



Sustainable Development in a Diverse World (SUS.DIV)

POSITION PAPER OF RESEARCH TASK 3.1

“Diversity and the creative capacity of cities and regions”

Diversity and the creative capacity of cities and regions

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Introduction

The aim of the Research Task 3.1 is to analyse whether, why, and how diversity can lead to higher innovation and, more broadly, knowledge creation.

Diversity is a multi-faceted issue and the achievement of a thorough understanding of its role and effects would require contributions from various social sciences. In this research project we will be mainly concerned with the study of diversity from the economic point of view. Specifically, we will restrict ourselves to the study of the direct economic consequences of diversity, leaving aside those by-products, often identified as indirect effects, associated with civil wars, revolution, crime etc. Moreover, we are interested in observing the dynamics of diversity within dense environment, such as cities and regions. To this purpose, we will propose an empirical analysis with a special focus on Europe.

The analysis of diversity involves various distinguishing features and requires a flexible approach. Identification and measurement of diverse environments is a challenging area towards which scholars are conveying substantial efforts (Easterly and Levine, 1997; Bossert, D'Ambrosio and La Ferrara, 2006; Desmet, Ortuño-Ortín and Weber, 2005). Although economists have not yet reached a consensus over measurement issues, the importance of diversity for economic performance has been widely acknowledged. Moreover, in the last years, the question has gained increasing relevance, becoming more than a pure theoretical interest for academics. In fact, the debate on diversity has been intense among policy-makers also. The **Universal Declaration on Cultural Diversity (UNESCO, 2001)** has legitimated the importance of the issue for the whole society, stating that “[...] cultural diversity is as necessary for humankind as biodiversity is for nature (Art. 1)” and that it is “one of the roots of development understood not simply in terms of economic growth, but also as a means to achieve a more satisfactory intellectual, emotional, moral and spiritual existence (Art. 3)”.

This paper will proceed in the following way. Section 1 will introduce the debate on the definition of diversity and the existing methodologies for its measurement. Section 2 will review the literature on diversity. Specifically, the existing theoretical models and

the empirical evidence on the relation between diversity and economic performance will be presented. In Section 3 we will debate some policy issues especially relevant for the EU. Finally, in Section 4 we will briefly describe the dataset at our disposal and the empirical approach we intend to use.

SECTION 1: Defining and Measuring Diversity

Recently the economic debate on diversity has been intense. Academics' efforts have been addressed to construct indexes to measure diversity according to the specific dimension they aim at capturing.

The concept of diversity can be studied along various dimensions as diversity in itself is not a self-explaining notion. On one side, according to the area of research, diversity describes different phenomena. On the other side, the number of available diversity measures is very large. The reason is that the various indices have been developed in parallel by different scholars in different disciplines and with different purposes and their comparison is a daunting task.

For this reason neither a broad definition nor a unique index can be provided.

In biology the concept has been widely investigated and a rich body of literature has been produced. Interestingly, these contributions turn out to be very helpful to study the topic in a socio-economic perspective also. We briefly review here some relevant topics in this field.

The U.S. Congress Office of Technology Assessment, "Technologies to Maintain Biological Diversity," in 1987 has given the following definition:

"Biological diversity is **the variety and variability among living organisms and the ecological complexes in which they occur**. Diversity can be defined as the number of different items and their relative frequency. For biological diversity, these items are organised at many levels, ranging from complete ecosystems to the chemical structures that are the molecular basis of heredity. Thus, the term encompasses different ecosystems, species, genes, and their relative abundance."

This explanation is relevant because it gives an idea of the theoretical framework to study biological diversity. In this respect, to characterize the degree of diversity within a population from a biological perspective the following dimensions are used:

- the *richness*: the number of types represented. It simply requires counting the species found in a community. This means that a population is considered more diverse the higher number of types it includes.
- the *evenness* of the population: the departure from a uniform types abundance distribution (Magurran, 2004). This means that a population with the same number of types, but with a more even distribution of types is considered more diverse;
- the *distance* between types: it means integrating the evaluation with some metric of differences between types.

Several measures have been proposed, taking into account one or a mix of these dimensions¹.

When economics deals with discrete qualitative variables (such as firms, industries, religions) it is easy to find the above cited dimensions helpful in catching broadly the phenomenon. In other words, in this case, it is easy to find parallels and similarities between biodiversity and economic diversity indexes.

