How does immigration affect regional well-being?

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Abstract

Immigration has grown in relevance as a topic in the context of the European Union in the last decades, both for the expanding foreign-born population within its borders and for the major effects that immigration has on the social and economic life of host regions. However, while the effect of immigration on the material welfare of the host territories, the literature on how immigration affects subjective well-being (SWB) is limited. For this reason, the paper aims to assess how immigration affects regional well-being. Specifically, the aim is twofold; to analyze the magnitude of this effect and to assess whether this effect is direct or is channelled through other socio-economic factors. By combining European regional data from the OECD regional data library, the study relates the FB population share with SWB of over 130 European NUTS 1 and NUTS 2 regions, along with other socio-economic variables. Furthermore, multiple other analyses were carried out, by splitting the sample according to the GDP per capita and by the regions' geographical location (Northern and Southern Europe) and by dividing the FB population groups according to their educational level and their origin (EU vs. non-EU). The main results suggest that although immigration is positively and significantly associated with SWB, this effect is mainly channelled through socio-economic factors, and immigration does not have a direct effect on SWB. However, the findings suggest that in Northern Europe, although presenting a positive association, after adjusting for socioeconomic factors, immigration has a negative direct effect on SWB.

Introduction

Immigration has grown in relevance as a topic in the context of the European Union (EU) in the last decades, mainly due to the great rise of the foreign-born (FB) population; as of 2021, more than 8 per cent of the total EU population is composed of FB, meaning that 37.5 million people are non-EU citizens (European Commission, 2021). Immigration brings major effects on the socio-economic performance of the host countries; in terms of economic welfare, immigration has been associated with overall benefits, although these effects might differ among high-skilled and low-skilled workers (Bansak et al., 2015; Borjas, 1995, 2001; Borjas & Katz, 2005; Staffolani & Valentini, 2010). However, immigration can affect social and non-material parameters, either by decreasing social capital and trust (Alesina & La Ferrara, 2000; Horwitz & Horwitz, 2007; Letki, 2008; Putnam, 2007; Sturgis et al., 2011) or by increasing opportunities and creativity (Florida, 2014; Mazzolari & Neumark, 2012). Therefore, as economists increasingly turn to non-material indicators of welfare, one above all subjective well-being (SWB) (Ballas et al., 2017; Pittau et al., 2010), the need to assess how immigration affects these parameters becomes a necessity.

Although being a limited field of literature, some studies have tried to assess the effect of immigration on SWB. The results in this stream of literature are mixed. While some researchers do not report any significant effect of immigration on SWB (Betz & Simpson, 2013; Papageorgiou, 2018), others claim that there is a direct relationship between the two variables (Akay et al., 2014; Longhi, 2014). Specifically, the former studies argue that any benefit that immigration has on SWB is channelled through economic performance; this means that any benefit that immigration may have on SWB can be explained by the benefits that immigration brings to the local economy (Betz & Simpson, 2013; Papageorgiou, 2018). Furthermore, other

studies report that the effect on SWB may differ according to the region (Akdede & Giovanis, 2020) or on the characteristics of natives (Ivlevs & Veliziotis, 2018). These mixed results make it difficult to delineate a clear picture of the effect of immigration on SWB. Many of these papers take into consideration either national entities or regional ones within the same country.

This paper tries to address some of the limitations of previous literature by performing an analysis of the effect on a cross-regional level at the European scale. By combining European regional data from the OECD regional data library, the study relates the FB population share with SWB of over 130 European NUTS 1 and NUTS 2 regions, while adjusting for socioeconomic variables. Furthermore, multiple other analyses will be carried out, by splitting the sample according to the GDP per capita and by the regions' geographical location (Northern and Southern Europe) and by dividing the FB population groups according to their educational level and their origin (EU vs. non-EU). The aim of this study is, therefore, to address how immigration affects regional well-being. Under this aim, the study will assess the quantitative magnitude of this effect and whether this effect is direct or indirect, namely whether it is channelled through socio-economic variables. This study will contribute to expanding on the limited field of how immigration affects SWB in host regions. It will also contribute to expanding the knowledge on regional economic analysis, which has been growing in attention due to the better assessment of the explanatory potential of growth models (Gennaioli et al., 2014).

The paper will provide a thorough Literature Review, in the next section, comprising an exploration of how immigration affects traditional socio-economic parameters, the rising importance of well-being in the economic field, the determinants of well-being and the previous literature on the effect of immigration on SWB. Then the Methodology of the study will be

presented, followed by the Results of the analysis. Then the Discussion will provide reasoning for the results of the analysis and its limitations. Finally, the Conclusion will summarize the main points of the Discussion.

Literature review

Immigration and traditional economic parameters

Several studies have looked at the influence of international migration on natives' well-being using objective measurements, particularly labour market variables like earnings and employment (Akdede & Giovanis, 2020). Upon their arrival, flows of immigration can have a significant effect on the socio-economic parameters of the host territory. There are several channels through which the effect of immigration can affect a certain territory, running from factors of production, changes in the labour market and in wages and overall effects on economic growth (Borjas, 1995, 2001; Münz et al., 2006). On another note, in light of the ageing phenomenon in certain countries, especially in Europe the inflow of immigrants could represent a possibility to curb the effect of the ageing population on European countries' economies (Akdede & Giovanis, 2020).

Previous literature has found mixed results on whether immigration stocks improve or decrease the welfare of native citizens in host territories. It is especially compelling the strand of literature that has focused on the effects of immigration on labour market indicators, namely wages and unemployment. Under the assumption of a perfectly competitive labour market, immigrants can have a very different effect on the native workers, depending on whether their skills are substituting or complementing the native workers' skills (Dustmann et al., 2016). In the case that they are substituting, the natives are usually penalized, as immigrants often accept lower wages and can put the native out of jobs; usually, these natives that suffer the most are the

ones working in low-skilled jobs, as immigrants tend to work in the low-skilled sector (Papageorgiou, 2018). However, Peri (2007) argues that the skills of migrants and natives are not substitutable, or at least hardly ever, leading to a situation where natives are prone to specialize in skilled jobs and immigrants can take on blue-collar jobs or be employed in jobs that require alternative skills. However, empirical evidence suggests that this is not always the case.

One of the first studies on the effect of migration on the local economy was conducted by Grossman in 1982; the study showed how wages have fallen due to the rise of migrant workers employed (Grossman, 1982). Since then, many papers have tried to analyze the effect of immigration on numerous economic parameters. A series of studies regarding the effect of immigration on the US wages and employment rates showed that the effect is negative albeit small, if any at all, on both indicators (Butcher & Card, 1991; Card, 2001); moreover, neither sudden and large immigration flows have significant effects on these two indicators (Carrasco et al., 2008; Dustmann et al., 2005).

These studies take into consideration overall national wages, which are not distinguished at the skill level. However, when the different effects on low-wage workers and high-wage workers are analyzed separately, the results are quite different. A study by Borjas and Katz (2005) showed how the inflow of low-skilled immigrants negatively affected the wages of the native low-wage worker, while it has benefitted high-skilled workers. Furthermore, in the context of Italy, it has been assessed that while highly skilled workers always benefit from immigration, the so-called blue-collar workers can either benefit or not, depending on the characteristics of the immigration flows (Staffolani & Valentini, 2010). Those natives whose labour market was not affected by immigration, namely high-skilled workers, may profit from lower relative prices for low-skill intensive goods and services, better labour market efficiency,

and production complementarities (Borjas, 1995, 2001; Borjas & Katz, 2005). However, if immigration rates are high in comparison to the labour force, blue-collar workers are disadvantaged, as competition for their jobs increases (Staffolani & Valentini, 2010).

These results, however, are contested by other studies, which conclude a much different picture of the effect of immigration on the welfare of natives. Immigration flows in the UK have been reported to increase the wage growth of native workers (Dustmann et al., 2003); furthermore, in contrast with the results from the case study from Italy, migrants increased the national wages of blue-collar workers (Gavosto et al., 1999). Other studies have found a positive impact of migration on the natives' wages, along with an increase in probability for both second-generation immigrants and natives to be employed; these results apply to Northern European Countries, while in Eastern and Southern Europe the positive effect of immigration can be assessed mostly on native's earnings (Akdede & Giovanis, 2020). These results are in line with the claim that if migrants are complementary to the labour market concerning native workers, the opportunities and the benefits for the natives will increase (Bansak et al., 2015; Bodvarsson & Berg, 2009).

It is therefore clear that as the results presented are mixed, a variety of factors might determine whether immigration has a positive or negative effect on the material welfare of the country or region, which can vary from characteristics and size of the immigration population to market and economic parameters of the affected country or region. Specifically, it is recognized how immigration can have a different impact on the wages of natives whether the skills of the two groups are complementary or substitutable.

Raising interest in subjective well-being.

Over the last decades, however, material econometric parameters have become less and less relevant in determining the development of a certain region, and well-being and life satisfaction as econometric parameters have increased in their relevance, both for research and for policy-making (Longhi, 2014).

Numerous research has shown how economic and financial parameters cannot fully account for the quality of life and that they do not fully explain human welfare (Diener & Seligman, 2004; Graham, 2016; Kahneman et al., 1997). On the other hand, well-being was generally investigated by psychologists and sociologists, while neoclassical economists tended to ignore these kinds of indicators (Diener et al., 1999). The first economic study to address the various dimensions of well-being next to income detected a lack of relationship between the fluctuation of GDP per capita and happiness in the US, marking the way for economists to study and assess the effect that economic parameters have on well-being (Easterlin, 1974). After Easterlin's (1974) recognized contribution, economists have started to take into consideration alternative approaches to thoroughly assess human welfare, namely through the analysis of individual SWB (Deaton, 2008).

There are two main reasons why SWB has grown in interest among the economics research community. First, SWB has been assessed as a great monitor of progress and an accurate indicator for public policy-making (Dolan & Metcalfe, 2012; Dolan & White, 2007). Second, there is significant evidence that well-being is associated with objective benefits, both on the micro and macro levels; among others, SWB leads to better health, higher income and productivity (De Neve et al., 2013; Diener et al., 2017; Dolan & White, 2007).

The determinants of well-being

In the stream of literature on well-being, several studies have focused on individual factors of well-being, while others have analyzed the effect that economic characteristics have on the well-being of individuals (Pittau et al., 2010). The majority of the literature has focused on the individual factors of well-being, namely those events and characteristics that can significantly affect one's well-being (Longhi, 2014). Among these determinants, we find personality traits, gender, age, income, educational level, marital status migration and many others (Diener et al., 1999; Stutzer & Frey, 2010).

In particular, age has been a debated topic on whether different age groups present different levels of SWB. A study from Blanchflower (2021), stated that happiness has a clear U-shaped relationship with happiness in virtually every country in the world, with happiness being high while young, decreasing with adulthood and increasing again while approaching old age. However, a subsequent study analyzed the relationship within European countries, revealing that the u-shaped relationship is evident in some countries, while others have different patterns; almost every pattern, however, shows a change in happiness while reaching old age (Bartram, 2022).

Another important individual characteristic that greatly affects happiness is educational level (Cuñado & de Gracia, 2012; Jongbloed, 2018; Nikolaev & Rusakov, 2016). This effect has been assessed as an increase in self-confidence and self-esteem that comes from knowledge acquisition, as well as from higher social status and income that derive from better education (Cuñado & de Gracia, 2012). In general, higher educational levels are reported to increase SWB among individuals, with tertiary education being significant for happiness for Europeans (Jongbloed, 2018).

