sup> Indeed 84.8% of respondents believe that "Cultural diversity is a value that is best embodied in Europe". Moreover, most respondents are convinced that globalization can spread different cultures around the world, preserving at the same time their specificities and richness: almost 70% of respondents believe that "Through globalization, European culture will become more dynamics and widespread in the world", but at the same time almost 60% disagree with the idea that "there is no specific European culture, only a global western culture which is, for example, the same in Europe and in the US". Finally, the survey hints to the idea that European citizens consider cross-cultural exchanges as a promoter of tolerance and greater understanding: 92.7% of respondents believe that "Culture and Cultural exchanges can play an important role in developing greater understanding and tolerance in the world, even where there are conflicts or tensions".

Despite the difficulties related to the coexistence of different cultural communities in European societies, there seems to be a taste for diversity that characterizes the majority of European citizens. This feature can be leveraged to promote a successful multicultural society. The idea that this paper proposes is that one possible channel through which cultural heterogeneity can emerge is the

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<sup>13</sup>The Eurobarometer is a survey, realized on behalf of the European commission, that regularly monitors the "mood" of Europeans on different topics. The Eurobarometer 67.1 (2007) interviewed 27.746 citizens (aged 15 and over) of the 25 countries in the European Union after the 2004 enlargement, in the remaining Accession Countries Bulgaria and Romania and in Candidate Country Croatia.

production and consumption of cultural goods and that it is possible to leverage the love for variety of open-minded individuals to enrich cultural diversity through globalization. Through cultural exchanges and consumption patterns of open minded individuals it is also possible to build a more tolerant society, reducing integration costs. Evidence of this effect is proposed in the descriptive analysis presented below, where I link 3 waves of the Eurobarometer survey on usage of foreign languages<sup>14</sup> with data on attitudes towards immigration from the European Social Survey (ESS)<sup>15</sup>. Indeed, the graphs that follow relate the share of the population consuming foreign cultural goods in the previous year (x axis) to the share of the population having positive attitudes towards immigration. Different shapes indicate different time periods. In particular, the Eurobarometer survey asks whether the respondent uses regularly foreign languages<sup>16</sup> to read books, newspapers or magazines (grouped as printed foreign media, see table 2), or to watch films/television or to listen to the radio (grouped as audio foreign media, see table 3).<sup>17</sup> From the ESS, instead, it is possible to retrieve data on the share of native population being favorable to immigrants of a different race and ethnicity as the majority of population.<sup>18</sup> On top of that, I also report data on the share of population that believes immigrants enrich cultural life in host country.<sup>19</sup> Finally, for the last year only, data on the share of people that enjoy eating foreign cuisine are available from the Eurobarometer (see Table 1). The descriptive evidence points to the fact that in countries where there is a higher consumption of foreign cultural goods, there are also more positive attitudes

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<sup>14</sup>In particular I use the Eurobarometer 54 edition (2000) "Special Survey on Languages", the Eurobarometer 64.3 edition (2005) "Foreign Languages, Biotechnology, Organized Crime, and Health Items" and the Eurobarometer 67.1 (2007) edition on "Cultural Values, Poverty and Social Exclusion, Developmental Aid, and Residential Mobility".

<sup>15</sup>For both sample specific population and sample weights have been applied.

<sup>16</sup>The first two foreign languages best known are considered. This sample includes both domestic and foreign nationals living in each country, but the latter represent in all country less than 5% of the population, with the exception of Luxembourg where they represent about 20% of the unweighted sample.

<sup>17</sup>The exact questions are: "When do you regularly use foreign language?" Respondent that chose the option "whatching films/television/listening radio" are considered consumers of audio foreign media, while those choosing "reading books/newspapers/magazines" are considered consumers of audio foreign media. Regarding foreign cuisine, the exact question is "Do you enjoy eating foreign cuisine?" and respondents answering yes are considered consumers of foreign food. Data excludes foreign nationals when possible.

<sup>18</sup>The exact questions are "*To what extent do you think [country] should allow people of a different race or ethnic group from most [country] people to come and live here?*". Following the approach of Facchini & Mayda (2009), the respondent is considered favourable to immigration if the answer to the respective question is either "allow many" or "allow some" and non favourable if the answer is "allow few" or "allow none".

<sup>19</sup>The exact questions are: "*Would you say that [country]'s cultural life is generally undermined or enriched by people coming to live here from other countries?*". The respondent is considered to appreciate the cultural enrichment brought along by immigrants if the answer to the respective question is >5, on a scale In a scale ranging from 0 (0=Cultural life undermined) and (10=Cultural life enriched)

towards immigrants among the population, supporting the idea that consumption of ethnic cultural goods can reduce the integration costs of immigration.

Table 1. Attitudes towards immigration and consumption of foreign cuisine (2008 only)

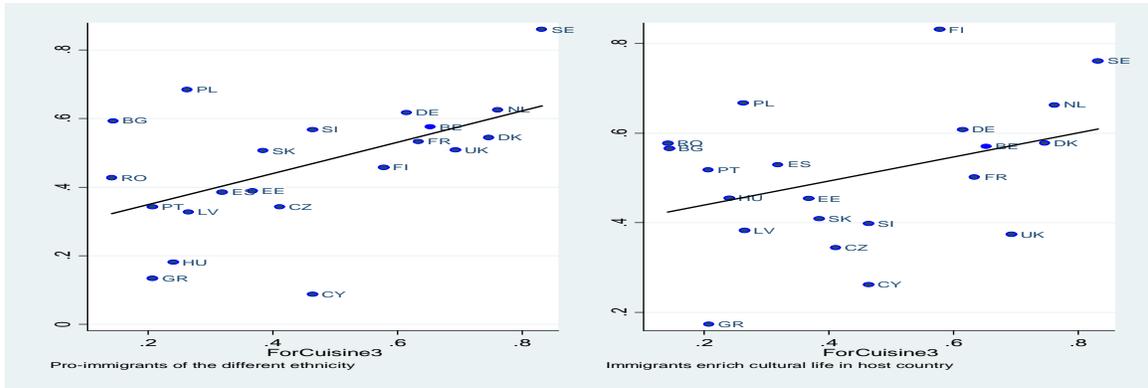


Table 2. Attitudes towards immigration and consumption of printed foreign media

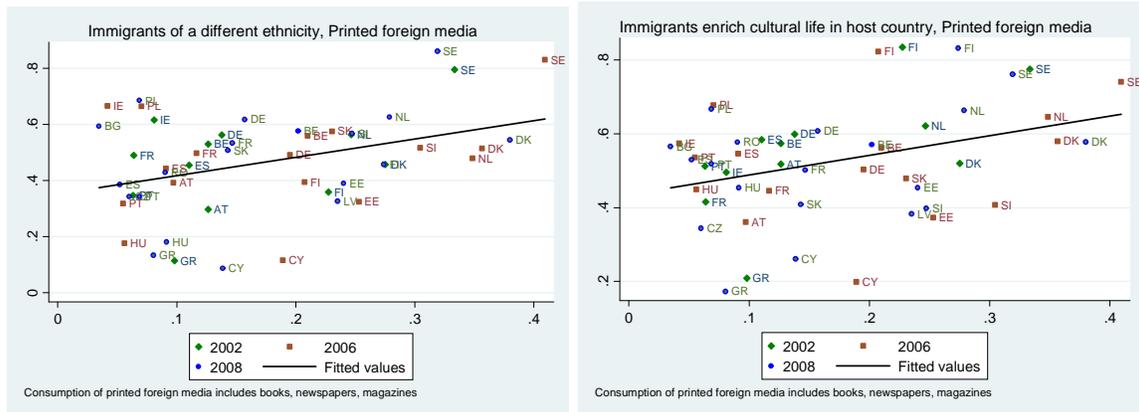
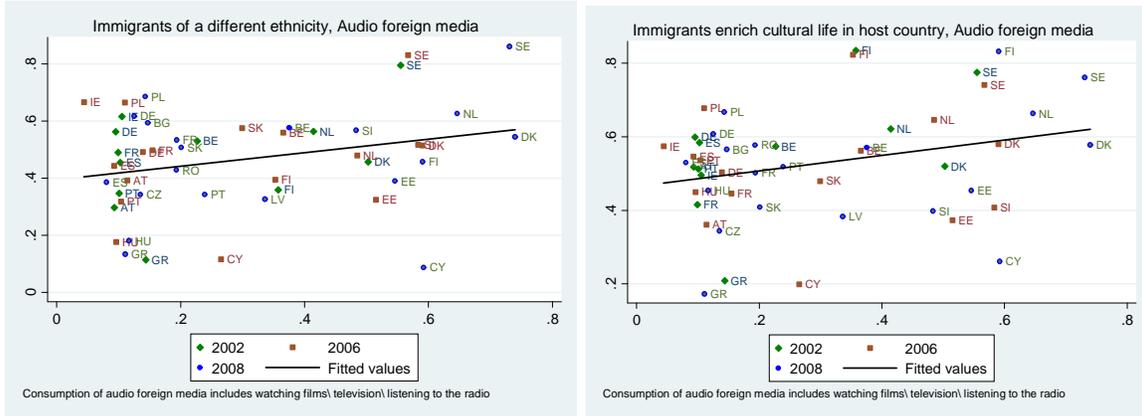


Table 3. Attitudes towards immigration and consumption of audio foreign media



### 1.3 The model

The simple theoretical framework that will be presented in this section is a two countries - three sectors - one factor model. The basic idea of the model is that one possible channel through which cultural heterogeneity can emerge in a society is the production and consumption of cultural goods. In this perspective, it is possible to leverage the love for variety of open-minded individuals to enrich cultural diversity through globalization and reduce the integration costs of immigration.

More precisely, consider a world where there exist 2 different countries indexed by  $z = 1, 2$ . Each country originates a culture and consequently a population that shares that culture. In each country there exist three sectors: two cultural goods' sectors and an homogeneous good sector characterized by perfect competition and constant returns to scale that can be considered as the rest of the economy. The two cultural industries are: an untradable homogenous good sector (i.e. local cultural good) that differs from the rest of the economy (i.e., the non cultural homogeneous good) precisely because it is not tradable and a (horizontally) differentiated good sector (i.e. ethnic cultural sector) that is characterized by monopolistic competition and increasing returns to scale.

This last sector can be thought of as representing ethnic production, where each variety is defined on the basis of the country of origin of the culture it represents.<sup>20</sup> Each of the two sectors requires only one production input: labor. Each individual owns one unit of labor that is fully supplied. Labor is mobile across sectors. As already discussed in the introduction, individuals are homogeneous when considered as workers, but, when considered as consumers, they can differ between "open-minded" individuals  $L^o$  and "closed-minded" individuals  $L^c$ .

More specifically, both types of individuals consume both cultural and non cultural goods. At the same time, though, while open minded individuals like not only the local cultural good but also ethnic production, closed minded individuals consume only the local cultural good. Moreover, open minded individuals give value to cross-cultural social exchange, while closed minded individuals experience a positive cultural externality only when they match with people of their same culture and type.

### 1.3.1 Consumers' preferences

The utility of individual  $k$  living in country  $z$  is defined as :

$$U_{kz} = q_k^H + [(1 - \gamma)\beta_z + \gamma\alpha] \left[ q_k^L - \frac{1}{2} (q_k^L)^2 \right] + \gamma\alpha \left[ \sum_{i=1}^{n_z} q_{ik} - \frac{1}{2} \sum_{i=1}^{n_z} q_{ik}^2 - \frac{1}{2\delta} \left( \sum_{i=1}^{n_z} q_{ik} \right)^2 \right] - C \left( \frac{\text{Im } m_z}{n_z} \right) \quad (1)$$

where  $k = 1, \dots, L$  indexes individuals and  $z = 1, \dots, M$  indexes countries. Moreover  $q_k^H$  is the quantity consumed by individual  $k$  of the homogeneous good  $H$ ,  $q_k^L$  is the quantity consumed by individual  $k$  of the local cultural good and  $q_{ik}$  is the quantity consumed by individual  $k$  of the single variety  $i$  of the differentiated good. The quadratic terms are penalties and in particular:  $-\frac{1}{2} (q_k^L)^2$  is a term that penalizes excessive consumption of the local cultural good,  $-\frac{1}{2} \sum_{i=1}^{n_z} q_{ik}^2$  is a term that penalizes uneven distribution of consumption across varieties and  $-\frac{1}{2\delta} \left( \sum_{i=1}^{n_z} q_{ik} \right)^2$  is a term that penalizes excessive consumption of the ethnic good. The first and the last terms ensure

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<sup>20</sup>More specifically, thus, in this context ethnic production encompasses all cultural goods that originate from a foreign culture.

that income is never completely devoted to consumption of cultural goods and the intermediate quadratic term introduce the love for variety feature that characterize preferences of open minded individuals.

The parameter  $\gamma$  distinguish individuals into their type: either open minded or closed minded.

In particular:

$$\gamma = \begin{cases} = 1, & \text{if } \gamma_k^* > \bar{\gamma}^* \\ = 0, & \text{if } \gamma_k^* < \bar{\gamma}^* \end{cases}$$

where  $\gamma^*$  is a latent variable indicating the individual propensity to cultural openness. Only if the individual has a sufficiently strong propensity to cultural openness, he/she actually exit from the "comfort zone" of its own culture and starts to approach foreign cultural goods. Such propensity to cultural openness depends on the education level of individual  $k$  and on the propensity to cultural openness of its parents:  $\gamma_k^* = f(edu_k, \gamma_{par,k})$ . This assumption is in line with previous literature that discusses the intergenerational transmission of preferences (see Olivier et al., 2008).

The parameter  $\beta_z$  embodies the so called *cultural externality* of closed-minded individuals. The concept of *cultural externality* is defined in Olivier et al (2008): let's assume that agents derive utility not only from individual consumption, but also from social exchange with other agents of their same type and culture. Social exchange is defined as follows: within each country a matching process takes place. At this stage, social exchange is possible only if two closed-minded individuals that happen to match together share the same culture. For all individuals matching is random, thus people match with certain probabilities  $x_z^c$  that depend on the number of closed-minded individuals of each culture living in their country and on their distribution over space. In general, following Olivier et al.(2008), if individual are homogeneously distributed within countries the probabilities will be defined as follows:  $x_z = \frac{L_z^c}{L_z}$ , i.e. the percentage of closed minded individual in country  $z$  over total population. Consequently, the cultural externality can be defined as

$$\beta_z = \left[ 1 + \frac{L_z^c}{L} (SE - 1) \right] \quad (2)$$

where  $SE$  is the so called *social exchange coefficient* (Olivier et al.,2008)

The parameter  $\alpha$  defines, instead, the *cultural externality* of open-minded individuals. It differs

from  $\beta_z$  in a number of ways. First of all, in the case of open minded individuals social exchange takes place only if they match with other open-minded individuals, regardless of their culture. Also in this case the matching is random and thus open-minded people match with a certain probabilities  $x_z^o$  that depend on the number of open-minded individuals present in the world and on their distribution. In general, if individual are homogeneously distributed within countries, the probability of any individual to match with an open minded individual will be defined as follows:  $x_z^o = \frac{L_z^o}{L_z}$ . Consequently, the cultural externality in this case can be defined as

$$\alpha_z = \left[ 1 + \frac{L_z^o}{L_z} (SE - 1) \right] \quad (3)$$

Moreover, the parameter  $\delta$  characterizes the *taste for diversity* of open-minded individuals, as the higher is this parameter, the larger will be the preference for ethnic goods with respect to other goods. Finally, the term  $C(\frac{Imm_z}{n})$  represent the cost of integration of immigrants. It is a positive function of the number of immigrants, while it decreases with the number of varieties produced/consumed in the economy. The idea that the consumption of cultural goods is not only beneficial for the individual consumer but builds up a "cultural capital that renders the society *more civilized* and which is enjoyed by all its members irrespective of (and in addition to) their own cultural good consumption" has already been recognized in economic literature (see, Pethig and Cheng, 2000, p.21). Here this idea is formalized assuming that integration costs decrease for both types of individuals with the increase in the number of cultural goods' varieties produced/consumed in the economy.<sup>21</sup>

Each individual will thus maximize utility (1) under a classical budget constraint of the form

$$p^H q_k^H + p^L q_k^L + \sum_{i=1}^n p_i q_{ik} = I_k \quad (4)$$

where

- $p^H$  is the price of the homogeneous non cultural good

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<sup>21</sup>The latter depends on the demand for such goods which derives from open minded individuals.

- $p^L$  is the price of the local cultural good
- $p_i$  is the price of variety  $i$  of the ethnic cultural good
- $I_k$  is the income of an individual  $k$ , that depends on labor income only and thus equals individual wage  $w$ . Note, indeed, that each worker supplies 1 unit of labour.

### 1.3.2 Production technology

Both the homogeneous non cultural good and the homogeneous cultural good are produced in a perfectly competitive sector with a production technology that exhibits constant returns to scale.

As for the differentiated good sector, it is characterized by monopolistic competition and technology exhibiting increasing returns to scale as in Krugman (1980). Firms are perfectly symmetric and technology is described by the following total cost equation:  $TC_{iz} = (f + bq_i)w$ , with  $0 < b < 1$  being the variable cost and  $f > 0$  being the fixed cost of production. The presence of these 2 additional cost components in the production of ethnic cultural goods, that differentiate the technology of this sector from the identity function defining local goods' total cost function captures the idea that ethnic production face higher costs than local cultural sector. Such costs are due mainly to the difficulty of "creating" a consumer base for products that are not well known in the host country since they belong to a different culture (i.e. marketing cost). In this perspective, the difference introduced here with respect to previous new economic geography models, lies in the fact that fixed costs of production,  $f$ , depends directly on the client base of the firm, i.e.  $f = F/L_{o,z}$ .  $F > 0$  is the total fixed cost that the firm would face if it bore the whole cost of creating a consumer base for its products because only one person consumed its goods in the population. The assumption that fixed cost of production is decreasing in the number of consumers is grounded in cultural goods' theory (see Choi et al. 1999), which defines cultural goods as credence goods, for which quality is rarely learned before consumption and "becomes dependent on what other people think". Thus fixed costs of production will mainly represent the investments that firms producing ethnic goods face to penetrate the market. These costs decrease in the number of actual consumers, a phenomenon depending on the idea that "socio-psychological network effects are self-enforcing, favouring

products which have already become known in some way" (see Choi et al. 1999, p. S63).

## 1.4 Equilibrium in closed economy

### 1.4.1 Demand side of the economy

Maximizing (1) under (4) we can find the optimal demand of each good for each type of consumer (see the mathematical appendix for a detailed derivation of the results). In particular, individuals' demand for the local cultural good depends entirely on the respective cultural externality:

$$\begin{cases} q_{o,z}^L = \frac{\alpha_z - 1}{\alpha_z} \\ q_{c,z}^L = \frac{\beta_z - 1}{\beta_z} \end{cases}$$

The stronger each type's cultural externality, the higher is the consumption of local cultural goods, a result in line with previous literature<sup>22</sup>. Open minded individuals consume also the ethnic cultural goods, more specifically their demand function is:

$$q_{i,z} = \frac{1}{\alpha_z} \left[ \frac{\alpha_z \delta}{\delta + n_z} + \frac{\sum_{j=1}^{n_z} p_{j,z}}{\delta + n_z} - p_i \right]$$

which is decreasing in the cultural externality,<sup>23</sup> but it is increasing in the love for diversity of open-minded consumers ( $\delta$ ).

Finally, the demand for the non cultural good of each type of consumers is defined as a residual after consumption choices of the other two goods are made (see the appendix):

$$\begin{cases} q_{o,z}^H = \frac{1}{\alpha_z} - \sum_{i=1}^{n_z} q_i p_i \\ q_{c,z}^H = \frac{1}{\beta_z} \end{cases}$$

Welfare of each type of individual can thus be evaluated using the indirect utility function associated with the utility function described in equation (1), i.e.:

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<sup>22</sup>Note that the demand functions presented in this section already incorporate the result  $p^H = p^L = 1$ . This simplification is derived in the following section and in the mathematical appendix.