On the other side, when economics has to deal with quantitative continuous variables (such as income, wages, consumption) more sophisticated measures have to be conceptualised, taking into account something new: the possibility of measuring and ranking alternatives.

This feature has been extremely important in the field of income inequality research, where diversity has been for long times investigated. In this area, scholars have conceived some relevant measures mainly aimed at capturing:

- the *concentration* of the population: a population is more concentrated the more it moves away from a uniform types abundance distribution.

¹ For a more detailed description and examples see: Ottaviano G. I.P., Pinelli D. (2005) and Ottaviano G. I.P., Pinelli D., Maignan C.J. and Rullani F. (2003).

- the *entropy* of the population: measuring inequality taking the notion of entropy from information theory. The higher is the entropy, the less diverse is the population;
- the *polarisation* of the population. From the application of the definition of polarisation² to racial, ethnic, religious clusters, capturing intra-group homogeneity and inter-group heterogeneity.³

The debate has recently taken a wider viewpoint. Indeed, the analysis has moved from an income inequality perspective only to a different one, where diversity is a broad concept that entails not only purely economic features but also cultural ones (such as ethnicity, language, religion etc...). In this context the benefits of completeness have to be traded off with the costs of measurement. Indeed, one of the main problems to deal with is the extent of cultural identity and subsequently the perception of what is culturally diverse.

To tackle with this problem, some empirical studies have measured diversity considering the ethno-linguistic fractionalisation among groups. The resulting Fractionalisation Index measures the probability that two randomly chosen individuals belong to different ethno-linguistic groups.

Each ethno-linguistic group is recognized by the language spoken alone or by additional ethnic features such as skin colour (Easterly and Levine (1997), Collier (2001), Alesina et al. (2003), Fearon (2003)). On the other side, some authors have computed diversity indexes based on language alone (Ottaviano and Peri (2005)) or ancestry (Alesina et al. (2004)). In other studies, authors have simply used the share of foreign born in the total population to proxy for diversity (Ottaviano and Peri (2005), Borjas (1998)).

The choice is not trivial, it is constrained by the data at disposal and has implications on the results.

Indeed, one of the main problems to cope with is data availability. For cross-country empirical analysis, Easterly and Levine (1997) and Collier (2001) used the Atlas

² “Suppose that a population of individuals may be grouped according to some vector of characteristics into ‘clusters’, such that each cluster is very similar in terms of the attributes of its members, but different clusters have members with very dissimilar attributes. In that case we say that the society is polarised”, Esteban and Ray (1994).

³ For a more detailed description and examples see: Ottaviano G. I.P., Pinelli D. (2005) and Ottaviano G. I.P., Pinelli D., Maignan C.J. and Rullani F. (2003).

Noradov Mira ethno-linguistic fractionalisation index computed at country level by Taylor and Hudson (1972); Alesina et al. (2003) used data on language spoken and religion taken from the Enciclopedia Britannica (2001). In these cases the grouping method matters and it is difficult to find a general rule to apply, given each countries' peculiarities. The same can be said about sources on ethnic identity, mostly coming from Population Censuses. Furthermore the list provided is a constraint and also the self identification can bring some bias on the results.

A large part of the literature on cultural diversity has been dedicated to the country level analysis. Instead, more recently some authors have concentrated their efforts on a micro analysis at cities or counties level. At this stage it is even more difficult to find official reliable resources to be used to create some measures of diversity.

In Ottaviano and Peri (2006a) the study on the impact of cultural diversity on economic life in US cities, relies on the Census Public Use Microdata Sample. US Censuses are quite rich of useful information (language spoken at home, ethnic group, ancestry, country of birth) that can be used to proxy cultural diversity. The geographical detail, the time series availability allow to test a variety of hypothesis, conveying at the same time robust and significant empirical results.

With respect to Europe, scholars face many difficulties to find exhaustive sources such as those ones available for the US. To the best of our knowledge, the most geographically detailed datasets on resident population in Europe are the ones deriving from the National Censuses. These data are usually provided at some aggregated level (i.e. county) and micro-data samples are generally not available. This in turn causes the impossibility to select particular sub-samples according to given characteristics or to make refined disaggregated analysis.

Besides, European Countries until now have not shown a great interest in inquiring into the cultural roots of their citizens. As a proof, the Census schedules do not include any question on subjects such as ancestry, language, ethnicity and the unique variable which could be used as a rough proxy for cultural diversity is nationality.