Despite individual characteristics having a major effect on well-being, a strand of literature has also assessed the effect of individual and regional economic characteristics on well-being and life satisfaction. After controlling for individual characteristics, SWB is greatly affected by values, and changes in these values, of country and regional level macroeconomic variables (Di Tella et al., 2003).

The most discussed parameter regarding its effect on well-being is personal income. Personal income has a major effect on the SWB of individuals (Pittau et al., 2010; Stanca, 2010). However, this effect changes according to the region of belonging; personal income is more significant in poorer regions than in richer ones, a pattern that holds for regions of the same country (Akgün et al., 2021; Pittau et al., 2010; Stanca, 2010). This is in line with Ingelhart's post-materialism theory, which outlines that after a certain threshold of richness, SWB is less related to material gains and more to non-material matters (Inglehart, 1977). Therefore, GDP per capita can also have a strong effect on SWB, which varies, although, on the personal income of the individual (Akgün et al., 2021).

Other findings show how unemployment status and unemployment status gain (e.g. losing one's job) have a major negative effect on the well-being of individuals (Clark & Oswald, 1994). Furthermore, findings show that unemployment rates in the region of belonging harm SWB (Pittau et al., 2010). The reason for this is twofold. Firstly, living in regions with high unemployment does not alleviate the decrease in unhappiness that comes with unemployment. Unemployed people living in these regions see even fewer opportunities to find a job, which can lead to a significant decrease in well-being. Secondly, employed people living in high unemployment regions are also negatively affected by this, as they might feel trapped in their

jobs or because of the fear of losing their job and not being able to find another one (Pittau et al., 2010).

Another major macro social component which greatly affects SWB is social cohesion (Delhey & Dragolov, 2016). The effect that social cohesion has on SWB is to strengthen trust and social factors, which are key components of leading a happy life (Delhey & Dragolov, 2016; Helliwell & Wang, 2011). Social cohesion is considered a great component of SWB. In Europe, people living in a cohesive society are reported to be happier and psychologically healthier (Delhey & Dragolov, 2016). Citizens living in the more affluent part of Europe benefit the most from social cohesion (Delhey & Dragolov, 2016), in line with the post-material theory of happiness (Inglehart, 1977). In affluent regions, the benefit of social cohesion is so significant that they outweigh the benefits from national wealth and income inequality (Delhey & Dragolov, 2016).

Immigration and well-being

As explained above, the literature on how immigration affects the material welfare of the host territories is thorough, albeit presenting mixed results; however, there has been little attention to how immigrants affect the SWB of host regions, despite more and more economists and policy-makers, have turned to subjective measures of welfare to assess development.

The literature on well-being and migration has mainly focused on the effect that the latter has on migrants themselves or the areas with large shares of emigration. Overall, migration has been reported to harm both family members left at home and migrants themselves, who tend to have much lower happiness scores than non-migrants (Bălţătescu, 2007; Bartram, 2010, 2011; Borraz et al., 2008).

Despite not assessing the effect of migration on the SWB of the host population, there have been extensive studies trying to assess the attitudes that natives might have towards immigrants and the effect that these immigrants might have on certain dynamics of the host country or community. Attitudes can be a proxy for happiness, as unhappy people tend to have lower opinions and negative attitudes towards immigrants; however, this is not related to whether the changes in their happiness are directly due to immigration-related reasons (Boateng et al., 2021; Panno, 2018).

The attitudes towards immigration vary significantly depending on the demographic characteristics and the country where these attitudes are analyzed. A report from the International Organization for Migration (IOM) shows how Northern and Western European countries disclose positive attitudes toward migrants, while Southern European countries report a rather negative perception towards migrants (IOM, 2015). Regarding the demographics with the most negative attitudes towards immigrants, the elderly are reported to have the highest opposition rates toward migration (Card et al., 2012; Mayda, 2006), despite being the least affected by eventual negative outcomes in the labour market that migrants might bring (Akdede & Giovanis, 2020). Among other demographic groups that show a lower perception of migration, we find low-income and unemployed people, while the younger, the employed and higher-income people present much more positive attitudes (Ivlevs & Veliziotis, 2018).

The reasons why these attitudes can oscillate are various. Theories against diversity point out the chance that misunderstanding, decrease in social capital and conflicts may arise when an area is affected by large diversity (Alesina & La Ferrara, 2000; Horwitz & Horwitz, 2007; Letki, 2008; Putnam, 2007; Sturgis et al., 2011). The effect of this can also be seen on the immigrants themselves; the social inclusion of immigrants may depend on their origin. It is reported that

within the EU, immigrants from the EU itself have better inclusion and integration opportunities than non-EU immigrants (Wang & Naveed, 2019). On the other hand, the cultural diversity derived from higher rates of immigration can be perceived as a social amenity, which leads to an increase in commercial services and opportunities (Florida, 2014; Mazzolari & Neumark, 2012).

On the effect of immigration on well-being, few papers have been published, with results that vary according to the analyzed context. However, there is no clear picture of how international migration affects the SWB of a given population (Betz & Simpson, 2013).

In a first study conducted by Betz and Simpson (2013), the effect of immigration on well-being was assessed as small but positive. The study concludes that, as the overall effects are minor, only substantial influxes of immigrants would have a meaningful impact on natives in host countries' happiness and life satisfaction, and that the flows had the larger impacts within the first year upon arrival (Betz & Simpson, 2013). As an explanation, Betz and Simpson (2013) state that the effect that immigration has on well-being is channelled through the changes that immigration has on the socio-economic parameters of the host country, such as wages and labour market performance.

A second study, performed with the data from the German Socio-Economic Panel, analyses the effect of immigration on the German native's well-being in 96 regions (Akay et al., 2014). The results show that immigration positively and significantly affects the SWB of natives and that welfare is gained through immigration (Akay et al., 2014). Furthermore, they assess that neither the labour market nor ethnic diversity is a potential channel behind the results; they state that the effect is dependent on the level of assimilation of immigrants in the region (Akay et al., 2014).

On the contrary, another study exploring the effect of diversity on SWB in the UK presents constructive results (Longhi, 2014). Specifically, white native British people are reported to suffer in terms of SWB in areas where diversity is high, while the effect of FB and non-white native British people is insignificant (Longhi, 2014).

Furthermore, studies conducted in the UK showed mixed results. Papageorgiou (2018), finds a positive, yet the negligible effect of immigration on natives' SWB; furthermore, it states that the labour market can be regarded as the channel through which immigration influences natives' well-being.

Finally, one of the last studies to assess this relationship showed how life satisfaction may increase or decrease due to immigration depending on the country, or the region, considered. Akdede and Giovanis (2020) find that migration positively affects the SWB of both natives and migrants in Northern Europe and Eastern Europe. Regarding Northern Europe, it is stated that this positive effect might be due to the openness of these countries, the diverse benefits that immigration brings and the contribution that migrants have to the economy, while for Eastern Europe the positive effect can be because migrants in those regions come to culturally similar countries, facilitating integration (Akdede & Giovanis, 2020). On the other hand, in Southern Europe countries, this relationship is rather negative, due to the large emigration rates of these countries, which develops a negative attitude towards migration in the native that stays, who fear a change in the social values and the demographics in the aftermath of immigration (Akdede & Giovanis, 2020).

To summarize, the results on how immigration affects regional well–being are mixed, depending on methods, context and case study taken into consideration (Akay et al., 2014; Akdede & Giovanis, 2020; Betz & Simpson, 2013; Ivlevs & Veliziotis, 2018; Longhi, 2014;

Papageorgiou, 2018). Building upon these studies, the subsequent analysis, therefore, will assess the determinants of well-being in over 130 European regions, to address the effect of immigration on European regional well-being. The cross-regional aspect of the study will try to cancel the effect of the national aspect on immigration, while it allows for a more local, specific view of the effect of immigration flows. The analysis will adjust on several reported determinants of happiness to allow the results to assess whether the effect of immigration on SWB is direct and significant, or if it channels through other factors.

Methodology

Assumed Directed Acyclic Graphs

In this section, we will discuss the conceptual framework under which the statistical analysis will be performed. The conceptual model is based on the framework of Directed Acyclic Graphs (DAG), which helps to assess true causality among two different variables and to account for eventual non-causal correlations. A directed acyclic graph is made up of variables (nodes) and arrows connecting them (directed edges), and it is impossible to start at any node, follow the directed edges in the arrowhead direction, and end up back at the same node. A directed acyclic graph has arrows that can be interpreted as relationships and includes all common causes of any pair of variables on the graph (Van der Weele & Robins, 2007).

In the previous section, we have tried to assess the relationship between the different variables that the paper will include later in the analysis. The literature, however, presents different results on how and if immigration affects SWB in the host territory. While some studies have found that migration can improve well-being, although, in small magnitude (Betz & Simpson, 2013), others have found that increased diversity may be detrimental to the native's SWB (Longhi, 2014). Furthermore, whereas some studies have found that the relationship

between immigration and well-being is not significant (Papageorgiou, 2018), others have found that not only the relationship is significant and positive, but it is not driven by labour market outcomes (Akay et al., 2014).

Among these mixed results from previous studies, the aim of the paper is, first, to assess whether there is a direct relationship between immigration and well-being and, second, if a true relationship is established, whether immigration is detrimental or beneficial to the SWB of the analyzed populations. Based on the findings of previous literature exposed in the literature review section, two different frameworks are conceptualized.

Model 1 (see Appendix) represents the eventuality in which immigration has no true direct causal relationship with SWB; in this case, a correlation between immigration and SWB would only be through the effect that immigration has on socio-economic parameters. This model would be in line with the findings of Betz and Simpson (2013) and Papageorgiou (2018), which state that the increased well-being of the native population can be explained by the benefits that immigration flows can bring to the local economy.

On the other hand, Model 2 (see Appendix) represents the possibility where immigration still plays a role in influencing SWB through its effect on the socio-economic parameters, but where there is also a direct relationship between immigration and SWB. This model would agree with the results of Akay et al. (2014), where the correlation between immigration and SWB is significant, positive and not determined by labour market outcomes.

The other relationships of both models (Model 1&2) are derived from the findings presented in the literature review. Socio-economic parameters have a significant impact on the well-being of regions; in the Literature Review, it was assessed how unemployment rates, GDP per capita and social cohesion are significant for SWB (Akgün et al., 2021; Delhey & Dragolov,

2016; Pittau et al., 2010; Stanca, 2010). Education and age have also been assessed as significant determinants of well-being (Bartram, 2022; Blanchflower, 2021; Cuñado & de Gracia, 2012; Jongbloed, 2018; Nikolaev & Rusakov, 2016); however, given the nature of the analysis, they are included in the model under socio-economic parameter as regional rates, and not individual features. These variables will be included as codependent variables in the OLS regression analysis. Furthermore, it is included in the model the relationship that past performances have on future ones, in regards to SWB and socio-economic parameters

One of the main problems that arise from the literature review is that certain parameters present a double relationship, meaning that they both influence and are influenced by each other; this means that it is difficult to assess the relationship between the two. In this case, the problem arises between Immigration and socio-economic parameters. While immigration has a clear effect on the economy of the host territory (Borjas, 1995, 2001; Münz et al., 2006), the economic and labour market conditions have a pull factor for immigration as well (Borjas, 2003; Landesmann et al., 2015; Lewer & Van den Berg, 2008). The model takes this into account by differentiating the pull factor effect that socio-economic parameters in year t (2013) have on immigration in year t (2013), and the effect that immigration in year t (2013) has on socio-economic parameters in year t1 (2014). These two years are chosen as 2014 is the only available year for data on SWB, and the greater effect of immigration on well-being can be seen with one year of lag, while this effect cancels in the long term (Betz & Simpson, 2013).