<sup>23</sup>This negative effect depends on the fact  $\alpha_z$  increases also the consumption of the local cultural good.

$$V_{o,z} = \frac{1}{2} \left[ \left( \alpha_z - \frac{1}{\alpha_z} \right) + \left( 1 + \frac{n_z}{\delta} \right)^{-1} \left( 1 - \frac{p_z}{\alpha_z} \right) (n_z (\alpha_z + p_z) - 2) \right] - C \left( \frac{\text{Im } m_z}{n_z} \right) \quad (5)$$

$$V_{c,z} = \beta_z^2 - C \left( \frac{\text{Im } m_z}{n_z} \right) \quad (6)$$

The welfare of open minded consumers rises with the increase of the cultural externality, as the latter enhances welfare gains from consumption of cultural goods, and with the increase in their love for diversity, as well as with the rise in the number of varieties available, while it decreases if the price level increases and if the integration cost increases. Welfare of closed minded individuals entirely depends on their cultural externality and on the integration cost.

#### 1.4.2 Supply side of the economy

As a result of perfect competition and constant returns to scale technology,<sup>24</sup> profit maximizing firms in homogeneous sectors face a market price that equals their marginal cost.<sup>25</sup> The latter coincides with wages given that labor is the only production input:  $p^H = MC = w$ . Taking the price of the homogeneous cultural good as the numeraire  $p^H = w = 1$ . Analogously also  $p^L = 1$ .

Profit maximization in the case of differentiated good's sector involves equating marginal revenue and marginal cost, thus leading to the following optimal price for any differentiated variety:

$$p_z = \frac{b(\delta + n_z) + \alpha_z \delta}{2\delta + n_z} \quad (7)$$

Optimal total demand for the differentiated good is:

$$Q_z^D = \frac{L^\circ \delta (\alpha_z - b)}{\alpha (2\delta + n_z)}$$

As in Krugman(1980), exploiting the free entry condition, profits must equal zero, thus the

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<sup>24</sup>Firms in these sectors face an identity production function, see the appendix for more details.

<sup>25</sup>As long as they produce.

optimal quantity produced is:

$$Q_z^S = \frac{F(2\delta + n_z)}{L_z^o(\alpha_z - b)} \quad (8)$$

The balance of demand and supply instead defines the number of varieties produced in equilibrium in each country:

$$n_z = \delta \left[ \frac{L_z^o(\alpha_z - b)}{\sqrt{F\alpha_z}} - 2 \right] \quad (9)$$

substituting (9) in (7) it is possible to obtain the price level of each variety and the equilibrium quantity of the differentiated good:

$$\begin{cases} p_z = b + \frac{\sqrt{F\alpha_z}}{L_z^o} \\ Q_z = \sqrt{\frac{F}{\alpha_z}} \end{cases}$$

Note that the number of varieties produced in a country is thus increasing in the consumer base ( $L_z^o$ ), as this allows to lower the burden of fixed costs, and in both the cross-cultural externality and the love for diversity coefficient. Note also that the direct effect of the cultural externality is positive both on the demand and on the price level. This is because an increase in  $\alpha_z$  rises the elasticity of demand. However, this direct effect is reversed by its indirect effect acting through the number of varieties, thus the net effect of  $\alpha_z$  on  $Q_z$  is negative. The result is such that while the love for diversity effect (parameter  $\delta$ ) affects only the number of varieties of the differentiated good produced in the economy, the externality causes the demand to become more rigid and increases the number of varieties.

As far as homogeneous goods are concerned, price equals 1 as it is taken as numeraire. The equilibrium total quantity produced of each good is instead:

$$\begin{cases} Q^L = L_z^o \frac{\alpha_z - 1}{\alpha_z} + L_z^c \frac{\beta_z - 1}{\beta_z} \\ Q^H = \frac{L_z^o}{\alpha_z} + \frac{L_z^c}{\beta_z} - \frac{(\delta\sqrt{F\alpha_z} + L_z^o)[L_z^o(\alpha_z - b) - 2\sqrt{F\alpha_z}]}{\alpha_z L_z^o} \end{cases}$$

As already noted, the total quantity of the local cultural good positively depends on the cultural externality for both types of individuals, while the equilibrium quantity of the homogeneous non cultural good is determined as a residual after taking into account the optimal consumption choices of the other 2 goods.

## 1.5 Equilibrium in open economy

The extension of this closed economy model to the case of 2 countries perfectly integrated through trade is straightforward. Free trade correspond to an increase in market size for firms that consequently leads to an increase in the number of varieties available in each country. This effect cause a decrease in price, while the equilibrium quantity of each variety now depends on fixed costs and on the interplay between the externality and the size of the open minded population in each country:

$$p^{FT} = b + \frac{\sqrt{\frac{F}{L^{oW}} \left( \frac{L_{o1}}{\alpha_1} + \frac{L_{o2}}{\alpha_2} \right)}}{L^{oW} - \left( \frac{L_{o1}}{\alpha_1} + \frac{L_{o2}}{\alpha_2} \right) b}$$

$$Q^{FT} = \sqrt{\frac{F}{L^{oW}} \left( \frac{L_{o1}}{\alpha_1} + \frac{L_{o2}}{\alpha_2} \right)}$$

The increase in the number of varieties and the decrease in their price leads to a welfare improvement for open minded individuals, which are the only consumers of ethnic goods. Indeed, the number of varieties produced under free trade is:

$$n^{FT} = \delta \left\{ \sqrt{\frac{L^{oW}}{F} \left( \frac{L_{o1}}{\alpha_1} + \frac{L_{o2}}{\alpha_2} \right)^{-1}} \left[ L^{oW} - \left( \frac{L_{o1}}{\alpha_1} + \frac{L_{o2}}{\alpha_2} \right) b \right] - 2 \right\}$$

Having said that, the interesting point in this model is that under free trade consumers enjoy a larger number of varieties of the not only because of their increased availability in each country, but also because the total number of varieties produced worldwide increases. Indeed, comparing  $n^{FT}$  and  $n^A$ , as defined in equation (9), it is possible to notice that  $n^{FT}$  is higher than  $n^A$  :

$$n^{FT} - n^A = \delta \left\{ 2 + \frac{L_{o1}(\alpha_1 - b)}{\alpha_1} \frac{\sqrt{L^{oW} \alpha_1} - \sqrt{\frac{L_{o1}}{\alpha_1} + \frac{L_{o2}}{\alpha_2}}}{\sqrt{F \left( L_{o2} + L_{o1} \frac{\alpha_2}{\alpha_1} \right)}} + \frac{L_{o2}(\alpha_2 - b)}{\alpha_2} \frac{\sqrt{L^{oW} \alpha_2} - \sqrt{\frac{L_{o1}}{\alpha_1} + \frac{L_{o2}}{\alpha_2}}}{\sqrt{F \left( L_{o1} + L_{o2} \frac{\alpha_1}{\alpha_2} \right)}} \right\} > 0$$

The number of varieties under free trade increases with the intensity of love for diversity of open minded individuals because the burden of fixed cost of production of ethnic goods decreases more than proportionally with the consumer base. Indeed, when the number of consumers increases, the fixed cost of production for each firm is spread on a larger base. At the same time, such cost decreases also because of "information cascades", an effect that derive from cultural goods being "credence goods", as discussed in section 1.3.2. This result indicates that trade integration can increase cultural diversity, leveraging the preference for diversity in consumption of foreign cultural goods that characterize open minded individuals. The idea is that globalization can generate new cultural forms and this will have a backlash on the welfare impact of immigrants in a country.

Starting from this result and although the number of immigrants in this model is exogenously given, through a comparative static exercise it is possible to gain some intuition on the impact of differences in the number of immigrants on individual's welfare. Note that immigrants' impact on people's welfare in this model depends on their impact on the cultural externality and on the integration cost.

In particular, as far as open minded individuals are concerned, the impact of immigrants on welfare depends on their cultural externality, which increases in the number of open minded immigrants present in the society, and on the integration cost, which decreases with the number of varieties produced. Indeed, from 5:

$$\frac{\partial V_{o,z}}{\partial \text{Im } m_z} = \frac{\Phi}{2} \frac{\partial \alpha_z}{\partial \text{Im } m} - \frac{1}{n} \frac{\partial C_z}{\partial \text{Im } m_z} \quad (10)$$

where  $\Phi = \left[ 1 - \frac{1}{\alpha_z^2} + \left( 1 + \frac{n}{\delta} \right)^{-1} \frac{[n(\alpha_z + p) - 2]p}{\alpha_z^2} + \frac{n(\alpha_z - p)}{\alpha_z} \right]$ , which is positive as long as the number of varieties  $n$  is greater than 1.

As far as closed minded individuals are concerned, instead, the impact of immigrants on welfare is always negative or zero as it depends only on the integrations costs. Indeed, from (6):

$$\frac{\partial V_{c,z}}{\partial \text{Im } m_z} = -\frac{1}{n} \frac{\partial C_z}{\partial \text{Im } m_z}$$

This result derives from the fact that, while open minded individuals value cross-cultural social exchange, closed minded individuals benefit of social exchange only from other closed minded people of their same culture.

The higher the number of varieties available in an economy, thus, the lower the integration cost and the higher the positive impact of immigrants on social welfare.

Thus trade, while increasing the diversity in ethnic production, can foster positive attitudes towards immigrants. This effect captures the idea that the creation of new varieties stemming from mixture of existing cultures shorten cultural distance among them, easing integration costs of immigration for all individuals. This model thus proposes also a non purely economic channel through which favorable attitudes towards immigration are closely linked to trade enhanced consumption of foreign cultural goods. Indeed, the presence of a wider range of varieties reduces cultural distance among countries, leading to a more tolerant society.

## 1.6 Conclusions

From an individual perspective, this paper suggests that some of our economic choices and actions as consumers can influence our broad understanding of the society we live in. From a social perspective, this paper offers a theoretical framework to analyze the potential welfare increasing effects of cultural globalization. As this last aspects of world integration is getting more and more attention in the political debate, protectionist attitudes both towards trade and immigration are rising. Starting from the idea, increasingly well-established in the literature on culture and trade, that foreign cultural goods can transform domestic tastes, this paper argues that multiculturalism can succeed without necessarily reducing diversity in the integration process. This is possible only if multicultural societies cultivate a new kind of identity that transcends geographical borders and is

grounded on openness towards different cultures and love for diversity. Indeed, leveraging the taste for diversity in consumption of foreign cultural goods that characterize open minded individuals, globalization can increase cultural diversity and foster positive attitudes towards immigrants and the cultural enrichment they brought along. Indeed, once an economy opens up to free trade in cultural goods, the number of varieties available worldwide increases: mixing and matching among cultures creates new intermediate varieties that shorten the cultural distance among local ones. At the level of the society, this effect can increase welfare gains from cross cultural social exchange and lower integration costs, enhancing social welfare and fostering overall pro-immigrant attitudes in the population.

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## 1.7 Appendix

### 1.7.1 Closed economy

**Consumers' maximization problem** Starting from 1, consider that in the case of open-minded individuals  $\gamma = 1$ . In this case, note that 1 can be rewritten as:

$$U_{kz} = q_k^H + \alpha_z \left[ q_k^L - \frac{1}{2} (q_k^L)^2 + \sum_{i=1}^{n_z} q_{ik} - \frac{1}{2} \sum_{i=1}^{n_z} q_{ik}^2 - \frac{1}{2\delta} \left( \sum_{i=1}^n q_{ik} \right)^2 \right] - C \left( \frac{\text{Im } m_z}{n_z} \right) \quad (11)$$

Thus, in each country open minded individuals' maximization problem in closed economy with ethnic sector leads to the following Lagrangian:

$$L = q_k^H + \alpha_z \left[ q_k^L - \frac{1}{2} (q_k^L)^2 + \sum_{i=1}^{n_z} q_{ik} - \frac{1}{2} \sum_{i=1}^{n_z} q_{ik}^2 - \frac{1}{2\delta} \left( \sum_{i=1}^n q_{ik} \right)^2 \right] - C \left( \frac{\text{Im } m_z}{n_z} \right) + \lambda \left( I_k^o - p^H q_k^H - p^L q_k^L - \sum_{i=1}^n p_i q_{ik} \right)$$

from which to derive to the following FOCs:

1.  $\frac{\partial L}{\partial q_k^H} = 1 - \lambda p^H = 0$  Normalizing  $p^H = 1$  (numeraire) this condition leads to  $\lambda = 1$ .
2.  $\frac{\partial L}{\partial q_k^L} = \alpha_z - \alpha_z q_k^L - \lambda p^L = 0$ . Substituting  $\lambda = 1$  and rearranging:  $1 - q_k^L = \frac{p^L}{\alpha_z}$ , and thus

$$q_k^{oL} = 1 - \frac{p^L}{\alpha_z} \quad (12)$$

thus

$$Q_k^{oL} = \frac{L_z^o (\alpha_z - p^L)}{\alpha_z}$$

3.  $\frac{\partial L}{\partial q_{ik}} = \alpha_z - 2\frac{1}{2}\alpha_z q_{ik} - 2\frac{\alpha_z}{2\delta} \sum_{i=1}^{n_z} q_{ik} - \lambda p_i = 0$ . Substituting  $\lambda = 1$  and rearranging

$$p_i = \alpha_z - \alpha_z q_{ik} - \frac{\alpha_z}{\delta} \sum_{i=1}^{n_z} q_{ik} \quad (13)$$

applying summation operator to both sides of the equation:

$$\begin{aligned}
\sum_{j=1}^{n_z} p_j &= \sum_{j=1}^{n_z} \left( \alpha_z - \alpha_z q_{ik} - \frac{\alpha_z}{\delta} \sum_{i=1}^{n_z} q_{ik} \right) \\
\sum_{j=1}^{n_z} p_j &= \alpha_z n_z - \alpha_z \sum_{i=1}^{n_z} q_{ik} - \frac{\alpha_z}{\delta} n \sum_{i=1}^{n_z} q_{ik} \\
\sum_{j=1}^{n_z} p_j &= \alpha_z \left[ n_z - \left( 1 + \frac{n_z}{\delta} \right) \sum_{i=1}^{n_z} q_{ik} \right] \\
\sum_{i=1}^{n_z} q_{ik} &= \frac{n_z - \frac{1}{\alpha_z} \sum_{j=1}^{n_z} p_j}{1 + \frac{n_z}{\delta}} \tag{14}
\end{aligned}$$

substituting 14 into 13 it is possible to write:

$$\begin{aligned}
p_i &= \alpha_z - \alpha_z q_{ik} - \frac{\alpha_z}{\delta} \frac{n_z - \frac{1}{\alpha_z} \sum_{j=1}^{n_z} p_j}{1 + \frac{n_z}{\delta}} \\
\frac{p_i}{\alpha_z} &= 1 - q_{ik} - \frac{n_z \alpha_z - \sum_{j=1}^{n_z} p_j}{\alpha_z (\delta + n_z)} \\
q_{ik} &= 1 - \frac{p_i}{\alpha_z} - \frac{n_z \alpha_z - \sum_{j=1}^{n_z} p_j}{\alpha_z (\delta + n_z)} \\
q_{ik} &= \frac{\delta \alpha_z + \sum_{j=1}^{n_z} p_j}{\alpha_z (\delta + n_z)} - \frac{p_i}{\alpha_z} \tag{15}
\end{aligned}$$

Multiplying individual open minded individuals' consumption of each ethnic variety by the total number of open minded individuals living in country  $z$ , we can obtain aggregate demand for each ethnic variety in country  $z$ .

$$\begin{aligned}
Q_{iz} &= L_z^o q_{ik} = L_z^o \left( \frac{\delta \alpha_z + \sum_{j=1}^{n_z} p_j}{\alpha_z (\delta + n_z)} - \frac{p_i}{\alpha_z} \right) \\
Q_{iz} &= \frac{L_z^o}{\alpha_z} \left( \frac{\delta \alpha_z + \sum_{j=1}^{n_z} p_j}{(\delta + n_z)} - p_{iz} \right) \tag{16}
\end{aligned}$$

$$3. \frac{\partial L}{\partial \lambda} = I_k^o - p^H q_k^H - p^L q_k^L - \sum_{i=1}^n p_i q_{iz} = 0$$

$$q_k^H = 1 - \left( 1 - \frac{p^L}{\alpha_z} \right) - \sum_{i=1}^{n_z} p_i q_{iz} \tag{17}$$

$$Q_z^{oH} = L_z^o \left( \frac{p^L}{\alpha_z} - \sum_{i=1}^{n_z} p_i q_{iz} \right) \quad (18)$$

Starting from 1, consider now the case of closed-minded individuals, i.e.  $\gamma = 0$ . In this case, note that 1 can be rewritten as:

$$U_{kz} = q_k^H + \beta_z \left[ q_k^L - \frac{1}{2} (q_k^L)^2 \right] - C \left( \frac{\text{Im } m_z}{n_z} \right) \quad (19)$$

Thus, in each country closed minded individuals' maximization problem in closed economy leads to the following Lagrangian:

$$L = q_k^H + \beta_z \left[ q_k^L - \frac{1}{2} (q_k^L)^2 \right] - C \left( \frac{\text{Im } m_z}{n_z} \right) + \lambda \left( I_k^o - p^H q_k^H - p^L q_k^L - \sum_{i=1}^n p_i q_{ik} \right)$$

from which to derive to the following FOCs:

1.  $\frac{\partial L}{\partial q_k^H} = 1 - \lambda p^H = 0$  Normalizing  $p^H = 1$  (numeraire) this condition leads to  $\lambda = 1$ .
2.  $\frac{\partial L}{\partial q_k^L} = \beta_z - \beta_z q_k^L - \lambda p^L = 0$ . Substituting  $\lambda = 1$  and rearranging:  $1 - q_k^L = \frac{p^L}{\beta_z}$ , and thus

$$q_k^{cL} = 1 - \frac{p^L}{\beta_z} \quad (20)$$

$$Q_k^{cL} = \frac{L_z^c (\beta_z - p^L)}{\beta_z} \quad (21)$$

3.  $\frac{\partial L}{\partial \lambda} = I_k^o - p^H q_k^H - p^L q_k^L - \sum_{i=1}^n p_i q_{iz} = 0$

$$q_k^{cH} = 1 - \left( 1 - \frac{p^L}{\beta_z} \right) \quad (22)$$

thus

$$Q_k^{cH} = \frac{L_z^c p^L}{\beta_z} \quad (23)$$

The total demand of the homogeneous good in each country is  $Q_z^H = Q_z^{oH} + Q_z^{cH} M$ , thus:

$$Q_z^H = L_z^o \left( \frac{1}{\alpha_z} - \sum_{i=1}^n p_i q_{iz} \right) + \frac{L_z^c}{\beta_z} \quad (24)$$

the total demand for the local cultural good is  $Q_z^L = Q_z^{oL} + Q_z^{cL}$ , thus:

$$Q_z^L = L_z^o \frac{\alpha_z - 1}{\alpha_z} + L_z^c \frac{\beta_z - 1}{\beta_z} \quad (25)$$

while the total demand of the differentiated good in each country will equal only the total demand of open minded individuals as they are the only ones that consume differentiated goods.

**Firms' maximization problem** Let's consider first the homogeneous good sector. The latter is characterized by perfect competition and constant returns to scale, with labor as the unique production factor. Technology will be thus described by a simple total cost function of the form:  $TC_H = wQ_H$ . In the optimum price will equal marginal cost thus:  $MC_H = w = p_H$  (= 1 by normalization)

Thus wages are defined by this same normalization as  $w = 1$ . Now consider local cultural good production: also this sector is characterized by perfect competition and constant returns to scale, with labor as unique production factor, thus also in this case  $MC_L = w = p_L = 1$ .

