IT TOOLS AND METHODS FOR MANAGING MIGRATION FLOWS

D4.3

Overview report on relevant socio-economic situation in EU Member States

Dataset on economic situation as input in EMT and for other WPs

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Overview report on relevant socio-economic indicators in EU Member States

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1 Introduction

This report gives an overview of relevant EU Member States' economic and social situation, compiling indicators that can affect migration decisions, planned destinations, and integration trajectories after arrival. All data used in the report originates from the Eurostat database. We identified the database as the most suitable source of live data as it is regularly updated and presents the data in a standardized form that makes it comparable across countries. Furthermore, the Eurostat database provides wide geographic coverage and an extensive set of variables that cover the key economic and social indicators relevant to the context of migration decision-making and attitudes towards migration. The raw data for each chart can be downloaded from Eurostat (2021c) using the link provided for the respective figure. This raw data is also integrated into the EUMigraTool and serves as an input to other work packages.

All figures use the most recently available information that is regularly updated from the Eurostat database by the EUMigraTool (EMT). While the text remains static, the graphs and core statistics (e.g., averages across the EU) cited in the text thus update automatically as new data become available. Specifically, an API automatically downloads new data when it comes available and feds it into the preprocessing process. Afterwards, the preprocessed data is fed into the code generating the report. Since the process is automatized, the updated report and its data will be available from the EMT website for as long as it exists. An example of the API, the code for the preprocessing of the data and the code generating the report can be found at the end of the deliverable.

The report does not follow a linear structure with an introduction and conclusion that tie together all the content. Instead, the report is meant to be read online as individual chapters to provide short overviews of the recent data to the interested reader. Furthermore, the report is purely descriptive and does not contain any causal analysis since that is not the aim of the electronic reports in the EUMigraTool. The electronic reports are meant to provide an overview of key statistics to the users of the EUMigraTool and include some links to the research literature to highlight the ways in which certain indicators matter for migration decisions or attitudes towards migration.

The report can be viewed in HTML format online or downloaded as a PDF.

2 Immigration to Europe

Migration to Europe and the EU Member States is not a new phenomenon. Nevertheless, the number of immigrants has grown considerably in the last few years. While many migrants seek better job opportunities or education, an increasing share arrives in search of international protection. Regardless of the motive for migration, large numbers of people request a residence permit in an EU Member State. However, there is also a considerable share of individuals who tries to access the EU irregularly, whereby the channels of irregular migration depend on the destination countries' geographical location and other traits.

This section characterises immigration trends to Europe in the last years. Given the salience of the topic, a particular focus is put on refugees. The section also provides an overview of the residence permits issued by EU Member States. Lastly, it gives insights into irregular migration.

Figure 1 below depicts recent **immigration** in absolute terms (left panel) and relative to countries' population sizes (right panel) (Eurostat 2021n; Eurostat 2021y). Currently, the most popular immigrant destination countries in Europe are Germany, Spain, Great Britain, and France. However, their figures are relatively low when compared to the countries' population size. In per capita terms, the top immigrant recipient countries are Luxemburg, Malta, Cyprus, Ireland, Switzerland, and Sweden. Shares tend to be higher in northern and central Europe, compared to the south and east. Interestingly, by 2021 neither Italy nor Greece were in the top ranks of either indicator, even though the public debates about immigration in Europe tended to focus on these two countries of first arrival. Note, however, that in both countries the immigration figures do not include asylum seekers.[1]

[1] Asylum seekers are included in the data on migration reported to Eurostat in: Belgium, Germany, Estonia, Greece, Spain, France, Italy, Cyprus, Luxembourg, the Netherlands, Austria, Portugal, the United Kingdom, Norway (only with residence permit), and Switzerland. They are excluded in: Belgium, the Czech Republic, Denmark, Ireland, Croatia, Latvia, Lithuania, Hungary, Malta, Poland, Romania, Slovenia, Slovakia, Finland, Sweden, Iceland, and Liechtenstein (Eurostat 2019).

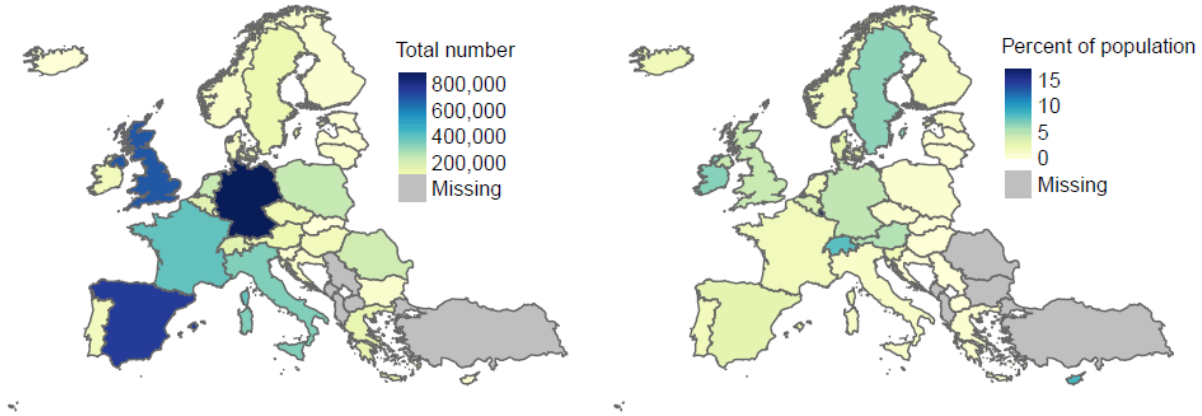

Figure 1: Numbers of recent immigrants, 2019

Compared to ten years ago, immigration to the EU has grown substantially. After a plunge in the aftermath of the financial crisis, the development has been rather steady, as illustrated by Figure 2 (Eurostat 2021n). Immigrant numbers peaked in 2015 due to the arrival of unprecedented numbers of asylum seekers. In 2018, however, this maximum was surpassed again.

The maps in Figure 3 illustrate country trends (Eurostat 2021n). By far the most significant increase of immigrants has been witnessed in Malta. In the rest of Europe, figures have grown at most four- to five-fold while most countries saw figures growing two- to three-fold. On the other hand, no change or a decrease in immigration figures was recorded, for example, in Spain, Greece, and Italy over the past decade. Note that a different picture arises when considering asylum applications (Figure 8). When considering only the last five years, the pattern is very similar. There are increasing numbers in key destinations of immigrants such as Germany. Several central European countries, such as Slovakia, have seen increasing annual immigration. However, in a few countries, the sign has changed, and immigration numbers have been increasing. That pattern can be found in Spain and Greece, both of which experienced a fall in immigration in 2009-2014 due to their economic crises.

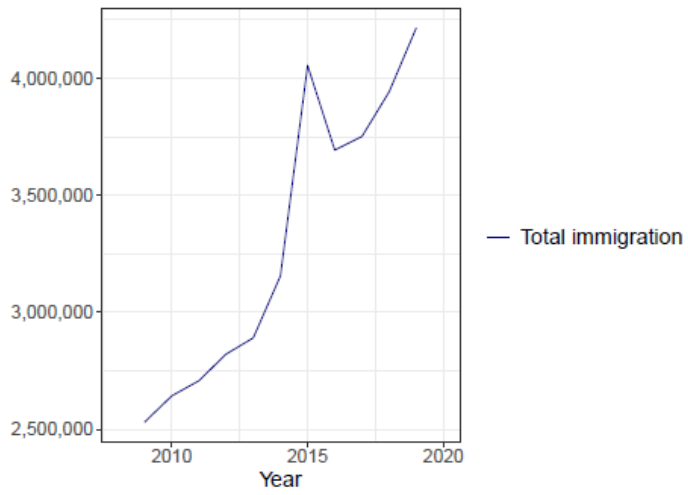

Figure 2: Total annual immigration inflow in the EU

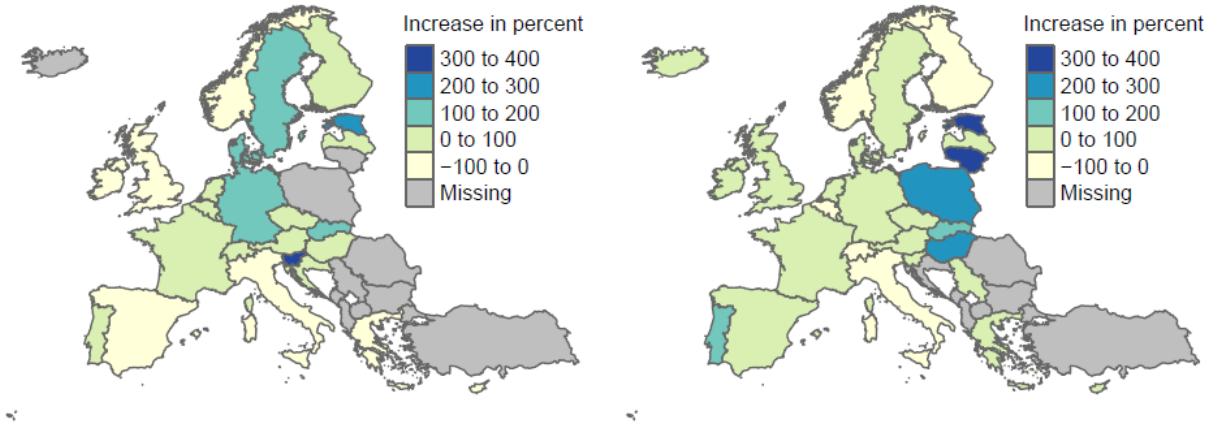

Figure 3: Increase in percent in immigration from 2009 to 2019 and 2015 to 2019 excluding outlier (Malta)

The countries receiving most immigrants in absolute terms are also among the top recipients of **asylum applications**. Figure 4 illustrates this observation (Eurostat 2021a). For example, Germany and France are not only among the top destinations for migrants but also for refugees. On the other hand, countries with extensive Mediterranean coastlines, namely Greece, Italy, Cyprus, Malta, and Spain, are common target locations for asylum seekers, especially those from North Africa and the Middle East. In 2019, most of the newcomers in Greece came from Afghanistan and Syria. In Italy, the most common origin countries were

Tunisia, Ivory Coast, and Algeria, and in Spain, the most common origins were Morocco, Algeria, and Mali. In Malta, it was Morocco and, in Cyprus, it was Syria (UNHCR 2019). Relative to the population size, by far the most asylum applications were registered in Cyprus, Greece, and Malta. These southern European countries have borne the brunt of arriving asylum seekers hoping to enter the EU. In all other countries, figures were significantly lower.

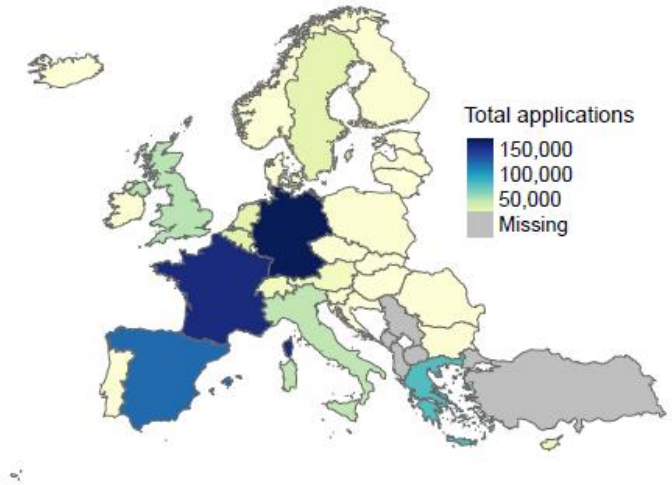

Figure 4: Total numbers of asylum applications, 2019

When looking at the share of asylum applicants of the total population, it becomes clear that in the average EU country for which data exists, asylum applicants only represent 0.19 % of the population and never more than 1.45 % (Figure 5 (Eurostat 2021a; Eurostat 2021y)). Figure 6 illustrates that people under 35 years of age make up the largest share of asylum seekers (ibid.).

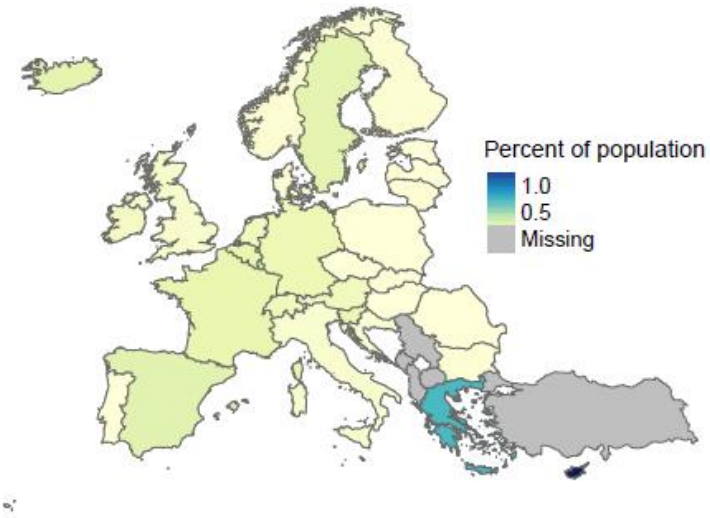

Figure 5: Share of first-time asylum applications of population, 2019

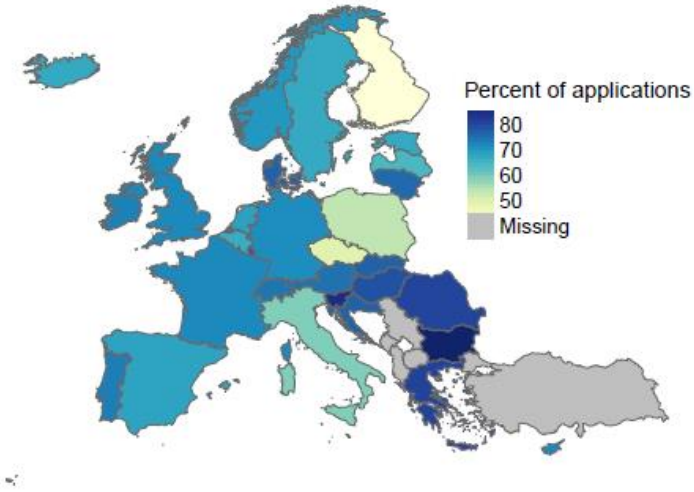

Figure 6: Share of first-time asylum applicants below 35 years of age of all asylum applicants, 2019

When looking at the development over time, one can see that asylum applications slowly increased before 2015, then surged, and have since been decreasing again (blue line in Figure 7 (Eurostat 2021a; Eurostat 2021n)). Furthermore, refugees have always constituted only a fraction of total immigration. Since 2015, their share has been declining, illustrated by the diverging yellow and the blue lines in the figure.

As shown in Figure 8, by far the most significant increases in asylum applications were recorded in Spain, Slovenia, and Portugal (Eurostat 2021a). While at a significantly lower scale, numbers also increased substantially in Germany, France, Italy, Greece, Cyprus, and most Balkan countries. The pattern does not change much when considering only the last five years.

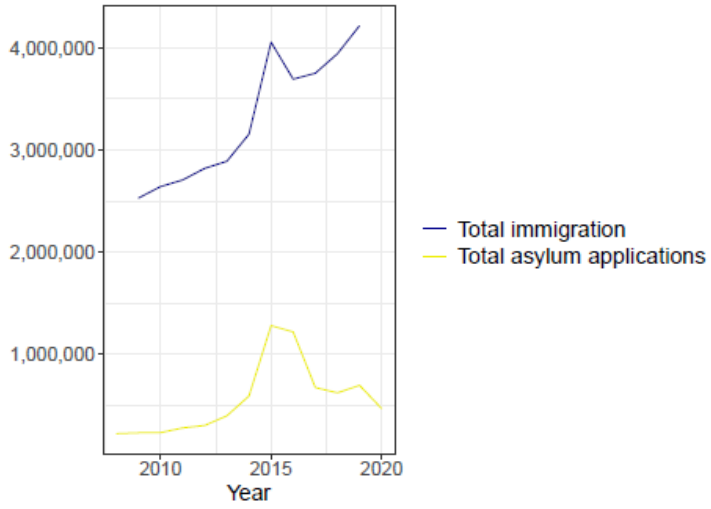

Figure 7: Total immigration inflow and total asylum applications in the EU

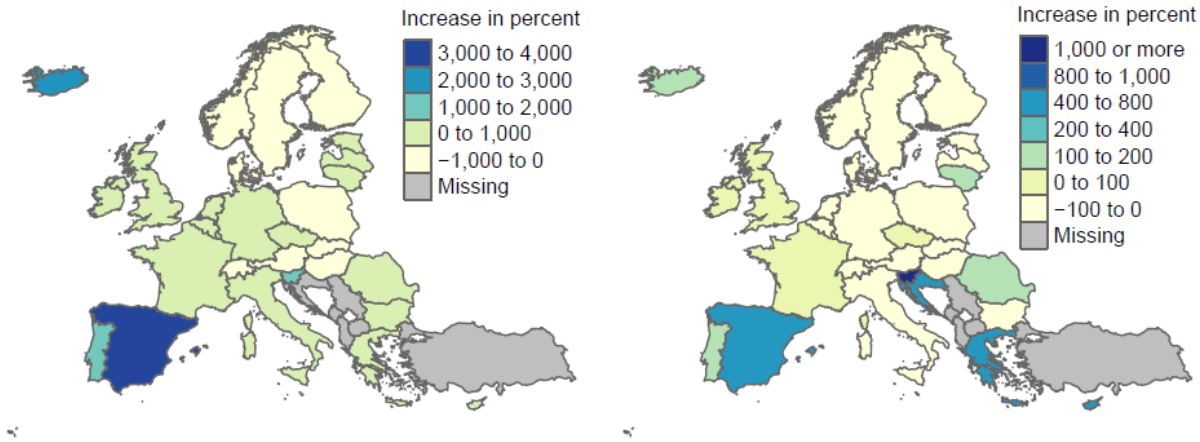

Figure 8: Percentage increase in asylum applications from 2009 to 2019 and 2015 to 2019

Speaking of the attractiveness of a destination country for asylum seekers may not be appropriate because they cannot freely choose their destinations. According to the Dublin III Regulation, refugees must apply for asylum in the country through which they have entered

the European Union (European Commission 2020b). Therefore, a country's geographic location is one of the main determinants of the number of asylum applicants. That is also one of the reasons why Greece, Malta, and Cyprus record such a high number of asylum applications. Hence, one cannot conclude that many asylum applicants signifies a high willingness to host people in need.

