Measuring Cultural Diversity at a Regional Level

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Measuring Cultural Diversity at a Regional Level

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Contribution to the Project

Set the stage for WP 503 and develop suitable indicators for the measurement of cultural diversity at a regional level.

Measuring Cultural Diversity at a Regional Level

By Dirk Dohse*and Robert Gold+

ABSTRACT

This paper discusses alternative measures of cultural diversity to be used in subsequent investigations of the impacts of cultural diversity on regional development in Europe. It derives indicators for the measurement of cultural diversity from the literature and describes possible adjustments and refinements. Finally, the discussed measures and weights are applied in order to provide a first descriptive overview of cultural diversity in in Europe at the regional (NUTS-2) level.

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1. Motivation

Migration into the EU has increased over the past decade.[1] In 2011, over 20.5 Million people living in the EU27 where citizens of non-EU countries (EUROSTAT 2012). Thus, 4.1 percent of the European population does not have European citizenship, and 6.1 percent of the population was born outside the EU27. This is also – and in particular – true for internal migration, which has recently been fuelled by the Euro crisis, inducing substantial South-North migration by highly-qualified job-seekers from Southern European countries like Spain, Portugal, Italy and Greece to central Europe. As a result, in 2011 more than 2.5 Million citizens of EU27 countries where not living in their home country. Taken together, migration is the driving force behind population dynamics in the majority of the EU27 countries, which have seen a substantial increase in the share of foreign population over the period 2001-2011, while the total population remained nearly unchanged, as Figure 1 explains.

[Figure 1 about here]

Since freedom of movement is an essential feature of the Single Market, internal migration might also be seen as a measure of (labor) market integration. Accordingly, migration should increase as market integration proceeds. Moreover, the job market problems in Southern Europe (in particular youth-unemployment) are further aggravating and a new wave of internal migration is expected in 2014 when all 25 EU countries are obliged to open their labor markets fully to Bulgarians and Romanians who joined the union in 2007. Apart from that, the EU will most likely continue to attract migrants from outside the Union. Against this background, assessing migration effects is highly relevant for predicting the economic perspectives of the EU. Thus our research will contribute to disentangling positive and negative effects of migration on welfare, wealth and work in Europe.

It is noteworthy, however, that there are significant differences between the member states with respect to in- and out-migration. As these differences are even more pronounced at the regional level, we will focus on NUTS2-regions to thoroughly asses this heterogeneity.

The underlying questions guarding our research are consequently: How does (potentially increasing) migration affect the development perspectives of regions? How does it affect the inter-regional distribution of human capital ('brain drain' versus 'brain gain')[2], knowledge

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[1] For an assessment of historical migration patterns in Europe after WWII, see Zimmermann 1995.
[2] For a discussion, see Agrawal et al. 2008.

and, finally, wealth? Will regions be uniformly affected, or does migration affect different regions differently? What does this mean for regional convergence?

We will focus on a specific aspect, closely related to migration, i.e. cultural diversity, which results from the ethnic composition of a region's population. With migration, cultural diversity potentially increases. Migrants bring along customs, traditions and norms of their home countries but also skills and attitudes that might be different from those prevailing in the receiving region. Receiving regions could benefit from an increase in cultural diversity, since it might positively affect the supply of goods and services, enrich the labor-market and increase the share of would-be entrepreneurs. But cultural diversity could also imply ethnic conflicts (DiPasquale and Glaeser 1998) and increase transaction costs in the provision of public goods (Alesina et al. 1999), if local communities find it more difficult to coordinate when diversity increases. Whether positive or negative effects prevail might (to a certain degree) be explained by the institutional setup in the receiving regions (Easterly 2001, c.f. Angrist and Kugler 2003), but also by the composition of the migrants' population.[3] Thus, regional differences have to be carefully taken into account.

We will start our analysis focusing on a specific aspect of cultural diversity, i.e. its role in the innovation process. Literature sees cultural diversity as resource in the innovation process, since it might enhance knowledge spillovers and thus foster the creation of new ideas and eventually of new products. If this is true, a high amount of cultural diversity could be a locational advantage of regions. In the course of the project, we will assess whether cultural diversity affects the innovative performance of regions, and whether this eventually translates into regional growth. We will take an inter-temporal and an inter-regional perspective to account for heterogeneity in this relationship. With the paper at hand, we set the stage for this analysis by developing measures of cultural diversity.

2. Literature

There is a young but rapidly growing literature dealing with the economic effects of migration, the ethnic or racial composition of a country's or region's population, and the diversity related to these issues. However, results are yet inconclusive and sensitive to the data and methods used. Numerous papers address the politically hot topic of whether and how

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[3] For a discussion, see Alesina et al. (2013)

(im)migration affects labor markets.[4] Borjas (1995) finds that immigration has a negative effect on the wages of native employees competing with the immigrants. However, this induces gains in productivity. More early work on the labor market effects of migration is summarized in Friedberg and Hunt (1995). They conclude that immigration effects on employment and wages of natives are neglectable. Using US data, Borjas (2003) confirms the negative immigration effect on competing native workers' employment opportunities and wages. Angrist and Kugler (2003) find similar results for Europe. On the contrary, Carrasco et al. (2008) find no wage effects of immigration in Spain. Using firm level data, Brunow and Blien (2011) confirm the negative employment effect of immigration for Germany and relate this effect to productivity gains. Using a Herfindahl fractionalization index, they explicitly take the foreign workforce's diversity into account. Focusing on the impacts of cultural diversity, Ottaviano and Peri (2005, 2006) find positive effects on productivity, wages and employment US cities. On the contrary, also using the Herfindahl fractionalization index to assess cultural diversity's labor market impacts, Longhi (2011) neither finds wage effects nor effects on job satisfaction in Britain.

Peri (2012) does not find migration effects on employment, but significant positive migration effects on TFP. Moreover, he points out that skill levels matter when it comes to labor market effects of migration. Card (2001) shows that particularly wages of low-skilled native workforce are negatively affected by immigration. Using city-level data for the UK, Nathan (2011) shows that immigration raises productivity, and that high skilled natives can benefit from immigration both in terms of employment and wages. Employing a Herfindahl fractionalization index to account for the immigrants' diversity, he finds that low-skilled natives' wages and employment opportunities are negatively affected, on contrast. While Otaviano and Peri (2012) in principle confirm their previous results on the positive effects of cultural diversity on wages, they find this effect to be sensitive towards the natives' education level. Moreover, they find negative effects of cultural diversity on previous immigrants' wages. For Germany, D'Amuri et al. (2010) also show that it is particularly previous immigrants' employment opportunities and wages that are affected by migration, while the effects on natives are mixed. This finding is confirmed for the UK by Manacorda et al. (2012) who find no effects on natives' wages but on immigrants' wages. Suedekum et al (2009) point out that the migrants' qualification matters as well. They show that share and diversity of high-skilled foreigners positively affect wages and employment of natives, while the share of

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[4] See Card et al. (2012) for an assessment of sentiments towards migration in the EU.

low-skilled foreigners has a negative effect on natives' wages and employment. This negative effect can, however, potentially be compensated by the low-skilled foreigners' diversity. Assessing the effects of a population's diversity measured by country of birth, Alesina et al. 2013 find positive diversity effects on economic development and productivity, which are particularly pronounced for high-skilled migrants in rich countries.

Using city level data, Glaeser et al. (1995) find no impact of a population's racial composition on growth. However, they argue that racial segregation might have positive growth effects in cities with a large share of white population. Easterly and Levine (1997) take a much broader perspective on diversity effects. Using the Soviet Atlas Narodov Mira from 1964, they introduce the Herfindahl fractionalization index to measure the effects of ethno-linguistic diversity on growth in a comparative analysis for up to 89 countries. Easterly and Levine (1997) show that ethnic diversity is positively correlated with bad institutions and has a negative effect on public policies. They conclude that ethnic diversity consequently affects growth negatively. A critical discussion of this approach can be found in Arcand et al. (2000) who find mixed effects of ethnic diversity on growth for African countries. Combining several measures of ethno-linguistic heterogeneity for up to 152 countries, La Porta et al. (1999) find negative diversity effects on government performance. Enriching the data used by Easterly and Levine (1997), Alesina et al. 2003 differentiate between ethnic fractionalization, linguistic fractionalization, and religious fractionalization. They confirm negative diversity effects on quality of government and growth with regard to ethnic and linguistic diversity. However, they do not find effects of religious fractionalization.

Alesina et al. 2003 also test a polarization index as alternative measure to assess diversity effects. With respect to their analysis, they conclude that the polarization index does not provide additional information as compared to the fractionalization index. Montalvo and Reynal-Querol (2005) still propose a fractionalization index to assess the potential for conflict resulting from diversity. Following this notion, Ratna et al. 2009 use a Herfindahl fractionalization index to account for racial and linguistic diversity in the US, and a polarization index to assess the impact of religious diversity. They find a negative growth effect of racial diversity, a positive growth effect of linguistic diversity, and no effect of religious diversity. For the EU, Brunow and Brenzel (2011) employ both fractionalization and polarization indices and provide evidence that ethnic and linguistic diversity have positive growth effects, while they do not find evidence for an effect of religious diversity. With respect to the potential of social conflict, DiPasquale and Glaeser (1998) employ a Herfindahl

fractionalization index to show that ethnic diversity is positively related to the occurrence of riots in the US. More generally, Alesina et al. 1999 find that ethnic diversity negatively affects the provision of public goods. Along that line, Luttmer (2001) finds racial diversity to have a negative impact on redistribution. Alesina and LaFerrara (2005) summarize the literature on diversity effects and explicitly discuss advantages and disadvantages of fractionalization and polarization indices. They conclude that ethnic diversity has a negative effect on public goods provision and that the evidence for effects on productivity is mixed. Eventually, Easterly (2001) points out that institutions can mitigate adverse migration effects, and thus reduce the potential for conflict induced by cultural diversity.