As far as the differentiated good sector is concerned, instead, we follow the seminal work by Krugman (1980). This sector is characterized by perfect competition and increasing returns to scale. Each firm produces 1 variety and all firms are perfectly symmetric with technology of the form:  $TC_H = (f + bQ_i)w$ . As already discussed, the only novelty introduced here regards fixed costs, which are a decreasing function of consumers' size:  $f = \frac{F}{L_z^o}$

Profit maximization leads to equate marginal revenues with marginal costs, i.e.  $MR=MC \Leftrightarrow p_i + \frac{\partial p_i}{\partial Q_{iz}} Q_{iz} = bw$

From 16 and assuming that a single firm is too small to influence the price of other firms:

$$\frac{\partial p_i}{\partial Q_{iz}} = \left[ \frac{L_z^o}{\alpha_z} \right]^{-1}; \text{ moreover } w = 1 \text{ thus:}$$

$$2p_i - \frac{\alpha_z \delta + \sum_{j=1}^{n_z} p_j}{\delta + n_z} = b$$

$$p_i = \frac{b}{2} + \frac{\alpha_z \delta + \sum_{j=1}^{n_z} p_j}{2(\delta + n_z)} \quad (26)$$

the system of  $n_z$  symmetric equations in  $n_z$  unknown given by 26 has a unique solution. Given that firms are all symmetric in equilibrium  $p_i = p_j = \dots = p$  and thus:

$$p_z = \frac{b(\delta + n_z) + \alpha_z \delta}{2\delta + n_z} \quad (27)$$

Free entry condition drives profit to zero, thus  $Q^s(p - b) + f = 0$  or  $Q^s(p - b) + \frac{F}{L_z^o} = 0$ , thus substituting 27 in this equation:

$$Q_z^s = \frac{F(2\delta + n_z)}{L_z^o \delta (\alpha_z - b)} \quad (28)$$

Substituting 27 into 16:

$$Q_z^D = \frac{L_z^o \delta (\alpha_z - b)}{L_z^o \alpha_z (2\delta + n_z)} \quad (29)$$

Equilibrium of demand and supply in each market requires 28 to equal 29 and this defines the number of varieties produced in each country:

$$n_z = \delta \left[ \frac{L_z^o (\alpha_z - b)}{\sqrt{F} \alpha_z} - 2 \right] \quad (30)$$

### 1.7.2 Open Economy

Equilibrium in a world of 2 countries where the homogeneous non cultural good and ethnic production are traded with no frictions (the local cultural good is non tradable by assumption) is derived using the same procedure as in closed economy. The only difference is that firms operating in the differentiated good's sector now face world demand defined as  $Q_W^D = Q_1^D + Q_2^D$ , thus

$$Q_W^D = \frac{L_1^o}{\alpha_1} \left( \frac{\delta \alpha_1 + \sum_{j=1}^{n_z} p_j}{(\delta + n_W)} - p_i \right) + \frac{L_2^o}{\alpha_2} \left( \frac{\delta \alpha_2 + \sum_{j=1}^{n_z} p_j}{(\delta + n_W)} - p_i \right)$$

that after a few manipulations reduces to

$$Q_W^D = \frac{\delta L^o}{\delta + n_W} + \left( \frac{L_1^o}{\alpha_1} + \frac{L_2^o}{\alpha_2} \right) \left( \frac{\sum_{j=1}^{n_z} p_j}{\delta + n_W} - p_i \right) \quad (31)$$

Thus in this case  $\frac{\partial p_i}{\partial Q_{iz}} = \left[ - \left( \frac{L_1^o}{\alpha_1} + \frac{L_2^o}{\alpha_2} \right) \right]^{-1}$ .

Following Bjorvatn and Cappelen (2003), the last crucial ingredient of the model is the assumption that differences in the social environment where people grow up affect their preferences and the latter in turn affect their adult economic decisions. In particular, the selection of individuals into open-minded or closed-minded consumers and their love for diversity is assumed to be defined during childhood, i.e. the formative period of people's life, and to depend on their education and the cultural environment they experienced. This assumption is grounded in sociological and psychological research: for example, Brown and Johnson (1971, p.311) find that 'children with no close contacts with immigrants tend to rely on stereotypes derived from hearsay, or from atypical situations. Such stereotyping, and its associated prejudices, is diminished by close contact with immigrants, since there is then an opportunity to form evaluative judgements which are truly representative of the racial group.

### 1.7.3 Welfare analysis

Substituting 12, 15 and 17 into 11 we get the indirect utility function for open minded individuals as a function of their cultural externality, their love for varieties, the integration cost, the price level and the number of varieties to which they have access to:

$$V_{o,z} = \frac{1}{2} \left[ \left( \alpha_z - \frac{1}{\alpha_z} \right) + \left( 1 + \frac{n}{\delta} \right)^{-1} \left( 1 - \frac{p}{\alpha_z} \right) (n(\alpha_z + p) - 2) \right] - C \left( \frac{\text{Im } m_z}{n} \right)$$

Note that this is an increasing function of  $\delta$ . Moreover this is an increasing function of  $\alpha_z$  as

$$\frac{\partial V_{o,z}}{\partial \alpha_z} = \frac{1}{2} \left( 1 + \frac{1}{\alpha_z^2} \right) + \left( 1 + \frac{n}{\delta} \right)^{-1} \left[ \frac{p}{\alpha_z^2} (n(\alpha_z + p) - 2) + \left( 1 - \frac{p}{\alpha_z} \right) n \right]$$

and this expression is positive as long as the number of varieties is greater than 1.

Welfare is also an increasing function of  $n$  as

$$\frac{\partial V_{o,z}}{\partial n} = \frac{(\alpha^2 - p^2)}{\alpha} \frac{\delta^2}{(\delta+n)^2} + \frac{2\delta}{(\delta+n)^2} \frac{(\alpha-p)}{\alpha}$$

which is positive as long as  $\alpha > p$  and this is always true if  $n > 0$

Finally welfare is a decreasing function of the price level, indeed:

$$\frac{\partial V_{o,z}}{\partial p} = -\frac{\delta}{\delta+n} \frac{n-\alpha}{\alpha}$$

which is negative as long as  $n > \alpha$ .

Let's now consider the welfare impact of immigration. A marginal increase in the number of immigrants affects welfare of open minded individuals through the eventual change in the externality effect, if immigrants are open minded as well, and through the impact on the integration cost, which is assumed to be an increasing function of the number of immigrants:

$$\frac{\partial V_{o,z}}{\partial \text{Im } m_z} = \frac{1}{2} \frac{\partial \alpha_z}{\partial \text{Im } m_z} \left\{ 1 + \frac{1}{\alpha_z^2} + \frac{[n(\alpha_z+p)-2]}{\alpha_z^2} \left(1 + \frac{n}{\delta}\right)^{-1} + \frac{(\alpha_z-p)n}{\alpha_z} \right\} - \frac{1}{n} \frac{\partial C_z}{\partial \text{Im } m_z}$$

define  $\Phi = \left[ 1 - \frac{1}{\alpha_z^2} + \left(1 + \frac{n}{\delta}\right)^{-1} \frac{[n(\alpha_z+p)-2]p}{\alpha_z^2} + \frac{n(\alpha_z-p)}{\alpha_z} \right]$

and note that  $\Phi > 0$  as long as the number of varieties is greater than 1.

Welfare of closed minded individuals is instead defined as:

$$V_{c,z} = \frac{1}{\beta_z} + \beta_z \frac{\beta_z - 1}{\beta_z} \left[ 1 - \frac{1}{2} \frac{\beta_z - 1}{\beta_z} \right] - C\left(\frac{\text{Im } m_z}{n}\right) = \frac{1}{\beta_z} + (\beta_z - 1) \left[ \frac{2\beta_z - \beta_z + 1}{\beta_z} \right] - C\left(\frac{\text{Im } m_z}{n}\right) = \frac{1}{\beta_z} + \frac{\beta_z^2 - 1}{\beta_z} - C\left(\frac{\text{Im } m_z}{n}\right) = \frac{1}{\beta_z} + \beta_z - C\left(\frac{\text{Im } m_z}{n}\right)$$



## **2 Exposure to foreign cultural goods and people's attitudes towards migration**

This paper proposes an empirical analysis of the role that cultural factors have in shaping people's attitudes towards immigration. More specifically, I introduce the idea that a possible channel through which cultural heterogeneity can emerge in a society is the production and the consumption of cultural goods and I analyse the impact that patterns of consumption of different cultural goods can have on public opinion over immigration. The paper provides empirical evidence on the possibility that, controlling for potential endogeneity, enhanced exposure to cultural heterogeneity positively affects attitudes towards immigration. In doing so, it joins data on individual attitudes from four rounds of the European Social Survey and data on trade flows from UN-Comtrade database.

### **2.1 Introduction**

How should European countries manage immigration? Which policies need to be adopted to handle the phenomenon? These two questions are among the most debated issues on today's political agenda. Aside from purely economic considerations, a growing attention is paid to issues such as national identity and culture. Recent statements by the German chancellor Angela Merkel about the death of multiculturalism have put integration strategies at the forefront of the political debate over immigration. The German leader pointed out that it had been an illusion to think that Germans and foreign workers could "live happily side by side". Similarly in the UK, considered a symbol of liberalism, a debate over national identity is starting and "compared with a decade ago, the laissez-faire approach to immigration has fewer takers, even on the left." In fact, "unequivocal defenders of multiculturalism are now hard to find; even its advocates concede the need for newcomers to learn to speak English, and, to a degree, for values and institutions to bind together a diverse population." (The Economist, Apr 29th 2010). Many European political leaders thus argue the failure of multiculturalism, but few of them are making further effort to elaborate on the nature

and causes of this failure. As Mr Cameron recently said at a conference in Munich, "the doctrine of *state multiculturalism* had encouraged Britons to live segregated lives. In its stead, he proposed a *muscular liberalism* that confronts extremism and promotes a British identity open to all" (The Economist, Feb 10th 2011). Multiculturalism is something that needs to be built and cannot simply happen. An ideal homogeneous society needs not to be supported to prosper peacefully, while cohabitation of different cultures in the same society needs reciprocal understanding in order to avoid social tensions. What if the failure of multiculturalism is just a matter of lack of mutual comprehension? What if the biggest obstacle is the lack of means through which different cultures can dialogue among each others?

Along with this heated political debate, the scientific literature has suggested the idea that cultural diversity in a society can influence in a number different ways both people's attitudes towards immigration and people's propensity to migrate. Pritchett (2006) points out that "of all ideas that limit migration, perhaps the most important is the idea that there is a national culture and that increased labor mobility threatens that culture".

Ethnic heterogeneity in economics is usually associated with positive effects on the supply side and negative effects on the demand side of the economy. The former are usually associated with enhanced productivity while the latter to welfare losses. Alesina and La Ferrara(2005), for example, consider a model where individual utility depends on the consumption of a public good (i.e. schools, roads, ecc.): high fragmentation of the society in ethnic groups causes conflict of preferences. On the production side, skills of different individuals are complementary in the production of a private good and thus the presence of a larger number of ethnic groups enhances productivity<sup>26</sup>. Ottaviano and Peri (2006) consider that cultural diversity could have an effect on agents' utility, acting as a local disamenity in so far as multiculturalism may endanger natives' own cultural values, or it could have a productivity effect associated with local diversity that depends on the interplay between intercultural frictions and complementarities. Kerr and Lincoln (2010) link directly high-skilled immigration and technology formation in US between 1995 and 2007: they show that increased admissions of highly skilled workers in US cities raised the total number of innovations and this

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<sup>26</sup>At a rate that decreases with the number of individuals' types available.

happened mainly thanks to the contribution of immigrant inventors.

However, growing empirical evidence highlights the role played by a third channel through which people's attitudes towards immigration can be shaped: cultural factors. Nevertheless, there is no clear discussion about the direction of the effect of enhanced cultural heterogeneity on those attitudes.

This paper contributes to the existing literature by introducing the idea that one possible channel through which cultural heterogeneity can emerge in a society is the production and the consumption of cultural goods. In particular, it discusses the role of an economic channel linking favorable attitudes towards immigration and consumption of foreign cultural goods. The empirical analysis that follows shows that "active" exposure to foreign cultural goods<sup>27</sup> can significantly increase the probability of being pro-immigration. This analysis is based on data from the European Social Survey on individual attitudes towards immigration and data from UN-Comtrade on cultural goods' imports. Results show that controlling for individual relevant characteristics and country level unobserved heterogeneity, exposure to higher cultural diversity increases people's tolerance towards immigration. This effect is stronger when considering immigrants of a different race/ethnicity and is shown to depend on immigrants' ability to enrich cultural life in their host country. Results are robust to more disaggregated regional controls and to endogeneity

The rest of the paper is organized as follows: section 2 briefly reviews the existing literature on the link between immigration and culture, section 3 presents the empirical analysis on cultural heterogeneity and attitudes toward immigration, section 4 discusses some robustness checks and section 5 concludes.

## 2.2 Literature review

This paper introduces the idea that one possible channel through which cultural heterogeneity can emerge in a society is the consumption of cultural goods and that it is possible to leverage such

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<sup>27</sup>By using the expression "active" exposure to foreign cultural goods I want to underline the importance of considering the actual individual specific exposure to foreign cultural goods that may reach a country. In particular I consider the effect mediated by education, following the econometric strategy proposed by Facchini and Mayda (2009).

channel to increase positive attitudes towards immigration and the multiculturalism immigrants brought along. In doing so I draw on different strands of literature.

First of all this paper builds on the debate over cost and benefits of increased immigration. Traditionally the economic impact of immigration is discussed in terms of labor market outcomes, as immigrants change the skill composition of the labor force, or in terms of welfare burden. As far as the labor market impact of immigration is concerned a wide literature has distinguished different channels through which host economies can adjust to immigration. Indeed, immigration inflows can change wage and employment levels or they can cause an adjustment in the output mix of host economy and in production technologies adopted (see Dustmann et al., 2008, for a review of existing literature). As far as the public finance impact of immigration is concerned, instead, the channels usually considered are mainly two: the impact of immigration on tax burden or its consequences on benefit adjustment. Empirical results in this regards are mixed and often depend on the country considered (see for example Borjas et al., 1996, and Borjas , 1999, for United States and Boeri et al. 2002 for the case of European Union member states). Considering more closely the effect of welfare-state considerations on individual attitudes towards migration, Facchini and Mayda (2009) support the idea that adjustment to immigration is realized through changes in tax rate. More specifically , they control for labor market determinants and other individual characteristics and they show in a cross-country analysis that high income individuals oppose unskilled immigration while favoring skilled one.

Secondly, this paper is mainly based on the literature that discusses the socio-economic impact of ethnic heterogeneity. As already discussed in the introduction, ethnic heterogeneity is usually associated with positive effects on the supply side and negative effects on the demand side of the economy (See Alesina and La Ferrara, 2005; Ottaviano and Peri, 2006)

An other important strand of literature this paper draws on is the discussion over the role of cultural factors in driving perceived costs and benefits associated with increased immigration and in shaping attitudes towards immigrants. A growing empirical literature, indeed, tries to distinguish the economic factors just described from non-economic determinants of attitudes towards immigration: all these contributions, controlling for labor market and welfare concerns, introduce an impor-

tant role for cultural factors, values and beliefs in shaping attitudes towards immigrants. Citrin, Green, Muste and Wong (1995) use US data to provide evidence that, conditioning on noneconomic factors, the correlation between attitudes towards immigration and economic characteristics is much weaker. Dustmann and Preston (2007) show for UK that preference for tight immigration policy is more strongly associated with racial prejudice than job insecurity or tax concerns when considering immigrants of different ethnicity from the majority. In a more recent paper (Card et al., 2009), they also broaden those results developing a reduced form model in which consumers distinguish between economic effect of immigration on the one side and "compositional amenities" effect on the other. In particular they identify these latter with characteristics of the society the individual lives in: preferred degree of homogeneity in customs, traditions, religion and language spoken, as well as perceived impact of immigrants on cultural life, social tensions and crime. Using answers to 10 questions from the European Social Survey (ESS), they identify the relative importance of the two channels described above in shaping individual preferences over immigration policy and they show that cultural effects are far more significant than economic effects in driving individual concerns over immigration. Bisin, Patacchini et al. (2010) discuss the idea that immigration's perceived impact is not only associated to an economic cost and benefit analysis, but also to cultural diversity and to the degree of integration of immigrants in host societies (civic identity, segregation along both economic and geographical lines and labor market outcomes). Moreover, a number of recent contributions, concentrate specifically on the crucial role of cultural considerations over national identity and integration costs in assessing the impact of immigration, defining individual attitudes and consequently shaping immigration policies. Hainmueller and Hiscox (2007), for instance, show that the effect of education on individual attitudes towards immigration depends on its link to anti-racist inclinations and preferences for cultural diversity. Facchini et al. (2009) consider US citizens in 2006 and, controlling for possible endogeneity and individual specific characteristics, they show that media exposure affects significantly public opinion on illegal immigration. Jain and Mukand (2010) propose a model that introduces the role of cultural factors in driving migration policy. The idea they start from is that "what is distinctive about the politics of migration is that in popular perception it has the potential to affect a country's culture and identity." They build a dynamic

political economy model where countries differ in their ability to culturally assimilate migrants. Countries with poor cultural assimilation will take advantage of short term foreign workers programs while more culturally diverse and tolerant countries will rely more on permanent migration. Interestingly, in the model's framework migration policy crucially depends on individual attitudes towards cultural heterogeneity.

Moreover, this paper is based on the literature linking cultural goods and individual preferences on the one hand and immigration inflows and diversity of production on the other. Ethnic (or cultural) goods and services are defined as the products of those sectors that embody habits and values from a specific culture/society, such as, for example: the art sector, the audiovisual industry (music, movies, television programs) or the publishing sector (newspapers, books), the food industry (restaurants) or education (language and culture schools).<sup>28</sup> Janeba (2007) identifies cultural goods as network goods for which consumption decisions of individuals are interdependent and their consumption is an input to production of national identity. Disdier et al. (2010a) analyze the importance of trade in cultural goods in overall trade arguing that the specificity of this type of trade flows lies in its ability to impact values and perceptions in the importing country. The existence of a link between cultural goods and individual preferences on the one side and between immigration inflows and diversity of production on the other side is also supported by two recent papers. The first is a contribution by Disdier et al. (2010b) that investigate whether exposure to foreign media affects naming patterns as a proxy national cultural traditions. The second is a paper by Mazzolari and Neumark (2010) that studies the effect of immigration on the diversity of consumption choices.

This paper draws form and links all these different strands of literature. Its novelty lies in the introduction of a different perspective to look at non purely economic determinants of individuals' attitudes towards immigrants, analyzing the possibility that one channel through which cultural heterogeneity can emerge is the production and the consumption of cultural goods and that enhanced cultural heterogeneity may positively affect attitudes towards immigrants. Indeed,

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<sup>28</sup>See UNESCO (2009) definition of cultural goods as "Consumer goods that convey ideas, symbols and ways of life, i.e. books, magazines, multimedia products, software, recordings, films, videos, audio-visual programmes, crafts and fashion".

the consumption of cultural goods is likely to represent one of the so much needed bridges between different cultures because it could affect people's attitudes towards immigrants.

### 2.3 Empirical analysis

The aim of my analysis is to discuss whether the patterns of consumption of cultural goods can enhance reciprocal understanding and favour coexistence of different cultures in the same society, i.e. the much debated multiculturalism that politicians claim to be dead.