According to DAG theory (for more material on DAG see: Pearl, 2009; VanderWeele & Robins, 2007), to assess the true relationship between immigration and SWB, all the paths between Immigration and SWB need to be controlled for. However, the econometric model takes

into consideration only the socio-economic parameters for the year t1, since the same parameters in different years have great multicollinearity, and would affect the results of the regression.

Econometric model

The determinants of regional subjective well-being can be modelled as such:

$$WB_r = \alpha + \beta_1 M_r + \beta_2 E_r + \varepsilon_r$$

where *WB* stands for the index of self-evaluated life satisfaction (SWB) in region *r* and *M* for the share of FB population in region *r*. The model also takes into consideration socio-economic parameters, *E*, to account as a determinant of SWB. The reason for this, as explained above, is to determine whether a potential significant correlation between WB and M is channelled or not through socio-economic parameters. If the relationship is significant, after adjusting for E, the p-value of β_1 will remain significant. These socio-economic parameters are various and range from GDP per capita to Educational statistics. The codependent variables are listed and described in the section below. The estimated coefficients are represented by α , β_1 and β_2. The aim of this model is to assess the value of $\beta_1$and determine the effect of immigration on SWB, after controlling for socio-economic parameters.

The multiple OLS regression with robust standard errors will be run between a dependent variable, "*Self-evaluation of life satisfaction*" and on the independent variable "*Share of 15-64-year-olds foreign-born population by origin, in % of total (native plus foreign) 15-64 age population, all individuals*", with the region of EU27 as the level of analysis. Furthermore, other multiple regression analyses will be performed using the socio-economic variables from the OECD library which will represent the codependent variables.

These variables include the GDP per capita, taken as its logarithm in the analysis, the share of the population with tertiary education, the share of the population with below secondary education, the unemployment rate, the elderly dependency ratio and the perceived social network support.

The study will also analyze the different effects of immigration on SWB, by splitting the sample into two. First, two regressions will be run by splitting the sample into rich and poor regions, by separating them by the median of their GDP per capita. Second, two regressions will be run by splitting the sample into Northern and Southern regions.

Other multiple regression analyses will be performed using the other variables from the OECD library; they will include the same multiple regression but take as the dependent variables, other shares of the FB population. The dependent variables, in these regressions, will be the shares of the FB population taken separately in age groups whether they are EU citizens or not.

In the analysis, it is expected to find a correlation between immigration and SWB; however, if the DAG Model 1 (see Appendix 1) is correct, this correlation would become insignificant after accounting for the other socio-economic parameters, while it would stay significant if the DAG Model 2 (see Appendix 1) is correct.

Data Description

The data has been collected from a series of databases on regional data in the OECD statistical library (OECD, 2022).

The variables, in the library, are described as such; the independent variable (WB) is reported as "*Self-evaluation of life satisfaction*", in the year 2013, while the dependent variable is

reported as "*Share of 15-64 year olds foreign-born population by origin, in % of total (native plus foreign) 15-64 age population, all individuals*", in the year 2013.

Here below the codependent variables are reported with the description found in the OECD statistical library (Table 1). Table 1 includes the different shares of the FB population that will be included in separate multiple regression analyses.

Table 1

Variable Name	**Description**
WB	Self-evaluation of life satisfaction
M	Share of 15-64 year olds foreign-born population by origin, in % of total (native plus foreign) 15-64 age population, all individuals
GDP	Regional GDP, USD per head, current prices, current PPP, year 2014
TE	Share of population 25 to 64 year-olds by educational attainment, Total tertiary education (ISCED2011 levels 5 to 8), year 2014
PE	Share of population 25 to 64 year-olds by educational attainment, Below upper secondary education, year 2014
U	Unemployment Rate (% unemployed over labour force 15-64), year 2014
ED	Dependency Ratio, Elderly (% 65+ over population 15-64), year 2014
SN	Perceived social network support, year 2014
M low	Share of 25-64 year olds foreign-born population with low education (ISCED 0-2), in % of 25-64 age population of the same origin
M medium	Share of 25-64 year olds foreign-born population with medium education (ISCED 3-4), in % of 25-64 age population of the same origin
M high	Share of 25-64 year olds foreign-born population with high education (ISCED 5-8), in % of 25-64 age population of the same origin

Table 1

Variable Name	Description
M EU	Share of 15-64 year olds foreign-born population by origin, in % of total (native plus foreign) 15-64 age population, all individuals, foreign-born from inside EU-27 countries, year 2013
M non-EU	Share of 15-64 year olds foreign-born population by origin, in % of total (native plus foreign) 15-64 age population, all individuals, foreign-born from outside EU-27 countries, year 2013

Summary statistics

The sample used in the main analysis includes 136 observations; these observations comprise of NUTS 1 and NUTS regions from 17 different countries member of the EU. The number of observations decreases when considering the different shares of the FB population that will be included in separate multiple regression analyses, that is 114.

Table 2 provides a summary statistics of all the variables, independent, dependent and codependent, included in the regression. In appendix 2 (Table 11) summary statistics of the four different samples are also provided. Table 2 shows a great difference between the minimum and the maximum values for almost all variables, denoting a great differentiation and inequality across regions. The high standard deviation in many of the variables also proves this pattern.

Regarding the dependent variable (WB), there is a rather low deviation; although the index goes from 1 to 10, the minimum is 4.5 and the maxim does not go higher than 8. When looking at the independent variable (M), we can notice that the mean is lower than the data on the FB population in the EU in 2021 (European Commission, 2021); although the sample does not include the entirety of the EU, it reinforces the proof that immigration within the EU is on the rise.

Table 2: Summary Statistics, Entire Sample

Panel 1: All Regions							
Variable	N	Mean	Std. Dev.	Min	Pctl. 25	Pctl. 75	Max
WB	136	6.496	0.814	4.5	6	7.3	7.8
M	136	11.282	8.301	0.154	5.097	16.062	52.155
M low	114	35.628	11.678	5.5	27.918	42.9	67.868
M medium	114	41.44	9.183	20.9	34.674	47.35	68.168
M high	114	22.932	9.274	6.807	15.908	29.375	49.75
M EU	117	3.85	4.234	0.31	1.662	4.67	39.71
M non-Eu	114	7.634	5.272	0.22	3.799	10.695	33.303
GDP	136	37454.338	14216.679	16081	26604.25	43800	101297
TE	136	26.979	9.044	13	18.675	33.45	50.2
PE	136	27.551	15.663	2.7	14.775	39.25	73.3
U	136	12.374	7.741	2.6	6.8	17.1	35
ED	136	29.618	5.57	16.88	26.015	33.755	45.65
SN	136	90.427	5.326	68.8	87.475	93.925	100

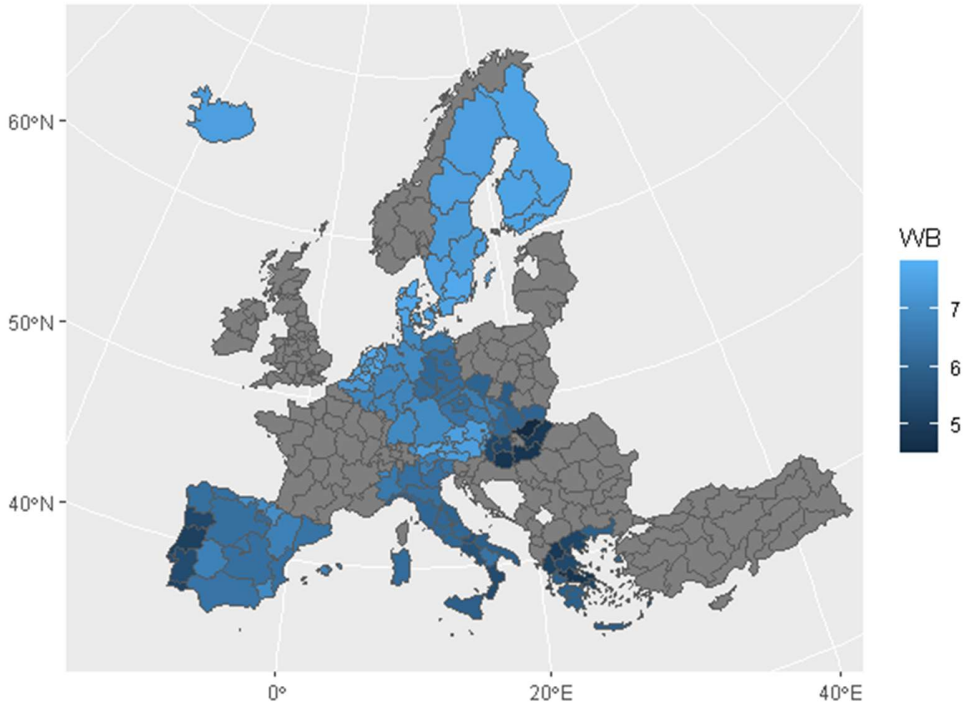

Figure 1: subjective well-being across the 136 regions

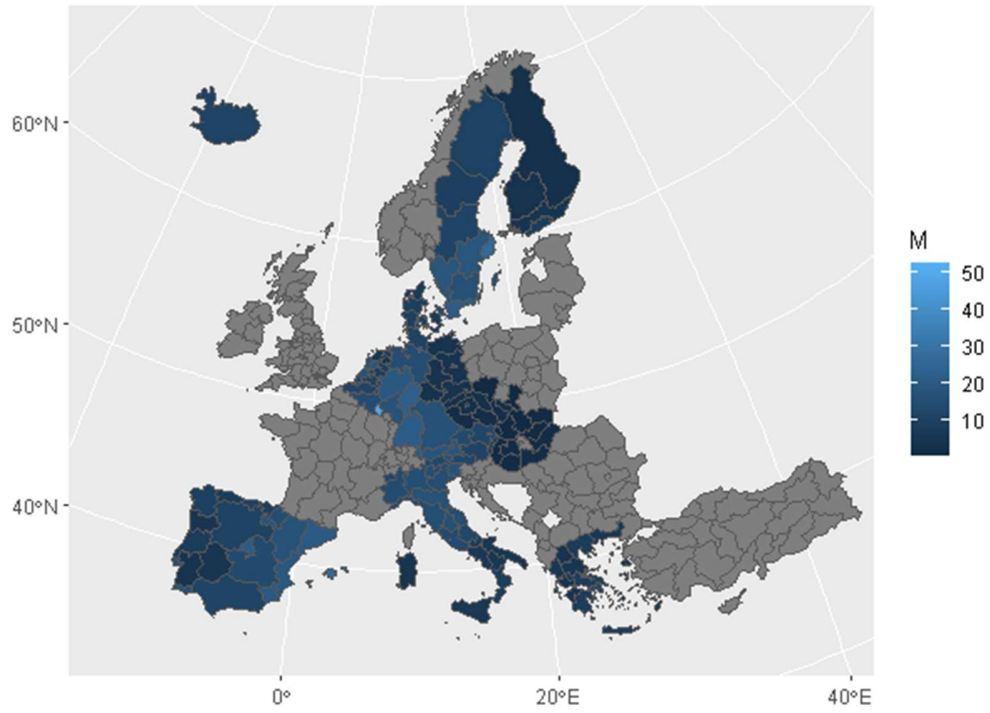

Figure 2: foreign-born population shares across the 136 regions

Figures 1 and Figure 2 show the distribution of the dependent and independent variables geographically. The map figures of the rest of the variables can be found in Appendix 3. The purpose of the figures is to show the different clustering of the values across regions. Regarding SWB (Figure 1), a pattern of lower SWB can be established in Eastern, including former East Germany, and Southern regions, while Northern regions seem to score higher in SWB. When looking at foreign-born population shares instead (Figure 2), we see how immigration rates differ within countries. For instance, we see a prevalence of immigration in Northern Italy, Western Germany, Southern Sweden and Eastern Spain, while other parts of those countries have low FB population values. On the other hand, other countries, such as the Eastern European ones, have low levels of immigration overall.