From a theoretical point of view, Lazear (1999) provides a notion of potential gains from diversity of teams that result from complementarities on the firm level. More generally, Berliant and Fujita (2008) develop a knowledge production model where heterogeneity has a positive effect on knowledge creation. Indeed, Sparber (2010) finds that racial diversity has a positive effect on productivity in the US using city level data. However, this effect is not robust on the state level. For the EU, Prarolo et al. (2009) find positive effects of cultural diversity on productivity. More specifically, Ozgen et al. (2011) use data on 170 European NUTS2 regions and show that the mere share of migrants does not affect a region's innovativeness. However, they find the immigrants' skill level to be positively correlated with patent applications, and the migrant's diversity to have a positive impact on innovation from a certain threshold on. Parrotta et al. (2011) confirm a positive effect of cultural diversity on innovation using Danish firm level data. Not too surprisingly, they also find qualification to be important in this respect. Moreover, Niebuhr (2010) finds positive effects of cultural diversity on innovation in Germany. She uses the Herfindahl fractionalization index, the Theil index, and the Krugman index in comparison to assess the effects of cultural diversity on patent applications, and obtains robust results. Audretsch et al. (2010) also use the Herfindahl fractionalization index, an adjusted Herfindahl index, and the Theil index to investigate the effects of cultural diversity on entrepreneurship. Using German data, they find that cultural diversity positively affects the formation of technology oriented start-ups.[5] Their results are confirmed by Cheng and Li (2011) who find a positive effect of cultural diversity on firm formation in the US, and by Marino et al. (2012) who find a positive effect of cultural diversity on entrepreneurship in the financial and business services using Danish data.

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[5] Moreover, Audretsch et al. (2010) provide a profound discussion of the properties of the different diversity measures used.

In summary, the current literature on the economic effects of (cultural) diversity is yet inconclusive. Analyses are skewed towards the US, although in recent years more and more studies have investigated diversity effects in Europe. Most current literature faces a tradeoff: Many papers provide an in depth-analysis based on country specific data that can control for regional heterogeneity, but are of limited generalizability. On the other hand, most comparative cross-country analyses omit the regional level. With our research, we intend to bridge this gap by conducting a comparative study for 27 European countries. However, we will focus on the regional variance within and between these states. The literature review has shown that results are sensitive towards the data and methods used. To a certain degree, this is inevitable since data restrictions limit the observability of cultural diversity. We will employ the European Labour Force Survey (ELFS) for our analysis that provides uniform information on all the European regions. Moreover, we will adopt the two most prominent measures of cultural diversity used in the literature, i.e. the Herfindahl fractionalization index and the Theil diversity index, and further adjust these measures to deal with the restrictions faced by previous research.

3. Measuring cultural diversity

3.1 Dimensions of cultural diversity on a regional level

Cultural diversity has many dimensions potentially correlated with each other, e.g. language, religion, customs & traditions (c.f. Fearon 2003, Alesina et al. 2003, Shenkar 2001). All those facets could be meaningful in particular cases. However, as we proceed towards a comparative analysis of all European NUTS2 regions, we have to abstract from specific details to obtain universal measures applicable to all regions alike. Most importantly, we focus on the effects of intercultural diversity, i.e. effects resulting from the presence of various national cultures in a region. By now, we thus have to assume that national cultures are homogenous. More specifically, we disregard the native culture's within-diversity. Arguably, this is a simplifying assumption that misses some variance induced by subcultures and regional heterogeneity. However, it is not too farfetched to assume that the cultural diversity of a NUTS2-region's native population is of minor importance as compared to the cultural diversity resulting from the presence of foreign cultures. Moreover, it is much more convenient to thoroughly control for regional differences in the native cultures in the regression analysis to be conducted in the future, than to explicitly measure this hardly observable within-variance. In line with the literature discussed above, we thus begin our

investigation of the cultural diversity of the EU27 NUTS2 regions with an assessment of foreign cultures present in those regions. As we proceed, we will propose several adjustments to this approach that help to account for different dimensions of cultural diversity. Subsequently, we use data from the European Labour Force Survey (ELFS) of the year 2007 to develop our measures.

3.2 Share of foreigners

Restricting ourselves to the assessment of intercultural diversity, we deduce a region's cultural diversity from the presence of various national cultures in that region. Conceptually, every individual living a region r represents one unit of culture present in this region. By now, we assume the native culture to be homogenous. Accordingly, a region's cultural diversity is determined by the share of the foreign population living in that region. Consequently, the share of foreigners living in a region represents the stock of foreign culture present in this region. Since this stock of foreign culture is the prerequisite for cultural diversity, the share of foreigners can be used as a first – and relatively rough – measure to approximate a region's cultural diversity. The data requirements for this measure are low which has the advantage that countries like Ireland which only provides aggregated data on the foreigners living in its regions can be included in the comparative analysis.

The ELFS provides information on i) whether an individual was born in another country than the country it lives in (independent of the individuals' citizenship) and on ii) whether an individual is citizen of another country than the country it lives in (independent of the individual's country of birth). Both measures can be used to identify "foreigners" on a NUTS2 level. Figure 2 maps the share of foreign born individuals according to measure i) for 261 NUTS2 regions in the EU 27 in the year 2007. Table 1 reports the 20 regions with the highest share (left panel) and the 20 regions with the lowest share (left panel) of foreigners by country of birth.

[Figure 2 about here]

[Table 1 about here]

Not too surprisingly, a huge share of the big European cities' population was born abroad. More than 30 Percent of the population of London, Luxemburg, Bruxelles and Vienna are foreign born. Moreover, Figure 2 shows a concentration of foreign born migrants in the center

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of Europe. Also, many foreigners live in the Mediterranean coastal regions of Portugal, Spain and France. Eventually, the southern Scandinavian regions and the northern Baltic regions have a significant stock of foreign culture measured by the population's country of birth. Apart from that, Figure 2 and Table 1 also reveal substantial differences between the NUTS2 regions. Peripheral regions have much less foreign born population, and hardly any foreigners are observed in the East European regions.

Relying on country of birth, we count individuals that had at least some contact to foreign cultures as "foreigners", and consequently as unit of foreign culture nested in these individuals. This might be reasonable, since migrants often keep in contact with family and friends in their original home regions and maintain at least some customs and traditions of their previous home country. However, we have no information on how long the individuals born abroad were influenced by foreign culture. Moreover, this measure also counts the children of expatriates as foreigners, and generally disregards processes of integration into the native culture of the migrants' current region of residence. So potentially, this measure overestimates the stock of foreign culture present in a region. Thus, we calculate the share of foreign citizens as alternative measure of the region's stock of foreign culture. Cultural diversity according to this measure is reported in Figure 3 and Table 2.

[Figure 3 about here]

[Table 2 about here]

For obvious reasons, the share of foreign citizens is usually lower than the share of individuals born abroad. Still, the most urban regions also have the highest share of foreign population. Apart from that, the foreign share based on citizenship draws a somewhat more differentiated picture of the stock of foreign culture in the European NUTS2 regions. Also with this measure, we see some concentration of foreigners in the European center, around the Mediterranean, and generally in more industrialized regions, but with more variance within these broader areas. Again, the East European regions score remarkably low on this simple measure of cultural diversity. However, also the group of least diverse regions changes with this new measure, as can be seen in Table 2. The same is true for the group of most diverse regions. Apparently, despite the fact that share of foreign citizens and share of foreign born migrants are related measures, they nevertheless measure somewhat different notions of cultural diversity.

Comparing the measures based on country of birth and based on citizenship it turns out that measuring the regional stock of foreign culture by inhabitants with foreign citizenship seems to be the more conservative approach. Conceptually, citizenship reveals some preference for being identified with a nation and its culture. Thus foreign citizenship more clearly indicates that an individual can be counted as unit of foreign culture. With respect to the figures and tables presented above, it also becomes clear that measuring the stock of foreign culture by share of foreign citizens is less likely to overestimate cultural diversity. Furthermore, information on citizenship is more easily available. We have detailed information on foreign citizens on the NUTS2 level for all regions except the Irish regions, while the ELFS lacks information on individuals born abroad for Ireland and Germany. Thus, we restrict ourselves to an assessment of the share of foreign citizens. However, in future regression analysis the country of birth based measure will most likely be a valuable variable for robustness checks. In this paper, we proceed by refining our measure of cultural diversity based on the regional stock of foreign culture represented by the foreign citizens living in the European NUTS2 regions.