A more suitable measure is the number of people a country receives through a voluntary **resettlement scheme**.[2] As Figure 9's left side illustrates, resettlement is more common in northern and western Europe, particularly in Great Britain and France, Sweden, as well as Germany and Norway (Eurostat 2021a; Eurostat 2021ac).

In absolute numbers and relative to the number of annual asylum seekers, resettlement numbers are low. While there were 699,085 asylum claims in 2019 across the whole EU, only 21,295 persons were resettled (ibid.). Disposing of the outlier Norway with resettlement numbers almost equal to asylum claim numbers, northern and western countries have the highest resettlement rate compared to their asylum claims.

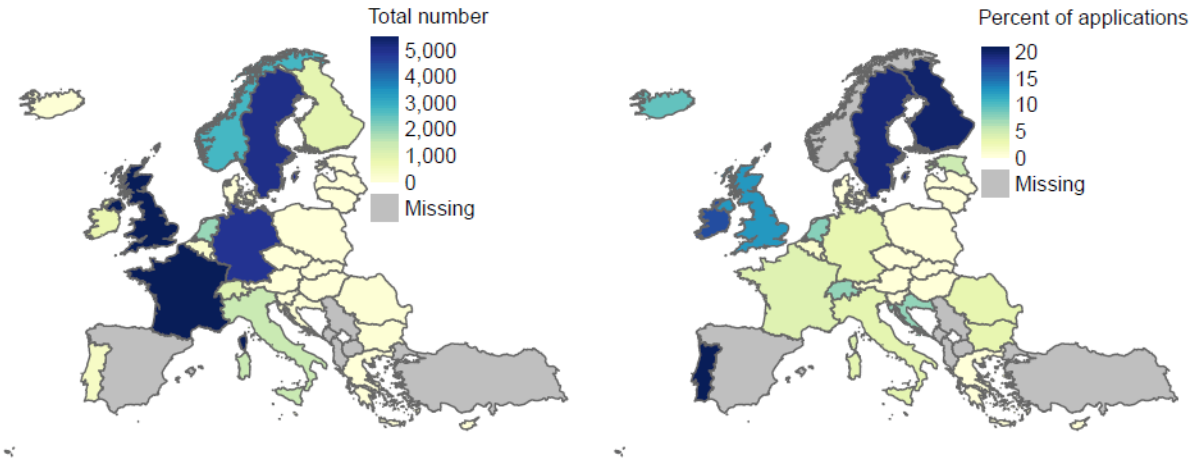

Figure 9: Total number of resettled persons and resettled persons as a share of all asylum seekers, 2019

[2] Resettled persons have been granted authorization to reside in a Member State within the framework of a national or Community resettlement scheme. Resettlement means the transfer of third-country nationals or stateless persons based on their need for international protection and a durable solution to a Member State, where they are permitted to reside with secure legal status (Eurostat 2021ac).

Regardless of their motive for migration or channel of arrival, immigrants need a **residence permit** to be legally recognised and granted rights in their destination countries.

Figures 10 and 11 represent the number of first residence permits granted by EU countries in absolute terms (Eurostat 2021i).[3]

Currently, Poland constitutes the country with the largest quantity of first permits. Though traditionally an emigration country, figures of arrivals and issuance of residence permits skyrocketed from 2013 onwards. This trend followed the liberalisation of access to the national labour market for foreign workers through the simplification of administrative processes. Poland is closely followed by Germany and, with notably fewer permits, Spain and France. The map in Figure 10 illustrates that the records from the Balkans, Scandinavia, and the Baltics are comparatively lower.

The graph in Figure 11 reflects a steady and linear increase in Poland, the leading country, throughout the entire decade of the 2010s, reaching its highest record in 2019. Concurrently, there was a sudden spike in Germany in 2015, while overall immigration numbers rose exponentially in many Member States as a result of unprecedented numbers of asylum seeker arrivals to the EU. The pattern in these two countries contrasts with the relatively stable and lower numbers in most of the others during that same timespan. Italy is an exception with a decreasing trend from 2010 to 2015 due to certain legislative decisions on entry quotas. Italy manages annual quotas of legal entries through an annual decree, and while in 2011 this quota was around 100,000 entries, in the following years, it plummeted to below 15,000.

[3] A residence permit is considered any type of authorisation valid for at least three months, issued by the authorities of a Member State, allowing a third-country national to legally stay in its territory. These statistics elate to permits granted to a person for the first time and to cases where the time gap between the expiry of the old permit and the start of validity of the new permit issued for the same reason is at least six months, irrespective of the year of issuance of the document (Eurostat 2021i).

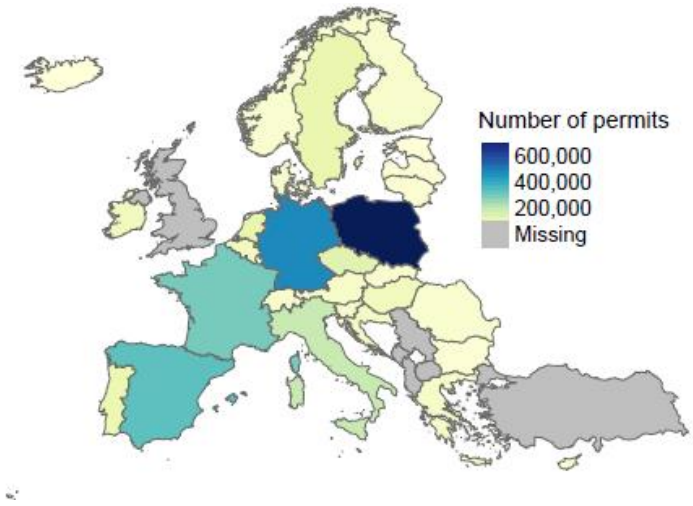

Figure 10: Total number of first permits issued, 2019

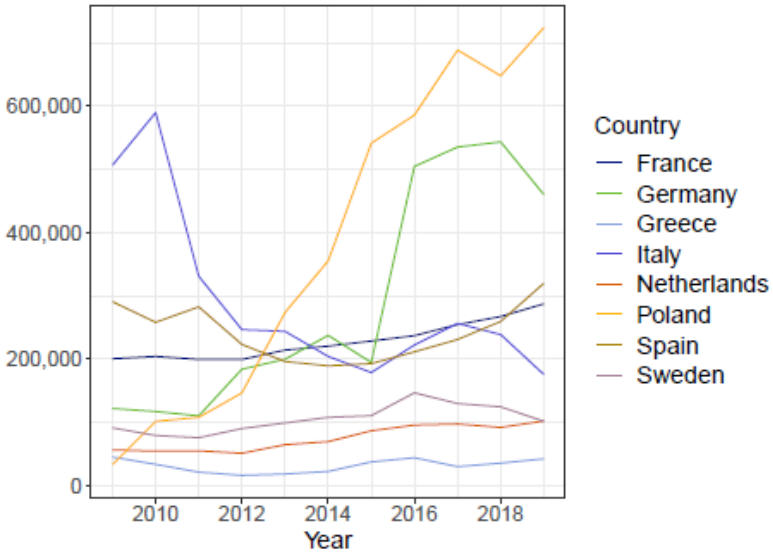

Figure 11: Number of first permits issued

The right of residence in a Member State is a key principle within the EU legal framework on the social rights to which foreign citizens have access. Consequently, its management applies to the national legislation on social affairs in each EU country (Bruzelius 2019). At a European level, residence permits are classified within three categories of length of validity: the first from three to five months, the second from six to eleven months, and the third from twelve months or more.

As illustrated by Figure 12, there exists a large heterogeneity across countries regarding the length of first permits issued (Eurostat 2021i). For example, Poland stands out as the country that issues the greatest number of first permits in absolute terms, but these permits are mostly short-term. Germany, on the other hand, has issued many long-term permits in recent years.

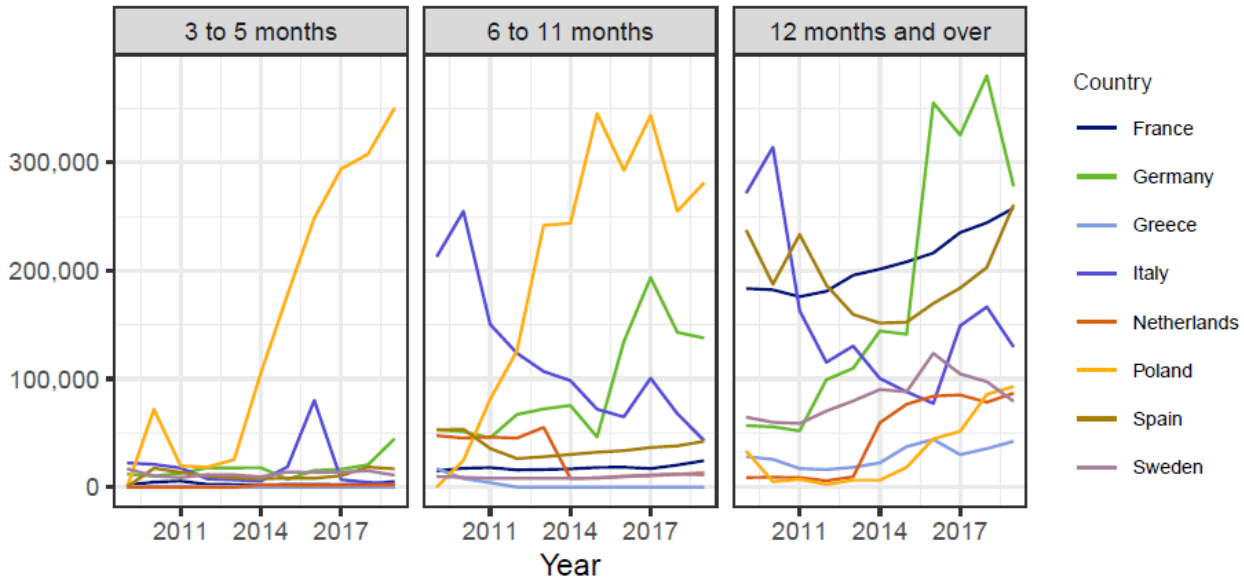

Figure 12: Total number of first permits issued by length

Apart from the migrants that successfully acquire a residence permit, some are being refused to access a Member State's external border. This is often due to non-valid documentation or, in other cases, due to the inability to properly justify the reason for entry and stay. Figure 13 illustrates the absolute numbers of third-country nationals that are formally **refused permission to enter the territory** of a Member State at its borders, with each person being counted only once within the determined period irrespective of the number of refusals issued to that same individual (Eurostat 2021ai).

First, the left graph of Figure 13 reflects how, albeit constituting the country with the greatest number of third-country nationals refused entry at its external borders, Spain experienced a significant decrease in refusals following the 2008 economic crisis, as mentioned earlier. The number of arrivals may have decreased due to precarious labour market conditions for non-qualified migrant workers, translating into reduced refusals at the border. Nonetheless, the combination of two factors could have generated a sudden and evident rise in 2019. The first

includes the deteriorating situation in the Moroccan Rif, where widespread social protest erupted in late 2016 due to police violence, endemic political corruption, low levels of development, and the economic abandonment of the region by the national government (Zaireg 2018). This led to a cycle of violence and repression at the hands of the state security forces, leading large numbers of Moroccans to abandon their homeland and travel to Spain. Second, in 2018, Morocco became the principal point of departure for citizens from different Sub-Saharan countries attempting to reach the EU, using Morocco as a transit territory and Spain as the closest point of entry. Finally, the 2020 drop might be related to the abovementioned restrictions applied as a result of the transnational COVID-19 pandemic.

Second, the right graph of Figure 13 shows the patterns in the other seven countries, with Poland and France constituting the two Member States with the largest rejections at their external borders. In the case of Poland, the bordering states of Belarus and Ukraine as countries of transit and origin might lead to high levels of arrivals, and thus, rejections. In the case of France, the increased security efforts in the country's fight against terrorism following the 2015 jihadist attacks at the hands of the Islamic State, together with the securitisation of borders and the use of profiling practices, may have led to the notable increase in external border rejections. As we can see, the rest of the countries maintained a relatively stable number of rejections throughout the entire decade, except for Greece experiencing a slight increase between 2015 and 2017.

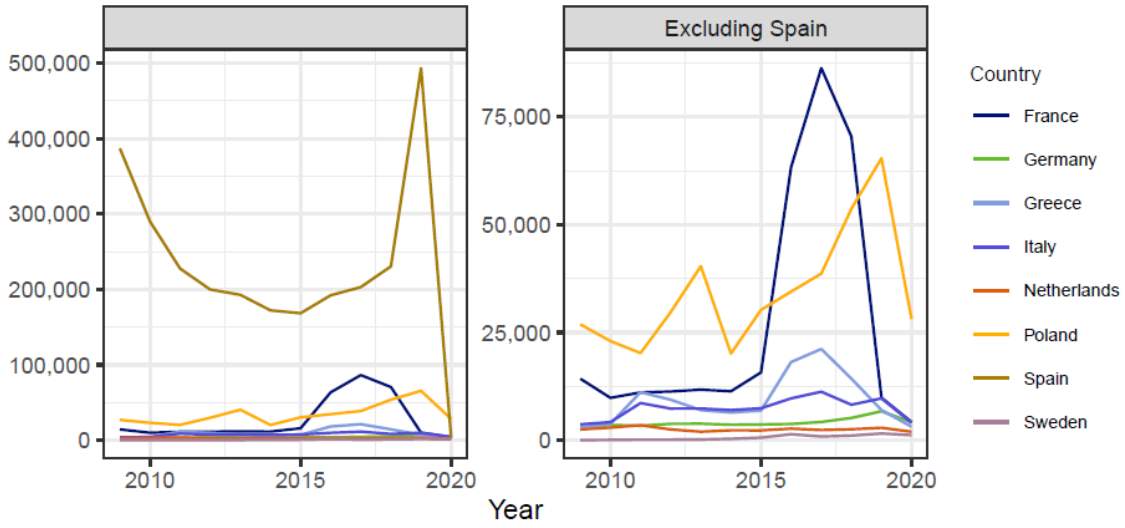

Figure 13: Total number of third-country nationals refused entry at the external borders

Within the analysis of third-country nationals refused entry at the external borders, we can disaggregate the data by different subsamples, for example, depending on the migrants' point of entry. As illustrated by Figure 14, Spain is by far the Member State with the highest records of refusals at the land border (Eurostat 2021ai). The greatest number of rejections take place in the autonomous cities of Ceuta and Melilla. Italy has the largest number of individuals refused entry at the sea border, experiencing two spikes in 2011 and 2017, after which numbers plumed. In the latter year, the collaboration between Italy and the Libyan Coastal Guard initiated. This constituted a policy change that strongly affected the number of refusals. Finally, refusals at the air border are more significant in France, Spain, Italy, and Germany. While France had high numbers with little variation, Spain experiences a fluctuation throughout the decade, and the numbers in Italy and Germany rise steadily from 2010 onwards.