Correlation matrix

Table 3 shows the correlation among the employed variables. As one can notice, there is no higher correlation than 0.69, meaning that no problems of multicollinearity arise in the econometric model. We see that the dependent and the independent variable correlate by 0.34. Not surprisingly, the other correlation values with WB are positive for GDP per capita, tertiary education population share and social cohesion, while they are negative for below secondary education population share, and unemployment rates. A surprising value is the elderly dependency ratio, which is negative, although quite low.

Table 3: Correlation Matrix

	WB	M	log(GDP)	TE	PE	U	ED	SN
WB	1							
M	0.34	1						
log(GDP)	0.69	0.65	1					
TE	0.58	0.44	0.61	1				
PE	-0.4	0.07	-0.35	-0.31	1			
U	-0.49	-0.05	-0.55	-0.12	0.69	1		
ED	-0.1	-0.11	-0.12	-0.19	0.16	0.06	1	
SN	0.65	0.2	0.46	0.4	-0.31	-0.38	-0.16	1

Heteroskedasticity

The presence of heteroskedasticity in linear models is detrimental as it leads to consistent but inefficient parameter estimates (White, 1980). For this reason, the analysis checks for the presence of heteroskedasticity. The Breusch-Pagan test allows assessing whether heteroskedasticity is present between the dependent and independent variables.

The Figure below (Figure 3), shows the Breusch-Pagan test performed between the two variables; as the p-value is lower than 0.05, we can assess that heteroskedasticity is present. To

adjust for this, the regressions, presented in the result section, will be run with robust standard errors; this will allow to compensate for heteroskedasticity and to obtain more accurate results.

Figure 3: Results of Breusch-Pagan test for heteroskedasticity

```
        studentized Breusch-Pagan test

data:  model
BP = 4.4907, df = 1, p-value = 0.03408
```

Results

In this section, we report the findings of this study derived from the various analyses. In Table 4 we report the results from the first OLS analysis with robust standard errors, which takes into consideration all the 136 Regions of some EU member countries, taking into consideration all the different types of FB populations in the region of analysis.

Model 1 of Table 4 establishes a significant correlation between SWB and Immigration; with a p-value lower than 0.001, it stands clear that these two variables are highly correlated in the context of European regions. The estimated coefficient states that for every unit increase in the percentage of FB population, SWB increases by 0.034.

The results from the rest of the regression, however, suggest that immigration becomes less and less significant if the codependent variables are added to the regression. Furthermore, the estimated coefficient for immigration becomes negative, meaning a negative effect of immigration on SWB when the codependent variables are adjusted for. Model 2 adjusts for only the logarithm of the regional GDP per capita; in this regression, immigration becomes only slightly significant and with a negative effect on SWB, while GDP per capita presents a great significance in determining SWB. As more codependent variables are added to the regression,

Table 4: OLS with robust standard errors, WB of all regions

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
(Intercept)	6.116***	-12.586***	-8.105**	-3.675	-3.704	-7.133+
	(-0.128)	(-2.46)	(-2.889)	(-4.813)	(-4.822)	(-4.222)
M	0.034***	-0.018+	-0.015	-0.009	-0.009	-0.006
	(-0.009)	(-0.011)	(-0.012)	(-0.013)	(-0.013)	(-0.01)
log(GDP)		1.843***	1.369***	0.928+	0.925+	0.790+
		(-0.245)	(-0.284)	(-0.471)	(-0.474)	(-0.415)
TE			0.022***	0.031***	0.032***	0.022**
			(-0.005)	(-0.007)	(-0.007)	(-0.007)
PE			-0.005	0.002	0.001	<0.001
			(-0.003)	(-0.006)	(-0.006)	(-0.005)
U				-0.027	-0.026	-0.015
				(-0.019)	(-0.019)	(-0.014)
ED					0.002	0.006
					(-0.009)	(-0.008)
SN						0.054***
						(-0.014)
Num.Obs.	136	136	136	136	136	136
R2	0.119	0.5	0.55	0.567	0.567	0.654
R2 Adj.	0.112	0.492	0.536	0.55	0.547	0.635

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Values between parentheses represent the standard errors

immigration's effect on SWB becomes insignificant; finally, Model 6, which includes all the variables, shows that the effect of immigration on SWB is low and insignificant. Surprisingly, GDP per capita becomes only slightly significant in determining SWB. In the final model (Model 6), the variables which have a great significance are the share of the population with Tertiary Education (ISCED Level 5-8) and Social Cohesion rates. Surprisingly enough,

Unemployment rates do not appear to be significant in determining SWB, although being reported as great predictors of SWB (Pittau et al., 2010).

To sum up, the main results suggest that while the FB population shares a significant correlation with the level of SWB, as the model adjusts for socio-economic indicators, the relationship between the two becomes insignificant.

Analysis differentiating between regions

The first analysis takes into consideration the entire sample, and the results show the overall insignificance of immigration on SWB when the model (Model 6) adjusts for the codependent variables. However, as mentioned above, this effect might change across host regions, according to the economic and market performance (Dustmann et al., 2016). As immigrants tend to take up lower-skilled jobs, the effect that immigration has on the host region may differ (Papageorgiou, 2018). This depends on whether low-skilled workers are prevalent in the region who have to compete with immigrants, or if high-skilled workers are prevalent, which can be complementary to immigrants in the labour market (Dustmann et al., 2016). Assuming that low-income regions have a prevalence of low-skilled jobs and that high-income regions have a prevalence of high-skilled jobs, we expect that immigration might have a different effect on SWB depending on whether the region has a high or low GDP per capita.

Moreover, the effect of immigration on the host region may differ due to geographical reasons. According to Akdede et al. (2020) migration positively affects the SWB of both natives and migrants in Northern Europe and Eastern Europe, while it undermines the SWB in Southern Europe. The reason for this regards openness, integration opportunities and cultural affinity for Northern and Eastern Europe, while for Southern Europe, it regards the mobility patterns of natives. Due to the large emigration rates of these countries, natives develop a negative attitude

Table 5: OLS with robust standard errors, WB of low- vs. high-income regions

	Panel 1: low-income regions						Panel 2: high-income regions					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
(Intercept)	5.801***	-15.843***	-11.435*	-10.553	-10.799	-11.550+	7.225***	1.329	9.876*	17.398***	19.641***	14.641**
	(-0.143)	(-3.889)	(-4.306)	(-6.53)	(-6.598)	(-6.663)	(-0.116)	(-4.52)	(-4.473)	(-4.757)	(-5.038)	(-5.115)
M	0.025	-0.003	0.002	0.004	0.003	0.004	-0.013*	-0.019+	-0.009	0.004	0.003	0.003
	(-0.015)	(-0.016)	(-0.021)	(-0.024)	(-0.023)	(-0.019)	(-0.006)	(-0.01)	(-0.011)	(-0.011)	(-0.012)	(-0.01)
log(GDP)		2.146***	1.669***	1.580*	1.647*	1.360+		0.558	-0.246	-1.037*	-1.174*	-0.985*
		(-0.388)	(-0.424)	(-0.643)	(-0.653)	(-0.71)		(-0.433)	(-0.431)	(-0.468)	(-0.505)	(-0.443)
TE			0.025*	0.027*	0.031*	0.016			0.014*	0.043***	0.038**	0.035**
			(-0.012)	(-0.013)	(-0.013)	(-0.016)			(-0.006)	(-0.009)	(-0.012)	(-0.011)
PE			-0.005	-0.003	-0.002	-0.004			-0.022**	0.007	0.006	0.008
			(-0.005)	(-0.007)	(-0.007)	(-0.006)			(-0.007)	(-0.011)	(-0.012)	(-0.012)
U				-0.005	-0.005	0.002				-0.097**	-0.094**	-0.088**
				(-0.022)	(-0.021)	(-0.017)				(-0.029)	(-0.033)	(-0.03)
ED					-0.018	-0.006					-0.019+	-0.015
					(-0.011)	(-0.013)					(-0.011)	(-0.012)
SN						0.040+						0.03
						(-0.022)						(-0.024)
Num.Obs.	68	68	68	68	68	68	68	68	68	68	68	68
R2	0.031	0.359	0.416	0.417	0.437	0.515	0.044	0.089	0.35	0.499	0.521	0.55
R2 Adj.	0.016	0.339	0.378	0.37	0.381	0.458	0.03	0.061	0.309	0.459	0.474	0.498

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Values between parentheses represent the standard errors

toward migration and fear a change in the social values and the demographics in the aftermath of immigration (Akdede & Giovanis, 2020). It is expected, therefore, that the effect on SWB will differ according to the geographical belonging of the region.

Then, this second section of the results will analyze the econometric model among different types of regions. Namely, the results of the regression differentiating between low and high-income regions and between regions from South or North of Europe will be presented.

Analysis of low- vs high-income regions.

In the second regression (Table 5), the sample of the region is split into two groups, low-income and high-income regions. The sample was separated according to the median GDP per capita, which is 36066.5$; the regions that fall below are part of the low-income samples and the regions that have higher GDP per capita than the median are part of the high-income group.

Panel 1 (Table 5) shows the results of the regression run in low-income regions. In this sample, it appears that immigration is never significant in determining SWB; there is no significant correlation between the share of the FB population and SWB (Model 1). When the codependent variables are added to the regression, the effect of immigration becomes lower and lower. In the final model (Model 6), only two variables are reported as significant determinants of SWB, namely the log of GDP per capita and social cohesion. Both variables, however, present a low significance ($p < 0.1$). Surprisingly, neither unemployment nor the share of the population with tertiary education are significant predictors of SWB in low-income regions.

Panel 2 (Table 5), reports the result of the regression in high-income regions. Similarly to low-income regions, FB population shares are not a significant predictor of SWB, despite reporting a significant negative correlation between the two variables (Model 1). When the codependent variables are added (Model 6), the results show a significant difference in low-

income regions. Here, the most significant determinants of SWB are unemployment, with a strong negative relationship, and the share of the population with tertiary education. GDP per capita is also reported as significantly affecting SWB, although with less significance than the other two variables; however, the relationship reported is negative, meaning that in high-income regions, for every unit of increase of the logarithm of GDP per capita, SWB appears to decrease by almost one unit. Surprisingly, social cohesion is reported to have no effect in determining SWB in high-income regions.

To sum up, the results among the two samples show a quite different picture, although none show a significant effect of the FB population on SWB. The SWB of low-income regions (Panel 1, Table 5) is determined by GDP per capita and social cohesion, while in high-income regions (Panel 2, Table 5), SWB is more related to educational levels and unemployment rates, while social cohesion plays no significant role. Furthermore, GDP per capita is significantly related to SWB, although negatively.

However, the results might also have been determined by the much lower size of the sample, which may have played a role in biasing the results. The R2 is lower, in both Panel 1 and Panel 2 (Table 5), than the one reported in the regression including the entirety of the sample (Table 4)

Analysis of North vs South regions

The third analysis splits the sample into two, according to the geographic position of the region. The sample was chosen according to the UN geoscheme; the first sample takes into consideration Southern Europe, while the Northern European sample includes regions from Northern, Western and Eastern Europe (UNSD, 1999).