3.3   Diversity Indices

By now, our measures of cultural diversity solely rest on a distinction between native population and foreign population, disregarding the foreign population's composition. Arguably, the stock of foreign culture is a prerequisite for cultural diversity, but its distribution among cultural groups is probably more informative when a region's cultural diversity is in question. A region can then be assumed to be culturally diverse, when a region's stock of culture (that is nested in a regions' population) is unevenly distributed among the cultural groups (i.e. the national groups according to our intercultural perspective) present in this region. The literature proposes an array of fractionalization and diversity indices to measure population heterogeneity. We will focus on two types of indices, a Herfindahl type and a Generalized Entropy (GE) type of index, that mark two opposite alternatives to assess some groups' contribution to a region's cultural diversity (c.f. Audretsch et al. 2010)[6]. As we will detail next, the Herfindahl type puts a strong weight on larger groups, while the GE type stronger emphasizes the contribution of smaller groups. Both assumptions might be reasonable, so comparing both types of indices could be informative by itself.

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[6] Montalvo and Reynal-Querol (2005) additionally propose a polarization index to assess the potential for conflict arising from ethnic heterogeneity. By now, this goes beyond the scope of this paper. However, it could be useful to integrate polarization measures in future regression analysis.

In the literature, most commonly the inverse Herfindahl fractionalization index is used to measure a region's diversity.[7] It comes in the general form

$$herf_r = 1 - \sum_{n=1}^{N} (s_{nr})^2$$

So $herf_r$ sums the squared population shares s of all national groups n observed in a region r, which by itself is a measure of concentration, and deducts it from unity. The higher $herf_r$, the less concentrated (and accordingly more diverse) is the distribution of cultural units amongst national groups. In our case, values range from 1-1=0 to 1-(1/N) = 0.9948, since we observe 192 national groups in the EU27 without Ireland in the year 2007. The resulting cultural diversity is depicted in Figure 4, most and least diverse regions according to the Herfindahl index are depicted in Table 3.

[Figure 4 about here]

[Table 3 about here]

The Herfindahl frationalization index draws a picture of cultural diversity in Europe most similar to the share of foreign citizens measure applied in Figure 3. Indeed, the rank order of most and least diverse regions according to the Herfindahl Index reported in table 3 is exactly the same as the rank order according to the share of foreign citizens measure reported in Table 2. This might turn out to be useful, since Ireland does not provide detailed information on the foreigners living in the Irish regions. Thus, the share of foreigners measure could potentially be used as substitute to the Herfindahl index for an analysis including the Irish regions.

Another group of indices frequently used as diversity measures are Generalized Entropy Indices.[8] For our purpose, the Theil index is the most appropriate measure of this group. It comes in the general form

$$theil_r = \sum_{n=1}^{N} (s_{nr}) \ln \left(\frac{1}{s_{nr}} \right)$$

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[7] See Alesina et al. (2013) for details.
[8] See Bickenbach and Bode (2008) for a detailed discussion.

By taking the logs, the Theil index gives a stronger weight to the tails of the distribution. Thus, the Theil index accounts for non-linearities in the groups' contribution to a region's cultural diversity. If we assume that the marginal contribution of some foreign culture to a region's cultural diversity decreases with group size, the Theil index should thus be the measure of choice. Intuitively, it seems reasonable to assume that e.g. the first Indonesian moving to a region r has a stronger effect on cultural diversity than the hundredths Korean. However, it is impossible to validate this assumption ex ante, thus it will be meaningful to compare Herfindahl and Theil index throughout our future analysis. A first step is an assessment of the cultural diversity of European NUTS2 regions using the Theil index.[9] Descriptive results are presented in Figure 5 and in Table 4.

[Figure 5 about here]

[Table 4 about here]

From Figure 5 and Table 4, we instantly learn two things: First, Theil index and Herfindahl index are related. Both rest on the distribution of a region's overall culture among different national groups. Thus, Figure 5 is in large parts similar to Figure 4, and the most and least diverse regions in Table 4 largely correspond to the regions listed in Table 3. Second: There are nevertheless differences between both measures that could turn out to be meaningful in future analysis. For instance, the ranks of most and least diverse regions change for almost all regions reported in Table 4 as compared to Table 3. These differences could potentially be exploited in future regression analysis.

3.4   Weights

By now, our measures rest on the assumption that every individual represents one unit of culture nested in this individual, and that the overall culture present in some region results from the aggregate number of cultural units. To obtain these measures, every unit of culture is treated alike, and there are good reasons to do so. For the measures described above, every cultural group contributes equally to a region's overall culture, and one can well argue that all cultures are equally valuable. However, since diversity is considered, one could contrarily argue that some cultures are quite similar, while others are very different, and that different cultures should consequently contribute to a region's cultural diversity differently. For

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[9] Throughout this paper, Theil index values are for convenience standardized by ln(N) to vary between zero and unity.

instance, a Portuguese living in a Spanish region might contribute less to the region's diversity than a Chinese living in the same region. In this section, we propose some adjustments to the measures described above to account for differences in the cultural distance between a region's native population and the foreign cultural groups living in that region.[10]

A straightforward approach to account for cultural distance is to approximate it by geographic distance. The simplifying assumption behind is that the cultural distance between two cultural groups increases with the geographic distance of the countries these respective cultures are rooted in. Accordingly, a foreign group living in a NUTS2 region *r* would contribute more to the cultural diversity of *r,* the larger the distance between the foreigners' home country and the country they are actually living in is. Conceptually, this means that the overall culture in a region is represented by the aggregate of distances observed in that region, which are again nested in individuals.

We use data provided by Mayer and Zignago (2011) to account for the geographic distance between the most populated cities in the country any observed NUTS2 region belongs to, and the countries the foreigners observed in this region are citizens of. We set the natives' distance to be unity and weight every other observation with the log of geographic distance between its country of residence and its country of citizenship. Consequently, the overall stock of regional culture results from the aggregate of distances (nested in individuals) observed in the region. Based on this adjusted measure of culture, we again calculate the Theil index and the Herfindahl index that describe how culture is distributed among the cultural groups observed in a region. Results are displayed in Figure 6 and Table 5 for the Herfindahl index and in Figure 7 and Table 6 for the Theil index.

[Figure 6 about here]

[Table 5 about here]

[Figure 7 about here]

[Table 6 about here]

Controlling for cultural distance with geographic distance noticeably affects the composition of cultural diversity in the European regions. On average, cultural diversity increases across

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[10] Compare Shenkar (2001) for a detailed discussion of the concept of cultural distance.

Europe when cultural differences are taken into account. Again, the central European regions score high on the measure of cultural diversity. With the distance weight, most noticeably the Northern Italian regions and many French, Spanish and British regions gain in diversity. Also the Scandinavian regions appear to be more diverse according to this measure. Again, the Theil index draws a more differentiated picture than the Herfindahl index with more variance within diverse regions. Whilst the least diverse regions are hardly affected by distance weight, the rank order of the most diverse regions changes remarkably, but not drastically. However, the spread between the most diverse and the least diverse regions increases significantly when cultural distances are accounted for.

Of course, geographic distance is by far not the only determinant of cultural distance, although it is fair to assume that cultural distance is correlated with geographic distance. However, to validate our results we use an alternative measure of cultural distance, i.e. language distance. Language itself can be considered to be an outcome of cultural history, thus differences in languages are probably a good approximation of cultural differences (c.f. Fearon 2003).

Melitz and Toubal (2012) do an excellent work in calculating language proximity for a set of 195x195 countries by combining different data sources. We use their measure of language proximity based on linguistic features of the two most common native languages spoken in a country to calculate the language distance between countries. We impute missing values with the sample mean distance. Again, we weight all observations of foreigners with the language distance to their host country. The language distance weight of the native population is restricted to be unity. Conceptually, the overall culture present in some NUTS2 region is now represented by the aggregated language distances nested in the individuals living in that region. Similar to the geographic distances, we calculate the share that each cultural group has in the region's total culture and use the Herfindahl index and the Theil index to assess the distribution of culture among the groups observed. Figure 8 and Table 7 report the results for the Herfindahl index, Figure 9 and Table 8 describe cultural diversity using a language distance weighted Theil index.

[Figure 9 about here]

[Table 8 about here]

[Figure 10 about here]

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[Table 9 about here]

Both indices nicely differentiate between different degrees of cultural diversity among the European NUTS2 regions. Centers of diversity are of course again the urban centers. Other diverse regions can be found in England, Scandinavia, Cyprus, the Mediterranean coast and around the Alps. Least Diverse regions are situated at the Atlantic coast, in Southern Italy and in Eastern Europe. Conceptually, the weighted indices differ from the simpler measures that rest on citizenship only by accounting for cultural distance. Particularly language weighted indices most likely grasp several dimensions of cultural diversity at once. However, all the measures discussed draw somewhat similar pictures with the most diverse regions being urban and industrial centers, while less populated and peripheral regions in Eastern Europe tend to be less diverse.

4. Comparing the Measures

Share of foreigners is a comparatively rough proxy for cultural diversity. But it is the only proxy that is available for all NUTS2 regions of the EU27. We prefer diversity and fractionalization indices over this stock measure, although this comes at the cost of excluding the Irish regions from analysis. Herfindahl and Theil index are both effective measures of cultural diversity with meaningful differences. We have a preference for the Theil index that gives stronger weight to the contribution of small cultural groups to cultural diversity than the Herfindahl index.

To better account for differences between cultural groups, it is useful to further weight the indices with cultural distance. Conceptually, cultural distance is most thoroughly accounted for using language distance. However, the differences between all the measures of cultural diversity are not too substantial, as Table 9 reveals.