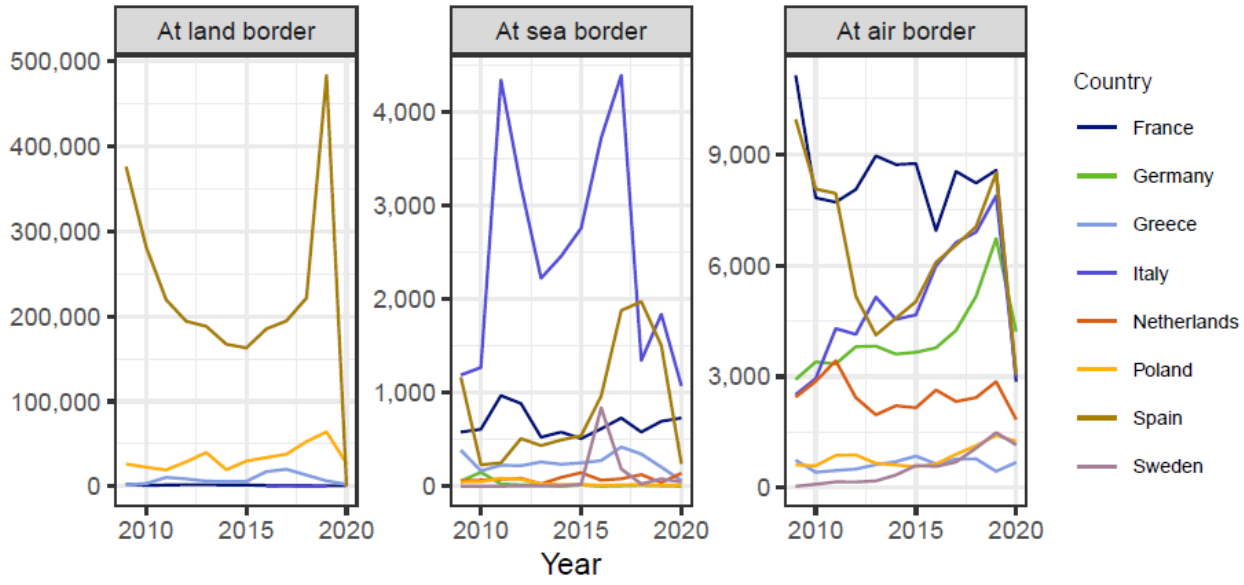

Figure 14: Total number of third-country nationals refused entry

Another demonstrative subsample includes the reason for the refusal (Figure 15 (Eurostat 2021ai)). In this regard, the upper-left graph of the figure displays how not having a valid legal document, as well as the inability to justify the reason for entry, are the two most common rationales for refusal. First, Poland is by far the country with the highest numbers of this type of refusals. While the rest of the analysed countries register around two thousand of these rejections per year—except for France between 2015 and 2019—Poland reaches

above ten thousand in most years, peaking at 30,000 in 2013. The 2013 spike could be due to the aforementioned policy changes affecting access of Eastern European migrant workers.

Second, the absolute numbers of third-country nationals rejected at an external border due to a false visa or residence permit are much lower. The refusals in the upper-right graph of the figure rarely surpass 300 per year, with general patterns decreasing progressively from 2011 onwards. An attempted channel often includes family reunification purposes, with false declarations of parenthood and marriages of convenience as two of the most frequently employed strategies (Müller 2012). In response to the use of fake documents, the EU has designed and implemented an online image-archiving system named FADO, which allows images of genuine and false travel documents to be shared in real time between all Member States (ETIAS 2021).

Third, lack of justification for the purpose and conditions of stay comprises another reason behind refusals at the Member States' external borders. Almost all the selected countries move within a range of 500 to a maximum of 7,500 rejections per year. At the same time, from 2015 onwards, Poland surpassed these numbers and reached 35,000 refusals in 2019, as illustrated by the lower-left graph of the figure. Poland, while accepting many migrant workers for non-qualified jobs, simultaneously rejects large numbers of people, alleging that their purpose and conditions of stay in the country do not correspond to national or international legal frameworks.

Fourth and last, a reason for rejections includes that a person has already stayed three months in a six-month period. The lower-right graph of the figure illustrates how the absolute numbers of people refused due to this reason are significantly lower than those involving invalid or false legal documents. In 2012, Poland and Greece began to reject more individuals due to overstaying the three months, with these rejections steadily increasing until 2016, when Poland's numbers skyrocketed to surpass 5,000 in 2018 slightly. The remainder of the countries usually has only 500 cases annually.

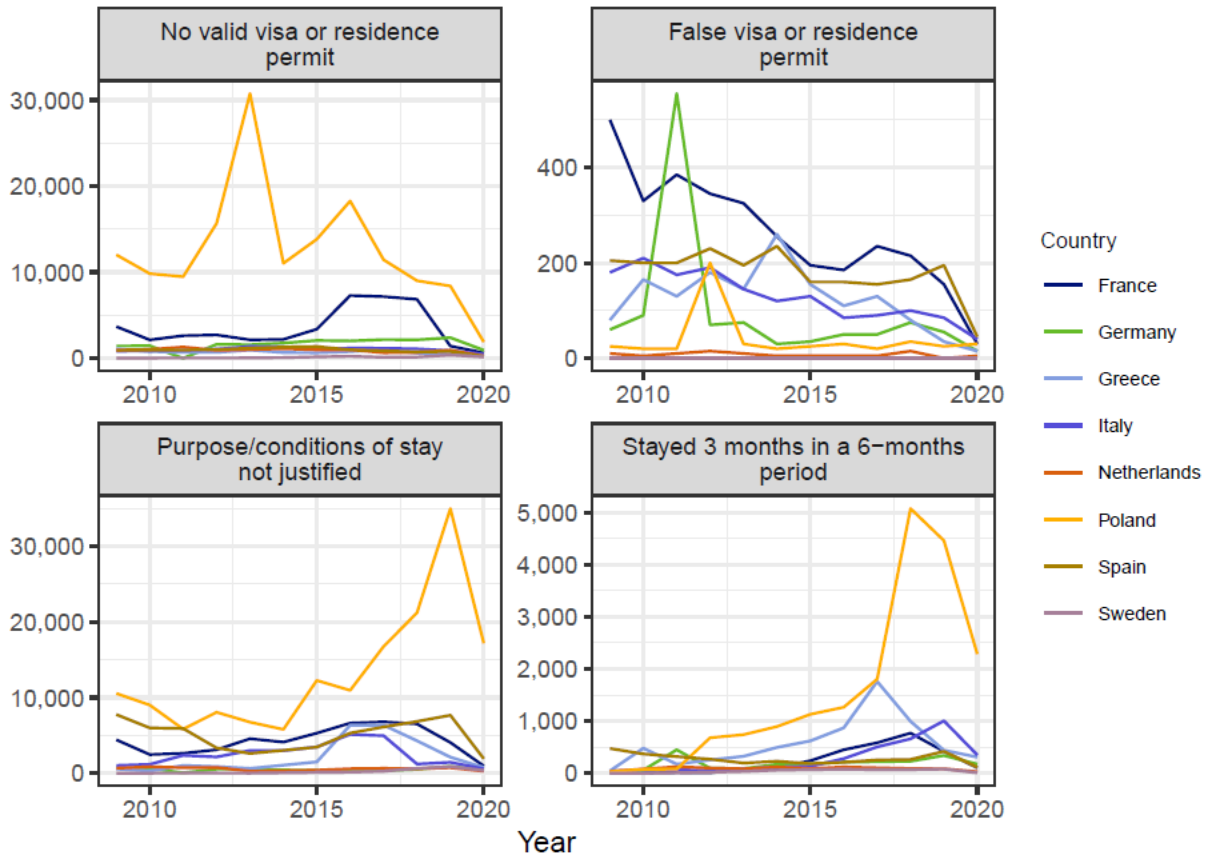

Figure 15: Total number of third-country nationals refused entry due to...

It is also important to address trends in **irregular immigration** to Europe, i.e., cases in which individuals enter a destination country without formal permission. Some see irregular migration as a sign of inconsequential border management. Others argue it is a stress signal, showing that the current European asylum and refugee policies and the options for legal immigration are deficient. Moreover, the presence of undocumented immigrants poses challenges in terms of integration. For example, irregular immigrants cannot get a work permit and are not entitled to social services. They remain separated and hidden from the rest of society. Data on irregular immigration to Europe exists even though its very nature renders it difficult to quantify. We rely on the official statistic on *illegally present third-country nationals*. This indicator is easily confused with irregular border crossings or other statistics, so in the following paragraphs, illegal should be understood as being based on this specific variable compiled by Eurostat.

Greece and Cyprus stand out with a high share of illegally present third-country nationals (Figure 16 (Eurostat 2021ah; Eurostat 2021y). The situation in these countries is associated with the large influx of asylum seekers in recent years. Due to their location at the external border of the EU, these countries received more asylum seekers than any other country and were therefore exposed to considerable organizational and bureaucratic challenges. Thus, many asylum seekers have been falling through the grid. Beyond that, the Dublin regulation, which stipulates that refugees have to claim asylum in the EU country where they arrive first, disincentives official registration for those who wish to move to another EU country (Frontex 2016; MEDAM 2019). The second-highest level of illegal immigration was recorded in Hungary and Croatia, i.e., the countries where many of the refugees passing illegally through Greece and the Balkans eventually applied for asylum (ibid.). It must be noted that no Eurostat data is available for the Balkan countries. However, for some of them, other sources report levels of magnitudes like those in Hungary and Croatia (SELEC 2019). In the rest of Europe, the share of illegal immigration is at a low level. Overall, in the average EU country for which data exists, only 0.15% of the population is estimated to be illegally present (Eurostat 2021ah; Eurostat 2021y)). Moreover, in international comparison, illegal immigration to Europe is generally happening on a small scale. For example, in the United States, undocumented immigrants make up an estimated three percent of the population (Budiman 2020). Lastly, the map looks very similar when considering only individuals below the age of 35. That indicates that this age group makes up most of all illegally present third-country nationals. That mirrors the finding for the age distribution of asylum applicants (Figure 6).

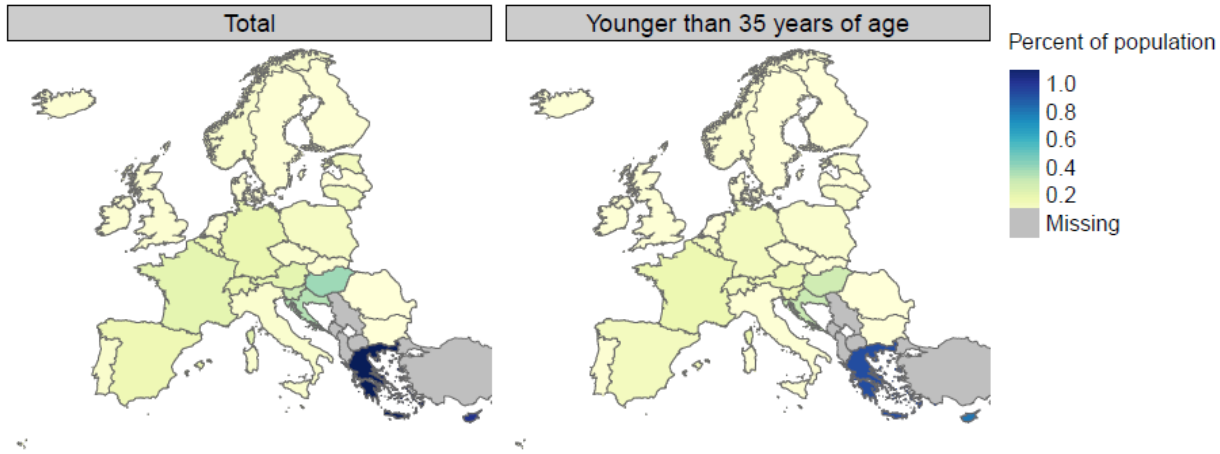

Figure 16: Share of third-country nationals found to be illegally present by age group, 2019

Although European countries increased border protection, the number of illegally present third-country nationals has grown substantially in recent years (Figure 17 (Eurostat 2021ah)). Compared to ten years ago, the number of illegal immigrants has at least doubled in almost all European countries. The increase was highest in Poland, followed by Hungary and Slovenia. Iceland and Germany saw considerable increases, too (left panel of the figure). Over the last five years, Slovenia, Croatia, and Cyprus have witnessed the most significant increases, while the growth has slowed down in Poland, Hungary, and Germany (right panel of the figure). A note of caution when interpreting these data: From the raw data alone, it cannot be inferred whether this increase was due to higher numbers or whether closer policing led to an a more representative picture of the actual situation.

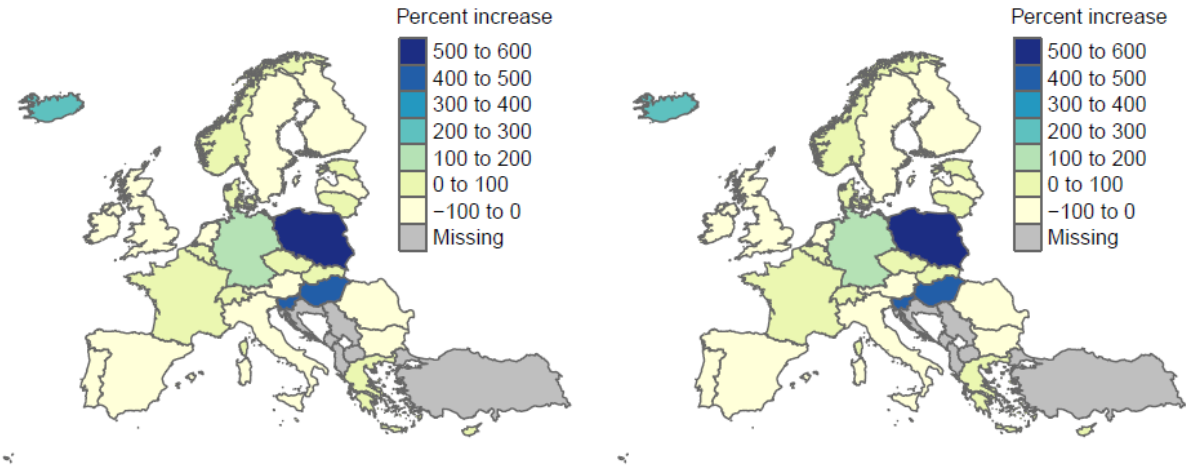

Figure 17: Percent increase in illegally present third-country nationals from 2009 to 2019 and 2015 to 2019

Not all immigrants or asylum seekers can stay in their destination countries. Asylum claims are often refused and if there are no other reasons to receive a permit to stay, such as subsidiary protection under the Geneva convention, the individual will be ordered to leave. The same holds if immigrants overstay their visas. In the average EU country for which data exists, 13.04% of all immigrants present are ordered to leave (Eurostat 2021n; Eurostat 2021aj).

This **return migration** is supposed to happen at a large scale all over the continent, such that at least ten percent of all immigrants in a country are ordered to leave (Figure 18 (ibid.)). Not all of these orders are actually enforced, as discussed next. Nonetheless, in Greece, more than half of all immigrants are third-country nationals who are ordered to leave the country. This large-scale return migration is related to the EU-Turkey Statement, in which Turkey agreed to the return of one illegally present third-country national from Greece for every Syrian refugee resettled from Turkey to one of the EU Member States (Moreno-Lax et al. 2021).

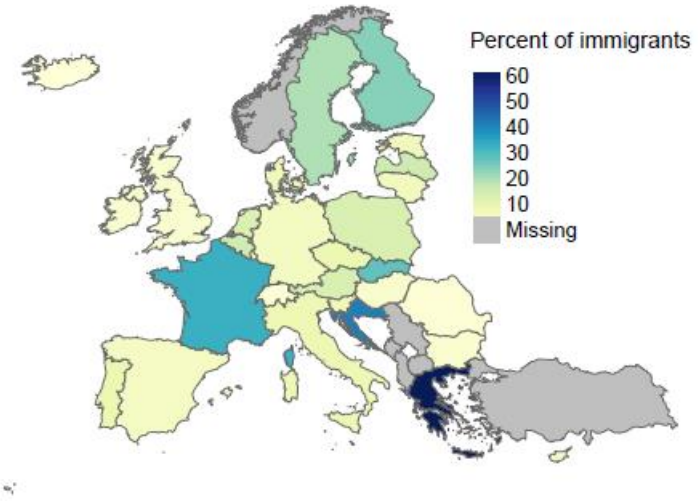

Figure 18: Share of illegally present third-country nationals ordered to leave compared to all immigrants, 2019

The last relevant indicator is the number of third-country nationals who have left the territory of a Member State following an administrative or judicial act stating that their stay is illegal and that the third-country national is obligated to leave the territory.[4]

Figures 19 and 20 depict third-country nationals **returned following an order to leave** (Eurostat 2021n; Eurostat 2021aj). As the map in Figure 19 reflects, in absolute terms, Germany is the country that enforces the greatest number of expulsions of individuals. The Balkans and the Baltic countries are those that have the lower numbers, while Western and Northern Europe accumulate the most. Relative to the immigrant population in the respective country, eastern European countries return relatively the most immigrants. Simultaneously, the graph in Figure 20 shows that, apart from Germany, Poland is the only country with an increasing pattern of realised expulsions from 2012 onwards, progressively converging to the numbers of Germany.

[4] When working with this statistic, it is important to note how third-country nationals who leave the territory within the year may have been subject to an obligation to leave in a previous year; this means the number of people who leave the country may sometimes be greater than those who were ordered to leave in the same year. Moreover, the data include forced returns and assisted voluntary returns, whereas unassisted voluntary returns are only included when and where these are reliably recorded (Eurostat 2021aj).