Table 6: OLS with robust standard errors, WB of Southern vs. Northern regions

	Panel 1: Southern Europe Region						**Panel 2: Northern European Regions**					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
(Intercept)	5.365***	-1.951	-3.199	-4.208	-3.149	-0.735	6.524***	-11.339*	-11.316*	-10.453	-12.670*	-13.979*
	(-0.153)	(-2.849)	(-3.205)	(-7.18)	(-8.565)	(-8.812)	(-0.17)	(-4.742)	(-4.976)	(-7.106)	(-6.299)	(-5.902)
M	0.056***	0.031+	0.022	0.022	0.021	0.019	0.030*	-0.018	-0.031*	-0.029+	-0.029*	-0.023+
	(-0.01)	(-0.016)	(-0.017)	(-0.021)	(-0.021)	(-0.017)	(-0.013)	(-0.017)	(-0.015)	(-0.017)	(-0.014)	(-0.013)
log(GDP)		0.737*	0.811*	0.905	0.834	0.256		1.739***	1.662**	1.579*	1.685**	1.422*
		(-0.289)	(-0.304)	(-0.694)	(-0.778)	(-0.856)		(-0.464)	(-0.5)	(-0.696)	(-0.618)	(-0.611)
TE			0.016*	0.014	0.014	0.007			0.012	0.014	0.011	0.011
			(-0.008)	(-0.011)	(-0.012)	(-0.011)			(-0.009)	(-0.012)	(-0.011)	(-0.011)
PE			0.005	0.005	0.003	-0.004			0.036***	0.036***	0.036***	0.028**
			(-0.009)	(-0.01)	(-0.012)	(-0.01)			(-0.009)	(-0.009)	(-0.009)	(-0.01)
U				0.004	0.001	-0.003				-0.009	0.014	0.008
				(-0.026)	(-0.03)	(-0.024)				(-0.037)	(-0.038)	(-0.034)
ED					-0.006	<0.001					0.036**	0.024*
					(-0.017)	(-0.015)					(-0.013)	(-0.012)
SN						0.045*						0.049+
						(-0.02)						(-0.027)
Num.Obs.	58	58	58	58	58	58	78	78	78	78	78	78
R2	0.26	0.33	0.374	0.375	0.377	0.528	0.152	0.481	0.584	0.584	0.635	0.666
R2 Adj.	0.246	0.306	0.327	0.315	0.303	0.462	0.141	0.467	0.561	0.556	0.605	0.633

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Values between parentheses represent the standard errors

Panel 1 (Table 6) runs the regression in the sample including the 58 Southern European regions. Among the Southern regions, a strong correlation can be seen between FB population share and SWB ($p < 0.001$). However, as the codependent variables are added into the model, immigration becomes insignificant, and ultimately (Model 6) only social cohesion appears to have a significant effect on SWB, with no other variable reporting a significant relationship.

However, as mentioned above, the results might also have been determined by the much lower size of the sample, which may have played a role in biasing the results. This might be true for Southern Europe (Panel 1, Table 6), with a much lower R2 than the first regression analysis (Table 4), while Northern Europe (Panel 2, Table 6), presents an R2 even higher than the first regression (Table 4).

Analysis differentiating across foreign-born populations' characteristics

The effect that immigration might have on the host regions might depend on their certain characteristics. However, the composition of the immigration population might also play a role in determining whether there is a benefit or a detriment for the host region. As mentioned above, the effect on the host region might differ whether the immigrants and the native worker are substitutable or complementary in the regional labour market. This may also depend on the skill level that the FB population presents. A larger percentage of low-skilled immigrants might pose a threat in the labour market to the vulnerable low-skilled native worker, while less competition may arise if the FB population is majority high-skilled since the high-skilled natives usually benefit from immigration in any case (Dustmann et al., 2016). Furthermore, another factor that might influence the effect of immigration on host regions is the origin of the immigrants. Factors like cultural affinity might play a role in the integration of immigrants and therefore their effect on the region. For example in the case of the EU, immigrants coming from within the EU were

reported to have better integration possibilities than those coming from outside the EU (Wang & Naveed, 2019).

In this third section of the results, we will analyze whether differences in the demographics of migrants make a difference in being a significant variable for SWB. Specifically, we will analyze the different effects that the FB population shares can have on SWB, depending on their education level, whether they were born in the EU or outside the EU and by age group. It is worthy to mention the fact that these regressions present less number of observations than the first regression analysis (Table 4), meaning that the difference in the results can also partly be explained because some regions included before are not part of this analysis.

Analysis by educational level

Tables 7, 8 and 9 present the results for the regression analysis, each considering a different demographic of the FB population, respectively, with low education level (ISCED Level 0-2), medium education level (ISCED Level 3-4) or with high educational level (ISCED Level 5-8). By analyzing the three different Tables, we can assess that there are indeed some evident differences in how the three different groups of FB populations affect the SWB of regions.

The first significant difference between the three groups can be assessed in the naive correlation between FB population shares and well-being. As Model 1 (Table 7) shows, immigrants with low education are negatively correlated with SWB, while immigrants with medium (Table 8) and high education levels (Table 9) are positively correlated with SWB, with immigrants with high education having a stronger an more significant positive effect on well-being. However, as Tables 7, 8 and 9 show, immigrants with low and medium SWB have an insignificant effect on SWB when the control variables are added to the model.

Table 7: OLS with robust standard errors, WB of all regions, share of FB with low educational level (ISCED level 0-2)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
(Intercept)	7.753***	-3.891*	-1.163	5.969+	8.297*	3.988
	(-0.224)	(-1.82)	(-2.07)	(-3)	(-3.34)	(-3)
M low	-0.031***	-0.018***	-0.011	-0.004	0.002	0.003
	(-0.006)	(-0.005)	(-0.009)	(-0.009)	(-0.01)	(-0.008)
log(GDP)		1.065***	0.747***	0.022	-0.145	-0.225
		(-0.168)	(-0.203)	(-0.333)	(-0.327)	(-0.23)
TE			0.019***	0.038***	0.038***	0.028***
			(-0.005)	(-0.008)	(-0.007)	(-0.007)
PE			-0.006	0.005	0.003	0.001
			(-0.007)	(-0.012)	(-0.012)	(-0.01)
U				-0.050*	-0.058**	-0.045**
				(-0.022)	(-0.021)	(-0.016)
ED					-0.022*	-0.020*
					(-0.009)	(-0.01)
SN						0.058***
						(-0.011)
Num.Obs.	114	114	114	114	114	114
R2	0.255	0.461	0.502	0.567	0.585	0.699
R2 Adj.	0.249	0.452	0.484	0.547	0.562	0.679

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Values between parentheses represent the standard errors

Table 8: OLS with robust standard errors, WB of all regions, share of FB with medium educational level (ISCED level 3-4)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
(Intercept)	6.044***	-7.697***	-2.578	4.774	6.632+	2.246
	(-0.309)	(-1.67)	(-2.07)	(-3)	(-3.70)	(-3)
M medium	0.015*	0.013*	0.018*	0.015*	0.01	0.01
	(-0.007)	(-0.005)	(-0.009)	(-0.007)	(-0.008)	(-0.007)
log(GDP)		1.314***	0.740***	0.03	-0.067	-0.14
		(-0.158)	(-0.187)	(-0.324)	(-0.338)	(-0.257)
TE			0.030***	0.046***	0.043***	0.033***
			(-0.007)	(-0.008)	(-0.008)	(-0.008)
PE			-0.005	0.009	0.008	0.006
			(-0.005)	(-0.01)	(-0.01)	(-0.008)
U				-0.049*	-0.054*	-0.041*
				(-0.022)	(-0.023)	(-0.017)
ED					-0.015	-0.014
					(-0.01)	(-0.009)
SN						0.058***
						(-0.01)
Num.Obs.	114	114	114	114	114	114
R2	0.255	0.461	0.502	0.567	0.585	0.699
R2 Adj.	0.249	0.452	0.484	0.547	0.562	0.679

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Values between parentheses represent the standard errors

Table 9: OLS with robust standard errors, WB of all regions, share of FB with high educational level (ISCED level 5-8)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
(Intercept)	5.875***	-5.575**	-1.229	6.830*	8.829**	4.487
	(-0.153)	(-1.89)	(-2.21)	(-3)	(-3.14)	(-3)
M high	0.034***	0.015*	-0.004	-0.01	-0.011	-0.012
	(-0.006)	(-0.007)	(-0.011)	(-0.01)	(-0.01)	(-0.009)
log(GDP)		1.129***	0.733***	-0.062	-0.184	-0.262
		(-0.182)	(-0.208)	(-0.309)	(-0.308)	(-0.228)
TE			0.022*	0.047***	0.046***	0.037***
			(-0.01)	(-0.01)	(-0.009)	(-0.008)
PE			-0.014**	0.003	0.003	0.001
			(-0.004)	(-0.009)	(-0.01)	(-0.007)
U				-0.055*	-0.060**	-0.047**
				(-0.022)	(-0.021)	(-0.016)
ED					-0.021*	-0.019*
					(-0.009)	(-0.008)
SN						0.058***
						(-0.011)
Num.Obs.	114	114	114	114	114	114
R2	0.255	0.461	0.502	0.567	0.585	0.699
R2 Adj.	0.249	0.452	0.484	0.547	0.562	0.679

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Values between parentheses represent the standard errors

Table 10: OLS with robust standard errors, WB of all regions, EU vs. NONEU foreign-born population

	Panel 1: EU foreign-born population							**Panel 2: Non-EU foreign born population**						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
(Intercept)	6.329***	-12.587***	-7.810**	-3.854	-3.849	-8.134+		6.251***	-11.520***	-4.731	2.039	1.924	-3.451
	(-0.224)	(-2.057)	(-2.563)	(-4.333)	(-4.4)	(-4.139)		(-0.137)	(-2.797)	(-3.292)	(-5.313)	(-5.36)	(-4.543)
M EU	0.047	-0.036+	-0.029	-0.024	-0.024	-0.009	**M non-EU**	0.038**	-0.023	-0.009	0.004	0.004	0.003
	(-0.061)	(-0.021)	(-0.034)	(-0.035)	(-0.036)	(-0.024)		(-0.013)	(-0.017)	(-0.018)	(-0.018)	(-0.019)	(-0.012)
log(GDP)		1.842***	1.359***	0.961*	0.961*	0.834*			1.743***	1.075**	0.401	0.405	0.388
		(-0.202)	(-0.254)	(-0.427)	(-0.43)	(-0.386)			(-0.278)	(-0.318)	(-0.517)	(-0.519)	(-0.416)
TE			0.019**	0.029***	0.029***	0.016+				0.019***	0.033***	0.033***	0.020*
			(-0.006)	(-0.008)	(-0.008)	(-0.008)				(-0.005)	(-0.007)	(-0.008)	(-0.008)
PE			-0.009*	0	0	-0.007				-0.014**	-0.003	-0.004	-0.008
			(-0.004)	(-0.008)	(-0.008)	(-0.006)				(-0.004)	(-0.007)	(-0.007)	(-0.005)
U				-0.028	-0.028	-0.011					-0.039+	-0.039+	-0.022
				(-0.019)	(-0.02)	(-0.015)					(-0.021)	(-0.021)	(-0.015)
ED					<0.001	0.014						0.002	0.012
					(-0.011)	(-0.01)						(-0.01)	(-0.009)
SN						0.061***							0.062***
						(-0.016)							(-0.014)
Num.Obs.	117	117	117	117	117	117		114	114	114	114	114	114
R2	0.054	0.509	0.563	0.583	0.583	0.685		0.057	0.464	0.554	0.591	0.591	0.711
R2 Adj.	0.046	0.5	0.547	0.564	0.56	0.664		0.049	0.455	0.538	0.572	0.568	0.691

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Values between parentheses represent the standard errors

Analysis by EU vs non-EU

Tables 9 and 10 present the results for the regression analysis, each considering a different demographic of the FB population, namely, the place of origin. Table 9 considers the share of the FB population which is originally from within the European Union, and Table 10 considers the share of the FB population which is originally from outside the European Union. Overall, the results from the two tables suggest that there is no true difference between the two demographics of immigrants and that overall their effect on SWB is insignificant.