We have presented some of the main issues, both theoretical and applied, related to the measurement of diversity.

To conclude this section, we will in a few words explain the methodological choices that will be done in this research project.

As we have discussed above, many sophisticated indexes have been proposed in the theoretical literature. However, poor datasets often do not allow a high level of complexity in computing these indexes. In our model we will mainly use a simple diversity measure, that is the share of foreign born in the total population. Alternatively, whenever data allow, we will infer the extent of diversity computing a nationality-based fractionalization index.

The last methodological choice has a twofold explanations: first it is not easy to compute complex measures building on the European data sources; secondly, we are interested in comparing our results with other empirical findings. Hence, considering that in the majority of the empirical studies a fractionalisation index has been chosen, we will follow this stream and we will use this simple index as the natural benchmark.

Alternative indices will be explored as robustness checks when deemed interesting to enrich the description of diversity.

SECTION 2: An overview of the Literature

Economists largely agree on the role that diversity can play as powerful force for economic performance and policy effectiveness.

The impact of diversity and fractionalisation on aggregate variables has been widely studied. There is evidence that *ceteris paribus* the higher the level of fragmentation within the country the smaller the growth rate of the economy (Easterly and Levine, 1997; Alesina, Devleeschauwer, Easterly, Kurlat and Wacziarg, 2003). However, under reasonable assumption on technology, the negative effect of fractionalisation is more consistent the lower the level of income (Alesina and la Ferrara, 2005).

Several authors have interpreted this negative correlation as a direct consequence of the high probability of conflict associated with a highly fractionalised/polarised society⁴. Indeed, heterogeneity can influence the distribution of rent-seeking activities thus increasing the potential conflict among groups. This in turn affects negatively investments and growth. Moreover, ethnic diversity may generate a high level of corruption (La Porta, Lopez de Silanes, Shleifer and Vishny, 1999) which could act as additional mechanism to reduce investment. Finally, the effect of ethnic polarization on growth can follow indirect channels, such as poor public policies, restricted trade opportunities, biased government expenditure and public infrastructure etc.

The literature on social capital and trust has provided another remarkable interpretation for this empirical findings. Fragmentation causes mutual distrust (Alesina and La Ferrara 2002; Glaeser, Laibson, Scheinkman and Soutter, 2000) which immediately reflects in a structural lack of social capital and productive public goods (Collier and Gunning, 1999). In turn, the low level of social capital and trust correlates negatively to economic growth (Knack and Keefer, 1997; Knack and Zack, 2001).

Finally, some scholars have stressed the role played by institutions within environments characterized by high fragmentation. Indeed, democracies are better at dealing with heterogeneity (Collier, 2001) and at a more general level, the presence of “good” institutions diminishes the negative impact of diversity on economic outcomes (Easterly, 2001).

The above cited contributions have investigated the link between diversity and economic performance in term of costs primarily. Nevertheless, there is a widespread consensus that heterogeneity of people, skills and ideas produces both costs and

⁴ Some authors have theoretically suggested the existence of a positive effect of ethnic fractionalisation on the likelihood of civil conflicts. However, the empirical evidence in this respect is neither robust nor convincing as instead the theoretical argument is. Hence, ethnicity has been disregarded by many as a leading source of conflict and civil wars (Collier and Hoeffler 2004; Fearon and Laitin, 2003). However, according to Montalvo and Reynal-Querol (2003) one possible reason for the lack of explanatory power of ethnic heterogeneity on the probability of armed conflicts and civil wars has to be found in the index of heterogeneity used. Indeed, although polarization is the concept used in most of the theoretical arguments, fractionalisation is instead the measure used for the empirical analysis. They show that measures of ethnic polarization (rather than fractionalisation) account successfully in the explanation of the incidence of civil wars.

benefits. This question is theoretically and empirically relevant and some literature tend to identify a trade-off between these opposite effects⁵.

When the downside of this trade-off is examined, the sneaky argument used is that more diverse societies are much more likely to face conflicts with respect to preferences, racism, barriers to communication. Heterogeneity can be bad as individuals do not internalise the social benefit deriving from assimilation (Lazear, 1999b). In other cases it can be negative because the larger the variety of agent-types the harder to reach a decision taking into account the whole set of preferences. Some authors have stressed the relevance of this argument with respect to the provision of local public goods as more diverse societies are less willing to pool resources for collective purposes. Indeed, it has been shown that diversity influences negatively both the quantity of public good supplied (Alesina and La Ferrara, 2005; Alesina, Baqir and Easterly, 1999, 2000; Poterba, 1997; Ottaviano and Peri, 2005;) and the quality/efficiency of the provision (La Porta, Lopez de Silanes, Shleifer and Vishny, 1999; Alesina, Devleeschauwer, Easterly, Kurlat and Wacziarg, 2003).