[Table 9 about here]

Table 9 clearly shows that all the measures are strongly correlated with each other. Even the share of foreigners based on citizenship and the share of foreigners based on country of birth measure are very similar. The Herfindahl index is more similar to the share of citizenship used as basis to calculate the indices than the Theil index, but still the Theil indices are strongly correlated with the share measures. Accordingly, for most analysis the measures of cultural diversity can most likely be substituted with each other. However, when it comes to

the analysis of subsamples and the assessment of concrete effects of cultural diversity, the conceptual differences between the measures proposed could become meaningful again. The language weighted measures differ most from the standard measures used. But they are still strongly correlated with the distance weighted measures, so that distance does indeed turn out to be a good proxy of cultural distance. Eventually, it does not seem reasonable to determine the best measure of cultural diversity ex post analysis. It seems more appropriate to deliberately use methodological variance in the subsequent assessments of the effects of cultural diversity on regional development and choose the measure according to the concrete research question and specification of the empirical model.

5. Summary and Conclusions

In this paper we have introduced and discussed measures of cultural diversity to be used in subsequent investigations of the impacts of cultural diversity on regional development in Europe. We have briefly reviewed the emerging literature on the measurement and the economic impact of cultural diversity and have applied our proposed diversity measures to European (NUTS-2) regions.

We find that cultural diversity is highest in the large urban agglomerations, in Central Europe, Benelux, Scandinavia, Northern Italy, the Southern UK and some Mediterranean Costal areas, whereas it is lowest in less populated and more peripheral Eastern European regions, in particular in Romania, Bulgaria and Poland. Although the correlation between the different measures of cultural diversity is relatively high, the measures are – from a conceptual point of view – rather different and the choice between them will depend on the concrete research question. Herfindahl-type indices put a strong weight on larger groups, while the generalized entropy type indices (such as the Theil index) give a stronger weight to the contribution of smaller population groups. Moreover, the consideration of differences in cultural distance between different population groups leads to some interesting changes in the diversity rankings that might become meaningful in the subsequent empirical analyses.

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Figure 1: Population Dynamics in the EU27 Over Period 2001-2011
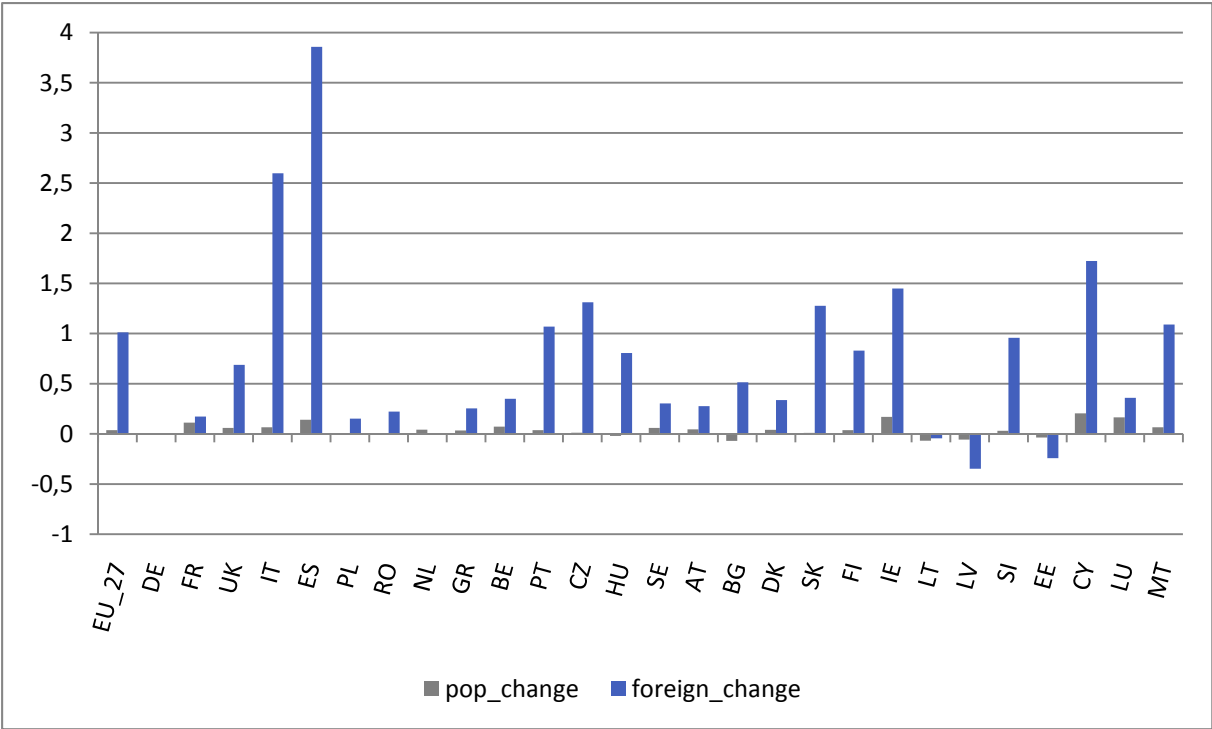
Notes: Figure depicts changes in the overall population (pop-change) and the foreign population (foreign_change) in the EU27 countries, and the EU27 average, over the period 2001-2011 in percent.

Figure 2: Cultural Diversity by Share of Foreigners (Country of Birth)
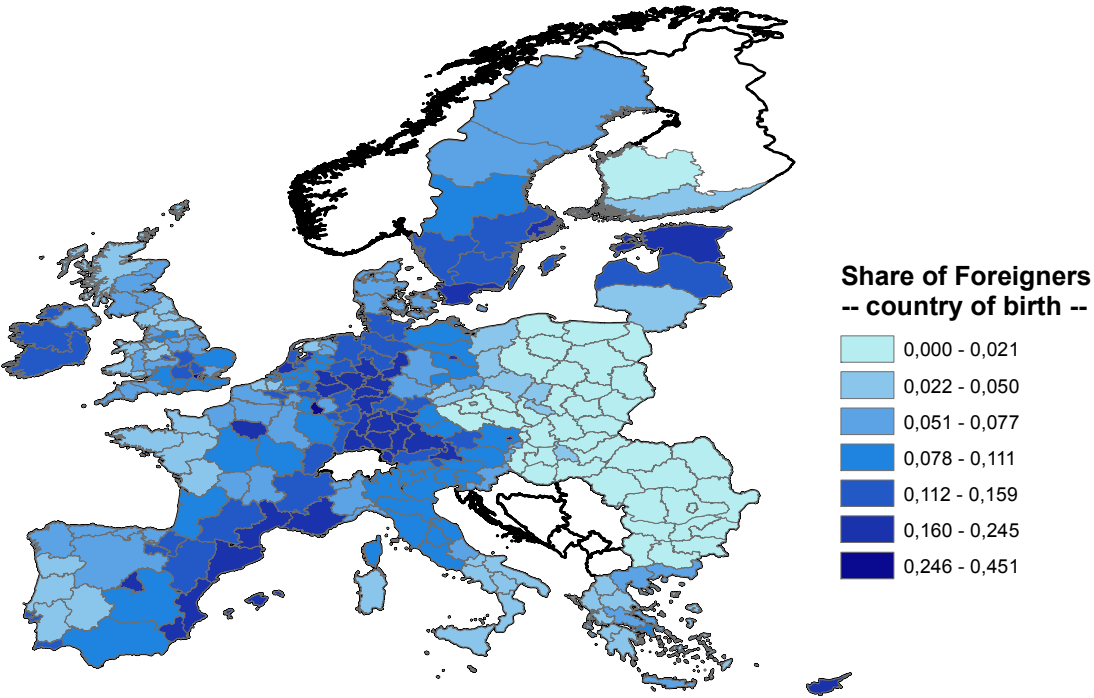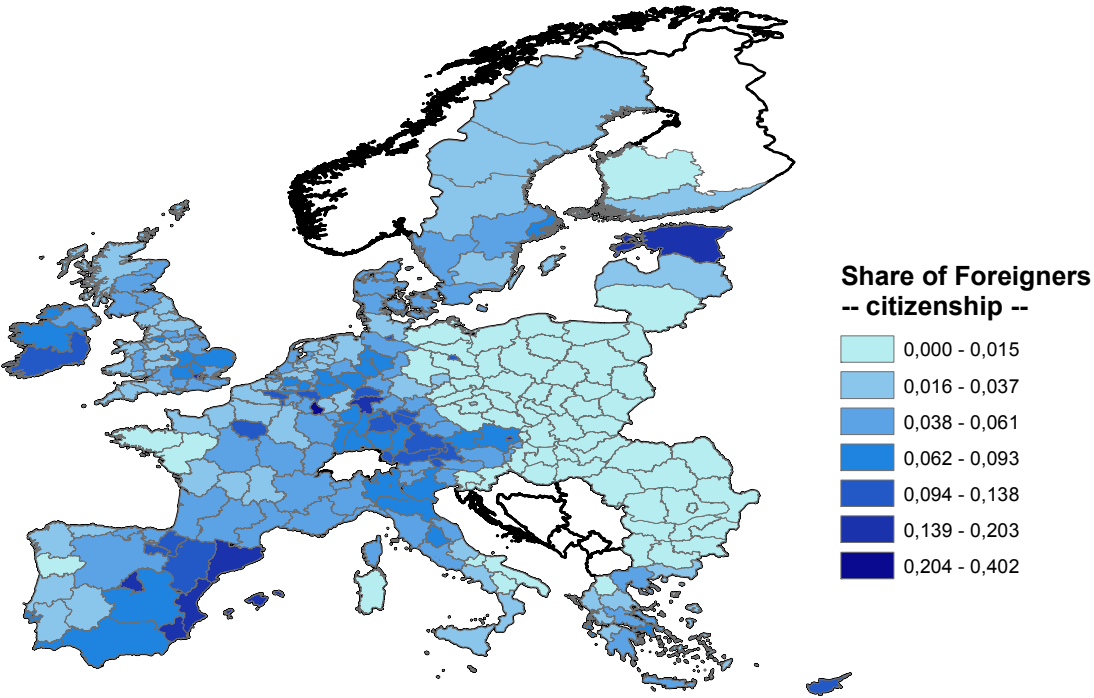

Notes: Figure depicts share of foreign born population in the EU27 NUTS2-Regions in the year 2007 based on the ELFS.