Discussion

With immigration being a large phenomenon within the EU (European Commission, 2021), it has become more and more important to assess the effect that this phenomenon has on the host territories. Evidence shows that immigration has always had a significant effect on the economy and the labour market; however, as non-material indicators of welfare, such as SWB, gain importance among economists, an assessment of the effect that immigration has on the well-being of host regions is needed. For this reason, the paper has aimed to assess how immigration affects regional well-being. Specifically, the aim is twofold; to analyze the magnitude of this effect and to assess whether this effect is direct or is channelled through other socio-economic factors.

By combining European regional data from the OECD regional data library, the study relates the FB population share with SWB of over 130 European NUTS 1 and NUTS 2 regions, along with other socio-economic variables. Furthermore, multiple other analyses were carried out, by splitting the sample according to the GDP per capita and by the regions' geographical location (Northern and Southern Europe) and by dividing the FB population groups according to their educational level and their origin (EU vs. non-EU).

The main results of the analysis suggest that while significant correlations can be found between immigration and SWB in almost all analyses; however when socio-economic variables are added into the regressions, the effect of immigration on SWB is low and insignificant, and socio-economic variables are far better determinants of SWB. Only when considering Northern European regions, does immigration appear to have a low negative, but significant, effect on SWB.

As mentioned above, immigration and SWB are highly associated with one another, when considering the entirety of the sample (Table 5). This means that, overall, a higher share of the FB population is associated with higher SWB levels in the regions considered in the sample. These results contradict Longhi's (2014) results, which reported a decrease in SWB in UK natives living in areas with high diversity. However, when the model adjusts for socio-economic parameters of the regions, the effect becomes smaller and smaller, and it becomes insignificant. It is hypothesized that, while the effect of immigration on SWB seems positive, it is indirect, and it is channelled through socio-economic factors; in other words, immigration rates do not have a direct effect on SWB, but, as they significantly affect the economic performance of the region, they may ultimately influence SWB, although indirectly (Betz & Simpson, 2013; Papageorgiou, 2018). These results, therefore, suggest that the mode in which immigration affects SWB can be explained through Model 1 (Appendix 1), where all the effect that immigration has on SWB passes through socio-economic parameters; for this reason, after adjusting for these parameters, the effect of immigration becomes negligible. Model 2 (Appendix 1), based on the results of Akay et al. (2014) is confused, as no direct relationship is established between immigration and SWB. The main conclusion from these results is that immigration affects the welfare of regions, although it does not directly relate to SWB; this means that immigration has overall positive

outcomes over socio-economic parameters and that European regions are not negatively affected by it in terms of welfare (Akdede & Giovanis, 2020; Bansak et al., 2015; Bodvarsson & Berg, 2009; Dustmann et al., 2003). In this entire sample, therefore, it must be concluded that immigration and diversity are not a cause for increased social conflict and tension, as was instead found in previous studies (Alesina & La Ferrara, 2000; Horwitz & Horwitz, 2007; Letki, 2008; Putnam, 2007; Sturgis et al., 2011), and provides support for the argumentations in favour of diversity (Florida, 2014; Mazzolari & Neumark, 2012).

These results, however, must be taken cautiously, as they reflect the situation of the entire sample, which comprises regions from all over Europe, with different economic performances, demographics, cultural characteristics and mobility patterns. When sub-samples are taken into consideration, the picture regarding the effect of immigration on SWB may differ.

When dividing between low-income and high-income regions, the picture stays similar, and no direct effect of immigration on SWB can be established. Under the assumption that low-income regions have a prevalence of low-skilled jobs and that high-income regions have a prevalence of high-skilled jobs, a difference in the effect of immigration on the SWB of regions was expected, as immigrants would compete for jobs in low-income regions and would complement the labour market in high-income regions (Dustmann et al., 2016), but that is not the case. In low-income regions, immigration is never significant in determining SWB. In high-income regions, immigration is negatively correlated with SWB and it becomes insignificant when the other variables are added. Therefore, although no direct effect is established, an increase in the FB population is associated with a decrease in SWB in high-income regions; this is surprising, as immigration has been reported to increase the material welfare of the high-skilled workers (Borjas, 1995, 2001; Borjas & Katz, 2005; Staffolani & Valentini, 2010). The

reason for this negative association could be found in the great difference between the share of the FB population between the two samples. As Table 2 shows, the high-income level has a higher percentage of FB. This could affect SWB negatively in two ways; first, a larger influx of immigrants is more difficult to manage, which could result in negative externalities such as unemployment and criminality, and second, immigrants report much lower mental health and life satisfaction scores than non-mobile populations (Bălţătescu, 2007; Bartram, 2010, 2011; Borraz et al., 2008), meaning that the number of immigrants could affect the SWB index in regions with a high concentration of FB. Nonetheless, in high-income regions, Model 1 (Appendix 1) remains relevant in explaining the effect, which is channelled through the economic outcomes, of immigration on SWB, although in this case, the effect is negative.

However, when splitting the sample between the Southern and Northern regions, the picture is quite different. For Southern European regions, the situation is quite similar to the one presented with the entirety of the sample. Immigration is positively and significantly associated with SWB, but the effect becomes insignificant when the regression adjusts for codependent variables; therefore, Model 1 (Appendix 1) still applies to Southern regions, with socio-economic factors channelling the effect of immigration on SWB (Betz & Simpson, 2013; Papageorgiou, 2018). For Northern Regions, immigration still presents a positive association with SWB, and the effect remains significant when adjusting for socio-economic variables, although it becomes negative. Therefore, a direct association is established between immigration and SWB, meaning that for Northern European regions, Model 2 (Appendix 2) better describes the situation, as a direct link can be drawn between the two variables. This is a surprising result, given the findings of Akdede & Giovanis (2020), which reported positive effects of immigration on SWB in Northern and Eastern Europe; furthermore, better attitudes towards immigrants (IOM, 2015), and

better integration policies (Cebolla-Boado & Finotelli, 2015) would also suggest otherwise. Although being an unexpected result, there could be a few reasons behind this. For instance, after accounting for the benefits that immigration has on the socio-economic performance (Akdede & Giovanis, 2020; Bansak et al., 2015; Bodvarsson & Berg, 2009; Dustmann et al., 2003), immigration in Northern countries might put stress on social relations and social capital, due to the higher cultural differences between individualistic values and collectivistic values of immigrants from outside the EU, which constitute the majority of immigrants within the EU (Appendix 2, Table 11). Another reason could reside in the year of the analysis, 2014; after major stress on SWB due to economic stagnation and heavy migration flows, the effect of these flows might have put under stress on SWB, due to the rise of political radicalization and xenophobic tendencies (Bolet, 2020; Edo et al., 2019; Koser, 2010). This would explain why in 2020, after the effect of the economic crisis and the heavy immigration flows, the effect curbed and turned positive in Northern Europe (Akdede & Giovanis, 2020)). Furthermore, Akdede & Giovanis (2020), take into consideration more Northern European countries than the one we included in the analysis, which could suggest why the results differ. Nonetheless, this represents surprising results, especially compared to the fact that Southern European regions are not affected by immigration after accounting for socio-economic parameters, and represents an interesting subject to explore for future research.

When taking into consideration different groups of immigrants, it appears that they do not have different effects on SWB; lowly educated migrants are negatively associated with SWB, while immigrants with medium and high education have a positive relation. The finding is in line with the literature, as low-educated immigrants will compete in the labour market with low-income workers decreasing their welfare (Borjas & Katz, 2005; Staffolani & Valentini, 2010),

while medium and high-educated immigrants might bring more advantages of skills and ideas to the local economy (Florida, 2014; Mazzolari & Neumark, 2012) but the effects of the three groups become insignificant when the codependent variables are added into the regression. The same results apply to the origin of immigrants, with no significant difference in the effect of immigration whether they come from outside or from within the EU. This result suggests that, despite the different associations with SWB, the characteristics of the host regions are more important in determining the outcome that immigration will have on SWB, rather than the composition of the immigrant population.

In this regard, it is argued that these results have several policy implications. When considering the entirety of the sample, immigration has a negligible direct effect on SWB; therefore, policy-makers should still largely focus on the material aspects affected by immigration in host regions. However, the results in Northern Europe suggest that a positive association with SWB (Model 1, Table 6), might hide a direct negative effect on it (Model 6, Table 6). Regional realities, therefore, might differ in the effect that immigration has, according to geographical position, history, culture, economy and mobility pattern. Therefore, policy-makers must expand the analysis and focus on SWB, and how immigration can, directly and indirectly, affect it. Furthermore, the regional focus should be taken more into account, as it may show a different picture than national focuses; therefore, collection and aggregation of data on SWB on the regional level is vital and not yet in place, as, for instance, the OECD regional library only provided this data for the year 2014.

To conclude, future research should expand on the topic presented, focusing on specific regions and territorial realities, to investigate how immigration affects SWB; different regional aggregation and samples might offer different results worth analyzing, as for the case of the

Northern Europe sample in this paper. Furthermore, future literature should expand on the mechanisms that underpin the impact of immigration on SWB; although some explanations are available (Alesina & La Ferrara, 2000; Florida, 2014; Horwitz & Horwitz, 2007; Letki, 2008; Mazzolari & Neumark, 2012; Putnam, 2007; Sturgis et al., 2011), more attention should be paid into that.

Limitations

The analysis of the paper presents several limitations, which could limit its scope. First, omitted variable bias might play a role in limiting the study, as not all determinants of SWB could be included in the regression, such as inequality index, health parameters etc. Furthermore, the study is at an EU level, although not all regions could be included; this is because the various OECD regional databases (OECD, 2022) have different regionalization of data (for instance, the well-being database presented in the data on NUTS 2, while the regional migration data presented the data on the NUTS 3 level), meaning that when we aggregated the data, some regions were lost. As mentioned, the year of the analysis also represented a limitation, as for regional well-being, only the year 2014 was available. Moreover, results in the spitted samples might be limited by the lower number of observations, as with lower observations, it is harder to establish a linear relationship.

Another limitation is represented by the variable *"Self-evaluation of life satisfaction"*, which might be biased for two reasons. First, life satisfaction is largely determined by life events and individual features, although the fact that it is presented as a regional index might curb this. Second, life satisfaction is connected to cultural characteristics, meaning that it can be reported differently according to the country and/or culture of origin (Oishi et al., 2009).

Finally, we assess that reverse causality might play a role in the study; the OLS linear analysis conducted does not establish causality, only association. As immigration not only affects regional welfare, but regional welfare attracts immigration as well, the result might be biased (Borjas, 2003; Landesmann et al., 2015; Lewer & Van den Berg, 2008). The conceptual models (Appendix 1) try to adjust for this, but it is still acknowledged as a limitation of this study.