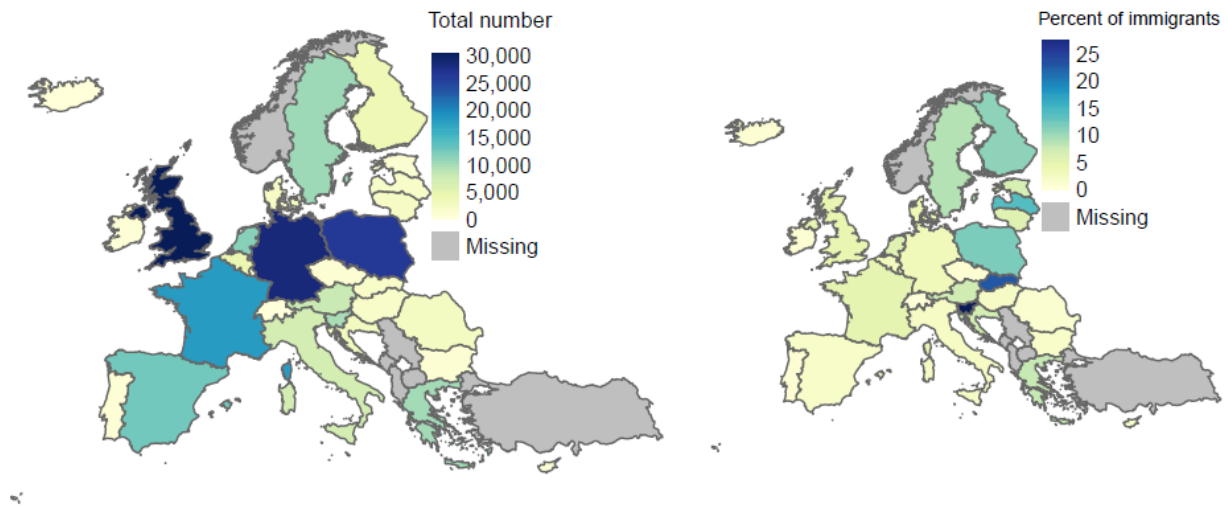

Figure 19: Third-country nationals returned following an order to leave, 2019

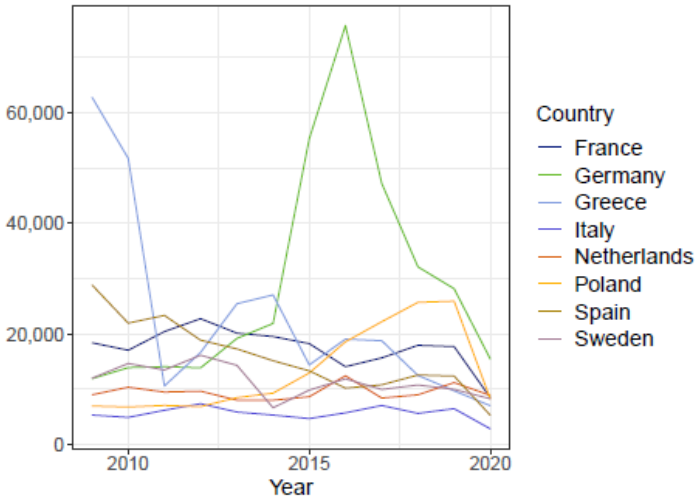

Figure 20: Total number of third-country nationals returned following an order to leave

3 Income, poverty, inequality, and social expenditure

Income levels, the prevalence of poverty and inequality, and the provision of social security benefits can directly affect migrants' choices for a destination country. At the same time, these factors are intimately connected to the capacity of destination countries to integrate migrants into the labour market and societies. There is also an indirect effect via the attitudes towards immigration among destination country residents. In the following section, we provide an overview of the current conditions across the EU Member States.

Migration comes at considerable costs. In financial terms, migrants need to pay for visas and other permits, transportation fees, accommodation, and potentially higher living expenses in the destination country. On the other hand, leaving behind family and friends and embarking on the risk of starting a new life elsewhere is emotionally challenging. Thus, whether a person decides to migrate or not crucially hinges on whether the expected benefits from doing so outweigh the associated costs. When deciding for a destination country, prospective migrants gauge political, social and environmental factors, and consider the presence of family or diaspora networks. In purely economic terms, however, these benefits often take the form of higher incomes. Basic economic theory and many empirical studies suggest that higher expected wages drive the decision to migrate in destination countries. Equivalently, migrants prefer to go to countries where the risk of falling into poverty is low. The income differential between origin and destination countries is particularly relevant for labour migrants, especially those who plan to send home remittances to support left-behind family members (Helms and Leblang 2019). At the same time, the income level of a destination country is an important determinant of its capacity to integrate immigrants because richer countries command over a larger public budget. Thus, governments can allocate more funds to spending related to the provision for and integration of immigrants. Lastly, citizens in more affluent societies tend to show more solidarity with immigrants (Paskov and Dewilde 2012; Dražanová et al. 2021).

While **median income levels** vary considerably among the European countries, a clear regional pattern is observable. Figure 21 serves to illustrate this observation (Eurostat 2021s). In northern and central Europe, half of the population earns at least EUR 20,000 per year, thereby making it the most affluent region on the continent. Two non-EU countries,

Norway and Switzerland, are by far the richest countries in Europe, with median income values beyond EUR 40,000. Southern Europe, including the Iberian Peninsula, Italy, Greece, and Cyprus, constitutes the second-richest region, with median incomes between EUR 15,000 and EUR 20,000. Lastly, the populations of eastern Europe earn the least, with median values below EUR 15,000. When considering the age cohort of 18 to 24 years, the regional pattern remains the same, but income levels are slightly lower.

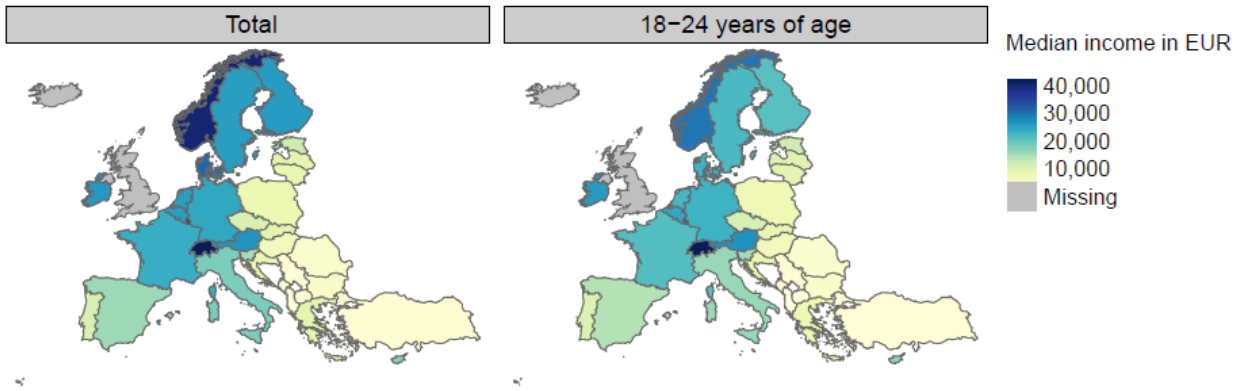

Figure 21: Annual median income by total population and age group, 2019

As illustrated in Figure 22, a rather similar but inverse pattern arises regarding the population's **risk of falling into poverty or social exclusion** (Eurostat 2021v). According to the common definition used in the EU, persons are at risk of poverty if their income after social transfers amounts to less than 60 percent of the national median income.[5] At high risk of social exclusion are individuals who are severely materially deprived or living in households with very low work intensity.[6] The south-eastern countries stand out with the highest levels, with about 30 to 35 percent of the population being at risk. The risk is lowest

[5] This relative definition of poverty risk stands in contrast to absolute thresholds such as the extreme poverty threshold of 1,95 USD at purchasing power parity. The risk of poverty thus does not account for differences between EU Member States.

[6] Severely materially deprived persons have living conditions severely constrained by a lack of resources. They experience at least 4 out of 9 following deprivations items: cannot afford i) to pay rent or utility bills, ii) keep home adequately warm, iii) face unexpected expenses, iv) eat meat, fish or a protein equivalent every second day, v) a week holiday away from home, vi) a car, vii) a washing machine, viii) a colour TV, or ix) a telephone. People living in households with very low work intensity are those aged 0-59 living in households where the adults (aged 18-59) work 20% or less of their total work potential during the past year. To measure child poverty, the same indicator is available for the subgroup aged 0-17 (Eurostat 2020a).

in the north and centre of the EU, while the south and northeast exhibit intermediate levels. Moreover, in most countries, women face a higher risk of falling into poverty.

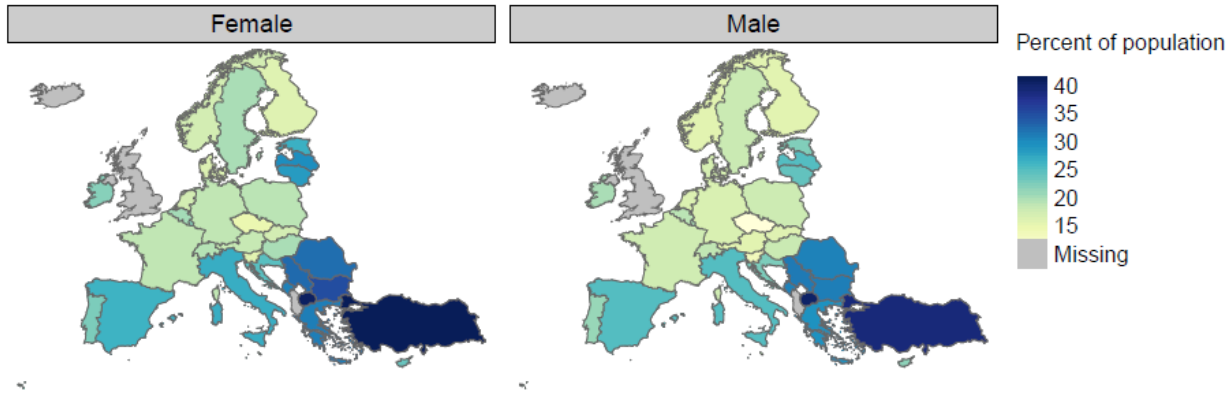

Figure 22: Share of the population at risk of poverty and social exclusion by sex, 2019

Despite the large differences in median incomes and poverty risk across the continent, the poorest European countries are still relatively well-off by global standards, thereby explaining its general attractiveness as a destination area for migrants. The average GDP per capita in the ten poorest EU Member States for which data exists amounts to about EUR 7,044 (Eurostat 2021aa) That figure is like the levels in better-off Latin American countries, such as Chile, Panama or, Uruguay. Most non-oil exporting Middle Eastern and Northern African countries are substantially poorer, with less than EUR 3,000 per capita on average. Income levels in Sub-Saharan Africa are even lower (World Bank 2021a). Similarly, poverty levels and the risk of falling into poverty are much higher in many regions outside Europe. These circumstances create a large income gap at the EU's external borders.

Next to the absolute income level, its distribution within countries can influence migration decisions. When migrating for labour, immigrants seek the highest possible returns to their skills while accounting for psychological costs, like losing family links, and monetary migration costs. Given the same average income levels between countries, wages of high-skilled workers are higher the more unequally wages are distributed. Conversely, low-skilled workers earn more if wages are more evenly distributed. Therefore, high-skilled migrants tend to be more attracted by destination countries with higher **wage inequality**, while low-skilled migrants prefer countries with more equal wage distributions (Borjas 1987). Most studies investigating this type of migrant selection rely on data from the United States and

not all find support for the theoretical argument (see review provided by Ruhose et al. (2015)).

A few case studies that include European countries, however, provide at least partial evidence that high-skilled migrants cluster in more unequal countries, while low-skilled migrants predominantly live in more equal ones (Beenstock et al. 2015; Belot and Hatton 2012; Brücker and Defoort 2009; Stolz and Baten 2012).

In terms of integration, there exists no evidence that income inequality causes solidarity with immigrants in societies to change (Paskov and Dewilde 2012). However, an indirect effect of inequality on immigration attitudes has been detected: in more unequal societies, poorer and less skilled people tend to have more negative attitudes towards immigrants than in more equal ones. The reverse is true for wealthier or high-skilled individuals (Borjas 1987; O'Rourke and Sinnott 2006).

A standard measure for income inequality is the Gini coefficient. It is calculated based on the distribution of equivalised disposable income, i.e., after tax and other deductions, across households within a given country. It ranges from 0 percentage (complete equality) to 100 percentage (complete inequality). Figure 23 visualises the inverse relation between inequality as measured by the Gini and median income levels (Eurostat 2021m). It is highest in southeast, south, and northeast Europe, which are also among the poorest regions. In the north and centre, income inequality is comparatively low, though the Scandinavian and Benelux states stand out with the lowest levels. The inverse relationship does not hold for the east of the continent (Poland, Czech Republic, Slovakia, and Slovenia) as both income and inequality are among the lowest. Although differences are observable between European countries, it is worth noting that Europe is among the world's most equal regions (World Bank 2021b).

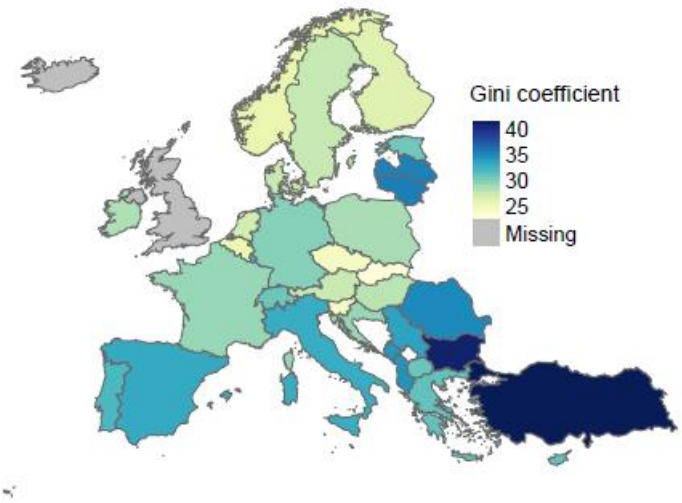

Figure 23: Gini coefficient of equivalised disposable income, 2019

Another important income-related factor is the level of countries' **social expenditure**. It can be linked to migration decisions through the so-called "welfare chasing hypothesis", which suggests that immigrants tend to cluster where generous welfare benefits are offered. This theory was developed and tested for the case of the United States (Borjas 1999). For Europe, recent evidence suggests that generous welfare benefits attract high-skilled immigrants who wish to settle in the long run (Cebolla-Boado and Miyar-Busto 2019). In more general terms, evidence is mixed. Moreover, the effect often depends on the particular immigration and welfare policies in destination countries and its magnitude is usually small (Beenstock et al. 2015; Cigagna and Sulis 2015; Giulietti and Wahba 2012; Razin and Wahba 2015; Agersnap et al. 2020). However, in terms of integration capacity, it is plausible that countries with a larger social spending budget can better buffer costs associated with immigration. That is particularly relevant for asylum seekers, who require accommodation and provisions but face restrictions to participate in the labour market. Within Europe, Member States can be stratified in both their welfare state models, including the models' generosity, as well according to which conditions migrants have access to social protection (Corrigan 2014). Migrants can be restricted in terms of work-based, residence-based, or citizenship-based criteria (Shutes 2016). This means that depending on migrant access to welfare state benefits, they may be exposed to social risks like material deprivation and inadequate living conditions. Such conditionalities can create inequalities among migrant and non-migrant

populations, with exclusionary consequences for the entirety of the population and overall societal wellbeing.

Figure 24 shows that, unsurprisingly, levels of social expenditure are very much in line with income (Eurostat 2021h; Eurostat 2021u). If people earn more, a country's tax base is larger, and thus, more funds are available for expenditures such as old-age pensions, unemployment benefits, or public healthcare. The same holds for pensions, which usually make up a large share of a country's social budget.

The analysis of income levels, the prevalence of poverty and inequality, and the provision of social security benefits can be linked with the observed migration patterns. In general, Europe's high income levels and low poverty rates attract immigrants from poorer countries. Another explanation for Europe's particular attractiveness as a destination country among low-skilled immigrants is that inequality in Europe is low in international comparison.

Some patterns arise when looking at the regional distribution of recent immigrants across Europe. A large share of immigrants and asylum seekers are present in northern and central Europe, i.e., in regions with high income levels, low inequality, low poverty risk, and generous social benefits. However, the highest numbers of immigrants relative to the population are found in southern and south-eastern Member States, where economic conditions are less favourable. The eastern region, which performs well in terms of poverty and inequality, receives only very few immigrants. However, more recently, numbers have been on the rise in this region.

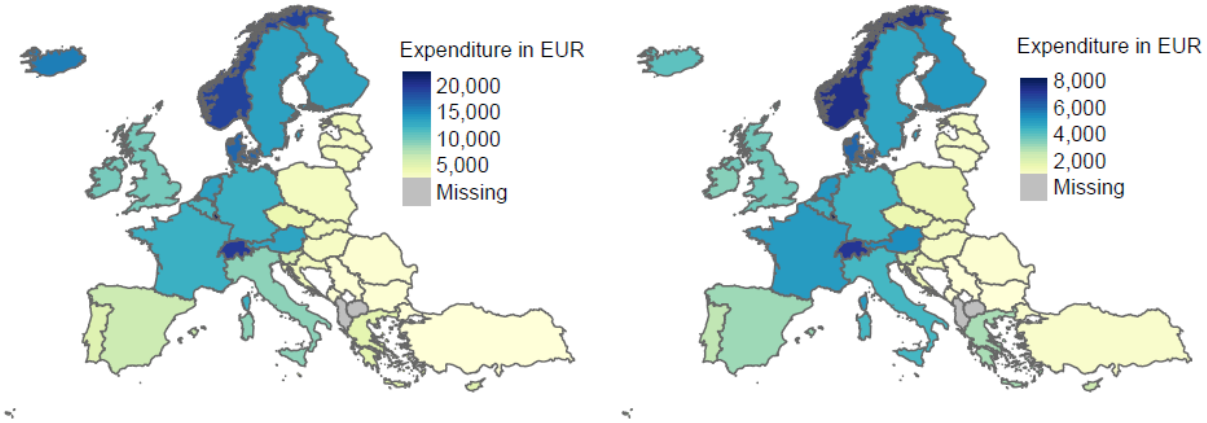

Figure 24: Total social expenditure and expenditure on pensions per capita, 2019

4 Employment and skills

The labour market situation in a destination country plays a vital role in migrants' decisions about where to move. Likewise, it is crucial from the destination country's perspective because immigrants can only be integrated into the labour market if sufficient and suitable jobs are available. Furthermore, the employment status of natives shapes their attitudes towards immigration. Against this background, this section provides an overview of the labour market situation in European countries (Padilla and Pereira Miguel 2009).