Nevertheless, alongside these drawbacks, advantages from being in a diverse environment may exist. The organizational and management literature provides relevant results as a robust correlation between diversity and task performance or problem solving skills has been found (Richard, Kochan and McMillan-Capehart, 2002; Hong and Page, 1998; Lazear, 1999a; Prat, 2002). A standard assumption in this kind of studies is that heterogeneity entails different ways of solving problems, a richer set of alternative solutions and therefore high-quality decisions. Diverse productive skills and

approaches may result in innovation and creativity (Berliant and Fujita, 2003). Finally, diversity increases the bundle of goods and services available for production and consumption. To the extent that diverse skills and expertise complement each other, a production-amenity effect may arise thus inducing higher productivity. At the same time, as long as agents prefer choosing from a more diversified bundle of goods and enjoy a more diverse environment, consumption amenities may occur. Needless to say

⁵ This trade off is in some cases caused by the technology available for production and the nature of the production unit (Lazear 1999a, 1999b); in other cases, it is conceived as the main force constraining the optimal choice of a social planner involved in maximising a welfare function and establishing the equilibrium size of a country (Alesina and Spolaore, 1997, 2003).

that the existence of amenities is not a straightforward implication, as disamenities and thus negative impacts may in fact take place.

In this sense, it can be worth to analysing in details the theoretical mechanism through which these effects develop and the structure that the literature uses to study the topic.

Alesina and La Ferrara (2005) have provided a comprehensive framework for a micro-founded study of the relationship between diversity and economic outcomes.

According to the authors, diversity may be relevant in choosing the strategies that individuals adopt for interactions. Indeed, in the presence of market failures, it may be optimal to make transactions with members belonging to the same group as communication costs may be reduced. Moreover, within restricted and homogeneous groups selection, monitoring, enforcement and social sanctions may be much more effective. However, group affiliation can be relevant also in the presence of perfect information as long as contract can not be legally enforced (La Ferrara, 2003).

Second, diversity can enter directly the individual utility function thus influencing optimal choices. Practically, rational agents can have a taste for or against heterogeneity, thus evaluating positively or negatively the interaction with other groups according to the perceived degree of diversity (Alesina and La Ferrara, 2000; Tajfel, Billig, Blundy and Flament, 1971). Conditional on the weights associated, amenities/disamenities in consumption can occur.

Finally, diversity may enter the production function thus affecting directly productivity. The importance of various primary inputs for production was strongly emphasized by Romer (1990) in his seminal endogenous growth model, as economic growth and productivity can largely benefit from expanding inputs variety. Along these lines, more recently, Alesina, Spolaore and Wacziarg (2000) analyse the model within a non competitive framework, specifically a Dixit-Stiglitz production structure. These contributions stress convincingly the possibility that variety, i.e.: diversity, can enhance productivity, innovation and growth thus underlying the economic value of diversity⁶.

⁶ It is interesting to analyse this question with respect to the size of the nations. Practically, should we expect larger countries to be more productive because they can enjoy a larger variety of intermediate inputs? The answer is not clear-cut as the final effect will be largely determined by the structure of the international trade. Indeed, in the presence of trade restrictions diversification in the production structure can be strategic for the growth of a country. On the other side, as long as trade is free, small countries can

In this respect cities have been claimed to be key places, because it is here that the large range of goods, services, ideas and skills can be detected and assessed in terms of productivity effects. Jacobs (1969) ascribes the success of cities to their industrial diversity. More recently, Fujita, Krugman and Venables (1999) build their theory of spatial development on the preferences that agents have for variety. Other economists consider knowledge spillovers as the most convincing explanation for the existence and success of cities (Lucas, 1988; Rauch, 1993). Indeed, cities are characterized by concentrated environments that make spillovers much easier and in fact “[...] *the only force that can keep individuals within the cities is the opportunity to learn from others*” (Lucas, 1988).