Conclusion

This study has aimed to assess the effect of immigration on the SWB of host regions. After performing an OLS regression analysis in 136 EU regions, the main result suggests that although immigration is positively and significantly associated with SWB, this effect is mainly channelled through socio-economic factors, and immigration does not have a direct effect on SWB. In high-income regions, the pattern is similar, although the association is negative. However, the findings suggest that in Northern Europe, although presenting a positive association, after adjusting for socioeconomic factors, immigration has a negative direct effect on SWB. These results corroborate the thesis that the effect of immigration on SWB is channelled through socio-economic factors (Betz & Simpson, 2013; Papageorgiou, 2018), although they dispute the argument that immigration has a beneficial influence on SWB in Northern Europe (Akdede & Giovanis, 2020). To conclude, future research should expand on the topic presented, focusing on specific regions and territorial realities, to investigate how immigration affects SWB and should expand on the mechanisms that underpin the impact of immigration on SWB.

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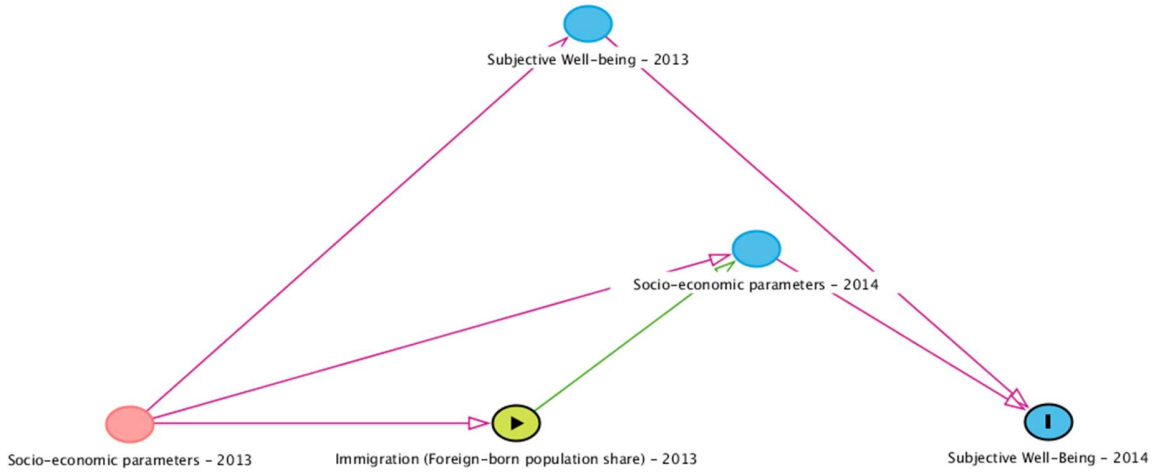
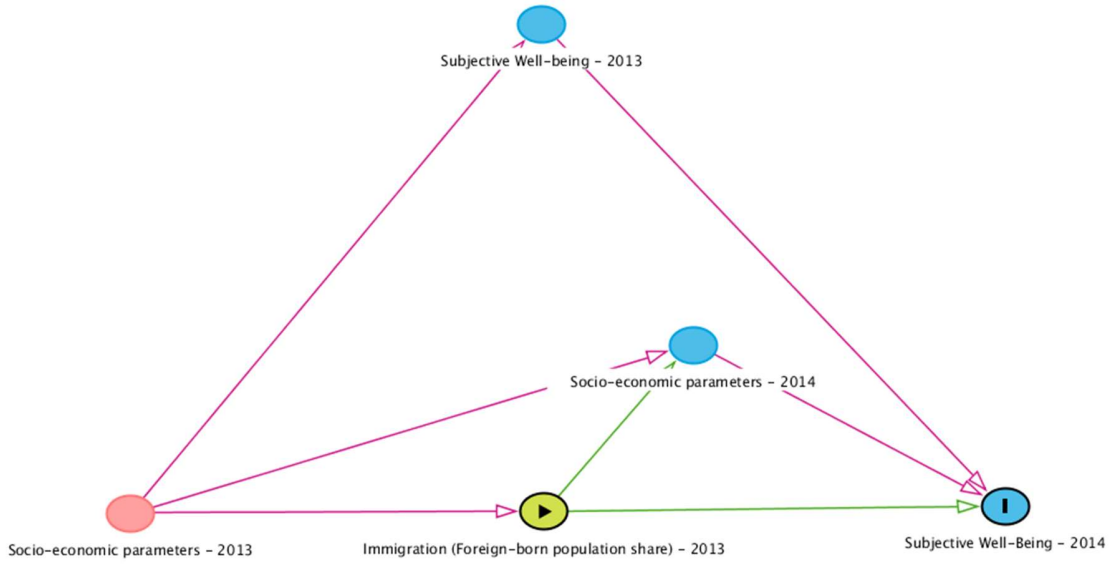
Appendix

Appendix 1: Directed Acyclic Graphs Models



Model 1



Model 2

Appendix 2: Summary Statistics for Sub-samples

Table 11: Summary Statistics, Sub-samples

Panel 2: Low Income Region (<36066.5$)							
Variable	N	Mean	Std. Dev.	Min	Pctl. 25	Pctl. 75	Max
WB	68	5.969	0.717	4.5	5.375	6.325	7.6
M	68	6.654	4.978	0.154	3.078	8.764	19.865
GDP	68	26721.544	5162.122	16081	23236.75	30390.25	36061
TE	68	22.466	6.528	13	17.675	27.025	38.7
PE	68	31.728	18.804	4.1	12.375	46.55	73.3
U	68	16.253	8.387	4.6	8.8	22.95	35
ED	68	29.753	5.872	17.15	25.625	35.17	40.05
SN	68	88.165	6.033	68.8	84.9	92.625	100
Panel 3: High Income Region (>36066.5$)							
Variable	N	Mean	Std. Dev.	Min	Pctl. 25	Pctl. 75	Max
WB	68	7.024	0.506	5.4	6.775	7.5	7.8
M	68	15.91	8.401	1.372	10.932	18.167	52.155
GDP	68	48187.132	12114.979	36072	40150	54045	101297
TE	68	31.491	8.992	15.2	25.675	37.5	50.2
PE	68	23.375	10.261	2.7	15.225	31.15	47.1
U	68	8.496	4.458	2.6	5.575	9.7	20.5
ED	68	29.483	5.291	16.88	26.178	32.298	45.65
SN	68	92.69	3.22	81	91.25	94.425	98.1
Panel 4: Southern European Regions							
Variable	N	Mean	Std. Dev.	Min	Pctl. 25	Pctl. 75	Max
WB	58	6.009	0.592	4.8	5.425	6.4	7
M	58	11.452	5.363	3.656	6.68	15.464	26.503
GDP	58	31377.655	9105.593	18368	24274.75	38440.5	57895
TE	58	23.672	8.886	13	17.05	27.525	47.2
PE	58	42.921	9.83	20	36.875	49.475	73.3
U	58	19.012	7.237	4.6	13.325	24.1	35
ED	58	31.724	5.546	18.69	28.29	36.193	45.65
SN	58	87.931	6.359	68.8	82.45	92.975	100
Panel 5: Northern* European Regions							
Variable	N	Mean	Std. Dev.	Min	Pctl. 25	Pctl. 75	Max
WB	78	6.859	0.768	4.5	6.425	7.5	7.8
M	78	11.156	9.974	0.154	3.529	16.807	52.155
GDP	78	41972.897	15635.932	16081	32339.25	49816.25	101297
TE	78	29.437	8.401	14.3	24.025	35.625	50.2
PE	78	16.123	6.952	2.7	11.7	21.3	32
U	78	7.438	2.903	2.6	5.6	8.8	18.5
ED	78	28.052	5.079	16.88	24.762	31.352	39.28
SN	78	92.283	3.408	78.6	90.9	94.375	97.8

*Northern, in this case, includes Northern, Western and Eastern European Regions, in accordance to the subregional division by the UN geoscheme (UNSD, 1999)

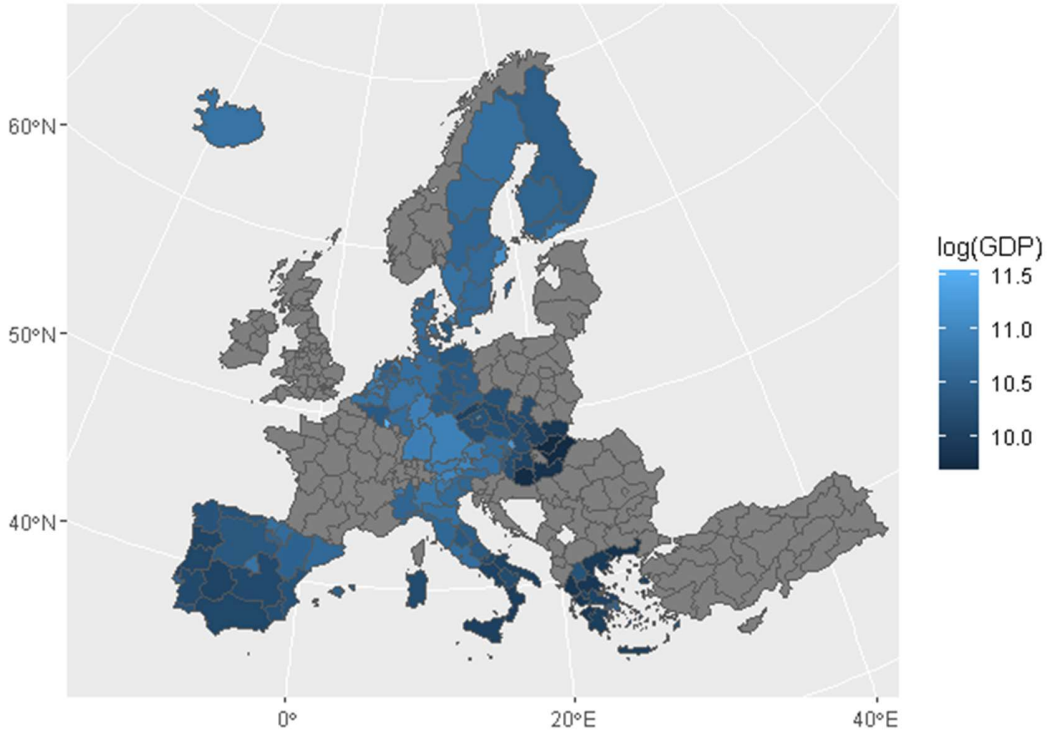


Figure 4: logarith of GDP per capita across the 136 regions

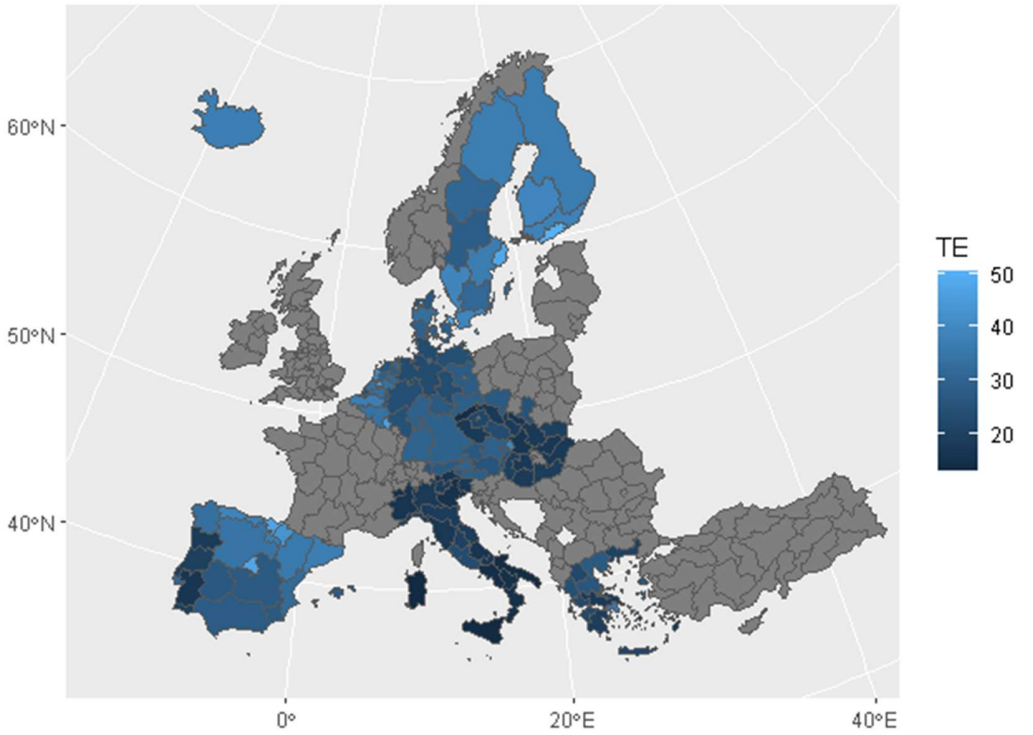


Figure 5: share of population with Tertiary education (ISCED level 5-8) across the 136 regions