Table 1: Most/Least Diverse Regions by Share of Foreigners (Country of Birth)

		most diverse regions			least diverse regions		
rank	nuts2	region	share_foreign_cob	share_foreign_cob	region	nuts2	rank
1	UKI1	Inner London	0,4514	0,0001	Vest	RO42	261
2	LU00	Luxembourg (Grand-Duché)	0,3851	0,0002	Centru	RO12	260
3	BE10	Région de Bruxelles-Capitale	0,3592	0,0002	Sud-Vest Oltenia	RO41	259
4	UKI2	Outer London	0,3294	0,0005	Nord-Vest	RO11	258
5	AT13	Wien	0,3193	0,0005	Sud - Muntenia	RO31	257
6	ES64	Ciudad Autónoma de Melilla	0,2561	0,0005	Severozapaden	BG31	256
7	DE71	Darmstadt	0,2453	0,0006	Nord-Est	RO21	255
8	FR10	Ile de France	0,2372	0,0007	Sud-Est	RO22	254
9	DE72	Giessen	0,2346	0,0009	Yuzhen tsentralen	BG42	253
10	ES53	Illes Balears	0,2288	0,0019	Yugoiztochen	BG34	252
11	SE11	Stockholm	0,2206	0,0023	Swietokrzyskie	PL33	251
12	DE50	Bremen	0,2079	0,0024	Severen tsentralen	BG32	250
13	DEA4	Detmold	0,2023	0,0029	Malopolskie	PL21	249
14	FR82	Provence-Alpes-Côte-d'Azur	0,1978	0,0036	Kujawsko-Pomorskie	PL61	248
15	ES30	Comunidad de Madrid	0,1945	0,0038	Lodzkie	PL11	247
16	DE11	Stuggart	0,1937	0,0041	Bucuresti - Ilfov	RO32	246
17	DE12	Karlsruhe	0,1890	0,0041	Podlaskie	PL34	245
18	DE25	Mittelfranken	0,1869	0,0045	Podkarpackie	PL32	244
19	ES52	Comunidad Valenciana	0,1832	0,0048	Wielkopolskie	PL41	243
20	ES70	Canarias	0,1830	0,0050	Pomorskie	PL63	242

Notes: Table reports share of foreign born population for the 20 most diverse regions (left panel) and the 20 least diverse regions (right panel) according to this measure.

Figure 3: Cultural Diversity by Share of Foreigners (Citizenship)


Notes: Figure depicts share of foreign citizens in the EU27 NUTS2-Regions' population in the year 2007 based on the ELFS.

Table 2: Most/Least Diverse Regions by Share of Foreigners (Citizenship)

rank	nuts2	region	share_foreign_cit	share_foreign_cit	region	nuts2	rank
		most diverse regions			least diverse regions		
1	LU00	Luxembourg (Grand-Duché)	0,4020	0,0001	Yuzhen tsentralen	BG42	261
2	UKI1	Inner London	0,2743	0,0001	Severozapaden	BG31	260
3	BE10	Région de Bruxelles-Capitale	0,2723	0,0002	Sud-Vest Oltenia	RO41	259
4	ES53	Illes Balears	0,2026	0,0004	Pomorskie	PL63	258
5	AT13	Wien	0,1906	0,0005	Wielkopolskie	PL41	257
6	UKI2	Outer London	0,1854	0,0005	Stredne Slovensko	SK03	256
7	EE00	Eesti	0,1795	0,0006	Vest	RO42	255
8	ES52	Comunidad Valenciana	0,1644	0,0006	Centru	RO12	254
9	ES62	Región de Murcia	0,1626	0,0006	Yugoiztochen	BG34	253
10	ES30	Comunidad de Madrid	0,1591	0,0007	Kujawsko-Pomorskie	PL61	252
11	ES51	Cataluña	0,1478	0,0007	Sud-Est	RO22	251
12	DE71	Darmstadt	0,1469	0,0009	Podlaskie	PL34	250
13	ES70	Canarias	0,1422	0,0009	Zapadne Slovensko	SK02	249
14	FR10	Ile de France	0,1381	0,0010	Lodzkie	PL11	248
15	CY00	Kypros / Kibris	0,1329	0,0010	Dolnoslaskie	PL51	247
16	ES23	La Rioja	0,1323	0,0012	Swietokrzyskie	PL33	246
17	AT34	Vorarlberg	0,1286	0,0012	Severen tsentralen	BG32	245
18	AT32	Salzburg	0,1219	0,0012	Malopolskie	PL21	244
19	DE30	Berlin	0,1167	0,0013	Slaskie	PL22	243
20	DE60	Hamburg	0,1132	0,0014	Lubelskie	PL31	242

Notes: Table reports share of foreign citizens in the Nuts2 regions' population for the 20 most diverse regions (left panel) and the 20 least diverse regions (right panel) according to this measure.

**Figure 4: Cultural Diversity by Fractionalization Index (Herfindahl)**
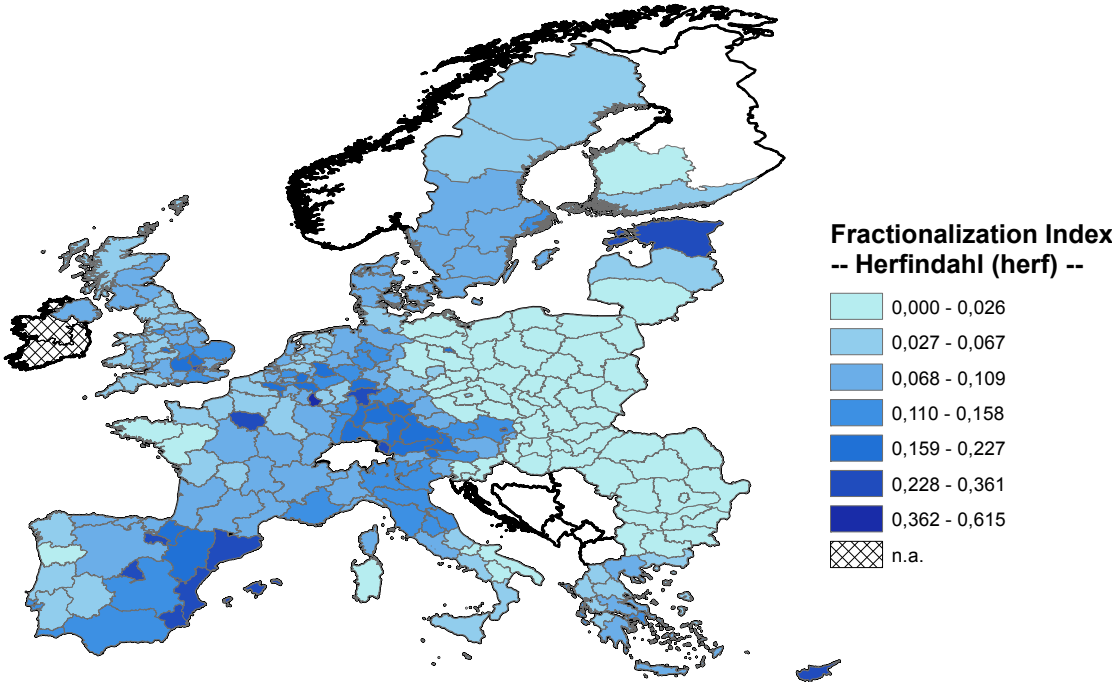
Notes: Figure depicts Herfindahl Fractionalization Index for EU27 NUTS2-Regions except Ireland in the year 2007 based on the ELFS.