An interesting feature of cities is that wages are generally higher compared to non metropolitan areas. Why should wages be affected by urban agglomeration? Individual ability can be the primary explanation for the premium, as workers with better unobserved characteristics would tend to concentrate in the largest and highest skilled labour market (Combes, Duranton and Gobillon, 2004). Alternatively, the effect could originate directly from the process of skill accumulation since workers are acquiring more skills in more dense environment (Glaeser and Marè, 2001). Indeed, there is evidence of a significant correlation between average labour productivity and employment density as the related elasticity is 5 percent in the US and 4.5 percent in Italy, France, Germany, Spain and the UK (Ciccone, 2002; Ciccone and Hall, 1996). Rosenthal and Strange (2004) report that doubling city size would increase productivity by 3-8 percent.

Considering our research interest, a natural question arises: is it possible to impute the observed higher productivity level of cities to diversity? In other words, is it possible that *ceteris paribus* more diverse cities show higher productivity?

Two recent papers (Ottaviano and Peri, 2005; Ottaviano and Peri, 2006a) have investigated directly the productivity effect of diversity within cities.

In the first article, they develop a model of open cities where the observed variations in wages (of US-born workers) and rents are used to identify the externalities associated with cultural diversity. The main finding is that, on average, cultural diversity has a net

enjoy the benefits of diverse inputs trading with other countries, without incurring in the high costs that heterogeneity produces.

positive impact on the productivity of US-born citizens because it is correlated with both the average wage received and the average rent paid. This correlation is robust to the inclusion of controls that proxy for productivity and amenity shocks across cities. Moreover, the use of instrumental variables to correct for endogeneity problems reassure on the significance of the empirical results. In other words, a more multicultural urban environment makes US-born workers more productive. In the following article, the same authors have further explored the topic investigating the existence of a *diversity wage premium* within US cities. After controlling for several variables, they find a significant positive correlation between the wages of white US-born workers and cultural diversity. This result is explained in terms of a positive causal link going from diversity to productivity.

It is worth underlining that besides this literature there is a large body claiming that the urban wage premium can exist also in the absence of labour productivity gains. Indeed, the premium does not necessarily reflect a higher productivity level because it could be a compensation that workers receive for congestion disamenities (longer commuting, smaller houses, higher cost of living, pollution etc.). In this type of compensating-differential model (see Gyourko, Kahn and Tracy, 1999) rents and wages adjust to make individuals indifferent between locations (Roback, 1982).

We have proposed an overview, hopefully exhaustive, on the economic literature on diversity.

Taking these contributions as our starting point, we intend to adopt a very concrete approach for the empirical analysis by focusing on a setting where distinctive characteristics among groups can be easily identified and perceived. To this purpose, we find interesting to exploit the heterogeneous features that immigration bring within societies. Indeed, an inflow of migrants can be thought as a shock in the existing stock of diversity thus providing an interesting framework for the economic analysis.

In general, it is not hard to recognize that immigration produces a wide range of economic effects in host countries, both positive and negative. Immigrants pay taxes

and demand public goods thus influencing redistributive policies (e.g. Razin and Sadka 2000; Straubhaar 2002). Moreover, host countries' social security systems are generally

influenced by immigrants' inflows, both legal and illegal⁷. Last but not least, immigration is generally seen as an exogenous change in labour supply for fixed capital stock, as immigrants are normally considered endowed with little physical capital. From such a perspective, a standard demand-supply model would predict wage decreases and employment losses.

There is a large body of theoretical contributions that studies the long-run consequences of immigration. This literature has mainly framed the analysis within a neoclassical growth model (Barro and Sala-i-Martin, 1995; Canova and Ravn, 2000; Dolado, Goria and Ichino, 1994). From such a perspective, international migration is a positive mechanism that accelerates convergence in income per capita and wages, thus producing equilibrium flows among capital abundant (receiving) countries and capital scarce (sending) ones.

On the other hand, there is a dynamic and increasing literature on the consequences of migration studied in a short and medium run perspective. However, these contributions have largely taken one viewpoint only building their analysis on the impact of low-skilled immigrants on US wages. Although the huge amount of empirical work produced (see, among others Borjas 1994, 1995, 1999, 2001, 2003; Borjas, Freeman and Katz, 1997; Boeri, Hanson and McCormick, 2002; Card 1990, 2001; Card and Di Nardo, 2000), a wide consensus has yet to be reached. Indeed, some economists identify only small or negligible effects of immigration (Butcher and Card, 1991; Card, 1990; Card, 2001; Friedberg, 2001; Lewis, 2003) while other ones find large and robust negative impacts (Borjas, Freeman and Katz, 1997; Borjas 1994, 1995, 1999, 2003).