To inspect the potential of cultural goods and investigate the role of this channel in shaping attitudes towards immigrants in European countries, I link data on individuals' attitudes toward migration to trade flows data regarding some specific categories of goods identified in existing literature as "cultural goods" (see for example Mayer et al., 2010), based on UNESCO (2009) classification. More specifically, I consider data from 4 waves of the European Social Survey (ESS): 2002, 2004, 2006, 2008. The resulting pooled sample includes overall individuals born in 32 European countries<sup>29</sup>. Aside from a number of individual-specific characteristics, the survey provides individual answers to two questions which are relevant for the analysis that follows:

1. *"To what extent do you think [country] should allow people of the same race or ethnic group as most [country] people to come and live here?"*
2. *"How about people of a different race or ethnic group from most [country] people?"*

Following the approach of Facchini and Mayda (2009), on the basis of answers to these questions I build two dummy variables defined as follows:

- `pro_immig1` is a dummy variable that equals 1 if the answer to question 1 is either "allow many" or "allow some" and 0 otherwise<sup>30</sup>

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<sup>29</sup>The countries considered are: Austria, Belgium, Bulgaria, Switzerland, Cyprus, Czech Republic, Denmark, Germany, Spain, Finland, France, Greece, Croatia, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Luxembourg, Netherland, Norway, Poland, Portugal, Romania, Russian Federation, Sweden, Slovenia, Slovakia, Turkey, Ukraine and United Kingdom

<sup>30</sup>i.e. `pro_immig1=0` if the answer is either "allow few" or "allow none" and the same criterion applies to `pro_immig2`

- `pro_immig2` is a dummy variable that equals 1 if the answer to question 2 is either "allow many" or "allow some" and 0 otherwise

I use those two variables as dependent variables in the analysis that follows and they represent a measure of attitudes towards immigrants in the specific context of this paper. Moreover, I restrict the sample to natives only, excluding from the analysis immigrants of first and second generation<sup>31</sup>. Following previous literature on attitudes towards immigration (O'Rourke and Sinnott, 2006; Mayda, 2006; Facchini and Mayda, 2009), a number of individual specific characteristics and controls are included in the regressions, considering in particular demographic and economic variables for each respondent. First of all I considered the age of the respondent, on the basis of the idea that on average the older a person is, the more adverse to immigration it is likely to be. I also consider some demographic controls such as a dummy that equals 1 if the respondent is married and 0 otherwise, a dummy that equals 1 if she/he has children and 0 otherwise and one indicating gender. For these controls I do not have a prior, but it may be important to include them in order to take into account possible systematic differences for the various groups of individuals. As for the economic variables, I consider the income of the household the individual belongs to and a dummy that equals 1 if the respondent is unemployed (actively looking for a job) and 0 otherwise. On the basis of existing literature, as discussed in section 2, I expect that individuals with higher income are more pro-immigration and those unemployed, instead, oppose immigrants. Finally, I include a variable that indicates political preferences of the respondent on a left-right scale, where 0 means the left and 10 means the right. What I expect, considering also the results of existing literature, is that the higher this variable, the higher the aversion towards immigration since right parties are usually associated to more conservative policies. Country-year fixed effects are also included.

I merge data from the ESS with an "index of variety of foreign cultural goods" built as an extensive margin of imports of cultural goods. In particular, I use data from UN-Comtrade database to build an index defined as the mean number of trading partners from which the country of interest imported at least one of the cultural goods considered over the 3 years preceding the interview<sup>32</sup>.

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<sup>31</sup>Indeed, note that we focus our analysis on the sample of people that are born in the country of interest and whose parents are both natives of that country.

<sup>32</sup>Averaging over 3 years we want to mitigate the effect of possible time-specific shocks.

In particular, the following sectors have been identified: HS-9706 (Antiques of an age exceeding one hundred years), HS-37069 (Cinematographic film, exposed and developed), HS-4902 (Newspapers, journals and periodicals) and HS-490199 (Printed reading books, excluding dictionaries).

From the descriptive statistics reported in table 1a, note that the pooled sample is overall composed by over 150 thousand individuals living in 32 different countries. The majority of individuals are favorable to immigrants of the same race/ethnicity as the majority of the population but oppose immigration of different races/ethnicities. Moreover, about half of the public opinion believes that immigrants enrich the cultural life of the hosting country, but the larger part believes that they make the quality of life lower. Most individuals included in the sample are married but without children and almost all of them are employed or outside the labor force. Note that females are slightly more represented than males.

*Table 1a: Descriptive statistics*

Variable	Obs	Mean	Std. Dev.	Min	Max
pro_immig same ethnicity	155044	0.61	0.49	0	1
pro_immig different ethnicity	155044	0.46	0.50	0	1
pro_immig cultural enrichment	155044	0.50	0.50	0	1
pro_immig welfare increase	155044	0.33	0.47	0	1
married	155044	0.53	0.50	0	1
child	155044	0.39	0.49	0	1
unemployed	155044	0.04	0.19	0	1
female	155044	0.54	0.50	0	1
age	154294	47.12	18.58	13	123
income	109379	5.87	2.70	1	12
left-right scale	132424	5.16	2.20	0	10
education (years)	153321	11.74	4.08	0	34
city	155044	0.31	0.46	0	1

The average individual belonging to the sample is middle-aged and it has completed about 12 years of education. Considering more closely the case of education however, there is a large variation

among individuals considered: there are, indeed, some individuals that completed more than 30 years of education.<sup>33</sup>

*Table 1b: Number of trading partners by country-year*

Country	2002	2004	2006	2008	Total
AT	78	97	95	.	90
BE	72	78	81	84	79
BG	.	.	48	55	52
CH	112	114	124	133	120
CY	.	.	51	53	52
CZ	70	73	.	79	74
DE	77	101	115	111	100
DK	112	120	125	124	120
EE	.	52	55	52	53
ES	83	102	117	133	111
FI	58	63	68	86	69
FR	126	125	125	122	124
GB	135	136	136	141	137
GR	61	56	.	62	60
HR	.	.	.	62	62
HU	51	56	56	52	54
IE	78	85	97	.	86
IL	64	.	.	71	67
IS	.	57	.	.	57
LU	51	57	.	.	54
LV	.	.	.	50	50
NL	93	94	93	100	95
NO	76	78	86	97	83
PL	37	35	71	88	56
PT	79	83	77	77	79
RO	.	.	.	68	68
RU	.	.	72	74	73
SE	115	128	124	116	121
SI	58	66	66	63	63
SK	.	66	65	62	64
TR	.	47	.	60	55
UA	.	45	47	50	47
Total	80	81	89	84	84

As far as the trade indices are considered (see table 1b above), first of all note that cultural goods are characterized by a large number of importing countries. This first evidence already suggest the importance of the origin country for these latter. In particular, on average countries import from 80/90 different partners with a peak of 141 in the case of United Kingdom in 2008. Note that this

<sup>33</sup>The latter belong mainly to The Netherlands, Germany or United Kingdom.

trade index, which varies at country/year level only, has been interacted with the level of education of the individuals to obtain a proxy for the individual-level "active exposure" to foreign cultural goods. By using the expression "active exposure", indeed, I want to underline the importance of considering the individual specific ability enjoy foreign cultural goods that may reach a country. All cultural goods considered, indeed, require a significant level of cultural literacy and interest in order to be appreciated. For this reason the analysis focuses on the effect of imports mediated by years of education of each individual, following the econometric strategy proposed by Facchini and Mayda (2009). Moreover, I believe that a person's education per se is not able to determine her/his attitudes towards immigrants. On the contrary, education is a tool through which knowledge and awareness of the phenomena can be gained and this crucially determines a person's opinion. One of the channels through which this knowledge is acquired is the consumption of cultural goods.

For this reason, the variable of interest for the analysis that follows will be the change in the impact of education on attitudes induced by the individual exposure to cultural goods. From the econometric point of view, this effect (call it  $\beta_7$ ) is identified as the interaction effect derived from the a linear probability model<sup>34</sup> defined as follows (for each individual  $i$  living in country  $c$ ):

$$\begin{aligned} pro\_immig_{ic} = & \alpha_{tc} + \beta_1 parents_{ic} + \beta_2 female_{ic} + \beta_3 age_{ic} + \\ & + \beta_4 income_{ic} + \beta_5 lr\_scale_{ic} + \beta_6 education_{ic} + \\ & + \beta_7 (education_{ic} * extensive\_margin_c) + FE_{ic} \end{aligned}$$

Testing the sign and significance of this effect will answer to the question of whether exposure to foreign cultural goods can positively affect attitudes towards immigrants. Standard errors and statistics are then computed using a linearization method. The latter allows for heteroskedasticity or

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<sup>34</sup>Note that the same estimation has been conducted applying a probit model and results are robust to different model specification. Results from probit estimation, deriving from an equation of the form  $pr(pro\_immig_{ic}|x_{ic}) = \Phi[\alpha + \alpha_t + \alpha_c + \beta_1 parents_{ic} + \beta_2 female_{ic} + \beta_3 age_{ic} + \beta_4 income_{ic} + \beta_5 lr\_scale_{ic} + \beta_6 education_{ic} + \beta_7 (education_{ic} * extensive\_margin_c)]$ , are reported in the appendix. The interaction effect in that case, following Ai and Norton (2003), can be defined as:  $\gamma = \frac{\partial^2 \Phi(\cdot)}{\partial education_{ic} \partial extensive\_margin_c} = \frac{\partial [\partial \Phi(\cdot)((\beta_6 + \beta_7 extensive\_margin_c))]}{\partial extensive\_margin_c}$  and it is reported in the appendix as well.

other violations of distributional assumptions and for correlation among the observations belonging to the same cluster<sup>35</sup>. For this reason, inference is robust to model misspecification and corrects for possible clusters in the data at country or regional level. Moreover, the estimation takes into account both design and population size weights.

The equation has thus been estimated for different specifications of the dependent variable<sup>36</sup>.

Given the idea that the positive effect of exposure to cultural goods on attitudes towards migration depends directly on its ability to promote multiculturalism, is important to understand whether the positive opinion toward immigrants is actually mediated by the belief that they may enrich the cultural of the host country and increase its quality of life. For this reason I estimate the same equation as above considering two additional dependent variables. In particular the survey provides individual answers to two additional questions which can be relevant in this perspective:

3. *"Would you say that [country]'s cultural life is generally undermined or enriched by people coming to live here from other countries?"*
4. *"Is [country] made a worse or a better place to live by people coming to live here from other countries?"*

On the basis of these two questions I build two additional dummy variables defined as follows:

- `pro_immig3` is a dummy variable that equals 1 if the answer to question 3 is >5 and 0 otherwise<sup>37</sup>
- `pro_immig4` is a dummy variable that equals 1 if the answer to question 4 is >5 and 0 otherwise<sup>38</sup>

Table 3 below reports semi-elasticities<sup>39</sup> of the response variable to different regressors and the

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<sup>35</sup>Clusters are considered at the country level, but results are robust when clustering at the regional level.

<sup>36</sup>Note that the same index of extensive margin has been also considered separately for each good included in the aggregate index. Using such data, the equation defined above has also been estimated considering separately different cultural goods. Results are reported in the appendix and do not differ significantly among the various goods.

<sup>37</sup>In a scale ranging from 0 to 10 where: 0=Cultural life undermined and 10=Cultural life enriched

<sup>38</sup>In a scale ranging from 0 to 10 where: 0=Worse place to live and 10=Better place to live

<sup>39</sup>In general the semi-elasticity of  $y$  with respect to  $x$  is defined as  $dy_{ex}() = (dy/dx) \cdot (x)$ . Given that all continuous variables are transformed in logarithm term their coefficient can be interpreted as elasticities, but since the dependent variable is a dummy it is not possible to compute a full elasticity. As far as dummy variables are concerned, the coefficient represent the effect of a discrete change from 0 to 1.

interaction effect as defined above.

Table 3: Exposure to imported cultural goods

	pro_immig same ethnicity	pro_immig different ethnicity	pro_immig cultural enrichment	pro_immig welfare increase
	b/t	b/t	b/t	b/t
married	-0.002 (-0.39)	-0.016*** (-2.69)	-0.028*** (-4.82)	-0.014*** (-2.74)
child	-0.018*** (-2.89)	-0.008 (-1.42)	-0.007 (-1.26)	-0.010* (-1.94)
unemployed	-0.039*** (-3.12)	-0.018 (-1.44)	0.007 (0.38)	0.011 (0.80)
female	-0.009** (-2.14)	-0.005 (-1.03)	0.002 (0.32)	-0.007 (-1.30)
age	-0.036*** (-4.33)	-0.067*** (-7.16)	-0.004 (-0.60)	-0.001 (-0.21)
income	0.013*** (8.32)	0.015*** (10.64)	0.016*** (8.83)	0.012*** (7.97)
left-right scale	-0.011*** (-6.98)	-0.022*** (-9.81)	-0.020*** (-9.37)	-0.015*** (-6.92)
education (years)	-0.300* (-1.90)	-0.543*** (-3.25)	-1.133*** (-7.08)	-1.057*** (-8.27)
exposure	0.107*** (3.06)	0.166*** (4.40)	0.297*** (8.09)	0.264*** (8.76)
country-year FE	YES	YES	YES	YES
constant	0.150** (2.53)	0.153*** (2.63)	0.162*** (2.59)	0.046 (0.79)
Observations	100910	100910	100910	100910
R2	0.092	0.11	0.126	0.07

Robust T-statistics in parenthesis, corrected for possible correlation within clusters.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10

First of all, it is important to notice that all coefficients, when significant, are of the expected sign in all groups of regressions. In particular, as far as economic variables are concerned: being unemployed slightly decreases the probability of being favorable to immigrants of the same race/ethnicity, while having higher income, on average, increases the probability of approving immigrants. Both results are in line with previous studies, highlighting the perceived competition

between immigrants and natives on the labor market. The difficulty in finding a job strengthens this perceived threat, while high income eases it. As far as immigrants of a different ethnicity are concerned, the labour market effect disappears, indicating a weak perceived substitutability of natives with such immigrants. Higher income is relevant also when considering opinions over cultural enrichment and welfare increase, a result that indicates the fact that the higher the individual wealth, the higher the possibility to enjoy cultural amenities.

The effect of political preferences also confirms the prior: since the higher the score on this variable (i.e. the more oriented towards right the individual is), the lower the probability of favouring immigration. As explained before this could be explained by the fact that right parties are usually associated to more conservative policies.

As far as demographic variables are concerned, as expected, increasing age is associated with aversion towards immigration and the other controls indicate that being married and having a child, when significant, decrease the probability of opposing immigration. The impact of education seems to be only as a tool to access cultural goods' consumption, as it is clear from the interaction effect reported. The latter effect is stronger when considering attitudes towards immigrant of a different race/ethnicity.

Considering more closely the cultural dimension and more generally the quality of life results are clearly confirmed. This suggests the idea that tolerance towards ethnic diversity is linked to perceived cultural distance.

### **3 Robustness checks**

The first robustness check I propose is meant at discussing whether the effect obtained in the previous analysis is a pure statistical effect or if it is a specificity of cultural goods. In order to build the counterfactual case, I introduce two homogeneous non cultural goods: HS-2702 (Lignite, except jell) and HS-2712 (petroleum in jelly, petroleum wax and other mineral waxes). Note that, first of all, classical goods are characterized by a much smaller number of importing countries than the cultural goods: lignite is imported from 2 to 10 partner countries, while petroleum is imported

by 7 to 41 partner countries. This difference is already a first piece of evidence of the importance of the extensive margin in the case of cultural goods. Having said that, I run the same regression as in the previous section considering these two non cultural goods. If the results previously found were just a statistical effect, the positive and significant effect of the exposure's coefficient should be present also in this case. Results of this exercise are presented in tables 4 and 5 below.

Table 4. *Exposure to 2702* (Lignite, except jell)

	pro_immig same ethnicity	pro_immig different ethnicity	pro_immig cultural enrichment	pro_immig welfare increase
married	0.001 (0.17)	-0.017** (-2.52)	-0.031*** (-5.16)	-0.018*** (-3.31)
child	-0.015** (-2.19)	-0.003 (-0.48)	-0.004 (-0.66)	-0.008 (-1.57)
unemployed	-0.040*** (-2.62)	-0.023 (-1.59)	-0.003 (-0.16)	0.002 (0.15)
female	-0.010** (-2.21)	-0.007 (-1.34)	0.001 (0.13)	-0.010* (-1.86)
age	-0.027*** (-3.03)	-0.057*** (-5.89)	-0.003 (-0.32)	-0.003 (-0.45)
income	0.013*** (7.40)	0.016*** (10.49)	0.015*** (7.86)	0.013*** (7.53)
left-right scale	-0.014*** (-8.06)	-0.025*** (-10.15)	-0.022*** (-8.76)	-0.018*** (-7.31)
education (year)	15.672*** (22.24)	22.659*** (4.26)	-4.637 (-0.13)	1.214 (0.04)
exposure	-15.477*** (-13.36)	-22.437*** (-4.39)	4.87 (0.13)	-1.062 (-0.03)
country-year FE	YES	YES	YES	YES
constant	17.060*** (11.55)	24.665*** (4.32)	-5.372 (-0.13)	1.083 (0.03)
Observations	83774	83774	83774	83774
R2	0.08	0.105	0.127	0.076

Robust T-statistics in parenthesis, corrected for possible correlation within clusters.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10

Results confirm that the impact of such goods on pro-immigration attitudes is either not signif-

icantly different from zero or negative, thus the positive effect is specific to cultural goods.

Table 5. *Exposure to 2712* (petroleum in jelly, petroleum wax and other mineral waxes)

	pro_immig same ethnicity	pro_immig different ethnicity	pro_immig cultural enrichment	pro_immig welfare increase
married	-0.002 (-0.44)	-0.017*** (-2.77)	-0.028*** (-4.9)	-0.014*** (-2.81)
child	-0.016*** (-2.68)	-0.006 (-1.02)	-0.003 (-0.54)	-0.006 (-1.25)
unemployed	-0.038*** (-3.01)	-0.017 (-1.29)	0.01 (0.50)	0.013 (0.96)
female	-0.009** (-2.13)	-0.005 (-1.02)	0.002 (0.38)	-0.006 (-1.24)
age	-0.036*** (-4.32)	-0.067*** (-7.09)	-0.004 (-0.56)	-0.001 (-0.19)
income	0.013*** (8.51)	0.016*** (10.80)	0.017*** (8.92)	0.013*** (8.18)
left-right scale	-0.012*** (-6.94)	-0.022*** (-9.72)	-0.020*** (-9.29)	-0.015*** (-6.85)
education (year)	0.708*** (17.06)	0.561*** (16.20)	0.397*** (8.71)	0.553*** (12.95)
exposure	-0.531*** (-13.66)	-0.366*** (-12.04)	-0.212*** (-5.00)	-0.436*** (-10.92)
country-year FE	YES	YES	YES	YES
constant	1.787*** (17.14)	1.257*** (13.74)	0.747*** (6.57)	1.343*** (12.59)
Observations	100910	100910	100910	100910
R2	0.091	0.108	0.121	0.065

Robust T-statistics in parenthesis, corrected for possible correlation within clusters.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10

The second robustness check that I consider points to the possible bias derived from the fact that the measure of diversity in cultural goods consumption I consider derives from a country level variable, while the mechanism I are inspecting is taking place at the micro-level. This approach is mainly due to data limitation since data on trade in cultural goods are only available at the national level. Exposure to cultural goods varieties that enter a country could be very different in the various regions and it is likely to be enhanced in urban areas rather than in small villages or

rural territories.