Table 3: Most/Least Diverse Regions by Fractionalization Index (Herfindahl)

rank	nuts2	region	herf	herf	region	nuts2	rank
		most diverse regions			least diverse regions		
1	LU00	Luxembourg (Grand-Duché)	0,6148	0,0002	Yuzhen tsentralen	BG42	259
2	UKI1	Inner London	0,4714	0,0002	Severozapaden	BG31	258
3	BE10	Région de Bruxelles-Capitale	0,4644	0,0004	Sud-Vest Oltenia	RO41	257
4	ES53	Illes Balears	0,3614	0,0009	Pomorskie	PL63	256
5	AT13	Wien	0,3423	0,0009	Wielkopolskie	PL41	255
6	UKI2	Outer London	0,3350	0,0010	Stredne Slovensko	SK03	254
7	EE00	Eesti	0,3119	0,0012	Vest	RO42	253
8	ES52	Comunidad Valenciana	0,2997	0,0012	Centru	RO12	252
9	ES62	Región de Murcia	0,2934	0,0013	Yugoiztochen	BG34	251
10	ES30	Comunidad de Madrid	0,2905	0,0014	Kujawsko-Pomorskie	PL61	250
11	ES51	Cataluña	0,2719	0,0014	Sud-Est	RO22	249
12	DE71	Darmstadt	0,2704	0,0018	Podlaskie	PL34	248
13	ES70	Canarias	0,2628	0,0019	Zapadne Slovensko	SK02	247
14	FR10	Ile de France	0,2551	0,0019	Lodzkie	PL11	246
15	CY00	Kypros / Kibris	0,2461	0,0020	Dolnoslaskie	PL51	245
16	ES23	La Rioja	0,2441	0,0023	Swietokrzyskie	PL33	244
17	AT34	Vorarlberg	0,2379	0,0024	Severen tsentralen	BG32	243
18	AT32	Salzburg	0,2273	0,0024	Malopolskie	PL21	242
19	DE30	Berlin	0,2175	0,0025	Slaskie	PL22	241
20	DE60	Hamburg	0,2120	0,0028	Lubelskie	PL31	240

Notes: Table reports Herfindahl Fractionalization Index for the 20 most diverse regions (left panel) and the 20 least diverse regions (right panel) according to this measure.

Figure 5: Cultural Diversity by Diversity Index (Theil)
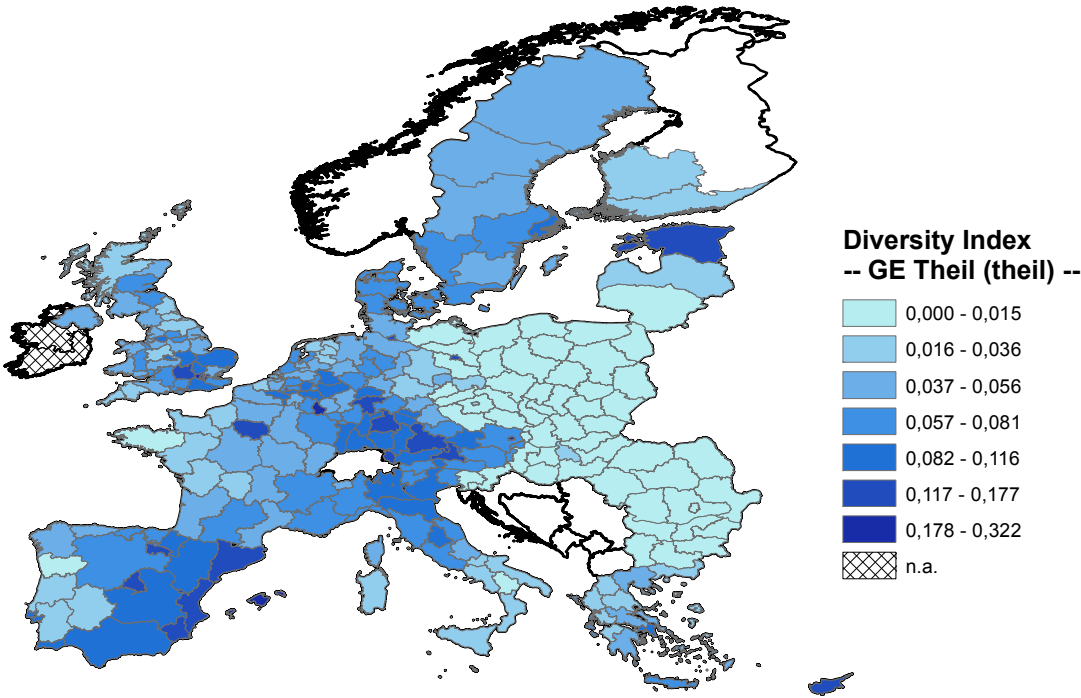
Notes: Figure depicts Theil Diversity Index for EU27 NUTS2-Regions except Ireland in the year 2007 based on the ELFS.

Table 4: Most/Least Diverse Regions by Diversity Index (Theil)

		most diverse regions				least diverse regions		
rank	nuts2	region	theil	theil	region	nuts2	rank
1	UKI1	Inner London	0,3216	0,0002	Severozapaden	BG31	259
2	LU00	Luxembourg (Grand-Duché)	0,3112	0,0002	Yuzhen tsentralen	BG42	258
3	BE10	Région de Bruxelles-Capitale	0,2756	0,0004	Sud-Vest Oltenia	RO41	257
4	UKI2	Outer London	0,2248	0,0008	Pomorskie	PL63	256
5	ES53	Illes Balears	0,2125	0,0009	Wielkopolskie	PL41	255
6	AT13	Wien	0,2097	0,0009	Stredne Slovensko	SK03	254
7	ES52	Comunidad Valenciana	0,1767	0,0010	Vest	RO42	253
8	ES30	Comunidad de Madrid	0,1681	0,0011	Yugoiztochen	BG34	252
9	ES51	Cataluña	0,1647	0,0011	Centru	RO12	251
10	DE71	Darmstadt	0,1640	0,0013	Sud-Est	RO22	250
11	ES70	Canarias	0,1592	0,0013	Kujawsko-Pomorskie	PL61	249
12	ES62	Región de Murcia	0,1513	0,0016	Zapadne Slovensko	SK02	248
13	FR10	Ile de France	0,1497	0,0016	Podlaskie	PL34	247
14	CY00	Kypros / Kibris	0,1440	0,0017	Lodzkie	PL11	246
15	AT32	Salzburg	0,1355	0,0018	Dolnoslaskie	PL51	245
16	AT34	Vorarlberg	0,1329	0,0020	Swietokrzyskie	PL33	244
17	ES23	La Rioja	0,1279	0,0021	Severen tsentralen	BG32	243
18	DE30	Berlin	0,1278	0,0022	Malopolskie	PL21	242
19	DE21	Oberbayern	0,1275	0,0023	Slaskie	PL22	241
20	DE60	Hamburg	0,1249	0,0024	Lubelskie	PL31	240

Notes: Table reports Theil diversity index for the 20 most diverse regions (left panel) and the 20 least diverse regions (right panel) according to this measure.

Figure 6: Cultural Diversity by Fractionalization Index with Distance Weights
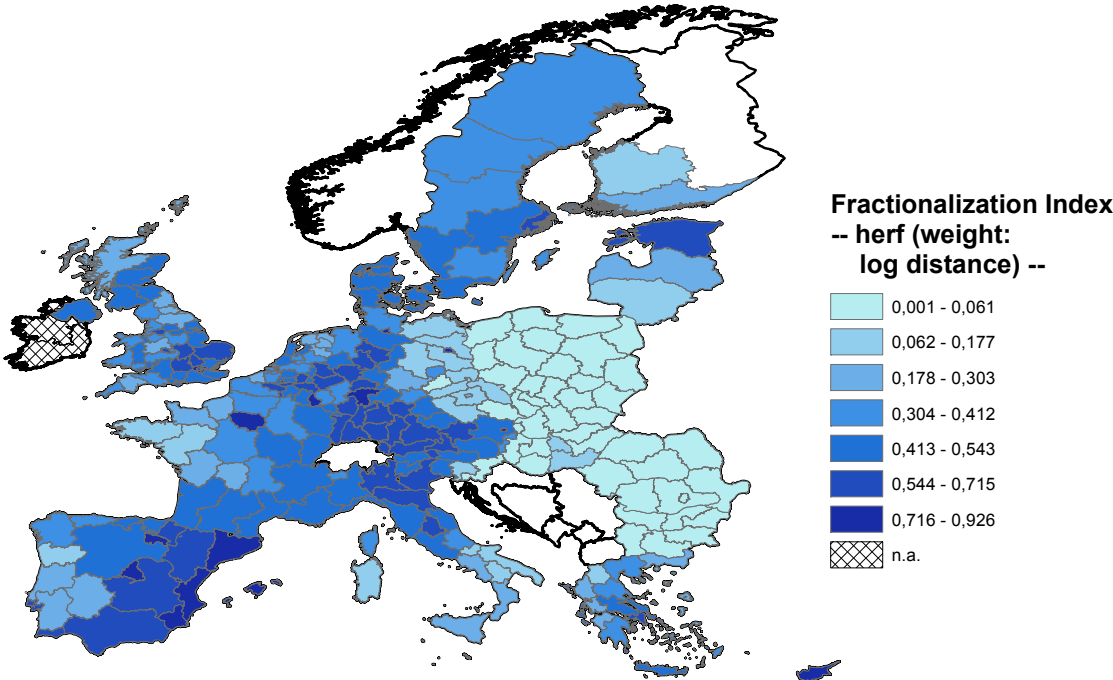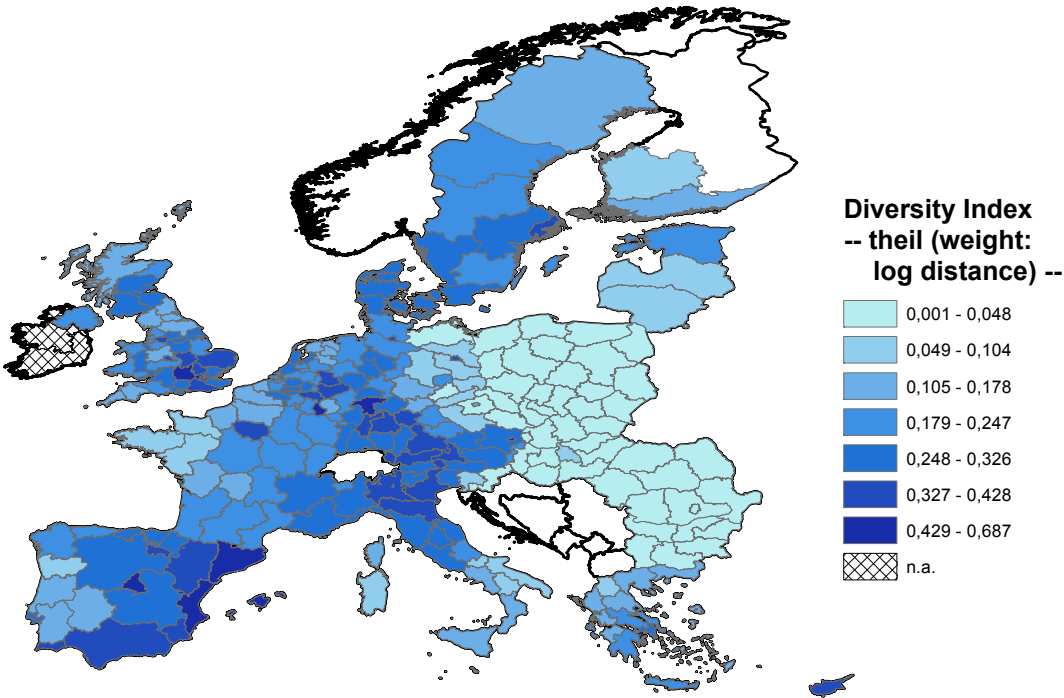