The negative impact of migration on wages is justified by the remarkable hypothesis that domestic and foreign workers with the same education are considered homogenous in terms of skills and potential performance and thus somewhat substitutable. Some influential studies in the field of relative supply of skills and relative wage of US born workers (Katz and Murphy, 1992; Welch 1979; Card and Lemieux, 2001) make clear that workers with different level of schooling and experience should better be considered imperfect substitutes.

⁷ Just to make an example, many observers have incessantly stressed the negative impact of immigrants inflow on the US welfare system. In California, for example, illegal immigrants have apparently created a net burden for California's taxpayers of around \$2 to \$3 billion annually (Borjas, 2004).

This result has been explored in Borjas (2003), who divided workers among imperfectly substitutable groups (by education and experience) while assuming perfect substitution of natives and foreign-born workers within each group. The empirical findings show that, because of immigration over the years 1980-2000, US workers lost on average about 3% of the real value of their wages; this loss increases to almost 9% for the low-skilled labour force.

In a recent work Ottaviano and Peri (2006b) challenge the hypothesis made in Borjas (2003). Indeed, they relax further the assumption allowing the possibility of imperfect substitution between foreign-born and native workers even within the same education-experience group⁸. This assumption has been investigated within a general equilibrium framework, with endogenous physical capital accumulation. The empirical findings suggest that high-skilled workers gained from immigration (2.4% up to 2.5%) while low-skilled workers did not gain but did not lose much (-0.4% up to 0%).

The relevance of such an approach is clear because in the presence of differentiated labour an inflow of immigrants will have, as demonstrated, asymmetric impacts depending on the extent of substitution and complementarity effects among groups. In other words, after accounting for immigrants diversity and endogenous capital accumulation the effect on the average wage of US natives results positive and large, because the negative effect (caused by substitution effects) is out weighted by the positive one (caused by complementary effects and increases in the marginal productivity of capital).

In conclusion, we have proposed to study the economic effects of diversity exploiting the heterogeneity that immigrants bring to our society. In other words, given the existing stock of diversity, we take immigration flows as a good proxy for an exogenous increase in diversity. Given this shock, we are interested in investigating the resulting economic effects.

Before discussing the details of the empirical approach (Section 4), we will debate some policy issues related to the topic.

⁸ This strong assumption is justified considering that immigrants often specialize in peculiar activities that are different from the ones where natives work. Be it because official immigrants are endowed with culture specific skills or because they are generally an open-minded and talented group, it seems reasonable to allow for imperfect substitution.

SECTION 3: Policy Issues

The survey of the theoretical and empirical literature has delivered mixed results with respect to the effects of diversity on economic performance and policies. The economic analysis of diversity requires the formalization of categories that have to be easily identifiable, according to clear-cut criteria. The so-called *demographic diversity* (i.e. relative to the demographic characteristics of people interacting and working together on joint tasks) is easily measurable and for this reason often used for this kind of analysis.

However, for the sake of accuracy, when dealing with the policy issues implied by heterogeneity we have to take on a wider viewpoint. Indeed, diversity has to be referred to not only as *demographic diversity* but also as *cognitive diversity* (i.e. diversity in terms of knowledge, insights, opinions, and beliefs linked to own experiences, lifestyles, and personal history). This approach can be helpful in order to catch the completeness of the phenomenon at social level.

Two main features break through from the above review.

First of all, diversity embodies a continuous trade-off between benefits and costs. Hence, policy-makers should act in order to maximise the gap between the social benefits and the social costs produced in a diverse environment. Secondly, it is largely acknowledged that modern developed societies are experiencing growing diversity both at different levels (firms, cities, regions, countries) and in different arenas (cultural, social, economic). One of the main reasons behind such a phenomenon is the process of globalization, that has suddenly pushed the flows of ideas, knowledge, goods, capital and people among countries. Undoubtedly, no feature of globalization is considered with more unease than the large flows of workers.

We have supposed that immigration flows can proxy satisfactorily for a shock in the existing stock of diversity. Hence, given this working hypothesis, we have proposed to focus on this occurrence to study the economic impact of diversity.