Table 6: *Exposure to imported cultural goods (city)*

	pro_immig same ethnicity	pro_immig different ethnicity	pro_immig cultural enrichment	pro_immig welfare increase
married	0.005 (0.845)	-0.007 (-1.469)	-0.020*** (-2.757)	-0.006 (-0.704)
child	-0.018*** (-3.083)	-0.007 (-0.830)	-0.004 (-0.710)	-0.007 (-1.256)
unemployed	-0.042*** (-4.569)	-0.021 (-1.538)	0.008 (0.441)	0.006 (0.367)
female	-0.011*** (-2.794)	-0.007 (-0.830)	0.002 (0.177)	-0.008 (-0.902)
age	-0.040** (-2.482)	-0.074*** (-4.143)	-0.012 (-0.953)	-0.009 (-0.868)
income	0.011*** (5.283)	0.013*** (7.590)	0.014*** (5.209)	0.010*** (4.991)
left-right scale	-0.011*** (-3.216)	-0.022*** (-3.789)	-0.019*** (-3.434)	-0.015** (-2.631)
education (years)	-0.036 (-0.265)	-0.108 (-0.652)	-0.203 (-1.310)	-0.212 (-1.650)
exposure	0.050* (1.765)	0.067* (1.918)	0.085** (2.471)	0.072** (2.541)
city	0.154** (2.363)	0.073 (0.899)	0.049 (0.876)	0.023 (0.248)
city*education	-0.087 (-1.673)	-0.070 (-0.928)	-0.093 (-1.412)	-0.086 (-1.455)
city*exposure	0.008 (0.885)	0.013 (1.144)	0.018 (1.449)	0.019** (2.478)
region-year FE	YES	YES	YES	YES
constant	-0.018 (-0.240)	0.175** (2.139)	0.059 (0.600)	0.009 (0.125)
Observations				
R2	95,480 0.117	95,480 0.135	95,480 0.144	95,480 0.091

Robust T-statistics in parenthesis, corrected for possible correlation within clusters.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10

For this reason I augment my previous specification to take into account regional controls and whether there is a differential effect of cultural goods on individuals living in big cities. To this aim I

substitute country-year fixed effects with region-year dummies and I interact the term representing exposure to foreign cultural goods with a dummy that equals 1 if the individual lives in a big city (dummy "city"<sup>40</sup>). Results are presented in the table 6 above.

Results show that active exposure to imported cultural goods is important in general and not only for individuals living in big cities. Nonetheless, if we disaggregate the analysis considering each good separately, as shown in the appendix, it is clear that for some good the overall effect of cultural goods on attitudes towards immigrants is driven by individuals living in big cities only and for other it is a characteristic of the whole population. In particular results indicate that, when considering foreign reading books and newspapers/journals /periodicals, a wider access to such good is possible only for individuals living in big cities, while when considering works of art and foreign films the general effect of exposure is confirmed, as museums and cinema are more homogeneously distributed within countries.

### 3.1 Instrumental variables

An other important source of bias is the fact that estimations may present a problem of endogeneity. Such problem can derive from two different issues: reverse causality on the one side and omitted variable bias on the other. In principle, unobserved individual heterogeneity should be mitigated by the use of country level variables when studying their impact on individual behavior and opinions. However, a reverse causality problem is difficult to avoid. In fact, the relationship between consumption of cultural goods and attitudes towards migration could be a self reinforcing process. For this reason, I introduce instrumental variable techniques in the analysis: in a two stages OLS procedure, the index of exposure to foreign cultural goods is instrumented using the overall number of museum present in the country, specialized stores selling newspapers and books' retailers<sup>41</sup>. We expect that the variables on which the instrument is based are correlated with the

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<sup>40</sup>The question from which the dummy is built is the following: "Which phrase on this card best describes the area where you live?". Possible answers are: 1="A big city"; 2="The suburbs or outskirts of a big city"; 3="A town or a small city"; 4="A country village"; 5="A farm or home in the countryside". The dummy city equals one if the answer to the above question take values 1 or 2 and zero otherwise.

<sup>41</sup>Note that in the appendix I report results of IV estimation also for each cultural good considered separately. In that case different instrumental variables are considered: antiques are instrumented using the number of museums

endogenous regressor as they represent the distribution channels of the cultural goods considered. At the same time we expect them to be exogenous as they are not limited to foreign cultural goods, but to also to domestic ones.

Results are reported in table 7 below. Results on the coefficient of interest are confirmed.

Table 7. IV estimation \_ imported cultural goods

	pro_immig same ethnicity	pro_immig different ethnicity	pro_immig cultural enrichment	pro_immig welfare increase
married	0.002 (0.38)	-0.017*** (-2.62)	-0.031*** (-5.19)	-0.018*** (-3.16)
child	-0.013** (-2.35)	0.003 (0.48)	0 (0.02)	-0.005 (-0.79)
unemployed	-0.046*** (-2.91)	-0.045*** (-3.17)	-0.021 (-1.29)	-0.023* (-1.72)
female	-0.010** (-2.21)	-0.005 (-0.76)	0.006 (0.98)	-0.007 (-1.21)
age	-0.052*** (-5.8)	-0.076*** (-7.08)	-0.009 (-0.96)	-0.001 (-0.17)
income	0.014*** (8.85)	0.015*** (10.10)	0.017*** (10.50)	0.012*** (7.27)
left-right scale	-0.015*** (-9.77)	-0.028*** (-11.5)	-0.026*** (-11.49)	-0.020*** (-8.38)
education (years)	-0.407* (-1.68)	-0.547** (-1.99)	-1.051*** (-4.22)	-0.598*** (-3.49)
exposure	0.135** (2.47)	0.172*** (2.76)	0.282*** (4.91)	0.164*** (4.11)
country-year FE	YES	YES	YES	YES
Observations	77275	77275	77275	77275
R2	0.047	0.068	0.056	0.03

Robust T-statistics in parenthesis, corrected for possible correlation within clusters.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10

First stage diagnostic is reported in table 8 below. Results indicate that the instrument consid-  


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present in the country, cinematograph films using cinema entries, newspapers using specialized stores selling newspapers and books using books' retailers. Data on the number of firms and museums are retrieved from Amadeus database (Bureau Van Dijk), while the number of cinema entries derive from the European Audiovisual Observatory database.



can influence attitudes toward immigrants. Cultural goods, indeed, can constitute one of the so much needed "bridges" linking different cultures: they can enhance reciprocal understanding and favour coexistence of different cultures in the same society, building the so called multiculturalism that recently has been claimed to be dead. Empirical evidence supports this view, showing that a greater exposure to foreign cultural goods can have a positive effect on attitudes towards immigrants. Indeed, heterogeneity in consumption patterns can lead to higher tolerance towards a more heterogeneous population. This effect is stronger when considering attitudes towards immigrant of a different race/ethnicity as the majority of the native population and it is explained by an increased awareness of the cultural enrichment that immigrants bring along, leading to an increase in welfare of natives. The positive effect of active exposure to foreign books and newspapers is driven by individuals living in big cities, where such goods are more widespread. The positive effect of active exposure to foreign movies and works of art is more pervasive in the whole population.

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### 3.3 Appendix

#### 3.3.1 Probit model

Table A1: Exposure to imported cultural goods

	pro_immig same ethnicity	pro_immig different ethnicity	pro_immig cultural enrichment	pro_immig welfare increase
married	-0.006 (-0.40)	-0.045*** (-2.73)	-0.077*** (-4.76)	-0.038** (-2.52)
child	-0.049*** (-2.75)	-0.022 (-1.42)	-0.019 (-1.15)	-0.029* (-1.84)
unemployed	-0.114*** (-3.22)	-0.047 (-1.37)	0.018 (0.38)	0.033 (0.85)
female	-0.028** (-2.18)	-0.014 (-0.97)	0.005 (0.33)	-0.02 (-1.34)
age	-0.097*** (-3.98)	-0.182*** (-7.05)	-0.009 (-0.46)	-0.011 (-0.51)
income	0.038*** (8.24)	0.041*** (10.50)	0.043*** (8.82)	0.036*** (7.84)
left-right scale	-0.034*** (-7.04)	-0.062*** (-9.82)	-0.055*** (-9.33)	-0.044*** (-6.81)
education (years)	-1.019** (-2.24)	-1.308*** (-2.69)	-3.016*** (-6.61)	-3.146*** (-8.11)
exposure	0.342*** (3.36)	0.416*** (3.80)	0.794*** (7.58)	0.788*** (8.52)
country-year FE	YES	YES	YES	YES
constant	-0.987*** (-5.83)	-0.966*** (-5.78)	-0.955*** (-5.54)	-1.282*** (-7.29)
Observations	100910	100910	100910	100910
R2				

Robust T-statistics in parenthesis, corrected for possible correlation within clusters.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10

Table A2: Marginal effect of interaction terms

pro_immig1	pro_immig2	pro_immig3	pro_immig4
<b>1.37 **</b>	<b>3.41 ***</b>	<b>1.206564 ***</b>	<b>1.722979 ***</b>

### 3.3.2 Disaggregated specification of exposure index

Table A3: Exposure to imported antiques (9706)

9706	pro_immig1	pro_immig2	pro_immig3	pro_immig4
married	0.003 (0.006)	-0.012* (0.007)	-0.025*** (0.006)	-0.009 (0.008)
child	-0.022*** (0.005)	-0.012 (0.008)	-0.006 (0.005)	-0.006 (0.004)
unemployed	-0.043*** (0.012)	-0.015 (0.018)	0.022 (0.017)	0.019 (0.021)
female	-0.006 (0.005)	-0.007 (0.009)	0.004 (0.008)	-0.003 (0.008)
age	-0.038* (0.020)	-0.068*** (0.023)	0.001 (0.010)	-0.003 (0.010)
income	0.011*** (0.002)	0.014*** (0.002)	0.015*** (0.003)	0.013*** (0.002)
left-right scale	-0.010*** (0.003)	-0.019*** (0.005)	-0.017*** (0.006)	-0.013** (0.005)
education (years)	0.008 (0.086)	-0.074 (0.095)	-0.231*** (0.068)	-0.207*** (0.054)
exposure	0.063** (0.025)	0.096*** (0.028)	0.144*** (0.021)	0.107*** (0.020)
Country-year FE	YES	YES	YES	YES
Constant	0.006 (0.101)	-0.053 (0.144)	-0.150 (0.163)	-0.149 (0.128)
Observations	82,618	82,618	82,618	82,618
R-squared	0.095	0.114	0.129	0.070

Robust standard errors, corrected for possible correlation within clusters reported in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A4: Exposure to cinematographic film, exposed and developed (37069)

37069	pro_immig1	pro_immig2	pro_immig3	pro_immig4
married	-0.000 (0.006)	-0.015*** (0.005)	-0.028*** (0.006)	-0.015 (0.009)
child	-0.018*** (0.006)	-0.007 (0.009)	-0.006 (0.006)	-0.008 (0.005)
unemployed	-0.042*** (0.011)	-0.018 (0.018)	0.007 (0.019)	0.005 (0.022)
female	-0.010** (0.005)	-0.007 (0.009)	0.001 (0.010)	-0.006 (0.008)
age	-0.032** (0.016)	-0.063*** (0.017)	-0.000 (0.010)	0.002 (0.011)
income	0.013*** (0.002)	0.015*** (0.002)	0.016*** (0.003)	0.013*** (0.002)
left-right scale	-0.012*** (0.003)	-0.023*** (0.005)	-0.021*** (0.005)	-0.016*** (0.005)
education (years)	0.023 (0.091)	-0.026 (0.121)	-0.147 (0.134)	-0.158 (0.100)
exposure	0.076* (0.040)	0.106* (0.055)	0.150** (0.064)	0.123** (0.048)
Country-year FE	YES	YES	YES	YES
Constant	0.019 (0.096)	-0.013 (0.127)	-0.038 (0.158)	-0.113 (0.127)
Observations	95,627	95,627	95,627	95,627
R-squared	0.094	0.111	0.127	0.069

Robust standard errors, corrected for possible correlation within clusters reported in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A5: Exposure to newspapers, journals and periodicals (4902)

4902	pro_immig1	pro_immig2	pro_immig3	pro_immig4
married	0.000 (0.006)	-0.014** (0.006)	-0.028*** (0.006)	-0.015* (0.008)
child	-0.018*** (0.006)	-0.008 (0.009)	-0.006 (0.006)	-0.008 (0.005)
unemployed	-0.040*** (0.011)	-0.016 (0.017)	0.006 (0.019)	0.006 (0.022)
female	-0.010** (0.005)	-0.006 (0.009)	0.001 (0.010)	-0.006 (0.008)
age	-0.036* (0.018)	-0.068*** (0.020)	-0.001 (0.009)	0.002 (0.010)
income	0.013*** (0.002)	0.015*** (0.002)	0.016*** (0.003)	0.013*** (0.002)
left-right scale	-0.011*** (0.003)	-0.022*** (0.005)	-0.020*** (0.005)	-0.015*** (0.005)
education (years)	-0.117 (0.279)	-0.246 (0.377)	-0.605 (0.427)	-0.485 (0.309)
exposure	0.085 (0.072)	0.125 (0.097)	0.216* (0.111)	0.164** (0.080)
Country-year FE	YES	YES	YES	YES
Constant	0.081 (0.093)	0.075 (0.131)	0.080 (0.155)	-0.023 (0.127)
Observations	98,659	98,659	98,659	98,659
R-squared	0.093	0.110	0.124	0.068

Robust standard errors, corrected for possible correlation within clusters reported in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A6: Exposure to reading books (490199)

490199	pro_immig1	pro_immig2	pro_immig3	pro_immig4
married	0.000 (0.006)	-0.014** (0.006)	-0.028*** (0.006)	-0.015* (0.008)
child	-0.018*** (0.006)	-0.009 (0.009)	-0.009 (0.006)	-0.011** (0.005)
unemployed	-0.041*** (0.011)	-0.016 (0.017)	0.005 (0.018)	0.005 (0.021)
female	-0.010** (0.005)	-0.006 (0.009)	0.002 (0.010)	-0.006 (0.008)
age	-0.036** (0.018)	-0.068*** (0.020)	-0.002 (0.009)	0.001 (0.010)
income	0.012*** (0.002)	0.014*** (0.002)	0.015*** (0.003)	0.012*** (0.002)
left-right scale	-0.011*** (0.003)	-0.022*** (0.005)	-0.020*** (0.005)	-0.015*** (0.005)
education (years)	-0.371 (0.385)	-0.745 (0.498)	-1.434*** (0.465)	-1.345*** (0.312)
exposure	0.133 (0.088)	0.225* (0.115)	0.381*** (0.109)	0.342*** (0.076)
Country-year FE	YES	YES	YES	YES
Constant	0.093 (0.077)	0.102 (0.099)	0.125 (0.119)	0.030 (0.088)
Observations	98,659	98,659	98,659	98,659
R-squared	0.093	0.112	0.127	0.071

Robust standard errors, corrected for possible correlation within clusters reported in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### 3.3.3 Robustness checks with disaggregated exposure index

Table A7: Exposure to imported antiques (9706)

9706	pro_immig1	pro_immig2	pro_immig3	pro_immig4
married	0.008 (0.006)	-0.007 (0.005)	-0.020*** (0.007)	-0.005 (0.008)
child	-0.022*** (0.006)	-0.010 (0.008)	-0.005 (0.005)	-0.006 (0.004)
unemployed	-0.041*** (0.009)	-0.018 (0.014)	0.017 (0.014)	0.015 (0.016)
female	-0.007 (0.005)	-0.008 (0.009)	0.005 (0.008)	-0.002 (0.008)
age	-0.040** (0.019)	-0.071*** (0.022)	0.001 (0.011)	-0.002 (0.010)
income	0.010*** (0.002)	0.012*** (0.002)	0.014*** (0.003)	0.011*** (0.002)
left-right scale	-0.010*** (0.003)	-0.019*** (0.006)	-0.016*** (0.006)	-0.013** (0.006)
education (years)	0.046 (0.104)	-0.095 (0.122)	-0.231*** (0.065)	-0.184*** (0.059)
exposure	0.054* (0.030)	0.100*** (0.034)	0.143*** (0.020)	0.101*** (0.022)
city	0.302 (0.243)	-0.021 (0.222)	-0.073 (0.168)	0.111 (0.176)
city#education	-0.103 (0.097)	0.033 (0.092)	0.021 (0.058)	-0.044 (0.067)
city#exposure	0.023 (0.029)	-0.008 (0.026)	-0.007 (0.019)	0.013 (0.022)
Region-year FE	YES	YES	YES	YES
Constant	0.451* (0.231)	0.853*** (0.263)	1.490*** (0.179)	1.134*** (0.159)
Observations	82,618	82,618	82,618	82,618
R-squared	0.119	0.138	0.150	0.094

Robust standard errors, corrected for possible correlation within clusters reported in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A8: *Exposure to cinematographic film*, exposed and developed (37069)

37069	pro_immig1	pro_immig2	pro_immig3	pro_immig4
married	0.004 (0.006)	-0.010** (0.004)	-0.023*** (0.006)	-0.011 (0.009)
child	-0.017** (0.006)	-0.005 (0.009)	-0.005 (0.007)	-0.007 (0.005)
unemployed	-0.040*** (0.008)	-0.019 (0.014)	0.006 (0.015)	0.005 (0.017)
female	-0.011** (0.004)	-0.007 (0.009)	0.002 (0.009)	-0.006 (0.009)
age	-0.034** (0.015)	-0.066*** (0.016)	-0.001 (0.010)	0.001 (0.011)
income	0.012*** (0.002)	0.013*** (0.002)	0.015*** (0.003)	0.011*** (0.002)
left-right scale	-0.011*** (0.003)	-0.022*** (0.006)	-0.020*** (0.006)	-0.016*** (0.006)
education (years)	0.075 (0.109)	-0.021 (0.142)	-0.129 (0.117)	-0.114 (0.087)
exposure	0.060 (0.047)	0.100 (0.061)	0.140** (0.056)	0.103** (0.045)
city	0.281 (0.256)	0.096 (0.324)	0.075 (0.209)	0.276 (0.235)
city#education	-0.110 (0.104)	-0.024 (0.138)	-0.046 (0.081)	-0.115 (0.093)
city#exposure	0.028 (0.037)	0.014 (0.049)	0.023 (0.031)	0.055 (0.033)
Region-year FE	YES	YES	YES	YES
Constant	0.168 (0.241)	0.602* (0.324)	0.943*** (0.323)	0.747*** (0.221)
Observations	95,627	95,627	95,627	95,627
R-squared	0.120	0.137	0.149	0.094

Robust standard errors, corrected for possible correlation within clusters reported in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A9: Exposure to newspapers, journals and periodicals (4902)

4902	pro_immig1	pro_immig2	pro_immig3	pro_immig4
married	0.005 (0.006)	-0.009* (0.005)	-0.023*** (0.006)	-0.011 (0.008)
child	-0.017*** (0.006)	-0.007 (0.009)	-0.005 (0.007)	-0.008 (0.005)
unemployed	-0.038*** (0.008)	-0.018 (0.013)	0.004 (0.015)	0.006 (0.016)
female	-0.011** (0.004)	-0.007 (0.009)	0.002 (0.009)	-0.006 (0.008)
age	-0.038** (0.017)	-0.071*** (0.019)	-0.001 (0.010)	0.002 (0.011)
income	0.011*** (0.002)	0.013*** (0.002)	0.015*** (0.003)	0.011*** (0.002)
left-right scale	-0.011*** (0.003)	-0.022*** (0.006)	-0.019*** (0.006)	-0.015** (0.006)
education (years)	0.078 (0.259)	-0.067 (0.364)	-0.485 (0.418)	-0.370 (0.270)
exposure	0.038 (0.068)	0.077 (0.095)	0.184* (0.108)	0.133* (0.072)
city	1.117*** (0.336)	1.105** (0.493)	0.879** (0.391)	0.912 (0.588)
city#education	-0.463*** (0.131)	-0.456** (0.202)	-0.362** (0.143)	-0.372 (0.234)
city#exposure	0.111*** (0.033)	0.122** (0.051)	0.098** (0.038)	0.102* (0.058)
Region-year FE	YES	YES	YES	YES
Constant	0.038 (0.618)	0.765 (0.860)	2.189** (0.974)	1.641** (0.619)
Observations	98,659	98,659	98,659	98,659
R-squared	0.118	0.136	0.147	0.092

Robust standard errors, corrected for possible correlation within clusters reported in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A10: Exposure to reading books (490199)

490199	pro_immig1	pro_immig2	pro_immig3	pro_immig4
married	0.005 (0.006)	-0.009* (0.005)	-0.023*** (0.006)	-0.011 (0.008)
child	-0.018*** (0.006)	-0.008 (0.009)	-0.008 (0.006)	-0.010** (0.005)
unemployed	-0.038*** (0.008)	-0.018 (0.013)	0.003 (0.015)	0.005 (0.016)
female	-0.010** (0.004)	-0.006 (0.009)	0.002 (0.010)	-0.005 (0.008)
age	-0.038** (0.017)	-0.071*** (0.019)	-0.002 (0.010)	0.001 (0.011)
income	0.011*** (0.002)	0.013*** (0.002)	0.014*** (0.003)	0.011*** (0.002)
left-right scale	-0.011*** (0.003)	-0.022*** (0.006)	-0.019*** (0.006)	-0.015** (0.006)
education (years)	-0.140 (0.390)	-0.487 (0.526)	-1.290** (0.480)	-1.166*** (0.330)
exposure	0.083 (0.089)	0.164 (0.120)	0.346*** (0.111)	0.300*** (0.080)
city	1.296*** (0.395)	1.395** (0.672)	0.778* (0.404)	1.160** (0.494)
city#education	-0.516*** (0.146)	-0.582* (0.288)	-0.336** (0.153)	-0.485** (0.212)
city#exposure	0.110*** (0.032)	0.136** (0.064)	0.081** (0.036)	0.117** (0.047)
Region-year FE	YES	YES	YES	YES
Constant	0.526 (0.932)	1.708 (1.250)	4.014*** (1.160)	3.521*** (0.830)
Observations	98,659	98,659	98,659	98,659
R-squared	0.118	0.137	0.149	0.096

Robust standard errors, corrected for possible correlation within clusters reported in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



## **4 FDI and Growth: can different regional identities shape the returns to foreign capital investments?**

Do different types of territorial capital determine different levels of FDI-induced growth? This paper analyses the impact of FDI on the growth rates of European regions. In so doing, it discusses the role of different components of territorial capital in magnifying or daunting such an impact. The paper starts from a very simple theoretical framework that clarifies how territorial capital can shape the returns to foreign direct investments. The subsequent empirical analysis uses data from the European Value Study to identify 3 soft components of territorial capital that define the identity of a region and can be relevant in shaping the impact of foreign capital on local growth. Using data from Eurostat and FDIregio database, the paper studies the impact of FDI induced spillovers on regional growth in European regions, controlling for possible endogeneity. Results indicate that technological spillovers are an important source of regional growth, but they take place only if the level of trustworthiness/generalized morality is widespread in the region, supporting the idea that low free-riding attitudes increase efficiency of transaction and effectiveness of cooperation between multinational and the regional economic system. The effect of relational capital is more ambiguous. A more disaggregated analysis reveals that some effects vary depending on the origin (intra vs extra European FDI) and on the type of economic activity (manufacturing vs service FDI).