Notes: Figure depicts Herfindahl-Fractionalization Index weighted with the log of distance between the most populated cities in the foreigners' home country and the country they are living in for EU27 NUTS2-Regions except Ireland in the year 2007 based on the ELFS.

Table 5: Most/Least Diverse Regions by Fractionalization Index with Distance Weights

		most diverse regions			least diverse regions		
rank	nuts2	region	herf_distw	herf_distw	region	nuts2	rank
1	UKI1	Inner London	0,9262	0,0015	Yuzhen tsentralen	BG42	259
2	BE10	Région de Bruxelles-Capitale	0,8856	0,0016	Severozapaden	BG31	258
3	ES53	Illes Balears	0,8620	0,0028	Sud-Vest Oltenia	RO41	257
4	UKI2	Outer London	0,8604	0,0057	Stredne Slovensko	SK03	256
5	LU00	Luxembourg (Grand-Duché)	0,8413	0,0071	Pomorskie	PL63	255
6	AT13	Wien	0,8268	0,0077	Wielkopolskie	PL41	254
7	ES52	Comunidad Valenciana	0,8204	0,0091	Yugoiztochen	BG34	253
8	ES30	Comunidad de Madrid	0,8133	0,0100	Centru	RO12	252
9	ES51	Cataluña	0,8012	0,0103	Vest	RO42	251
10	ES70	Canarias	0,8000	0,0106	Kujawsko-Pomorskie	PL61	250
11	DE71	Darmstadt	0,7922	0,0108	Zapadne Slovensko	SK02	249
12	FR10	Ile de France	0,7764	0,0116	Podlaskie	PL34	248
13	ES62	Región de Murcia	0,7745	0,0116	Sud-Est	RO22	247
14	CY00	Kypros / Kibris	0,7566	0,0148	Lodzkie	PL11	246
15	ES23	La Rioja	0,7478	0,0159	Dolnoslaskie	PL51	245
16	DE60	Hamburg	0,7329	0,0162	Severen tsentralen	BG32	244
17	DE30	Berlin	0,7217	0,0164	Swietokrzyskie	PL33	243
18	DE21	Oberbayern	0,7151	0,0179	Slaskie	PL22	242
19	DE11	Stuggart	0,7127	0,0189	Malopolskie	PL21	241
20	AT34	Vorarlberg	0,7085	0,0197	Vychodne Slovensko	SK04	240

Notes: Table reports Herfindahl fractionalization index weighted with the log of distance between the most populated cities in the foreigners' home country and the country they are living in for the 20 most diverse regions (left panel) and the 20 least diverse regions (right panel) according to this measure.

**Figure 7: Cultural Diversity by Diversity Index with Distance Weights**

Notes: Figure depicts Theil Diversity Index weighted with the log of distance between the most populated cities in the foreigners' home country and the country they are living in for EU27 NUTS2-Regions except Ireland in the year 2007 based on the ELFS.

Table 6: Most/Least Diverse Regions by Diversity Index with Distance Weights

rank	nuts2	region	theil_distw	theil_distw	region	nuts2	rank
		most diverse regions			least diverse regions		
1	UKI1	Inner London	0,6874	0,0012	Severozapaden	BG31	259
2	UKI2	Outer London	0,5955	0,0013	Yuzhen tsentralen	BG42	258
3	BE10	Région de Bruxelles-Capitale	0,5623	0,0022	Sud-Vest Oltenia	RO41	257
4	AT13	Wien	0,5159	0,0043	Stredne Slovensko	SK03	256
5	ES53	Illes Balears	0,5083	0,0052	Pomorskie	PL63	255
6	ES51	Cataluña	0,4707	0,0055	Wielkopolskie	PL41	254
7	ES52	Comunidad Valenciana	0,4694	0,0066	Yugoiztochen	BG34	253
8	LU00	Luxembourg (Grand-Duché)	0,4650	0,0070	Vest	RO42	252
9	DE71	Darmstadt	0,4631	0,0072	Zapadne Slovensko	SK02	251
10	ES70	Canarias	0,4605	0,0074	Centru	RO12	250
11	ES30	Comunidad de Madrid	0,4518	0,0077	Kujawsko-Pomorskie	PL61	249
12	UKJ1	Berksh., Buckinghamsh. ,Oxfordsh.	0,4441	0,0082	Podlaskie	PL34	248
13	FR10	Ile de France	0,4276	0,0083	Sud-Est	RO22	247
14	CY00	Kypros / Kibris	0,4157	0,0107	Lodzkie	PL11	246
15	DE21	Oberbayern	0,4119	0,0113	Severen tsentralen	BG32	245
16	UKH2	Bedfordshire and Hertfordshire	0,4032	0,0115	Swietokrzyskie	PL33	244
17	UKG3	West Midlands	0,4006	0,0115	Dolnoslaskie	PL51	243
18	DE30	Berlin	0,3939	0,0132	Slaskie	PL22	242
19	DE60	Hamburg	0,3932	0,0135	Vychodne Slovensko	SK04	241
20	AT32	Salzburg	0,3921	0,0135	Lubelskie	PL31	240

Notes: Table reports Theil diversity index weighted with the log of distance between the most populated cities in the foreigners' home country and the country they are living in for the 20 most diverse regions (left panel) and the 20 least diverse regions (right panel) according to this measure.

Figure 8: Cultural Diversity by Fractionalization Index with Language Weights
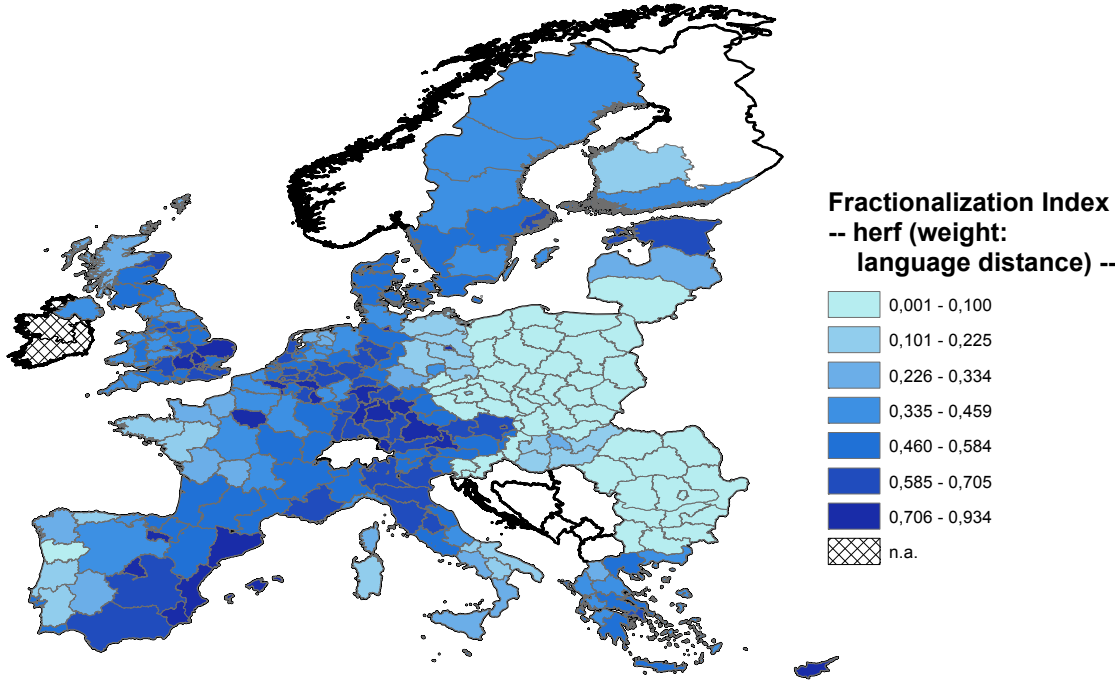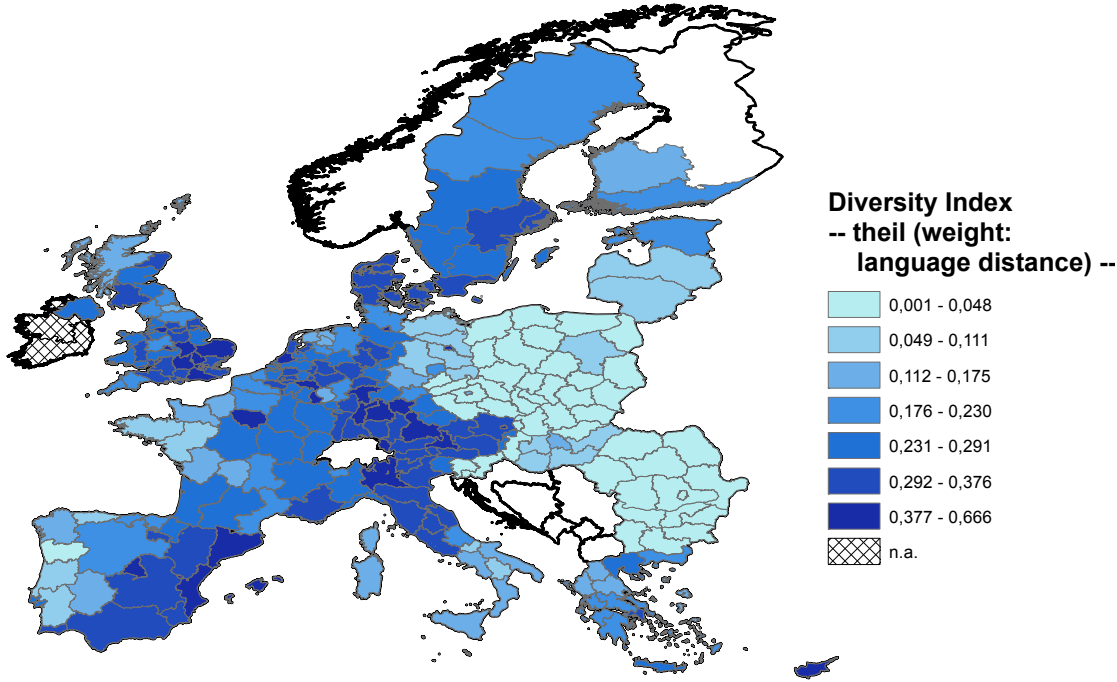