In the last years there has been a remarkable surge in international immigration towards developed countries. In particular, the main “immigration” countries are, in decreasing

order, Australia, Switzerland, Canada and the United States (Peri, 2005). The EU also, although to a lesser extent, is undergoing an analogous rise of immigrants, especially coming from Turkey, Africa and Eastern Europe. This phenomenon is somewhat new because Europe has been throughout its history a traditionally point of departure for immigrants.

In general, as a consequence of this massive inflows of migrants, the percentage of foreign born people in the population of the receiving countries has increased significantly.

Just to make few examples, during the last thirty years foreign-born residents in the US have increased substantially as a share of both the total population and the labour force. In 1970 only 4.8% of the US residents were foreign-born and this percentage has grown to 8% in 1990 and to 12.5% in the year 2000 (Ottaviano and Peri, 2006a). A similar pattern can be distinguished in the share of foreign-born in total US employment: the percentage has grown from 2.6% in 1970 to 13.2% in 2003 (Ottaviano and Peri, 2006b). This upward trend is consistent with the evidence for the EU, as well. However, the EU maintains a smaller share of foreign-born and the net immigration rate is a scarce 4.7%, much less than a third of the US's rate and less than a fifth of Australian's rate (Peri, 2005). Another interesting feature is that the EU is still far from being an integrated labour market like the US one, because it exhibits modest levels of cross-country labour force mobility (Peri, 2005). Finally, the EU, with the unique exception of the UK, dramatically fails in attracting high-skilled and talented immigrants, being the majority of new entrants low-skilled (Peri, 2005).

In both the US and Europe, the phenomenon is causing many tensions and policy makers have to tackle new problems and policy dilemmas. The growing mobility of workers, with varying skills, education and abilities can potentially represent an extraordinary resource. However, native citizens largely perceive immigration as a threat. Indeed, large migratory flows can seize economic opportunities and agents are less prone to pool resources the higher the heterogeneity. The resulting hostility and anxiety has the potential to explode in discrimination and xenophobia, thus making the cohabitation among diverse environments much more difficult.

The awareness of this trade-off and risks has produced a heated political and economic debate and immigration-reform plans/integration policies are at the moment key issues in the institutional agenda. In the US, for example, the huge wave of immigrants is creating a big discussion. Many states have to deal with serious border problems, that are inexperienced in such a dimension. In August 2005 New Mexico and Arizona declared the state of emergency and in the following months the Mexican-American relations grew tense. Faced with harsh immigration, in March 2006 the Senate studied a reform that would grant immigrants citizenship but it failed to pass it. As a consequence, in April and May 2006 there were mass protests throughout USA. (for additional information on the issue, *The Economist*, 30/3/2006, 4/5/2006, 18/5/2006 etc...).

Similarly in Europe, the strong pressures that immigration is putting on the borders of the traditionally receiving countries (most notably France, Germany and UK; more recently Italy, Spain and Austria) has created an intense discussion on immigration policies. Besides, after the completion of the EU enlargement the entrance of people coming from less developed EU countries will be easier and it is fairly predictable that the issue will gain additional relevance (for additional details, *The Economist*, 12/4/2006, 11/5/2006, 9/3/2006 etc...). Moreover, the recent violent rebellion within the French *banlieu* has led many countries, and not only France, to think about the effectiveness of their racial integration policies. Finally, many European countries are roughly debating about immigrants' rights and duties. Indeed, many question the extent to which European countries can tolerate as a right "unusual" (according to our principles) practices conducted within our societies.

The heated institutional debate has been accompanied by a large and growing theoretical and empirical literature on the consequences of migration. However, the literature has conveyed mixed results. For this reason, a clear understanding of the determinants and effects of these migratory flows is extremely difficult, both for policy makers and public opinion.

What we can easily affirm is that immigration is nowadays a fervid topic, whose economic, social and political implications have to be entirely comprehended. Moreover, for many countries and Europe in particular, the issue of multi-ethnicity will

be one of the major challenges in the next years. Hence, we find stimulating to analyse more carefully the phenomenon, especially in its economic consequences, in order to keep flawed perceptions separated from reality.

These features give us a double incentive.

First, we would like to frame our analysis within the context of Europe. This is because immigration is a living matter of great importance for modern Europe. Secondly, the

analysis of immigration has mainly focussed on US data thus creating, to the best of our knowledge, a lack of a comprehensive and detailed investigation (such as that for the US) for other countries such the European ones. Hence, by focussing the empirical analysis on the European labour market we aim at giving a contribution in filling the gap with respect to the US case.