### **4.1 Introduction**

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

defined in the literature as the soft components of territorial capital (See Camagni, 2008).<sup>42</sup> This paper discuss how a very local element such as territorial capital may enable (or hamper) regions' ability to take advantage of globalization in the form of FDI inflows.

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

These arguments are very common in the literature based on country level evidence and do not consider that, at sub-national level, the FDI-growth relationship becomes more ambiguous. At the regional level, indeed, important local factors can undermine or reinforce the FDI-growth relationship, depending on the regional ability to fully exploit their economic potential. Local externalities, local assets, relational distance, local governance, cultural elements and values are all crucial elements in defining the flexibility and the catching up ability of regions in taking advantage of FDI spillovers and complementarities. Theoretical arguments motivating the potential of territorial capital for higher returns on investments are manifold and can be found in different strands of theoretical literature, such as the limited rationality theory (Malgrem, 1961; Simon, 1972), contract theory (Williamson, 2002) and the cognitive approach to district economies (Camagni, 1991; Storper, 1995).

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<sup>42</sup>Territorial capital is broadly defined as the set of localized assets that constitute the competitive potential of a territory. Its soft components are organizational, relational and social capital. See Camagni (2008) for a comprehensive discussion.

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

In order to provide an answer to these research questions, I first define the theoretical mechanism through which territorial capital influence the FDI-growth relationship, starting from a simple neoclassical framework. Then I assess the impact of FDI on economic growth, testing and controlling for possible endogeneity. Additionally, I introduce those soft components of the territorial capital that may exert an impact on the transmission of FDI induced spillovers to the local economy, such as social capital and relational territorial capital and closeness of the region. Such soft components of territorial capital may enhance the opportunities of a region to take advantage of knowledge by more advanced organizations or markets. Finally, I consider separately the effect of different types of FDI inflows, decomposed according to macro-sectors of activity and broad geographic origin.

The rest of the paper is organized as follows. Section 2 reviews the relevant literature and discusses the theoretical foundations of this study. Section 3 describes empirical trends in FDI and growth in Europe and then focuses on detailed description of the construction of territorial capital endowments' indexes for European regions. Section 4 presents a simple theoretical framework showing how territorial capital can shape the returns to FDI and defines the estimation strategy. Section 5 is devoted to discussion of results. Major conclusions and a summary of the findings are discussed in Section 6.

## 4.2 Theoretical background and relevant literature

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

Generally speaking, the literature acknowledges that FDI plays a relevant role in economic development processes of host economies through several channels, which go far beyond the increase in the local endowment of financial and physical capital. In the neoclassical growth models à la Solow (Solow, 1956) this implies that foreign investments do not only contribute to factor accumulation, complementing local endowments, but they can also contribute to technological growth or the so called “Solow residual”. Indeed, the impact of FDI may be more relevant because of the presence of such indirect effects that increase total factor productivity because of the transfer of new technologies and improvement in the efficiency of production.

Part of these indirect effects that benefit the host economies, called more properly spillovers, arise since multinational firms cannot completely internalize the benefits of knowledge and technologies which are at the base of their competitive advantage (Kokko, 1994; Markusen, 1995). The intensity of these spillovers may vary according to their nature intra- or inter-sectoral. While multinational firms try to avoid intra-sectoral spillovers because they benefit their direct competitors, they may produce inter-sectoral spillovers since they benefit suppliers and clients (Kugler, 2006). Moreover, indirect effects may arise because of increased competition that forces domestic firms to improve their efficiency of production, resulting in productivity gains for the whole region, as the literature on firm heterogeneity suggests (see, for instance, Barrios et al., 2005). Finally, another important indirect effect arising from the presence of multinational firms is export spillover, which affects local firms’ export decisions (Girma et al., 2004; Kneller and Pisu, 2007).

Focusing on spillovers’ transmission (see Barba Navaretti and Venables, 2004), it can take place through imitation processes, labour force training, pro-competitive effects, and input-output linkages (Blomstrom and Kokko, 1998). Regardless of the channel chosen, the impact of FDI on growth

is far from being automatic; rather, it depends on the degree of complementarity and substitutability between foreign and domestic capitals (De Mello, 1999), the degree of development of the host economies (Johnson, 2006; Carkovic and Levine, 2005; Blonigen and Wang, 2005), the capacity of the host economy to absorb new technologies and knowledge brought by foreign firms (Borensztein et al., 1998), the degree of openness of the host economies (Balasubramanyam et al., 1996), the degree of embeddedness of foreign firms in the local economies (Markusen and Venables, 1999; Rodriguez-Clare, 1996) and other host economies' characteristics, such as the quality of the institutions and, generally speaking, the business environment (Olofsdotter, 1998; Blomstrom and Kokko, 2003; Xu, 2000).

Despite the plethora of FDI-growth studies, the relationship between FDI and growth is still not clear, since many of these works are based on aggregate data on FDI, which do not allow either to distinguish between different types of FDI (vertical vs. horizontal; greenfield vs. other forms of FDI), which is potentially important (Beugelsdijk et al., 2008) or to consider host economies at a finer geographical disaggregation (sub-national levels). Consequently, it is implicitly assumed that, on the one hand, different types of FDI have the same impact on economic growth rates, and, on the other hand, that the impact of FDI on economic growth is constant across space. Finally, with few exceptions, most studies focus on FDI in manufacturing, while ignoring either finer disaggregation within the manufacturing sector or FDI in services.<sup>43</sup>

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

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<sup>43</sup>Bobonis and Shatz (2007), Alfano (2003) and Girma and Wakelin (2001) represent notable exceptions.

firms, based on the assumption that foreign firms are by definition technologically superior to domestic firms (Markusen, 1995). But, what happens when foreign firms undertake an investment in a technologically advanced region in order to exploit its knowledge (Dunning, 1999; Cantwell, 1989)?

In conclusion, there remains a clear need to quantify the impact of FDI on regional economic performance. This paper addresses these issues in the context of the European Union. In so doing, it will not only augment the existing evidence on the impact of FDI on EU regions' performance, which is quite scarce, but also try to overcome some of the ambiguities that still plague the literature.<sup>44</sup> More specifically, this study aims at uncovering whether the complexity of the FDI-growth relationship depends on the substantial heterogeneity in regional identities. Such identities encompass both soft and hard resources of local economies, that constitute the building blocks of the so called "territorial capital".

"It is now recognized that each area has a specific capital – its 'territorial capital' – that is distinct from that of other areas and is determined by many factors [...]. These factors may include the area's geographical location, size, factor of production endowment, climate, traditions, natural resources, quality of life or the agglomeration economies provided by its cities, but may also include its business incubators and industrial districts or other business networks that reduce transaction costs. Other factors may be "untraded interdependencies" such as understandings, customs and informal rules that enable economic actors to work together under conditions of uncertainty, or the solidarity, mutual assistance and co-opting of ideas that often develop in clusters of small and medium-sized enterprises working in the same sector (social capital). Lastly, according to Marshall, there is an intangible factor, 'something in the air', called the 'environment' and which is the outcome of a combination of institutions, rules, practices, producers, researchers and policy makers, that make certain creativity and innovation possible. This 'territorial capital' generates a higher return for specific kinds of investments than for others, since they are better suited to the

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<sup>44</sup>Studies examining the regional dimension of FDI generally deal with location choice rather than the impact on growth and productivity. Exceptions include Figlio and Blonigen (2000), Leichenko and Ericson (1997), Bode and Nunnekamp (2010), Bode et al. (2009) and Mullen and Williams (2005). All of them refer to the experience of US State. As for Europe is concerned, the existing works concentrate on specific countries or groups of them, mainly located in Central and Eastern Europe (Girma and Wakelin, 2007; Driffield, 2006; Nicolini and Resmini, 2011).

area and use its assets and potential more effectively” (OECD, 2001, p.15).

The role of territorial capital is increasingly recognized in its importance for the effectiveness of regional policies and is inspiring the reform of European regional policies towards a more placed-based approach, that started after the publication of the well known Barca Report (Barca, 2009). In this perspective, Barca et al. (2012) sustain that “if convergence is to be promoted, this is to be done by development rather than by redistribution”. Theoretical arguments sustaining the importance of a cognitive approach vis-à-vis regional development are manifold: from the theory of limited rationality (Malmgren, 1961; Simon, 1972) to contract theory (Williamson, 2002) and the cognitive approach to district theory (Camagni, 1991; Storper, 1995).

The interesting point in this context is to study how an element of regional identity, purely local, such as territorial capital, can shape the impact of global forces, such as FDI, on local development. What this paper will argue is that the role of territorial capital in releasing untapped economic potential is fundamental because it can empower regions to take advantage of globalization benefits. Being FDI a major expression of globalization trends, I believe that their positive externalities in local economies are likely to depend on how deep they are rooted within the local economic context. Thus, the effectiveness of the regional economy in maximizing potential spillovers will ultimately depend on the local context and in its territorial capital. In particular I identify 3 main soft components particularly relevant for the local returns of foreign investments in terms of regional growth.

The first is what I call closed social capital, summarizing the negative attitude of local agents towards external and diversified contributions. The importance of informal components of regional openness on regional performance has already been recognized in the literature (see Gambardella et al., 2009), but here I focus especially on such soft components and argue that they can act as a catalyst for beneficial effects of foreign investments. Indeed, the cultural closeness of a region prevent multinationals from taking roots in the area where they establish, inhibiting local spillovers.

The second informal component of territorial capital that I deem relevant for the growth impact of FDI is what the literature calls generalized morality or “trustworthiness” of citizens (see Tabellini, 2010). Generalized morality is considered a characteristic of “modern democratic societies, where

abstract rules of good conduct apply to many social situations, and not just in a small network of personal friends and relatives.” If the level of generalized trust is high in a region, it means that low free-riding attitudes increase the efficiency of transaction and effectiveness of cooperation between multinational firms and the regional economic system, thus enhancing the FDI induced local growth.

Finally, the role of relational capital in shaping returns to foreign investments is more ambiguous. The literature on territorial capital and innovation (see Capello et al., 2011) define relational capital in the regional context as the network component of territorial capital, the “relational space where functional and hierarchical, economic and social interactions take place and are embedded in geographical space”. In this perspective, collective action and cooperation capabilities foster socio-economic interactions, magnifying the effects of knowledge creation on productivity and growth. While this mechanism is certainly acting when considering the regional economy as a whole, it might be a discriminating factor for foreign multinationals present in a territory. In fact, if the network effect of relational capital reinforce mutual understanding and social commitment within the boundaries of such network, it might increase the relational distance with entities that are not able to penetrate such boundaries. Relational capital will thus enhance or hinder foreign multinationals’ impact on local economic development, depending on their ability of to penetrate such networks.

An additional insight from the analysis is aimed at uncovering eventual differences in the intensity and importance of all those effect depending on the origin (intra vs. extra European FDI) and on the type of economic activity (manufacturing vs. service FDI).

The section that follows will discuss in more detail the estimation of the three components of territorial capital, describing their distribution in Europe and their link with FDI-growth relationship in regions of the EU.

### **4.3 Empirical Evidence on territorial capital, FDI and growth in Europe**

A widespread wave of globalization affected world economy since the beginning of the past decade, with FDI playing a major role as a way of internationalizing economic activity. Despite the slowdown

caused by the recent crisis, the importance of worldwide economic integration as a fuel for sustained growth has been recognized by all international organizations, with the European Commission stating the importance of reinforcing the single market and ease investment procedures as a major stimulus for growth (Europe 2020 Agenda). Indeed, multinational enterprises (MNEs) play a leading role in shaping and driving cross-border integration through the transfer of production facilities, functions and or technology across space (Baldwin and Martin, 1999; OECD, 2007).

A recent report on the progress of the EU towards the Europe 2020 Agenda shows that the EU is the largest provider and recipient of FDI in the world, with intra-EU investments increasing rapidly (Hamilton and Quinlan, 2011). These trends have been reinforced by the liberalization of new markets, especially in the services sectors, the reduction of capital movement restraints, and the creation of a friendly environment for Foreign Direct Investment (FDI), especially in the services sectors. Despite the cyclical character of FDI flows and their dependence from economic fundamentals, inward FDI stocks in the EU have increased exponentially since the 1980s, reaching their peak in 2007, with more than 7,000 billions of USD and a percentage of world stocks of about 45%.<sup>45</sup> In particular Intra-EU FDI, that represents around 62% of total FDI, have increased markedly, resulting in significant economic gains: 2.1% of EU GDP over the period 1992-2006 (500 Euros per head) and 2.75 million jobs.<sup>46</sup>

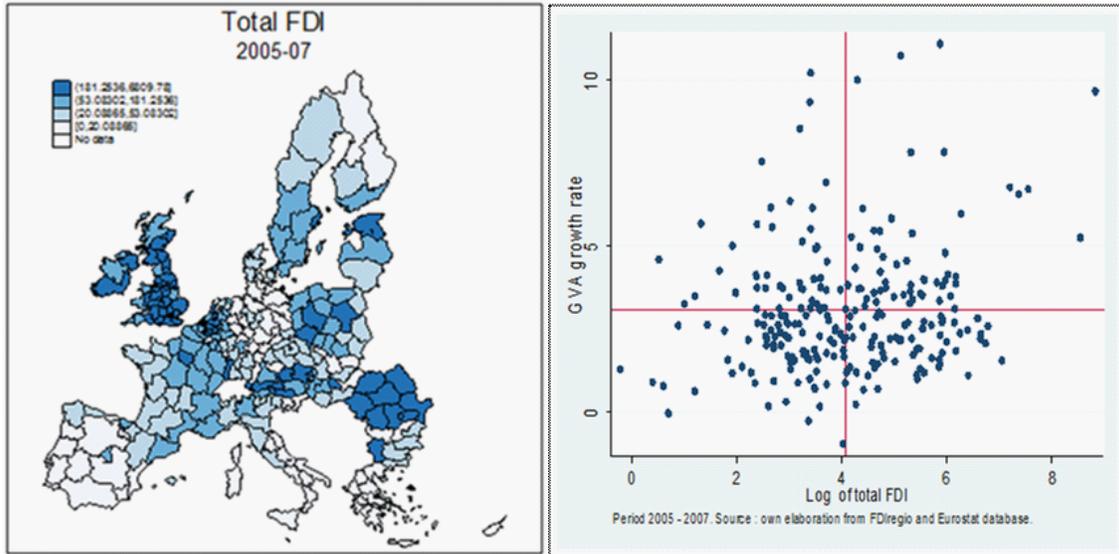
Despite that, as it is shown in Figure 1, the relationship between FDI and local growth rates seems much complex and regions with the largest concentration of foreign firms are not necessarily those with the highest gross value added growth rates.

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<sup>45</sup>See UNCTAD, World Investment Reports, various issues for an in-depth analysis of FDI flows and stocks at European and world levels.

<sup>46</sup>EUROPE 2020, Background Information for the Informal European Council, 11 February 2010.

Figure 1. The FDI-growth relationship in Europe



Indeed, the recent literature in regional science (see Camagni, 2008, for a comprehensive discussion) suggests that deterministic cause-effect relationships cannot explain the complexity and diversification of regional development patterns. As discussed in the previous section: “Each Region has a specific ‘territorial capital’ that is distinct and generates a higher return for specific kinds of investments than for others. Territorial development policies should first and foremost help areas to develop their territorial capital” (European Commission-DG Regio, 2005, quoted from Camagni, 2008).

Following Van Schaik (2002), Capello et al. (2011), and Caragliu and Nijkamp (2012), I measure social capital using results of the European Values Study.<sup>47</sup> I do not consider all possible elements of the territorial capital, but only those that I believe can crucially affect the ability of regions

<sup>47</sup>The European Values Study (EVS) is a large-scale, cross-sectional, and longitudinal survey research project on basic human values, initiated by the European Values Systems Study Group in the late seventies. The EVS questionnaire was developed to measure basic value orientations in important domains of life such as religion and morality, socio-economic life, politics, work, leisure time, family, marriage, and sexuality. We focus in particular on results of the 1999/2000 wave of the survey, which included all European countries, except for Norway and Switzerland, Albania and parts of former Yugoslavia.

to take advantage of FDI for local development. The spatial distribution of these factors is quite uneven, as it will be shown in what follows.

In more detail, I consider three different elements of the territorial capital: closed social capital, trustworthiness (or generalized morality) and relational capital. As already mentioned, in order to obtain a quantitative measure for each region's endowment of all types of social capital we exploit the EVS database.

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

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

Regional means to the four above mentioned questions are computed and then aggregated in a unique index using a Principal Components Analysis (PCA) . The first factor explains 47 per cent of the total variance and I call it Closed Social Capital. Results are presented in Figure 2 below.