Notes: Figure depicts Herfindahl-Fractionalization Index weighted with the language distance between the foreigners' home country and the country they are living in for EU27 NUTS2-Regions except Ireland in the year 2007 based on the ELFS.

Table 7: Most/Least Diverse Regions by Fractionalization Index with Language Weights

		most diverse regions			least diverse regions		
rank	nuts2	region	herf_langw	herf_langw	region	nuts2	rank
1	UKI1	Inner London	0,9339	0,0008	Severozapaden	BG31	259
2	UKI2	Outer London	0,8983	0,0016	Yuzhen tsentralen	BG42	258
3	BE10	Région de Bruxelles-Capitale	0,8789	0,0032	Sud-Vest Oltenia	RO41	257
4	AT13	Wien	0,8736	0,0051	Yugoiztochen	BG34	256
5	ES53	Illes Balears	0,8422	0,0053	Vest	RO42	255
6	DE71	Darmstadt	0,8280	0,0069	Stredne Slovensko	SK03	254
7	LU00	Luxembourg (Grand-Duché)	0,8267	0,0080	Zapadne Slovensko	SK02	253
8	FR10	Ile de France	0,8121	0,0084	Podlaskie	PL34	252
9	ES52	Comunidad Valenciana	0,7994	0,0093	Severen tsentralen	BG32	251
10	UKJ1	Berksh., Buckinghamsh. ,Oxfordsh.	0,7912	0,0104	Centru	RO12	250
11	ES51	Cataluña	0,7750	0,0117	Wielkopolskie	PL41	249
12	AT34	Vorarlberg	0,7657	0,0139	Swietokrzyskie	PL33	248
13	UKG3	West Midlands	0,7569	0,0163	Kujawsko-Pomorskie	PL61	247
14	DE11	Stuggart	0,7556	0,0167	Vychodne Slovensko	SK04	246
15	DE25	Mittelfranken	0,7551	0,0227	Sud-Est	RO22	245
16	UKH2	Bedfordshire and Hertfordshire	0,7532	0,0228	Slaskie	PL22	244
17	AT32	Salzburg	0,7497	0,0234	Severoiztochen	BG33	243
18	CY00	Kypros / Kibris	0,7492	0,0237	Bratislavsky kraj	SK01	242
19	DE30	Berlin	0,7483	0,0239	Sud - Muntenia	RO31	241
20	ES62	Región de Murcia	0,7472	0,0242	Lubelskie	PL31	240

Notes: Table reports Herfindahl fractionalization index weighted with the language distance between the foreigners' home country and the country they are living in for the 20 most diverse regions (left panel) and the 20 least diverse regions (right panel) according to this measure.

Figure 9: Cultural Diversity by Diversity Index with Language Weights

Notes: Figure depicts Theil Diversity Index weighted with the language distance between the foreigners' home country and the country they are living in for EU27 NUTS2-Regions except Ireland in the year 2007 based on the ELFS.

Table 8: Most/Least Diverse Regions by Diversity Index with Language Weights

		most diverse regions		least diverse regions			
rank	nuts2	region	theil_langw	theil_langw	region	nuts2	rank
1	UKI1	Inner London	0,6657	0,0006	Severozapaden	BG31	259
2	UKI2	Outer London	0,6199	0,0014	Yuzhen tsentralen	BG42	258
3	AT13	Wien	0,5494	0,0024	Sud-Vest Oltenia	RO41	257
4	BE10	Région de Bruxelles-Capitale	0,5358	0,0040	Yugoiztochen	BG34	256
5	UKJ1	Berksh., Buckinghamsh. ,Oxfordsh.	0,4769	0,0040	Vest	RO42	255
6	DE71	Darmstadt	0,4732	0,0050	Stredne Slovensko	SK03	254
7	FR10	Ile de France	0,4632	0,0059	Zapadne Slovensko	SK02	253
8	ES53	Illes Balears	0,4559	0,0062	Podlaskie	PL34	252
9	LU00	Luxembourg (Grand-Duché)	0,4460	0,0070	Severen tsentralen	BG32	251
10	ES52	Comunidad Valenciana	0,4433	0,0075	Centru	RO12	250
11	UKH2	Bedfordshire and Hertfordshire	0,4377	0,0079	Wielkopolskie	PL41	249
12	AT32	Salzburg	0,4325	0,0100	Swietokrzyskie	PL33	248
13	UKG3	West Midlands	0,4295	0,0111	Kujawsko-Pomorskie	PL61	247
14	UKD3	Greater Manchester	0,4239	0,0118	Vychodne Slovensko	SK04	246
15	DE21	Oberbayern	0,4129	0,0133	Sud-Est	RO22	245
16	UKF2	Leicestersh., Rutland, Northamptonsh.	0,4082	0,0150	Sud - Muntenia	RO31	244
17	DE25	Mittelfranken	0,4006	0,0151	Pomorskie	PL63	243
18	UKH1	East Anglia	0,4001	0,0152	Lubelskie	PL31	242
19	UKJ2	Surrey, East and West Sussex	0,3988	0,0160	Severoiztochen	BG33	241
20	ES51	Cataluña	0,3986	0,0162	Bratislavsky kraj	SK01	240

Notes: Table reports Theil diversity index weighted with the language distance between the foreigners' home country and the country they are living in for the 20 most diverse regions (left panel) and the 20 least diverse regions (right panel) according to this measure.

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Table 9: Correlation Between Diversity Measures

	share_cob	share_cit	herf	theil	herf_distw	theil_distw	herf_langw	theil_langw
share_cob	1.0000							
share_cit	0.8731	1.0000						
herf	0.8833	0.9963	1.0000					
theil	0.8880	0.9763	0.9853	1.0000				
herf_distw	0.8302	0.8536	0.8895	0.9069	1.0000			
theil_distw	0.8295	0.8486	0.8820	0.9295	0.9759	1.0000		
herf_langw	0.7889	0.7860	0.8237	0.8505	0.9651	0.9481	1.0000	
theil_langw	0.7952	0.7864	0.8214	0.8765	0.9436	0.9732	0.9737	1.0000

Notes: Table reports pairwise correlations between the diversity measures discussed above.

Project Information

Welfare, Wealth and Work for Europe

A European research consortium is working on the analytical foundations for a socio-ecological transition

Abstract

Europe needs a change: The financial crisis has exposed long neglected deficiencies in the present growth path, most visibly in unemployment and public debt. At the same time Europe has to cope with new challenges ranging from globalisation and demographic shifts to new technologies and ecological challenges. Under the title of Welfare, Wealth and Work for Europe – WWWforEurope – a European research consortium is laying the analytical foundations for a new development strategy that enables a socio-ecological transition to high levels of employment, social inclusion, gender equity and environmental sustainability. The four year research project within the 7th Framework Programme funded by the European Commission started in April 2012. The consortium brings together researchers from 33 scientific institutions in 12 European countries and is coordinated by the Austrian Institute of Economic Research (WIFO). Project coordinator is Karl Aiginger, director of WIFO.

For details on WWWforEurope see: www.foreurope.eu

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