The integration of immigrants into the labour market is of utmost importance. For two-thirds of all international migrants, finding employment is why they leave their home countries in the first place (ILO 2021). Within the EU, however, the share of labour migrants is substantially smaller. Between 2008 and 2016, 25 percent of all residence permits have been issued for employment-related reasons. Nonetheless, employment ranks second in the list of motives for immigration, preceded by "other reasons", which includes international protection (Burmann et al. 2018). Besides, regardless of the motive for migration, employment enables immigrants to provide for themselves and become a part of society.

The odds of finding a suitable job as a migrant are higher in countries where unemployment is low. Accordingly, several studies have identified employment prospects in terms of low unemployment in a destination country as one of the most important pull factors of migration (Ferwerda and Gest 2021; Matsui and Raymer 2020). However, while the pull effect is powerful for voluntary (labour) migrants, it is not necessarily a factor influencing asylum people who flee persecution or conflict (Kang 2021).

Regarding the integration of immigrants into the labour market of destination countries, the availability of sufficient and suitable employment opportunities is crucial. Furthermore, the employment situation of the native population is associated with attitudes towards immigration. Specifically, unemployed natives, especially those with a relatively low skill level, may feel threatened by immigrants due to increased competition for scarce jobs (Dražanová et al. 2021; Hellwig and Kweon 2016; Pardos-Prado and Xena 2019). However, not all studies find evidence for this hypothesis of labour market competition (Young et al. 2018).

Across Europe, there are clear regional differences in terms of unemployment. As Figure 25 below demonstrates, **long-term unemployment** is relatively high in southern Europe, e.g., Greece, North Macedonia, Montenegro, and Spain (Eurostat 2021q). In contrast, unemployment is very low in most of northern, central, and eastern Europe.

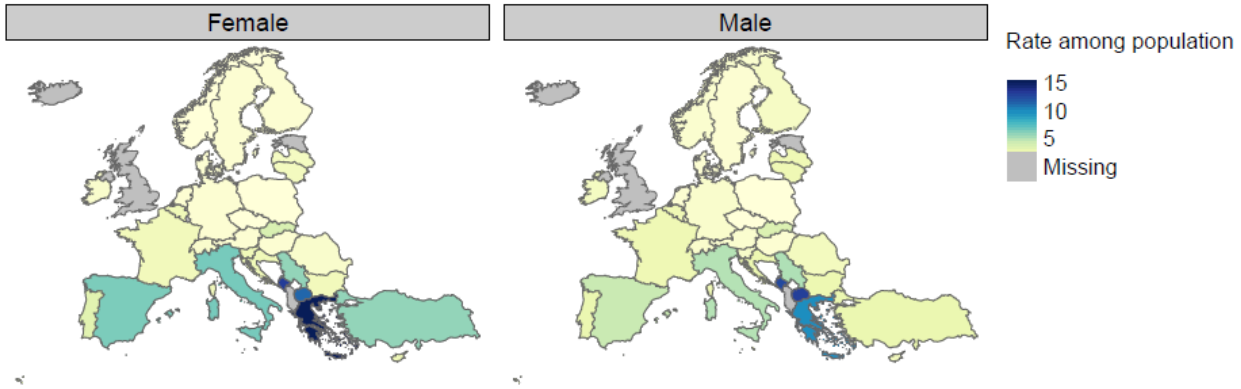

Figure 25: Long-term unemployment rate by sex, 2019

In all European countries, women are more likely to be unemployed compared to men. This observation is corroborated in Figure 26, which visualises the development of **unemployment rates** in selected countries (Eurostat 2021q). Similarly, unemployment rates are higher among the younger population, i.e., those younger than 25. Youth unemployment rates are a particularly important indicator when considering the labour market prospects of recent immigrants. First, as Figure 6 shows, first-time asylum seekers are typically young. Second, younger adults have the least experience and have thus a much harder time finding jobs. The highest value of **youth unemployment** is currently recorded in Greece, followed by Spain and Italy, i.e., countries with generally high unemployment. Furthermore, Italy and Spain have a high share of low-skilled workers (see Figure 29 and the related discussion below) and strong labour protections for older workers, making it difficult for younger job-seekers to find work.

Figure 26 also highlights that unemployment rates were rather stable in all selected countries before the Great Financial Crisis. An exception is Poland, where the numbers were declining rapidly. In the direct aftermath of the crisis, unemployment increased only briefly in Poland, while Greece and Spain witnessed sustained surges during the Euro crisis. In Italy, only youth unemployment spiked, which is a consequence of the young's more precarious labour market

position. More recently, the Italian unemployment rate has started falling towards that of other countries again. In contrast, rates have been relatively stable at a medium level in Sweden and France and a low level in Germany and the Netherlands.

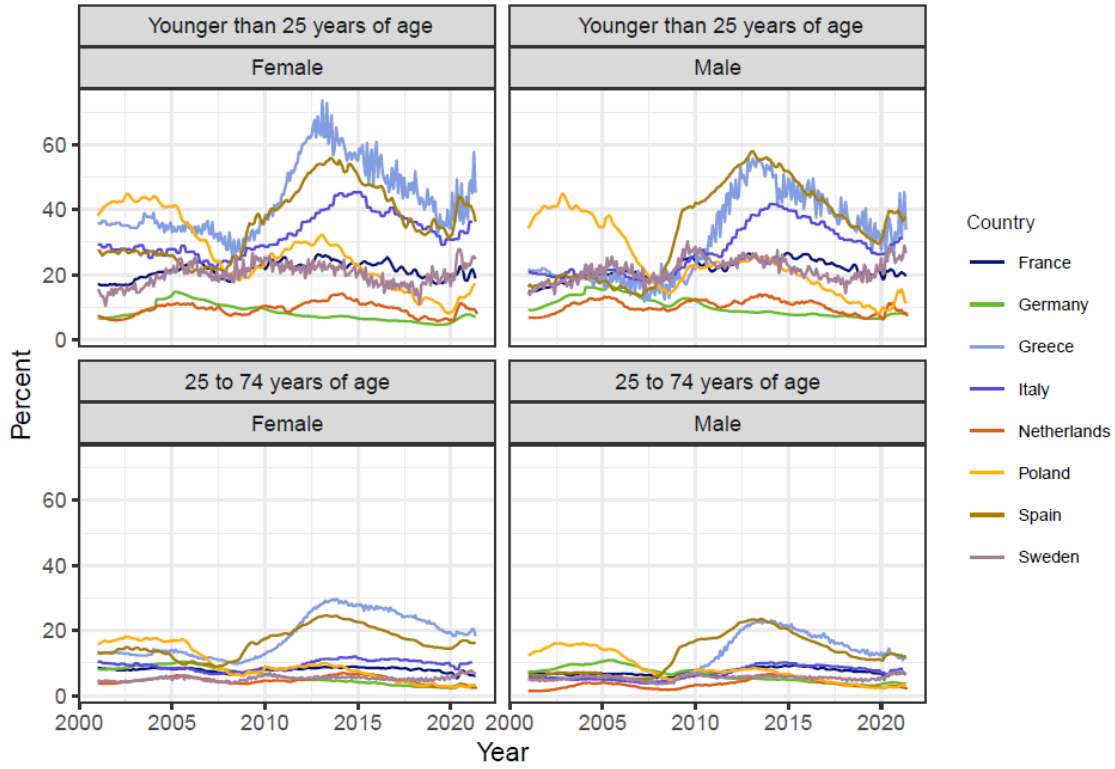

Figure 26: Long-term unemployment rate by sex and age group

Figure 27 reinforces these patterns by visualising the employment rates of people graduating with at least an upper secondary degree in the last three years (Eurostat 2021g). In most parts of Europe, graduates transition very smoothly into their first employment. However, in the south and southeast, the share of graduates who find work within three years is rather low. Furthermore, throughout the continent, female graduates are less likely to be employed within three years after graduation than male graduates.

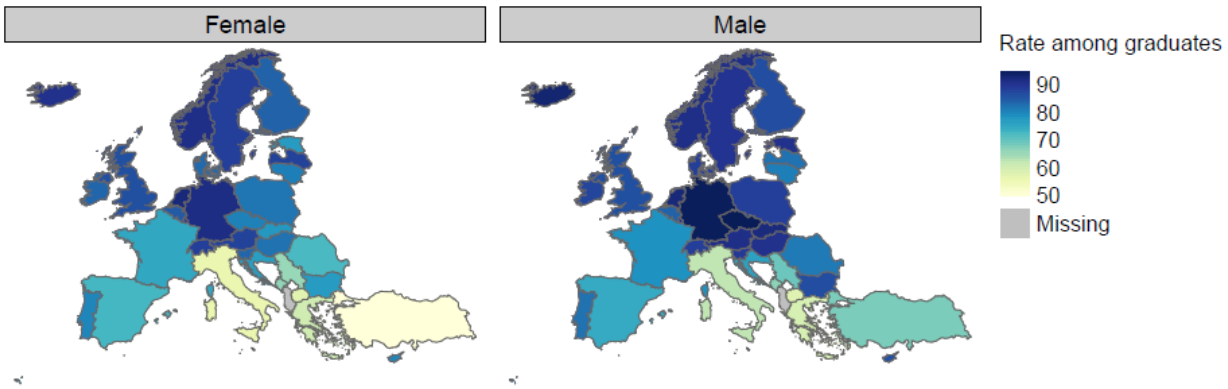

Figure 27: Employment rate of graduates within the last three years, 2019

The **employment rate of immigrants** in the EU countries for which data exists averages out at 61% (Eurostat 2021f). Compared to the native population this rate is lower as immigrants, who do not migrate following a job offer, need to establish themselves in the labour market. Especially asylum applicants also often first need to obtain relevant skills like language skills.

In Europe employment levels of immigrants were highest in Iceland, Luxemburg, and Switzerland (Figure 28 (Eurostat 2021f)). That corroborates the theoretical assumption that the labour market integration of immigrants hinges crucially on the general situation of the labour market. Interestingly, immigrant employment rates are also very high in some eastern and north-eastern countries like Poland, the Czech Republic, Slovakia, Lithuania, and Estonia, while they were the lowest in Greece.

The high immigrant employment rates in central and northern Europe are in line with the popularity of these countries as immigration destinations. An exception is France, which hosts many immigrants, although their employment rates are among the lowest. The high employment rates of immigrants in eastern Europe can be explained by the low migration rate into these countries. In many central and eastern Member States, labour migrants have historically made up a larger share of immigration. In countries that also host many refugees, employment rates of recent immigrants are naturally lower. Depending on the rigidity of labour market regulation and the support they receive, even refugees who tend to arrive unprepared for the host country labour market's specific requirements catch up in terms of their employment rates over time.

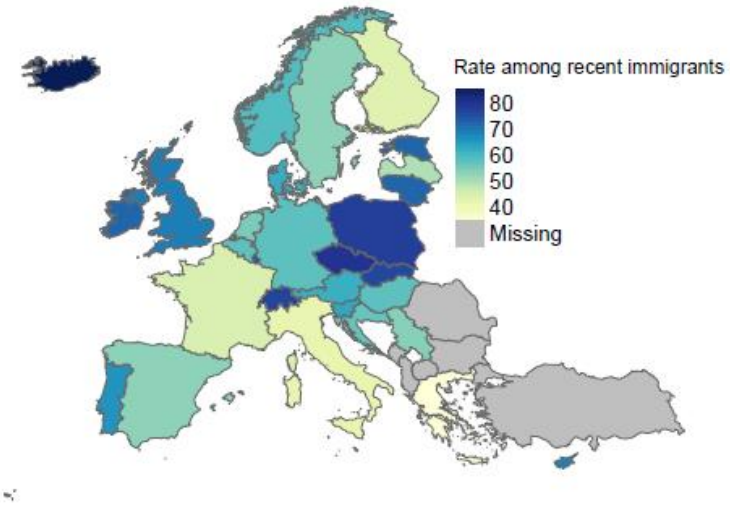

Figure 28: Employment rate of recent immigrants, 2019

In addition to employment levels, the **skill endowments** of destination country populations can affect migration decisions. A high skill level among natives signals the availability of quality education and opportunities for career advancement through professional training. Furthermore, it makes for an environment that is conducive to innovation. However, high-skilled immigrants often take on jobs for which they are overqualified. In many cases, this is due to insufficient language skills, lacking transferability of skills, or non-recognition of certification related to education and work experience (Bonfanti and Xenogiani 2014; OECD 2019b).

Furthermore, natives' skill levels are essential from a destination country perspective. Skill endowments affect not only integration outcomes but also the extent to which natives accept or appreciate the presence of immigrants in society. Evidence shows that highly qualified individuals tend to have more positive attitudes towards migration (Cavaille and Marshall 2019; Dražanová et al. 2021; Lee and Lee 2015). However, as indicated earlier, attitudes also depend on the extent to which immigrants are perceived as a competition for jobs, which also holds in the high-skilled sector (Pardos-Prado and Xena 2019). It is common practice in migration research to utilise educational attainment as a proxy for skill levels (e.g., OECD 2019b). For this variable, a clear regional pattern arises within Europe, which, as Figure 29 illustrates, is similar to unemployment (Eurostat 2021x). The south and east are characterised by high shares of people with low education levels. Within the EU, Portugal,

Spain, and Italy host the highest percentage of people with less than secondary education. In contrast, almost half of the population obtain tertiary education in the north and centre of the continent. Interestingly, among these countries, Germany has the smallest share of people with tertiary education. This observation can be attributed to the country's dual education system, in which job qualifications can be obtained either through a tertiary university degree or through non-tertiary vocational training (Destatis 2020a).

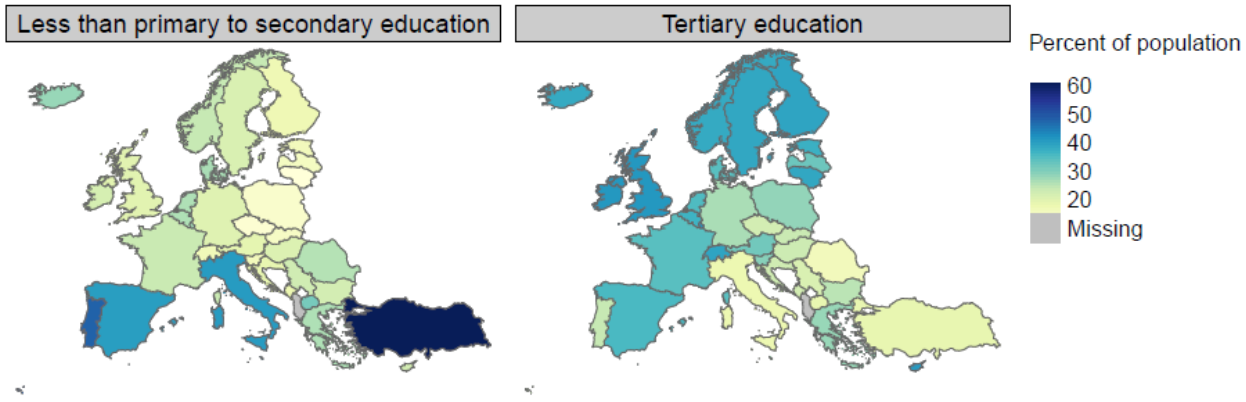

Figure 29: Educational attainment of the population by level of education, 2019

A growing number of countries depend on targeted immigration as their native **population ageing** is increasingly putting native labour forces under pressure. For example, in the absence of immigration, Germany's population would have been shrinking since 1972 (Destatis 2020b). The labour shortage is particularly pronounced for highly skilled labour (Burmann et al. 2018). In general, migration is the main driver of regional population growth (Padilla and Pereira Miguel 2009). Many countries have passed migration policies aimed at actively attracting skilled immigrants. For example, EU Member States issue immigration permits, so-called "EU Blue Cards," for high-skilled immigrants so that they can work and live in the EU. This system is implemented in all Member States except Ireland and Denmark. It establishes standardised requirements to be fulfilled by candidates, such as a binding job offer, qualification certificates, and work experience (Burmann et al. 2018). However, immigration via Blue Card permits is still happening at a relatively small scale. In 2019, European authorities issued 37,000 Blue Cards, with 80 percent issued in Germany alone, followed by France and Poland with just over five percent each (Eurostat 2021ad). Furthermore, some governments have introduced national policies, such as point systems, to

actively recruit highly skilled labour migrants (Burmann et al. 2018). Overall, these initiatives are making an impact. In 2019, more than half of the employment-related residence permits in the EU were issued to highly-skilled workers and researchers (Eurostat 2021j).

However, it is not only the highly skilled who are sought after. Immigrants play an important role in filling lower skilled occupations, such as in the health, hospitality, and transport sectors. Demographic change across the EU will further increase the need for foreign workers. If integration into the labour market and society is successful, immigration is thus in the interest of both the migrant and the destination country. For immigrants with suitable skills, countries with a high labour force shortage are particularly attractive.