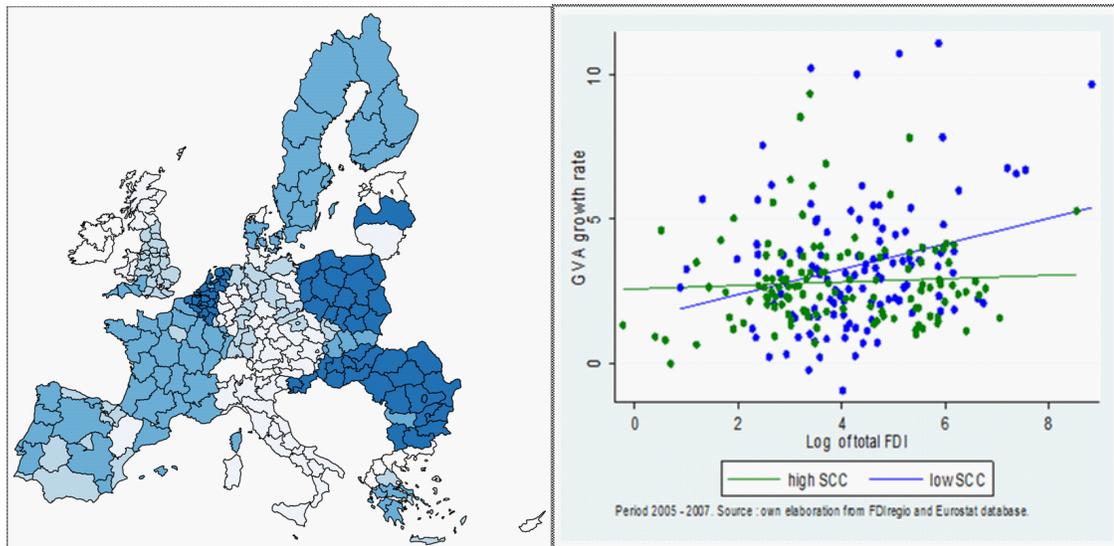
Closed Social Capital<sup>48</sup> seems to be particularly high in Austria, Italy, Czech Republic, Latvia some regions of UK, Germany and Spain, while it is quite low in Scandinavian countries, Benelux, France and some Eastern European regions. High Closed Social Capital can prevent the region to

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<sup>48</sup>Note in the map in Figure 2, lighter colours indicate higher closed social capital (or lack of openness) of the region.

take full advantage of possible spillovers from FDI because it can isolate foreign multinationals and avoid its integration in the local economy.

Figure 2. The Closed Social Capital



Indeed, the relation between foreign direct investments in regions with high endowments of closed social capital, as depicted in figure 2 above, seems weaker than in other regions. The second element of territorial capital that I deem important for the FDI-growth relationship is the concept of generalized morality. It is related to the concept of trustworthiness (see Platteau, 2000 and Tabellini, 2010) and characterize societies where rules of good conduct apply to all social situations, making citizens more reluctant to free-ride on others. I measure generalized morality aggregating answers to the following three questions of the EVS:

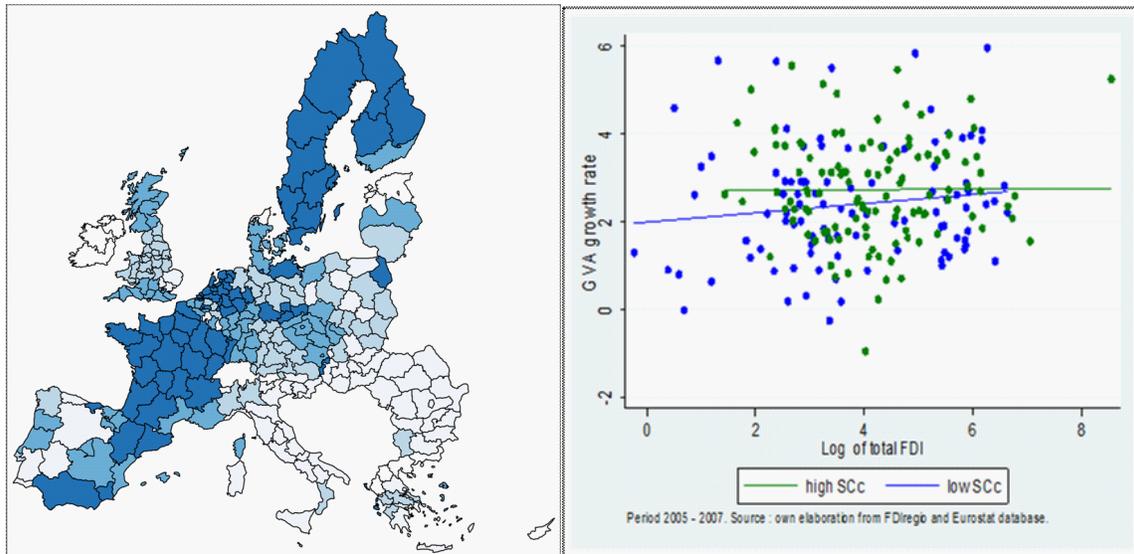
“According to you, how many of your compatriots do the following?”

- Claiming state benefits to which they are not entitled (1=almost all / 4=almost none)
- Cheating on tax if they have the chance (1=almost all / 4=almost none)
- Paying cash for services to avoid taxes (1=almost all / 4=almost none)”

Also in this case, regional means to the three above mentioned questions are computed and

then aggregated in a unique index using a Principal Components Analysis (PCA).<sup>49</sup> The first factor explains 47 per cent of total variance and thus represents a good summary indicator of trustworthiness. Results are mapped in Figure 3 below.

Figure 3. The Social Capital: generalized morality

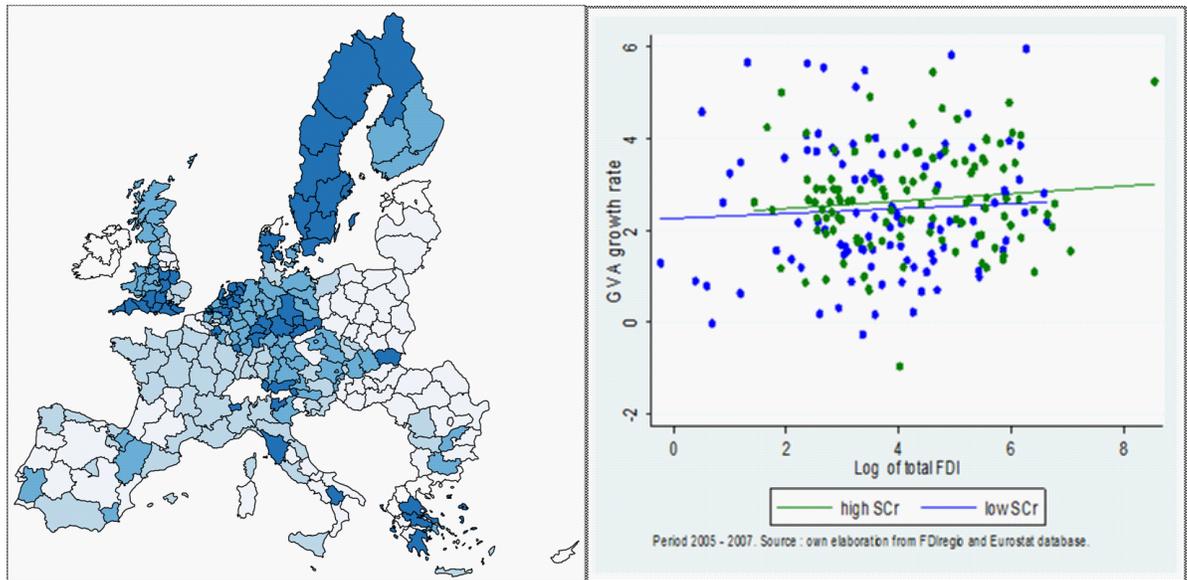


Generalized morality result higher in north eastern, central and south western European regions. More specifically, trustworthiness is higher in Scandinavian countries, Benelux, most British and French regions, some regions of Germany and souther Spain. It is lower in most regions of new European member states, some regions of Spain, Italy and Greece. High generalized morality can lower contractual costs, information costs and transaction costs associated mainly to weak enforcement of legal systems and lack of information about foreign markets and different social institutions. For the same reasons, high generalized morality can also decrease uncertainty and risk associated with MNEs operations abroad. In this case, the relation between foreign direct investments and growth in regions with high endowments of generalized morality, as depicted in figure 3 above, seems stronger than in other regions.

<sup>49</sup>Results of the PCA are presented in Appendix 2.

Finally, an important informal component of territorial capital is relational capital, i.e. the system of bilateral and multilateral relations built by local economic actors among each others. This capital represent the inverse of interpersonal distance between economic actors in the region and it is very important to reduce uncertainty in economic relationships and to facilitate the diffusion of information. Following Van Schaik (2002), Capello et al. (2011), and Caragliu and Nijkamp (2012), I measured relational capital as participation in civil society, broadly defined, i.e. clubs and voluntary associations (sport, cultural, communal), religious communities, as well as unpaid voluntary work and social activities with friends and colleagues. Applying the same procedure described above, in this case the first factor explains 49 per cent of the total variance of the underlying elements. Results are mapped in Figure 4 below.

Figure 4. The relational capital



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

Bulgaria, Spain, France and most some Italian and Greek regions. Also in this case, at first sight, the relation between foreign direct investments and growth in regions with high endowments of relational capital, as depicted in figure 4 above, seems slightly stronger than in other regions, with growth rate per se being higher too in the first group of regions on average.

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

## 4.4 Empirical strategy

### 4.4.1 The model

The theoretical framework that describes the link between territorial capital and FDI-growth relationship at regional level and substantiate empirical analysis is largely drawn from the contribution by Capello et al. (2011). However, while they define a neoclassical model to capture the increasing returns in human capital when studying regional production and regional growth, here I focus on increasing returns to foreign capital spillovers. This will entail a slight modification of the model, as I want to concentrate here on the possible spillover effect of foreign multinational firms, rather than on the direct contribution of FDI to input factor accumulation. For this reason I focus on the contribution that foreign investments can give to regional TFP or the so called “Solow” residual.

Consider first a simple Cobb-Douglas regional production function of the form:

$$VA_{r,t} = A_{r,t} K_{r,t}^{\alpha} L_{r,t}^{\beta}$$

Now let’s explicit the impact of FDI spillovers on the level of technology, i.e.  $A = e^a e^{\gamma_r FDI_{r,t}}$ :

$$VA_{r,t} = e^a e^{\gamma_r FDI_{r,t}} K_{r,t}^{\alpha} L_{r,t}^{\beta}$$

or, in log-linear form:

$$va_{r,t} = a + \gamma_r FDI_{r,t} + \alpha k_{r,t} + \beta l_{r,t}$$

Where lower-case letters indicate the logarithm of original variables. Note that in this form FDI spillovers enter as an additive term to regional production and not as a multiplicative term. This implies that regional value added is not necessarily driven to zero if no spillovers take place.

Following Capello et al. (2011), I modify this equation introducing the role of territorial capital. Territorial capital may act as a catalyst for FDI spillovers, enhancing or daunting their effect on the general level of TFP. In formal terms, I can assume that the coefficient of FDI,  $\gamma_r$ , depends on territorial capital endowments,  $tc_r$ , in the following way:

$$\gamma_r = \gamma_0 + \gamma_1 tc_r$$

so that the explicit form of equation (3) is

$$va_{r,t} = a + \gamma_0 FDI_{r,t} + \gamma_1 tc_r FDI_{r,t} + \alpha k_{r,t} + \beta l_{r,t}$$

If I take the first difference of this equation I define the relation between FDI spillovers and regional growth:

$$\Delta va_{r,t} = \gamma_0 \Delta FDI_{r,t} + \gamma_1 tc_r \Delta FDI_{r,t} + \alpha \Delta k_{r,t} + \beta \Delta l_{r,t}$$

Starting from this equation, I control directly for the effect of territorial capital on growth, along with country dummies ( $c_{id}$ ) and sector controls ( $ss_{id}$ ):

$$\Delta va_{r,t} = \gamma_0 \Delta FDI_{r,t} + \gamma_1 tc_r \Delta FDI_{r,t} + \alpha \Delta k_{r,t} + \beta \Delta l_{r,t} + \delta_1 tc_r + \delta_2 c_{id} + \delta_3 ss_{id}$$

This equation is the base of the empirical analysis that follows.

#### 4.4.2 Data and methodological issues

The empirical analysis presented in this section is based on different sources of data. First of all, data on indexes of territorial capital derive from the exercise described in section 3 and are based on EVS database, as already mentioned.<sup>50</sup> The three indexes previously identified are transformed in dichotomous variables that assume value 1 if the region has an index above the European median value and 0 if the region has an index below European mean. These dummy variables are three components of the  $tc_r$  variable defined in equation (6).

As a proxy for FDI spillovers I use the number of new foreign firms<sup>51</sup> established in each EU27 region (NUTSII level) during the period 2005-07.<sup>52</sup> I use different measures for FDI, from total number of FDI to more disaggregated variables, which distinguish between sectors of economic activity (manufacturing vs. services) and origin of the foreign investors inside or outside Europe. Data on foreign firms in European regions derive from the database FDIregio, see Appendix 1 for a more detailed description of the database construction and discussion of the representativeness of the sample.

Data on gross value added real growth, physical capital and labor accumulation derive from Eurostat regional database. In particular, as a dependent variable I use real growth rate of regional gross value added (GVA) at basic prices at NUTS level 2, cumulated over the period 2005-2007. As a proxy for physical capital stock ratio I use the capital investment ratio: note that, applying the perpetual inventory method, this implies that the sum of depreciation rate of capital and growth rate of capital investment is constant over time.<sup>53</sup> Capital investment data at nuts2 level are provided by Eurostat as gross fixed capital formation. Finally, I use the total regional labor force as provided by Eurostat to estimate labor endowments of the region.

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<sup>50</sup>Note that the 1999/2000 release has been used, as the EVS database is updated every 10 years and we wanted to create a predetermined variable for our analysis. Moreover we believe that territorial capital components are stable in the short and medium run.

<sup>51</sup>In thousands.

<sup>52</sup>New foreign firms are classified on the basis of their incorporation date, i.e. the date of registration of the company name in the respective Business Register at the Chamber of Commerce. They represent mainly greenfield investments, but this proceeding might include in the aggregate figure also some M&A if the operation caused a change in the name of the company. However, this component is a neglectable part of the phenomena, see appendix A1 for a detail discussion of the issue.

<sup>53</sup>See appendix 3 for a detailed discussion on the assumptions behind this proceeding.

When analyzing the relationship between foreign investments and economic growth some methodological issues have to be taken into consideration. First of all, an issue of endogeneity may occur: do foreign investors identify more dynamic regions as best destinations of their capital flows because they anticipate higher future profits, or does regional growth depend directly on the contribution of foreign investors? The literature that studied this relationship at country level does not provide a definitive answer.<sup>54</sup> This source of endogeneity, though, could be absent in a regional perspective, given that foreign investors locating in any of the European regions are more likely to be interested in the whole EU market rather than in the local one, which is surely too small for their profit objectives (see Mariotti and Piscitello, 1995). In any case, it is important to test be sure that a simple OLS regressions explaining regional growth in terms of FDI does not lead to inconsistent results due to reverse causality bias: I will target this issue during the analysis. Moreover, another possible source of endogeneity could lie in the persistency of FDI flows over time and their contribution to GDP. To address this issue I will augment the baseline specification including initial GDP level in a “convergence-like” framework.

Apart from this endogeneity-related aspect, another important concern is the possible heteroskedasticity and spatial autocorrelation that regional data often display. I will address this issue by controlling for the specific structure of the variance and covariance matrix of the error terms.<sup>55</sup>

As a general remark, note that data refer to all regions of EU-27 member states for which data are available. The only exceptions are EU outermost regions and overseas territories and Romanian regions.<sup>56</sup>

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<sup>54</sup>The existence of a reciprocal relationship between FDI and growth is confirmed by Choe (2003) and Chowdhury and Mavrotas (2006), while Feridun and Sissoko (2006) find that, according to Singapore’s experience, it is growth to determine FDI. An opposite result has been found by Zhang (2001) and partially by Chowdhury and Mavrotas (2006).

<sup>55</sup>Note also that I repeated the analysis applying different spatial model (Spatial Lag model, Spatial Error model and Spatial Durbin model) and the results are robust to such specifications. In addition note that in such analysis the spatial lags introduced are not significantly different from zero.

<sup>56</sup>For a more specific discussion on this point see Appendix A1.

## 4.5 Results

Table 2 below presents different estimates of equation (7) defined in section 4.1, starting from a simplified version of the model where only input accumulation is taken into account (Model 1 and 2). Note that model 1 and model 2 are equivalent except from the fact that in model 1 no correction for the structure of errors is made. Testing heteroskedasticity in model 1, however, leads to reject the null of constant variance (see Table 1), thus requiring to introduce a correction for heteroskedasticity - robust statistics in subsequent estimates.

Table 1. Test for heteroskedasticity

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity	
Ho: Constant variance	
Chi2(1)	= 11.78
Prob > chi2	= 0.0006

Moreover, starting from residuals of model 1, I also tested whether the presence of spatial autocorrelation may endanger results. Results are presented in Figure 5 below, where residuals of the regression are plot against their first order spatial lag.<sup>57</sup> No further evidence of residual autocorrelation arise.

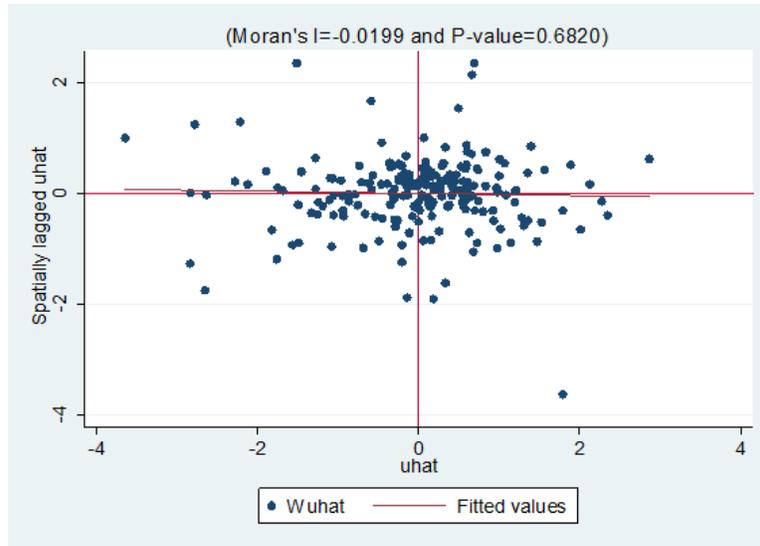
Starting from model 2 and in all subsequent estimates, statistics presented are robust to heteroskedasticity.<sup>58</sup> In addition, note that country fixed effects and dummies controlling for the sector specialization<sup>59</sup> of the region are included in each regression.

<sup>57</sup>Note that the results presented in figure 5 are based on a spatial lag constructed using a contiguity matrix, but similar results apply when using an inverse distance matrix. Moreover, note that all regressions are robust to estimation with Spatial Lag, Spatial Error and Spatial Durbin Models.

<sup>58</sup>Notwithstanding results of the Moran's I, estimates have been repeated also considering possible clusters at country level and results do not change significantly.

<sup>59</sup>As far as sector specialization is concerned, 2 dummy variables are included in the analysis. Both are based on location quotients referring to employment and consider as benchmark the EU. One dummy refers to the manufacturing activity and takes value 1 if the LQ of the region is higher than 1. The other refers to services and takes value 1 if the LQ of the region is higher than 1.