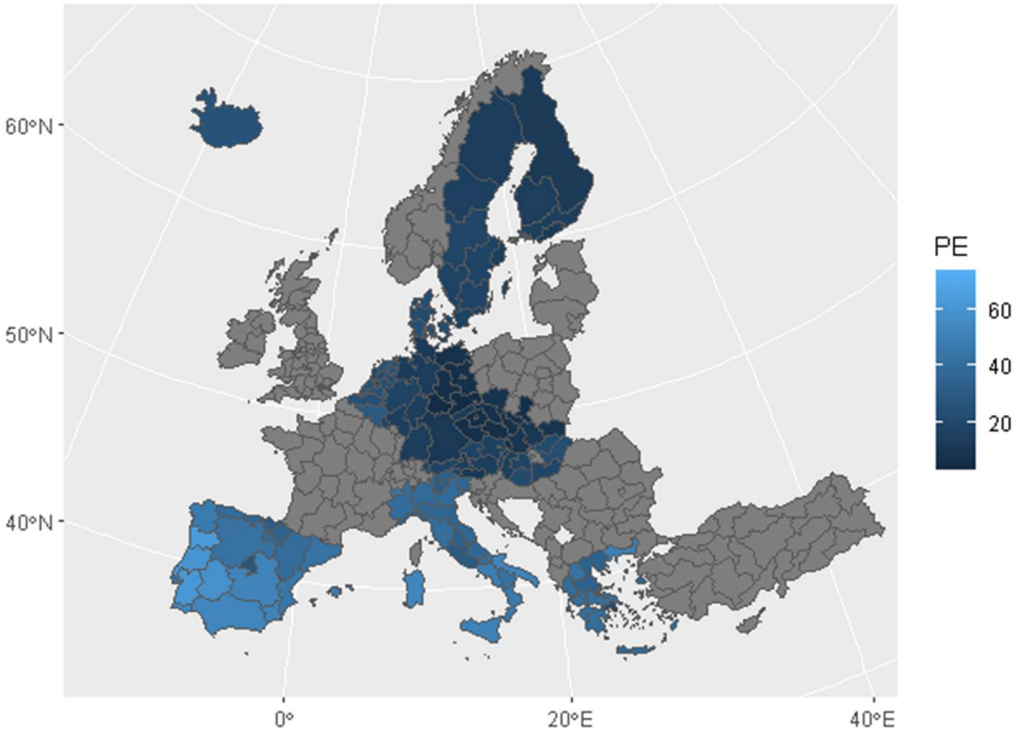


Figure 6: share of population with education below secondary (ISCED level 0-2) across the 136 regions

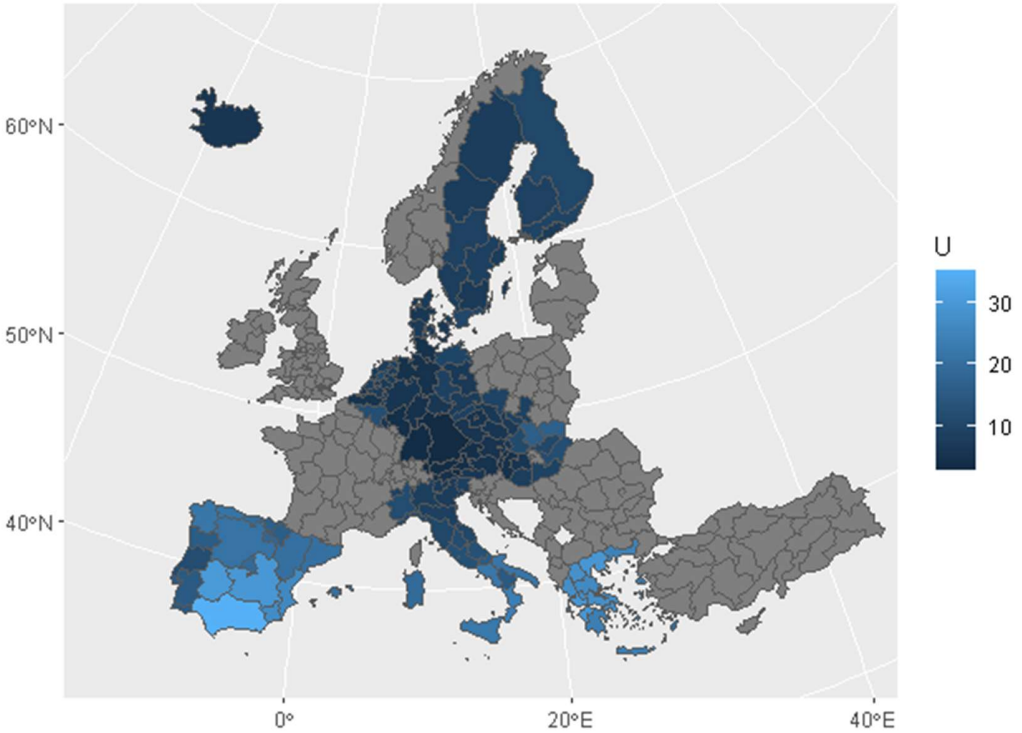


Figure 7: Unemployment rates across the 136 regions

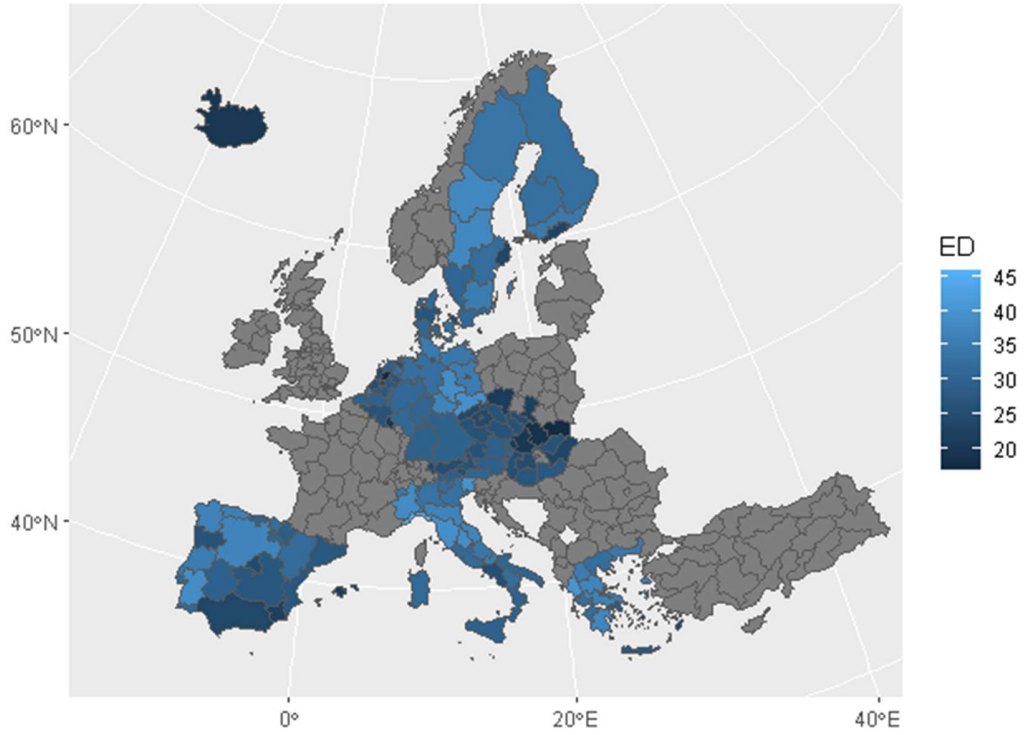


Figure 8: Elderly dependency ratio across the 136 regions

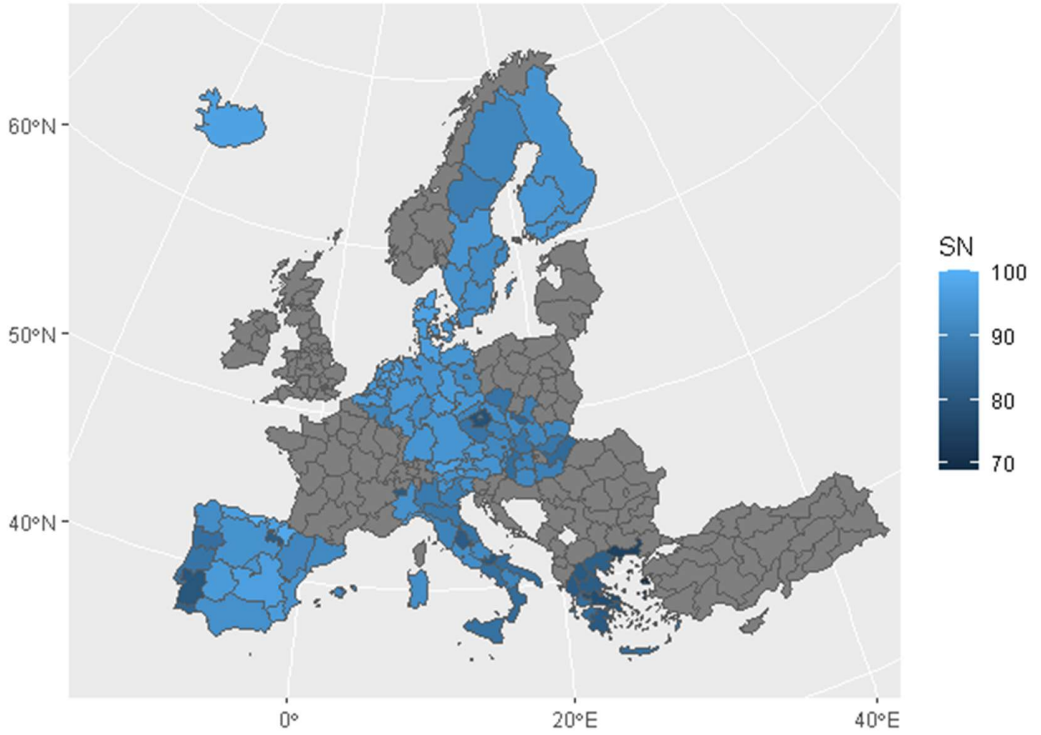


Figure 9: Social cohesion across the 136 regions