Beyond the labour force shortage argument, it is commonly assumed that population age also matters regarding natives' attitudes to immigration. Indeed, some studies show that older people tend to view immigration less favourably (Hellwig and Kweon 2016; Meeusen and Kern 2016). However, a recent meta-study that systematically reviewed earlier research suggests that age often has an insignificant role in predicting attitudes towards migration (Dražanová et al. 2021).

Figure 30 depicts the share of individuals older than 65 years of age in European countries (Eurostat 2021y). In every country except Turkey, they make up a considerable share of the population. The highest ratios are reported in Italy, Greece, Finland, Germany, and Portugal. In regional comparison, the shares tend to be somewhat lower in the east and southeast, but there are outliers like Greece, Bulgaria or, the Baltics.

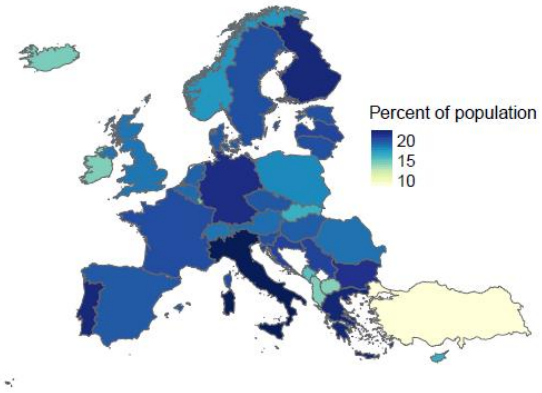

Figure 30: Share of the population above 65 years of age, 2019

Besides population aging, **emigration** can add additional pressure on labour markets. However, natives do not leave European countries at a large scale, with most countries exhibiting emigration rates below 2 percent (Figure 31(Eurostat 2021e; Eurostat 2021y)). In some countries of Latin America and Sub-Saharan Africa, on the other hand, emigration rates reach levels of over 20 percent, and in a few cases, even more than 50 percent (OECD/AFD 2019).

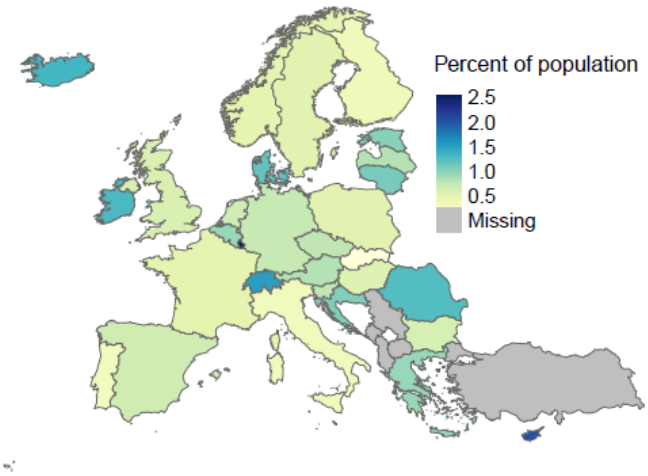

Figure 31: Emigration as share of the population, 2019

5 Gender dimensions in terms of employment, pay, and roles

Gender roles and inequalities may, both directly and indirectly, affect migrant decision-making in determining their destination country. Taken together, the EU Member States scored 67.4 out of 100 on the 2019 EU Gender Equality Index 2019 (European Institute for Gender Equality (EIGE) 2021). While not a perfect score, migrants may find this situation more attractive than those in their origin countries, offering more equal opportunities and influencing family livelihood strategies. At the same time, in 2020, the European Commission reported only a slight improvement in gender equality since 2005 (European Commission 2020a). Furthermore, EU Member States continue to differ along gender dimensions, which affects migration flows and migrant labour dynamics across the continent. Moreover, gendered differences in opportunities and constraints reflect host countries' overall capacity to provide for the whole of their population and to ensure social and economic integration. In addition, different host country societies have different perceptions regarding gender roles, identities, and expressions. This affects the way they relate to certain migrant populations. While gender considerations are not limited to these indicators, this section explores EU Member States' gender employment gaps, gender pay gaps, and the relative size of the population that is inactive due to caring responsibilities.

Gender and employment are significant from a migrant perspective. Both globally and in Europe, women undertake most of the unpaid care and domestic work, often related to childcare or attending to other family members (Ryan and El Ayadi 2020). Moreover, women, girls, and LGBTQI+ individuals continue to face inequalities in access to employment and employment conditions. These can compound precarity and vulnerability not only for this group of the native population but for migrants as well. Migrant women in the EU generally assume particular roles in the labour market, including in the service sector via low-paid and flexible labour, and in care and domestic work. While they may be overqualified in this work, it can serve as a means of access to the EU. At the same time, systems of feminised global care chains can assist origin countries in generating money flows via remittances (Sassen 1998; Hochschild 2014). Indeed, the right to employment can be one of the most effective ways to achieve migrant integration in host countries (Crul and Schneider 2010; Wrench 2016). However, integration policies in the EU Member States that appear neutral may in reality

target women and men differently, resulting in diverging outcomes (Kofman et al. 2015). For example, inadequate recognition of the qualifications of women migrant workers can be an obstacle to integration, as can a lack of appropriate support structures, including childcare facilities. Social and legal inequalities in destination countries can also be exacerbated given the often informal nature of migrant women's work. Furthermore, female migrants frequently face breaches of fundamental rights if they enter the EU irregularly.

Finally, it is important to consider host societies' perceptions of gendered social roles. For example, Muslim migrants may be associated with racialised and gendered categories and stigmas inconducive to overalls societal cohesion. These may include that Muslim migrant woman are forced to stay at home and are not able to work, or that they should not be permitted to wear traditional head coverings at their workplaces (which can preclude their hiring or continued employment) (Bracke and Fadil 2012). Against this background, Figure 32 demonstrates the difference in employment rates between men and women aged 20 to 64 in the respective Member States (Eurostat 2021k). Out of the selected countries, the greatest gaps are found in Greece and Italy, followed by the eastern European countries. This indicates a regional pattern of greater gaps in southern and eastern European regions. In Scandinavia, the gender employment gap is the lowest compared to the rest of Europe.

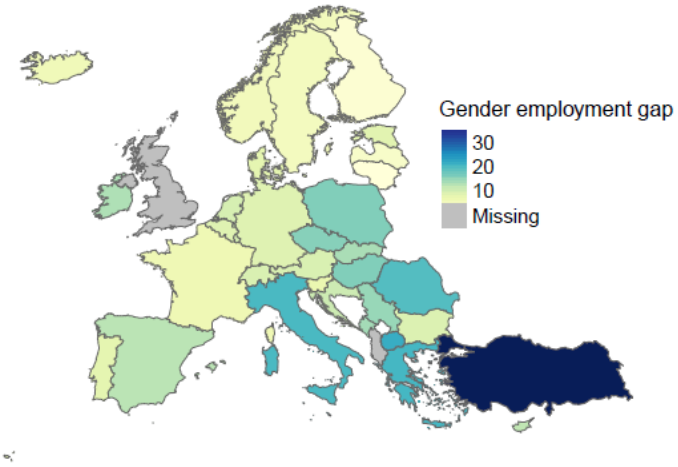

Figure 32: Gender employment gap, 2019

While women's equality is emphasised in EU frameworks and goals as well as international human rights norms, they continue to earn disproportionality less than men. This difference is captured by the **gender pay gap**.

Migrant women, who are already in a vulnerable and precarious socio-economic position, face compounded disadvantages from gender pay gaps. Moreover, they may encounter prohibitive family immigration regimes or sponsorship requirements in the EU Member States. For example, women wishing to enter the EU may be unable to meet income requirements due to gender gaps in employment and pay in host countries (Kofman et al. 2015). Overall, gendered social roles in the EU Member States can continue to subject women to disadvantage. Employment, policies, and structures do not remain gender-neutral, and there is continued difficulty in reconciling work and family.

Furthermore, gender pay gaps produce overall socio-economic repercussions for societal integration and reflect the dynamism of inequalities and the market power of different societal groups and stakeholders (O'Reilly et al. 2015). Their lower earnings put women at an increased risk of falling into poverty, thereby impacting both women's and children's well-being in host countries (Harkness 2013).

Figure 33 displays the difference between the average gross hourly earnings of male paid employees versus that of female paid employees, expressed as a percentage of the earnings of male paid employees (Eurostat 2021l). It is defined here as "unadjusted" given that gender inequalities cannot be solely measured via the concept of equal pay for equal work. In general, patterns in this figure do not correspond to the employment rates displayed previously. For example, Germany has one of the greatest differences in pay. Other western European countries like France, the Netherlands, Austria, and Spain display large differences between male and female earnings, while Italy and Poland maintain the lowest gaps. Central Europe demonstrates a greater gender gap in pay, and southern Europe is in the lower range. In this sense, the gender pay gap must be understood within a more comprehensive understanding of gender equality. A low gender gap in pay, for example, could be attributed to lower female employment rates. This may be the case in Italy, where a lower female employment rate was recorded, and where a low gender pay gap is present.

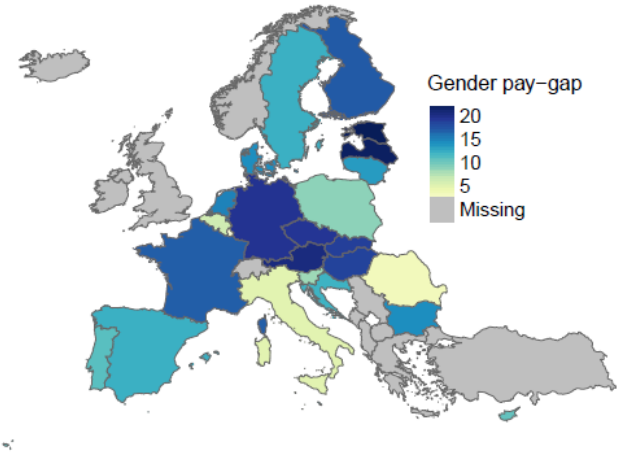

Figure 33: Unadjusted gender pay-gap, 2019

Finally, social roles and expectations are prominent features in debates about both gender equality and migration trends. Crucially, such gender roles still contribute to a paradigm of men being freer to engage in productive roles, while women are expected to engage in reproductive ones. Some migrants and women groups may reflect low rates of participation in the labour market due to their potential role as primary caregivers (Kofman et al. 2000).

Figure 34 illustrates the population that is economically **inactive due to care responsibilities** (Eurostat 2021o).[7] Care work is important to host societies as it not only maintains the elderly population but also raises and nurtures society's future citizens. The figure shows that the inactive populations are largely feminised. Across the whole of Europe, women make up a considerably larger share of the inactive population compared to men. In those countries for which data is available, the share of men inactive due to care responsibilities never reaches more than 15.1 percent (Eurostat 2021o). This stands in stark contrast with women, where those inactive due to caring responsibilities constitute up to 58.4 percent of the female population (ibid.). These overall percentages reflect the dynamics

[7] Those not working, not actively seeking work, or not available to work, and thus considered outside the labour force, due to care work (Eurostat 2021o). These statistics define inactivity due to caring responsibilities as "looking after children or incapacitated adults" or "other family or personal responsibilities." As such, it is only referring to unremunerated or undeclared work (Kofman 2012).

of migrant labour chains, as well as family welfare state structural or societal configurations (Pfau-Effinger 2005; Sassen 1998).

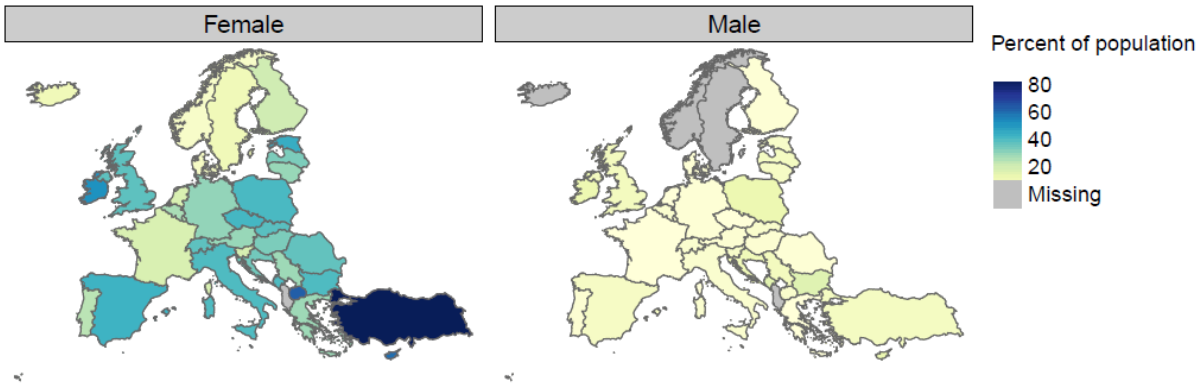

Figure 34: Share of population inactive due to caring responsibilities by sex, 2019

6 Determinants and indicators of health and wellbeing

This section addresses population health and health system performance in the EU by examining life expectancy, crude death rates, citizens' self-perceived health, and self-reported unmet medical needs in the selected Member States. While these considerations are not exhaustive, they help to explore how health relates to migrant decision-making and choice of destination, as well as to integration trajectories. When comparing the destination with the origin country, evidence of comparatively more healthy societies, including longer life spans, lower mortality rates, or improved health systems and access to health services, can be perceived by migrants as an opportunity for an enhanced quality of life. From the host society perspective, and as defined in EU human rights frameworks, the potential of its populations (including its migrants), cannot be fully achieved if these populations are unhealthy or have difficulty accessing healthcare services (Padilla 2009).

Health is shaped by the social context in which an individual lives, and it may directly or indirectly influence migrants' decisions. Social determinants of migrant health include the conditions in the country of origin, the transit journey, or destination country policies. Most EU countries offer universal coverage for a basic set of health services, with some countries having the best health care systems in the world (OECD 2019a). EU countries also rank relatively high in indicators of health status, like life expectancy, as compared to the rest of the world (Eurostat 2020b). Migrants consider these aspects in their family and livelihood planning, as various factors and inequalities in their origin countries can contribute to health inequalities or a lack of access to healthcare (Castelli 2018; OECD and European Union 2020).

There exists a gap in the literature regarding migrants' health literacy in the EU, as well as to how health systems and services impact migrants' decision-making (Kuschminder and Koser 2017; Ward et al. 2019). However, some smaller qualitative studies illustrate migrants' expectations regarding health systems and services in current or potential EU host countries. For example, a recent study surveyed migrants who arrived in Greece and intended Germany, Sweden, or the Netherlands as their destination countries. 85% of these respondents revealed that the good social assistance and health policies in their intended destinations influenced their choice (Kuschminder and Koser 2017). Other evidence points to how migrants with chronic health conditions may decide to rather stay in an EU Member State

than to return to their country of origin due to better access to healthcare (Kristiansen et al. 2015).

Moreover, the operation of EU health care systems depends on the international migration of healthcare workers. These immigrants compensate for labour shortages, which can be related to aging European population structures and projected decreasing populations (Eurostat 2020b). Depending on the situation and policies at the destination, demand for health and care work offers migrants not only labour opportunities but also simplifies integration.

On average, **life expectancy** in the EU has increased by two years per decade since the 1960s (Eurostat 2021t). As of 2020, the expected number of healthy life years for men and women combined was higher than 70 years. Thereby, the EU was only surpassed by the G20 members Japan, Canada, Australia, South Korea, and the United Kingdom (Eurostat 2020b). This health aspect may be a mitigating influence on migrants' choice of the destination country.

At the same time, recent data indicate stagnation or decline in life expectancy in most of the EU Member States (Eurostat 2021t). In combination with fertility and death rates, the life expectancy reflects whether a society has an aging population structure. On average, the EU countries have an older population compared to all other G20 member countries, except for Japan (Eurostat 2020b). Migration can mitigate the societal and economic consequences of an aging society.

Figure 35 demonstrates how life expectancy in the Member States remains above 80 years, except for some eastern European countries (Eurostat 2021p). In all the countries, women have a higher life expectancy compared to men. Research attributes biological differences as playing somewhat of a role, but also increasingly observes the influence of social relationships or health-risk behaviours. Furthermore, a weak but positive correlation between gender equality measures and longer life expectancy has been observed in the EU (Kolip and Lange 2018).