Figure 5.Spatial autocorrelation



In model 3 the FDI variable has been added. Results confirm that, aside from the effect of accumulation of input factors, spillovers from foreign firms play an important role in European regions. Model 4 is augmented to include also the level of GDP at the beginning of the period. This term is introduced in order to control for the possible endogeneity derived from the persistence characterizing the FDI variable. Indeed, if FDI flows are driven by agglomeration economies and, at the same time, they contribute to the GDP of the region in every period, it is possible that this self-reinforcing process cause endogeneity. As expected, in fact, the coefficient of FDI in model 4 is slightly lower than the one in model 3, but still significantly different from zero. Note also that the coefficient of GDP variable is positive and significant, confirming a pattern of divergence at regional level in Europe, that has been widely discussed both at the academic and at the institutional level. As argued in the previous section, an additional source of endogeneity could originate from possible reverse causality or to omitted variable bias. For this reason, model 5 is estimated using an instrumental variable approach. In particular, I used three different instruments in this regression:

the number of newly established firms in European regions in the period 1997-1999, i.e. 8 year before 2005-2007, the second order spatial lag of FDI inflows in 2005-2007 and the third order spatial lag of FDI inflows in 2005-2007. The idea is that, precisely because of their persistency, FDI inflows are correlated over time, but at the same time, regional characteristics 8 years before are predetermined not relevant for explaining growth in the period of interest. Moreover, spatial lags of FDI are correlated with the FDI inflows that a region attract, because of a mechanism of complementarity among locations. Consider for example a multinational that sets its headquarters in the Netherlands and drives its suppliers' investments in Poland or a foreign enterprise that penetrate the EU market both as market seeking FDI and efficiency seeking may delocalize different production steps in different locations. At the same time, though, growth of a region is mainly determined by the firms present in the region itself. The possible effect of spillovers from neighboring regions is indeed ruled out by taking the second order of the spatial lag of FDI, i.e. the weighted sum of FDI inflows in the regions that share a common border with neighboring regions of the region of interest, thus excluding immediate neighbors. The same reasoning applies to the third order spatial lag.

Table 2. Model definition

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	b/t						
employment	11.899*** (4.08)	11.899*** (3.27)	10.994*** (3.08)	11.124*** (3.14)	11.120*** (3.38)	10.892*** (3.41)	10.822*** (3.26)
capital	1.664*** (3.48)	1.665*** (2.69)	1.609*** (2.73)	1.596*** (2.68)	1.595*** (2.86)	1.534*** (3.07)	1.401*** (2.64)
FDI			0.131*** (5.75)	0.079** (2.26)	0.080* (1.75)	0.105** (2.26)	-0.352 (-0.58)
Initial GDP				0.546* (1.73)	0.545* (1.74)	0.579* (1.89)	0.719* (1.93)
SC relational						0.019 (0.14)	0.032 (0.24)
SC closed						-0.461** (-2.22)	-0.415* (-1.84)
SC generalized morality						-0.162 (-1.33)	-0.356*** (-2.95)
FDI*SC rel.							-0.255* (-1.72)
FDI*SC c.							-0.287 (-0.57)
FDI*SC g.m.							0.947** (2.55)
Sector Specialization	YES						
Country FE	YES						
Constant	3.413*** (10.74)	3.413*** (12.45)	3.426*** (12.49)	-2.085 (-0.67)			
N	210	210	210	210	210	210	210
r2	0.657	0.657	0.668	0.674	0.175	0.195	0.214

\*\*\*, \*\*, \* indicate significance at 1, 5 and 10 percent level, respectively. T-statistics are reported in parenthesis.

Note that in order to conduct instrumental variable estimation I use the “ivreg2” STATA routine and I partial out<sup>60</sup> country fixed effect and regional specialization variables .

Summary results for the first stage regression<sup>61</sup> are reported in table 3 below. The diagnostic

<sup>60</sup>The Frisch-Waugh-Lovell theorem (Frisch and Waugh, 1933, Lovell, 1963) demonstrates that regressing Y a set of exogenous regressors X1 and on other regressors X2 is equivalent to projecting Y and X2 on the orthogonal complement of the space spanned by the columns of X1 and then regressing such projections of Y on those of X2.

<sup>61</sup>Note that this represent the first stage of equation (3) as subsequent models’ interactions are instrumented using

confirms that the instruments respect the exogeneity and relevance assumptions. Moreover note that the endogeneity test implemented by `ivreg2`<sup>62</sup> do not reject the null hypothesis of regressors' exogeneity, indicating that the FDI variable could be treated as exogenous. As discussed in section 3, this confirms the idea that foreign investors locating in European regions are not interested in the local market directly because it is too small for their industrial objectives.

Table 3. First stage diagnostic

First stage (robust)			
Employment	3.63	1.24	***
Capital	0.43	0.25	*
Initial GDP	0.11	0.18	
FDI(1997-99)	2.71	0.75	***
SpatLag2_FDI	2.20	0.79	***
SpatLag3_FDI	-1.24	0.66	*
F test of excluded instruments: F( 3, 182) = 12.66      Prob > F = 0.0000			
Angrist-Pischke multivariate F test (Weak identification): F( 3, 182) = 12.66      Prob > F = 0.0000			
Angrist-Pischke Chi-sq test (Underidentification) Chi-sq( 3) = 43.82      Prob > F = 0.0000			
Kleibergen-Paap rk LM statistic):      7.406			
Chi-sq(3) P-val = 0.0600			
Cragg-Donald Wald F statistic:      226.932***			
Kleibergen-Paap rk Wald F statistic:      12.660**			
Hansen J statistic (overidentification test of all instruments):      3.855			
Chi-sq(2) P-val = 0.1455			
Endogeneity test of endogenous regressors:      0.972			
Chi-sq(1) P-val = 0.3242			

Given that instrumental variable estimation at worst implies a loss of efficiency in estimates with respect to OLS, but it guarantees the consistency of results, notwithstanding the result of the interaction between territorial capital components and the instruments listed for the FDI variable.

<sup>62</sup>The endogeneity test reported is a difference of two Sargan-Hansen statistics, see the `ivreg2` help and Baum et al. (2007) for further details. Note that the endogeneity test statistic reported is robust to various violations of conditional homoskedasticity assumption.

endogeneity test all subsequent models are estimated using instrumental variables.

Model 4 is equivalent to model 3, augmented with the three components of territorial capital, i.e. relational capital, closed social capital and generalized morality. Results indicate that closed social capital has a direct and negative effect on regional growth. Introducing also interactions between social capital variables and FDI inflows, results presented in model 5 indicate that relational capital hinders the growth enhancing effect of foreign direct investments, while generalized morality magnify such effect. Note that in this last model, instruments for interactions are the respective interactions between each component of territorial capital and initial instruments.

Overall, thus, results from table 2 confirm that FDI can enhance economic growth at regional level. These first aggregated results indicate, however, that the effect of FDI spillovers varies depending on the specific endowments of territorial capital of the region. Indeed, when interacting territorial capital components with FDI, it emerges that the impact of foreign investments on growth can be negative if a region is characterized by high relational capital, indicating that multinationals are not able to penetrate local networks, increasing relational distance and inhibiting local spillovers. Results are reversed if the level of generalized trust is widespread in the region, supporting the idea that low free-riding attitudes increase efficiency of transaction and effectiveness of cooperation between multinational and the regional economic system. Relational capital is not relevant in these first estimates.

At this point it is interesting to inspect more in detail which types of FDI are more relevant for local economic development and how social capital impact varies depending on the type of foreign investment considered. To this aim, first I study separately European investors (model 8) from extra-European ones (model 9). The former represent an expression of European integration processes while only the latter can be considered a pure effect of globalization. Secondly I separate FDI inflows also on the basis of economic activity: manufacturing (model 10) versus services (model 11). Results are presented in table 4 below.

Results suggest that the effect of relational capital acts in opposite ways for European FDI, for whom it could be easier to penetrate the network, and Extra-European ones. The latter indeed, coming from a more distant business environment, could be excluded from the network and this

would explain the negative returns of extra European FDI on growth in regions where relational capital is higher. Finally, the beneficial effect of generalized morality as a catalyst for FDI induced local development is confirmed in all specifications. The importance of generalized morality in magnifying the growth-enhancing effect of FDI is linked to different effects. First of all consider that if the level of generalized trust is high in a region, it means that low free-riding attitudes increase the efficiency of transaction and effectiveness of cooperation between multinational firms and the regional economic system, thus enhancing the FDI-induced local growth. Moreover, economic literature (see, for instance, Aghion et al., 2010) highlighted the fact that if generalized morality is high the level of regulation is likely to be low, decreasing the associated costs and thus increasing the potential degree of cooperation among economic agents and in particular MNEs and local firms. Finally, a recent analysis by Burkner and Minerva (2012) shows that civic capital influence the size distribution of plants: thus larger local firms might have higher absorptive capacity to benefit from MNEs spillovers.

Table 4. Different types of FDI: broad disaggregation by origin or economic activity

	(8)	(9)	(10)	(11)
	b/t	b/t	b/t	b/t
Employment	10.707*** (3.24)	11.166*** (3.37)	10.405*** (3.17)	11.007*** (3.29)
Capital	1.431*** (2.74)	1.316** (2.36)	1.411*** (2.67)	1.402*** (2.63)
FDI	-0.273 (-0.39)	-3.018 (-1.11)	-0.88 (-0.39)	-0.525 (-0.65)
Initial GDP	0.690* (1.83)	0.780** (2.24)	0.718* (1.95)	0.724* (1.93)
SC relational	0.028 (0.21)	0.038 (0.28)	0.119 (0.89)	0.017 (0.12)
SC closed	-0.413* (-1.82)	-0.463** (-2.07)	-0.440* (-1.93)	-0.413* (-1.84)
SC generalized morality	-0.348*** (-2.9)	-0.341*** (-2.86)	-0.421*** (-3.34)	-0.338*** (-2.85)
FDI*SC rel.	-0.299 (-1.42)	-1.091* (-1.82)	-2.152* (-1.7)	-0.275* (-1.69)
FDI*SC c.	-0.533 (-0.84)	0.441 (0.25)	-0.721 (-0.34)	-0.369 (-0.57)
FDI*SC g.m.	1.226*** (2.60)	3.736** (2.35)	4.345*** (2.93)	1.226** (2.52)
Sector Specialization	YES	YES	YES	YES
Country FE	YES	YES	YES	YES
N	210	210	210	210
r2	0.216	0.207	0.197	0.215

\*\*\*, \*\*, \* indicate significance at 1, 5 and 10 percent level, respectively. T-statistics are reported in parenthesis.

Table 4. Different types of FDI: broad disaggregation by origin or economic activity

	(12)	(13)	(14)	(15)
	b/t	b/t	b/t	b/t
employment	10.470*** (3.17)	10.719*** (3.28)	11.656*** (3.51)	11.377*** (3.42)
capital	1.447*** (2.77)	1.314** (2.40)	1.404*** (2.65)	1.323** (2.38)
FDI	-0.786 (-0.33)	-8.99 (-0.77)	-1.154 (-1.1)	-4.314 (-1.09)
Initial GDP	0.721* (1.95)	0.742** (2.25)	0.847** (2.06)	0.792** (2.12)
SC relational	0.091 (0.65)	0.157 (1.20)	0.015 (0.11)	0.028 (0.21)
SC closed	-0.430* (-1.89)	-0.533** (-2.37)	-0.461** (-1.97)	-0.488** (-2.14)
SC generalized morality	-0.407*** (-3.18)	-0.377*** (-3.21)	-0.340*** (-2.82)	-0.316*** (-2.66)
FDI*SC rel.	-2.049 (-1.1)	-11.162** (-2.19)	-0.262 (-1.23)	-1.137 (-1.58)
FDI*SC c.	-1.493 (-0.6)	4.772 (0.60)	-0.13 (-0.15)	0.985 (0.43)
FDI*SC g.m.	5.458*** (2.80)	16.422*** (3.01)	1.650*** (2.67)	4.552* (1.89)
Sector Specialization	YES	YES	YES	YES
Country FE	YES	YES	YES	YES
N	210	210	210	210
r2	0.216	0.207	0.197	0.215

\*\*\*, \*\*, \* indicate significance at 1, 5 and 10 percent level, respectively. T-statistics are reported in parenthesis.

A more disaggregated analysis is reported in table 5, that shows results for intra-EU FDI in manufacturing (model 12), extra-EU FDI in manufacturing (model 13), intra-EU FDI in services (model 14) and extra-EU FDI in services (model 15). The negative returns of FDI on growth in regions with high relational capital is confirmed only for Extra-EU FDI in manufacturing activities. Moreover, the potential of the trustworthiness component of territorial capital to enhance the

regional ability to fully exploit FDI spillovers is confirmed in all specifications.

## 4.6 Conclusions

The aim of this paper is to evaluate the growth effect of FDI at the regional level, introducing the idea that development patterns can be very heterogeneous depending on the variety of European regional identities. The latter are measured along 3 main axis, identifying three soft components of territorial capital: relational capital endowments, generalized morality or trustworthiness of citizens and cultural closeness of a region. Results confirm that, generally speaking, FDI can enhance economic growth at the regional level, but they also suggest that this relationship is far from being a deterministic cause-effect link. Indeed, the impact of FDI is constrained by regions' socio-economic characteristics, representing their territorial capital, and by the investment characteristics that I considered as intra- and extra-EU FDI as well as manufacturing and services FDI. In particular my findings show that local returns of FDI are boosted by high level of trustworthiness. Moreover, I found that relational capital has ambiguous effects on FDI-growth relationship, hindering the potential beneficial effects of extra-EU firms operating in manufacturing activities on local economies. Indeed, only regions with high endowments of generalized morality/ trustworthiness benefit from FDI inflows and yield a growth premium. This may depend on several factors: high level of generalized trust implies higher efficiency in economic transactions and effectiveness of cooperation between multinational and local firms, but it implies also low level of regulation (Aghion et al., 2010) thus lower costs of cooperation among MNEs and local firms. Finally, high civic capital may imply larger local firms (Burker and Minerva, 2012), which might have higher absorptive capacity vis-a-vis MNEs spillovers. Considering relational capital, instead, the effect is more ambiguous: the network effect can be inclusive and "exclusive" at the same time for different actors.

Such results have important policy implications: first of all the analysis highlights that FDI can be an important source of growth for local economies and thus such aspect of globalization is very important also for local policy makers. Moreover foreign investment's impact is affected by local conditions and in particular by the cultural dimension of local business environment: this result

makes clear that investments on building a solid social capital in a region are very important also for their economic returns.

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## 4.7 Appendix

### 4.7.1 A1: Representativeness of the sample

This paper exploits a new database, FDIregio, which has been built up starting from Amadeus database. It consists of company accounts reported to national statistical offices concerning 11 million public and private companies in 41 European countries. For each company Amadeus provides the year of incorporation, the country/region and the ownership structure by nationality. The data also include the region where the firms were founded, as well as the sector of activity. Firms newly created during the 2005-07 period whose percentage of assets owned by non-residents was at least 10% have been considered as foreign. Then they were aggregated in each European NUTS2 region by sector and by origin within or outside Europe. The overall sample includes 264 NUTS2 regions and 25 NACE1 manufacturing and service sectors. A limitation of these data for studying the geographical patterns of foreign firms is that they include firm level information. This can potentially bias the location of FDI in favour of regions and/or countries where headquarters tend to locate. In order to have an idea of the magnitude of such bias I compared FDIregio dataset with the well known fDiMarkets database compiled by Financial Times Business, tracking crossborder greenfield investment projects. The Pearson correlation coefficient between FDIregio data on the total number of newly created foreign firms in European NUTS2 regions and fDiMarkets data on greenfield investment projects is 0.805 significant at 0.01 level (if I exclude Romania<sup>63</sup>).

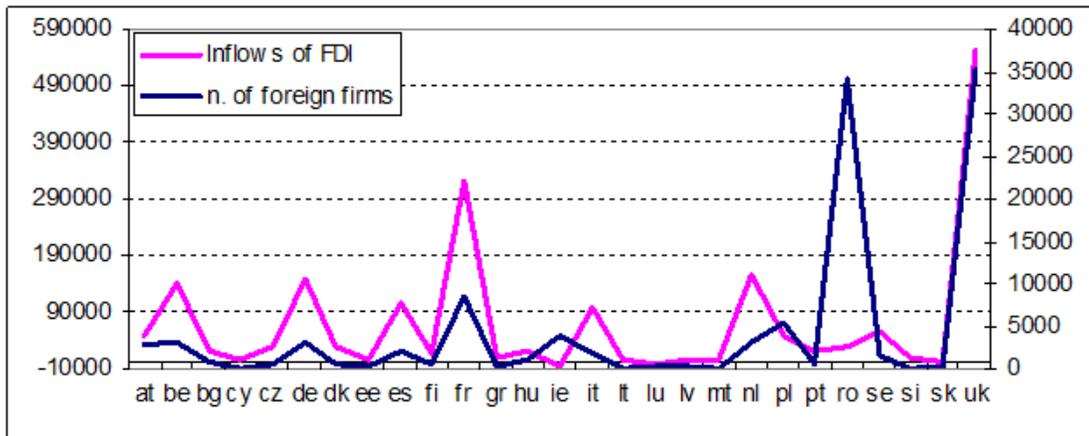
An advantage of this approach is instead represented by the fact that the regional distribution of foreign firms is directly observed and not indirectly derived from a “regionalization” of national data. Top-down approaches, in fact, are based on the simplifying assumption that the sensitivity of foreign firms to employment data –or whatever it is used to regionalize patterns of FDI– is constant across foreign firms, regardless the internationalization strategy they pursue (efficiency, market and resource seeking FDI), the country of origin and the role foreign affiliates can play within the group (productive vs. research units).

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<sup>63</sup>Pearson coefficient drops to 0.619, though still significant at 0.01 level, if we include Romanian data. This is likely due to a different classification of firms’ balance sheets in this country. Indeed, in Romania balancesheets are collected at the plant level rather than at the firm level. This problem with Romanian data is confirmed by the comparison with official UNCTAD data in table A1. Because of this reason we exclude Romania from our analysis.

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

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



Pearson correlation coefficient: 0.626; p-value>0.000

4.7.2 A2: Principal Components Analysis (PCA)

Closed Social Capital	
Variable	Factor loadings
confidence (companies)	0.4137
immigrants	0.592
national identity	-0.4212
trust (people)	0.5486
Eigenvalue	1.8706
Proportion	0.4677

Generalized morality	
Variable	Factor loadings
claim state benefits	0.4376
cheat on tax	0.4506
pay cash	0.469
Eigenvalue	2.80986
Proportion	0.4683

Relational capital	
Variable	Factor loadings
voluntary associations	0.4942
voluntary work	0.611
social activities	0.6184
Eigenvalue	0.4907
Proportion	1.4722

### 4.7.3 A3. Perpetual inventory method in the context of this analysis

The perpetual inventory method defines the mechanism of capital formation as the following formula:

$$K_t = (1 - \delta_K)K_{t-1} \left( \frac{P_t}{P_{t-1}} \right) + I_t$$

Where  $P$  is the industry-level capital goods deflator,  $K$  represent capital stock and  $I$  investment, while  $\delta_K$  is the depreciation rate of capital.

Assuming  $\delta_K$  is constant over time, and that capital investments  $I$  grow at a constant rate  $g$  so that

$$I_t = (1 + g)I_{t-1}$$

it is possible to derive recursively a direct relation between capital stock and investment in the following way :

$$K_t = I_t \sum_{i=0}^{+\infty} \left( \frac{P_t}{P_{t-1}} \right)^i \left( \frac{1 - \delta_K}{1 + g} \right)$$

So the physical capital stock ratio can be defined as

$$\frac{K_t}{K_{t-1}} = \frac{I_t \sum_{i=0}^{+\infty} \left( \frac{P_t}{P_{t-1}} \right)^i \left( \frac{1 - \delta_K}{1 + g} \right)}{I_{t-1} \sum_{i=0}^{+\infty} \left( \frac{P_{t-1}}{P_{t-2}} \right)^i \left( \frac{1 - \delta_K}{1 + g} \right)}$$

or<sup>64</sup>

$$\frac{K_t}{K_{t-1}} = \frac{I_t}{I_{t-1}}$$

Thus the physical capital stock ratio can be approximated by the ratio of capital investment if

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<sup>64</sup> Assuming that inflation is stable, i.e. the ratio of the price level over two periods is constant over time. In the context of the EU in the years we consider (2005-2007) this assumption holds.

I assume sufficiently constant depreciation rate and growth rate of investments and stable inflation rate.