SECTION 4: The Empirical Analysis

The empirical analysis will be carried out using a European database, owned by FEEM. These data cover 12 countries out of the EU15 which are: Austria, Belgium, Denmark, France, Germany, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden and the United Kingdom. Due to the lack of some relevant variables, the remaining European countries (Luxembourg, Greece and Finland) have been excluded. However, notwithstanding this incompleteness with respect to the whole EU15 community, the coverage of the dataset is quite satisfactory.

In terms of spatial unit of observation, we will mainly consider data at a NUTS3 (Nomenclature of Territorial Units for Statistics) level. This aggregation corresponds to the *départements* in France, the *provinces* in Italy, *large counties* in the UK. However, when information is not available at this level of disaggregation, the original database will be integrated with data at a NUTS2 level. Two different points in time will be taken as reference for our analysis. Data refer to the years 1991 and 2001, for a total of 963 observations each year. However, for some countries, the years 1990 and 2000 will be instead taken into consideration, due to a lack of data.

Demographic variables, such as age, gender, level of education, citizenship, etc., have been extracted from the databases of each countries' National Statistical Institutes. Specifically, the national Census Surveys or Registry Data have provided this kind of information.

The variable 'citizenship', which will be valuable in our analysis, deserves a special description because some of its features will be relevant for the empirical analysis.

Indeed, for the majority of the countries in which there is a *jus sanguinis* regulation of citizenship acquisition, the country of birth is not found in the census of population results, but citizenship is instead provided. In few cases only, specifically United Kingdom and Ireland, citizenship is not available and the country of birth is instead provided.

Hence, for some countries we will directly deal with the variable 'citizenship', while in other cases we will use the only piece of information helpful to proxy for citizenship, that is 'country of birth'. In addition, for each country the share of foreign born people is also available.

As far as we know, other collections of European data at NUTS3 level including variables such as ethnicity, language spoken, religion, do not exist. Needless to say, these data are extraordinary important for the characterisation of cultural identity and the kind of research we intend to face.

The majority of the economic variables, such as GDP and unemployment rate, compensation per employee, etc., derive from the Eurostat REGIO database. When unavailable, we have taken this information from Cambridge Econometrics.

Moreover, a proxy for the evaluation of non tradable goods' prices has been created taking the values of the restaurant prices from the Michelin Red Guides: a mean of second category restaurant prices has been computed for a sample of cities for each NUTS3.

For the empirical analysis we will mainly build on the theoretical model developed in Ottaviano and Peri (2005, 2006a). In this model, cultural diversity may affect both productivity (production amenity) and/or quality of life (consumption amenity). The hypothesis has been tested on a US dataset in the context of US cities.

The empirical findings have been achieved by a joint estimation of wage and rents regression, exploiting an approach that was originally proposed by Roback (1982).

Taking these contributions as our starting point, we will adapt the methodology used to estimate these effects within a European framework. This will require a big effort in defining the empirical approach as the European data sources are not as detailed and rich as the US dataset.

For this reason, the model and the empirical methodology require some refinements before being applied to the European case. Furthermore wage and rent variables are not available at NUTS3 level for the European countries. For this reason, GDP per head and restaurant prices will be used to proxy for non tradable goods' prices.

Whenever possible we will cross the information on migration flows with parallel information of firms location choices. Special attention will be devoted to Foreign Direct Investment (FDI) as the inflow of foreign capital may complement the inflow of foreign workers thus easing their absorption through the promotion of higher labour productivity and wages.

Finally, the econometric estimation of the effects of immigration and diversity on productivity, innovation and growth cannot be performed in a historical and sociological vacuum. In Europe different waves of migration have concerned distinctly different types of migrants. In particular, the specificities of the countries of origin and destination may determine the impact of migrants on receiving economies.

A multidisciplinary approach is needed to grasp those specificities. This will be achieved by supplementing the econometric analysis with in-depth case studies of key migration events.

Given its persistent role among European countries in receiving relatively large and varied inflows of immigrants, the target country we have chosen to focus on is Germany. Three main waves of immigration will be studied: Italians, Greeks and Turks. These groups exhibit enough cultural diversity among them to allow for an exploration of the impact of immigration depending on different patterns of assimilation and integration of newcomers. Attention will be also devoted to migration patterns in Eastern Europe with a special focus on Bulgaria.

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