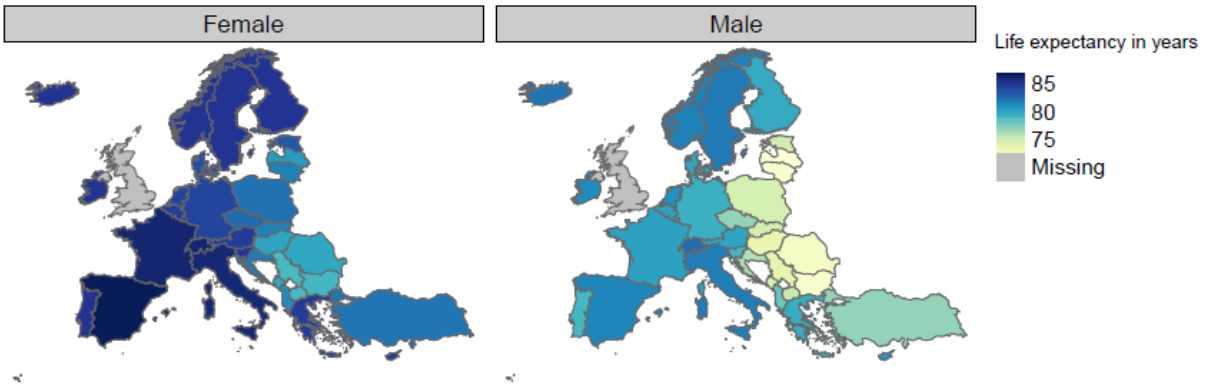

Figure 35: Life expectancy by sex, 2019

In addition, the EU features one of the highest average **crude death rates** in the world. Figure 36 displays the crude death rate, defined as the ratio of the number of deaths to the average population, per year and 1,000 persons (Eurostat 2021d). Overall, Greece and Germany show the highest rates, while the Netherlands and Sweden have some of the lowest. High crude death rates are not necessarily a consequence of bad living conditions but can be caused by a large share of old people in the population. In 2017, only Japan and Russia outstripped the EU (Eurostat 2020b). While in Japan the high crude death rates is a consequence of the old population that experiences some of the longest life expectancies in the world. In Russia, by contrast, the high crude death rate comes with a relatively low life expectancy, which is a consequence of unhealthy lifestyle choices, especially high alcoholism among men.

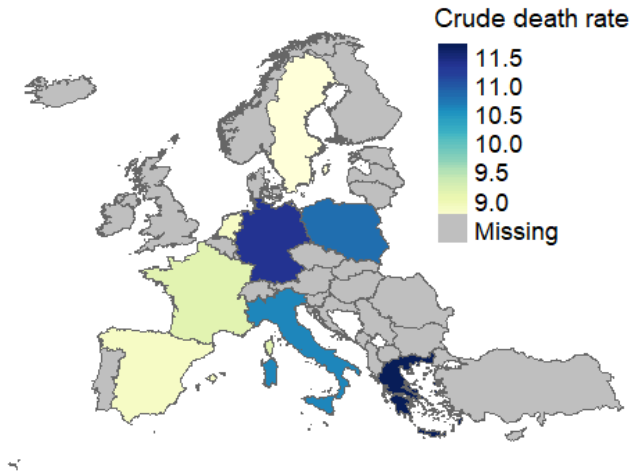

Figure 36: Crude death rate, 2019

Furthermore, EU citizens' health status as indicated by their **self-perceived health** helps to elucidate the relation between health, migration, and integration. Combinations of social privilege and disadvantage can have negative effects on health (Gkiouleka and Huijts 2020). Moreover, health can be interconnected with a range of socio-political factors, including economic stability, education and access to health care and quality thereof, social or community contexts, and the environment. The indicator of perceived health refers to health in general, rather than its current state, and encompasses biological, social, and emotional dimensions (Bonner et al. 2017). From the migrant perspective, a country may be more attractive as a destination if the overall health status is perceived as favourable. In terms of the destination country, health perceptions inform not only migrant integration but also overall societal wellbeing. In this regard, migrants' perceptions may be shaped by transnational networks connecting origin and destination through kinship and ethnicity. Moreover, technology and communication tools, including new media sources like social media, can assist in developing such perceptions (Dekker and Engbersen 2014).

Figure 37 illustrates the percentage of the population in the selected Member States that perceive their health as (very) good, fair, or (very) bad (Eurostat 2021ae). Notably, more than half of the populations in all selected countries perceive their health as good or very good. In Sweden, the Netherlands, Spain, and Greece, the figure has been standing at well above 70 percent. In Sweden and the Netherlands, this may be attributable to their health systems providing preventative care in addition to primary medical care through social insurance or public funds (Tikkanen et al. 2020). Italy joined the high ranks in 2017. Studies indicate that significant population ageing contributes to improvements in perceived health in Italy (Cislaghi and Cislaghi 2019). On the other hand, more than a quarter of the German and Polish populations perceive their health as fair, and Poland also shows the largest proportion of people in bad self-perceived health. Lastly, health perceptions in France are slightly better than in Germany.

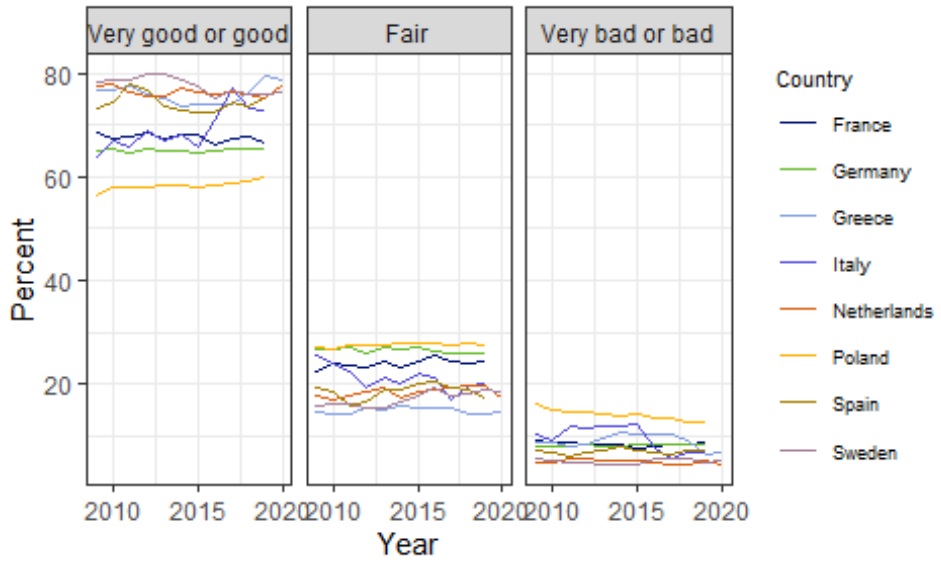

Figure 37: Self-perceived health

Populations in the EU countries may feel they are **limited in having their health needs met** due to lacking accessibility of health care in terms of costs, waiting times, and proximity. Access to health care is especially relevant for migrants as they are more vulnerable to communicable disease and more exposed to environmental and occupational risks than the national population. Within the migrant population, women, children, unaccompanied minors, irregular migrants, refugees, and asylum seekers, trafficked or smuggled migrants, or migrant workers in high-risk occupations remain the most exposed (Cole 2007). Furthermore, migration is a social determinant of health and a risk factor for mental health (The Lancet 2006). While most countries allow immigrants to access healthcare services in emergency cases, broader universal health access and coverage can vary (Ledoux et al. 2018). Moreover, health inequalities may contribute to vulnerable populations forgoing care. For example, a migrant's irregular status may influence decisions to attempt to access care. A final consideration is how anti-immigration attitudes in EU destination countries can include perceptions that low-skilled migrants, irregular forced migrants, including asylum-seekers or refugees can impose a burden on or abuse of public services provided by welfare states, including health systems. These attitudes may affect the overall integration of migrants (Lesińska 2014).

As a proxy of unmet health needs in general, Figure 38 illustrates the percentage of the population aged 16 and older reporting unmet needs for medical examination due to either financial reasons, waiting times, or because the travel to the point of medical examination was too far (Eurostat 2021af). While the figures are low across the continent, Estonia and Greece stand out as outliers. In general, the literature suggests that there exists a gender difference in terms of self-perceived health. In this sense, gender inequalities, dynamic gender-related experiences, and constructions of gender roles relate in complex ways to health (Annandale and Hunt 2000). Recent research studying gendered dynamics of self-perceived health in Europe attributes women reporting worse self-perceived health than men partially to gender inequalities in the individual social determinants of health, but not by their Gender Empowerment Measure or Gross Domestic Product (Palència et al. 2014).

Figure 39 zooms in on time trends in the selected Member States (Eurostat 2021af). Here, Greece generally has the highest percentage of self-reported unmet needs, with Poland following and Italy coming in third Interestingly, all three experienced a decrease in self-reported unmet needs from the year 2016 to 2017. Meanwhile, Netherlands and Spain consistently record the lowest self-reported unmet needs. This may reflect health care system configurations, such as the engagement in cost-sharing in the Netherlands with its system of mixed compulsory social insurance and private voluntary insurance, secondarily funded by public taxation (Bertens and Vonk 2020).

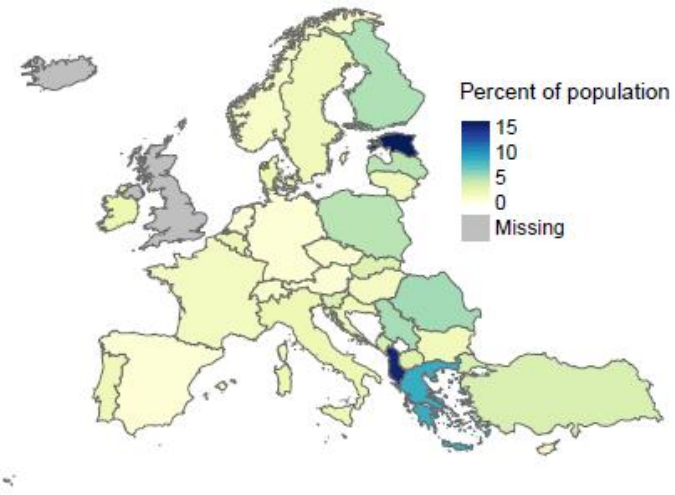

Figure 38: Self-reported unmet needs for medical examination, 2019

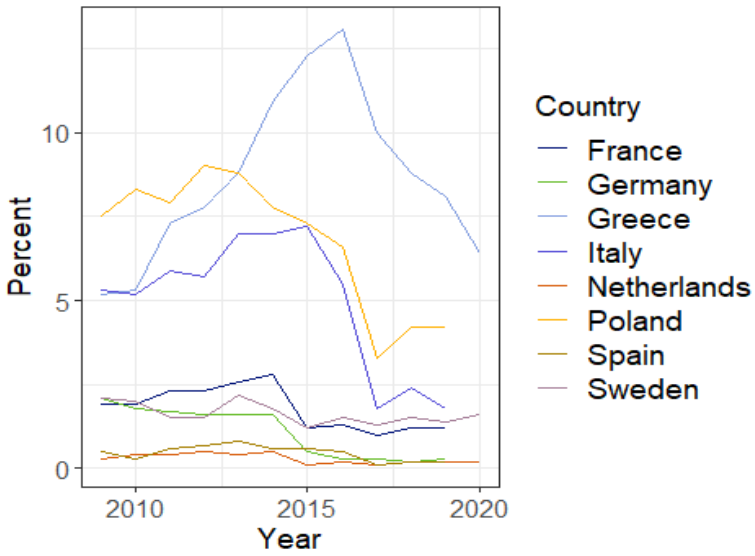

Figure 39: Self-reported unmet needs for medical examination

7 Material and social deprivation

Migrants' decision-making can be influenced by the perception of conditions in the destination country, in the country of origin, and transit. Countries with a strong welfare state system or robust social protection nets may be perceived as offering improved wellbeing. In comparison to other nations globally, EU Member States have relatively comprehensive welfare systems, with higher levels of social expenditure than the OECD average (Arts and Gelissen 2010; OECD 2020). Furthermore, better living conditions bolster the efforts of destination countries to integrate newcomers, inter alia, through increased societal cohesion and more favourable attitudes towards immigration. In this light, this section seeks an understanding of the levels of wellbeing in Europe and examines the prevalence of lacking basic needs or inadequate living standards within the context of welfare states providing certain social protections.

Some literature argues that migrant populations are at lower risk for poverty in welfare states with comparatively more extensive policies (Eugster 2018). It is theorised that more generous welfare states are more likely to offer welfare benefits and social protections that provide for basic needs and living standards. At the same time, others caution that such policies may in practice not extend to migrants (Römer 2017; Gschwind 2021). From the migrant perspective, access to welfare policies providing social protections ensures basic needs and improved wellbeing, as well as aid in their integration in the chosen destination country. Again, while the drivers of migration are not fully understood, literature shows that poverty and deprivation in the origin country are a push factor of migration. On the other hand, comparably lower deprivation in the host country is perceived as a pull factor (Cummings et al. 2015). Furthermore, research proves that while emigration policies in EU Member States do not substantially shape migrant intentions, policies like welfare state conditions and services can influence the decisions (Gubert and Senne 2016).

From the societal perspective, improved incorporation of migrants and equal distribution of resources among the entire population decreases societal fragmentation, as well as possibly shapes more favourable public attitudes towards redistribution, welfare abuse, and dependency (Crepaz and Damron 2009; Kymlicka and Banting 2006). Moreover, migration is key for the functioning of industrialised economies, and therefore ensuring the wellbeing of migrants is significant.

Several indicators can provide a picture of the state of material and social deprivation and living conditions in the selected EU Member States. Figure 40 compares the rates of **material and social deprivation** experienced by employed versus non-employed persons in the selected Member States, aged 16 and above (Eurostat 2021r). Material and social deprivation refers to indicators related to economic strain, durable goods, and the characteristics and conditions of a dwelling space. In all the Member States, there are lower rates of deprivation among the employed versus the unemployed. Greece has the highest rates of material and social deprivation. Countries such as France, Italy, and Spain experience similar rates. Finally, the Netherlands and Sweden display the lowest rates of deprivation.

Figure 40: Share of population materially and socially deprived by working status, 2019

An almost identical pattern arises in terms of **severe material deprivation rates**, as demonstrated by Figures 41 and 42 (Eurostat 2021ag). Sweden remains the country with the consistently lowest rates, with the Netherlands holding only a slightly higher percentage. Italy and Poland follow, but over time the percentage of the population experiencing severe deprivation has decreased, thereby beginning to close the gap between them and the other selected Member States. In Greece, repercussions from the financial crisis beginning in 2008 and its ongoing economic strain could explain the high level of material deprivation (Łuczak and Kalinowski 2020). It also explains why many migrants move from Greece and Italy as a point of entry into Europe on to other Member States (Stevens 2018; Brekke and Brochmann 2015).

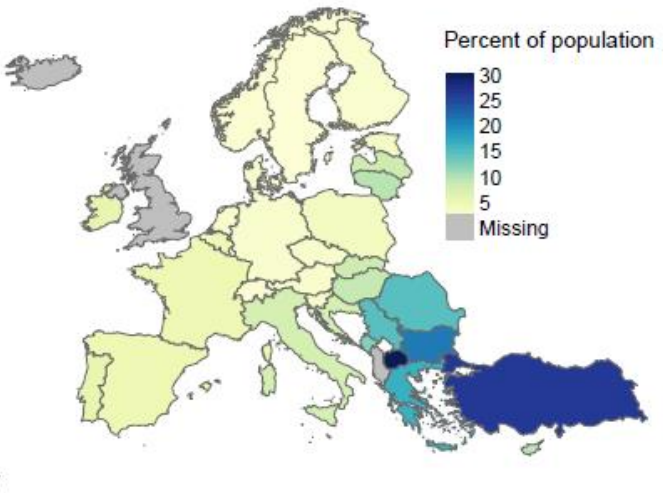

Figure 41: Share of the population severely materially deprived, 2019

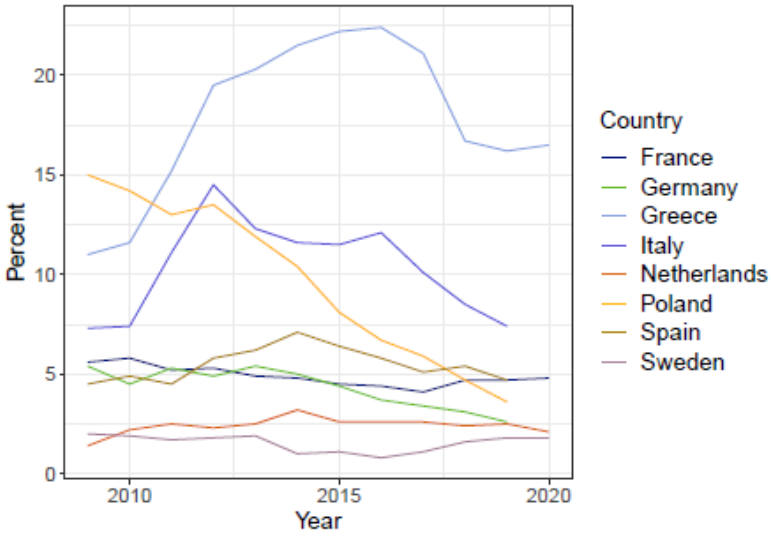

Figure 42: Share of the population severely materially deprived

In terms of living conditions contributing to an understanding of material deprivation, Figures 43 and 44 display the percentages of households with **dwellings that lack adequate conditions**, i.e., those with a leaking roof, damp walls, floors or foundation, or that have rotting window frames or floor (Eurostat 2021ak). Italy generally has the highest percentage of the population living in such conditions, albeit the numbers had been decreasing in recent years before the COVID-19 pandemic. Sweden again has the lowest numbers. Most countries exhibit approximately the same percentage of the population experiencing the indicated

inadequate conditions over time, and any gender gap does not seem to be particularly significant.

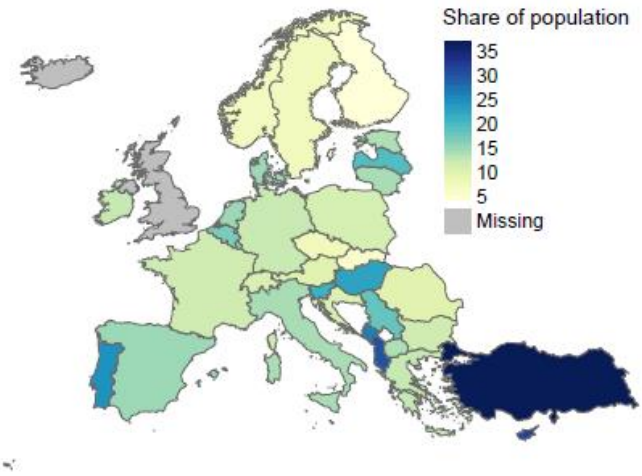

Figure 43: Share of the population living in a dwelling with a leaking roof, damp walls, floors, or foundation or rot in window frames of floor, 2019

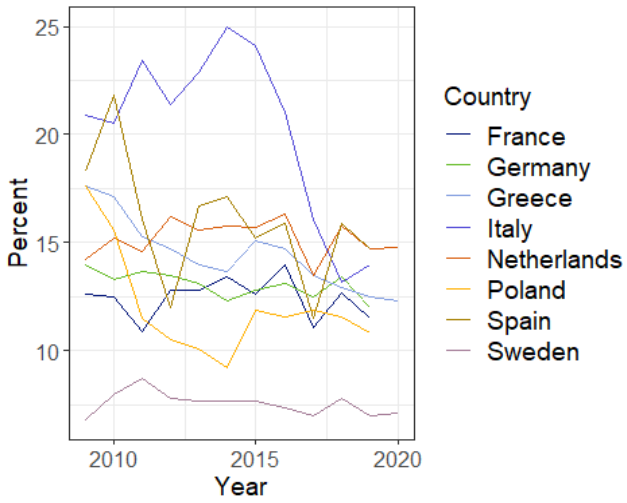

Figure 44: Share of the population living in a dwelling with a leaking roof, damp walls, *floors, or foundation or rot in window frames of floor*

Looking at households without basic amenities also helps to inform the overall picture of whether the population has adequate living conditions. Figure 45 and Figure 46 illustrate the percentages of **households having neither a bath, shower, nor flushing toilet** (Eurostat 2021al). In this regard, Poland has a significantly higher share of deprived population, which

could reflect the country's social expenditure. While Poland is one of the highest spenders out of the group of central and eastern European countries, it is one of the lowest in the EU-15. Moreover, compared to the rest of the Member States, Poland's spending on housing benefits and social assistance for the marginalised is relatively low (Sawulski 2017). Sweden records no population lacking these amenities, and Germany virtually none.

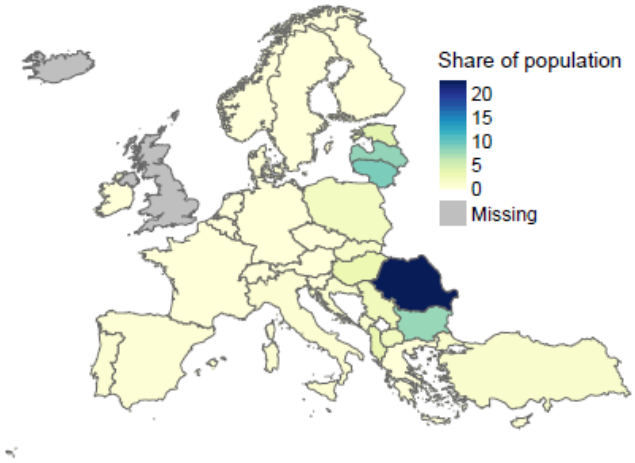

Figure 45: Share of the population having neither a bath, nor a shower, nor indoor flushing toilet in their household, 2019

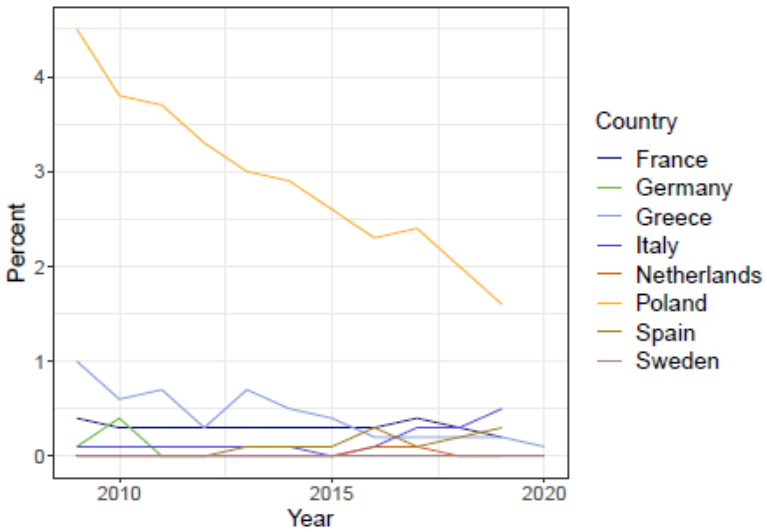

Figure 46: Share of the population having neither a bath, nor a shower, nor indoor flushing toilet in their household

Finally, Figures 47 and Figure 48 depict the percentage of the selected Member States' populations that self-report they are **unable to maintain their homes at an adequately warm temperature** (Eurostat 2021z). The percentages in Greece and Italy remain higher than in the rest of Europe, with the Netherlands and Sweden on the other end of the spectrum. Again, the Greek example could pertain to the economic crisis. For all indicators considered here, Sweden exhibits low or the lowest levels of deprivation. This may relate to Sweden's comparatively more extensive welfare regime. For example, childcare policies include publicly subsidised childcare facilities, benefits for children's material needs, and generous parental or family leave policies to allow for care work (Lohmann and Zagel 2016; Szebehely 1998). Addressing work-family conflict and gendered regimes of paid work and unpaid care work via such policies is known to have a positive effect on overall material resources and wellbeing (Lin 2018; Lohmann and Zagel 2016). Reflecting on the observations in this section overall, it is important to note that measures of material deprivation are self-declarative. Thus, the way the surveyed population perceives well-being can be relative. For example, in examining European survey data, one study indicates that the surveyed population in Italy finds keeping the house warm is a relatively important category, while that of Spain found it comparatively negligible (Mussida and Parisi 2019).

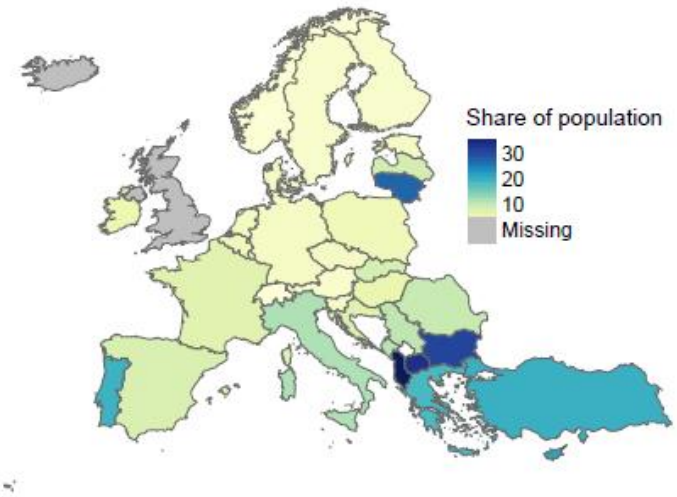

Figure 47: Share of the population unable to keep home adequately warm, 2019

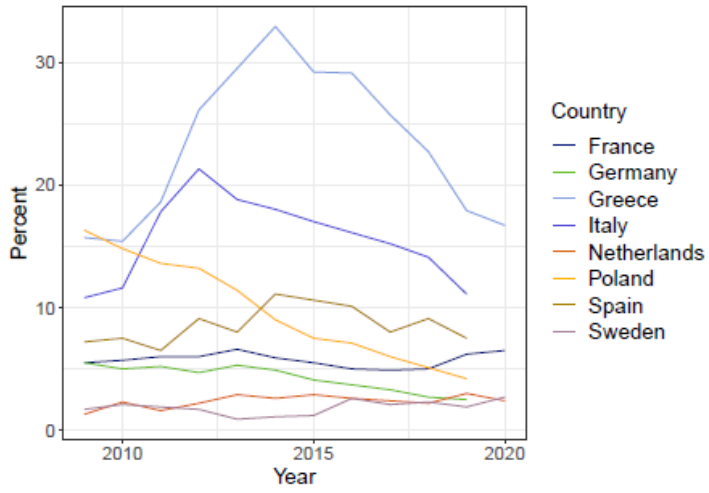

Figure 48: Share of the population unable to keep home adequately warm

8 Justice system and levels of corruption

In full democracies, inclusivity and respect for human rights are key principles, together with the protection of the most vulnerable, the rule of law, and proper governance at all administrative levels. To that end, political and judicial institutions must be transparent and efficient, working to uphold the principle of accountability, promote non-discriminatory laws and policies, prevent, and combat endemic corruption, bribery, or organised crime, and defend citizen safety in the face of criminality and violence (Eurostat 2021w). The levels of transparency and accountability of public institutions, together with the application of non-discriminatory policies and the scale of corruption, may have an impact on the migrants' decision-making when determining a destination country. These indicators are useful to reveal the countries' capacities both to adhere to democratic values and to adequately use and not mismanage the state public resources collected through taxes.

According to the core principles of the EU, respect for the rule of law and the independence of the legislative branch are prerequisites for protecting all fundamental rights and democratic values. Under the core principle of the separation of powers, judicial entities must be provided with adequate financial resources, and be able to make decisions without interference or pressure from policy or other economic actors. This way, they can ensure that individuals and businesses operating within a country can fairly and fully enjoy their rights. Within a timeframe between 2016 and 2020, Figure 49 illustrates the citizen perceptions about the **independence of the judiciary** in the eight selected Member States, specifically in relation to the courts and judges of their respective countries (Eurostat 2021w). The graphs on the right and left of the figure divide the citizen opinion between perception of "very good or fairly good" or "very bad or fairly bad", respectively.

Sweden, the Netherlands, and Germany stand out as the top three countries with the highest shares of confidence in their respective national judicial systems. They all consistently surpass 75 percent confidence—with the single exception of Germany in 2016. Confidence in Sweden notably rises above 80 percent in 2020. Next, France and Greece remain nearer to 50 percent, demonstrating increased levels of confidence over time, especially in the case of Greece. Poland is the only country where citizens experience a clear decline in their trust in the judiciary, dropping from around 45 percent to almost the lowest levels displayed. Finally,

Spain and Italy record the lowest numbers overall, but with two different tendencies. On one hand, Spain progresses from a low 30 percent confidence in 2016 to approximately 45 percent in 2020, which means that the population has acquired more trust in the judiciary throughout the last five years. On the other hand, Italy, albeit augmenting in levels of trust overall, demonstrates a drop from 2019 to 2020 that puts the country back to 2017 levels.

In terms of negative perceptions, the numbers are reversed. However, it is notable that the scale of percentages varies between the two subsamples, with positive perceptions reaching 80 percent at their greatest, whereas the negative perceptions only surpass 60 percent in 2016 in Italy.

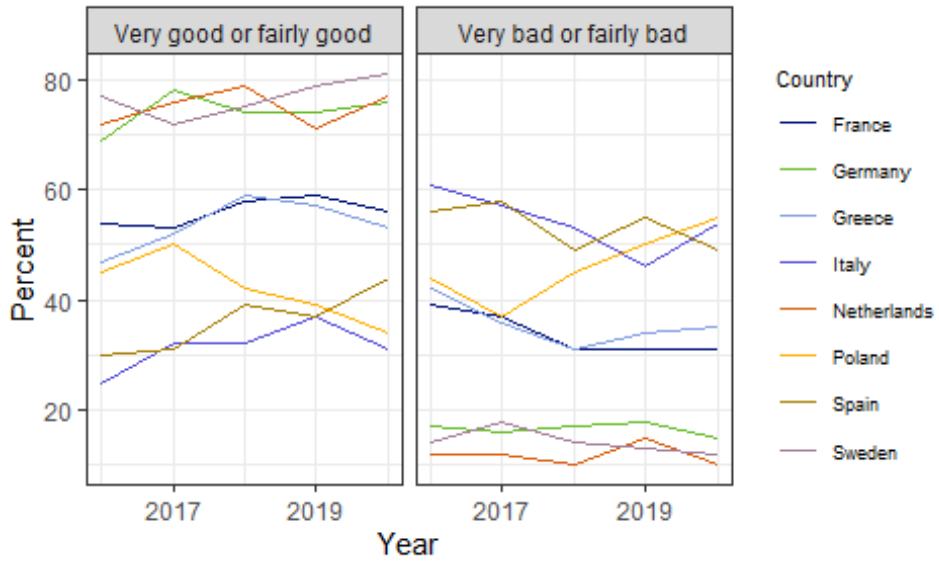

Figure 49: Perceived independence of the justice system

Furthermore, perception of **corruption** is useful in considering the strength of a democratic state. Corruption inflicts financial damage on a country by lowering investment levels, hampering the fair operation of the internal market, and reducing public finances. It also harms the society as organised crime actors engage in corruption to commit other types of crimes, such as trafficking illicit substances or human beings. Since there is no reliable way to measure absolute corruption levels in countries or territories via hard empirical data, analysing citizens' perceptions of corruption serves as a method of comparing relative corruption levels across EU Member States. The indicator examined here is a composite index based on a combination of surveys and assessments of corruption from thirteen different

sources. These surveys evaluate how corrupt the public sector of the analysed country is perceived to be, with a score of 0 representing a very high level of corruption, and a score of 100 meant to represent a corruption-free country.

Figure 50 shows that, for most of the selected countries, the perception of corruption levels does not vary significantly, with only Greece and Italy experiencing a steady improvement (Eurostat 2021b). Overall, Sweden and the Netherlands are the two countries with the highest index of perception of a corruption-free country, always surpassing 80. Germany also ranks high, close to those two countries, followed by France, Poland, and Spain at the middle of the figure. In 2020, more than two-thirds of the world's countries scored below the mark of 50, with an average of 43 out of 100. The highest scoring region was western Europe and the European Union, having an average regional score of 66 out of 100. Concurrently, the lowest-scoring region was Sub-Saharan Africa, with an average mark of 32 (Transparency International 2020).

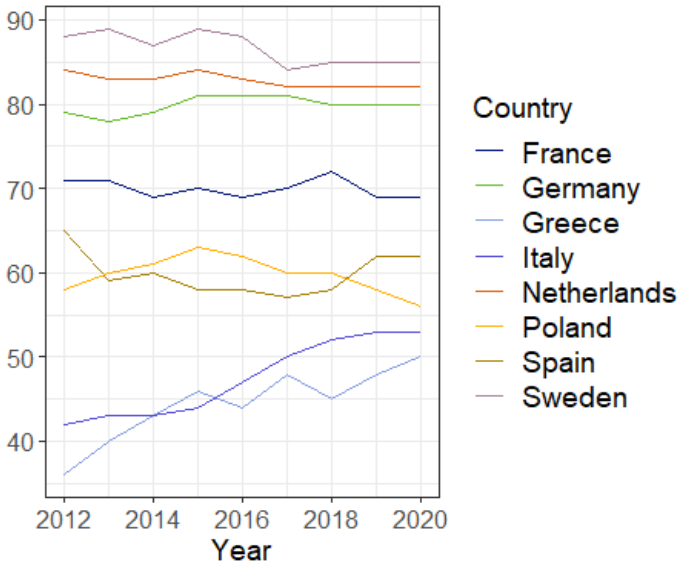

Figure 50: Corruption Perceptions Index

9 Crime and recorded offenses

Citizens' security and the eradication of crime and violence are core objectives of democratic governments. For both citizens and foreign nationals, as well as resident third-country nationals, physical safety is likely to factor into perceptions of quality of life in a given territory. Furthermore, the decision process of migrants can be influenced and vary significantly depending on the levels of the criminality of destination countries. States that maintain low levels of crime and wherein the rule of law is respected are likely to be perceived as more stable and safer. Low levels of criminality can also have an impact on the social body of destination countries, strengthening the levels of unity and trust both among citizens and towards residing foreigners whilst also increasing the level of confidence in the public institutions. There are different types of crimes and recorded offenses by the police, and this section of the report presents data on four of those, generally more present in everyday life (Eurostat 2021ab). The unit of measure used for these indicators is the rate by population size of 100,000.

First, **intentional homicides** are defined as unlawful death inflicted upon a person with the intent to cause death or serious harm.[8] The upper-left graph of Figure 51 presents the data on intentional homicides in the eight analysed EU Member States. For this category of crimes, the records rarely surpass 1.5 intentional homicides for every 100,000 citizens, with Greece displaying the highest records during the first half of the 2010s, and figures decreasing radically until reaching low levels in 2018. Overall, France is the country with the greatest number of intentional homicides, followed by Greece and Sweden. Conversely, Spain, Italy, and the Netherlands are the three Member States with the lowest records.

Second, the upper-left graph of Figure 51 presents data on **sexually motivated offenses**[9], and shows that this type of crime is reported most frequently in Sweden. Moreover, the

[8] In most Member States, the category of intentional homicide includes crimes of murder, voluntary manslaughter, extrajudicial killings, killings caused by excessive use of force by law enforcement or state officials, honour killing, serious assault leading to death, death as a result of terrorist offenses, dowry-related killing, femicide, and infanticide (Eurostat 2021ab).

[9] They are defined as unwanted sexual acts, attempts to obtain a sexual act, or contact or communication with unwanted sexual attention without valid consent or with consent as a result of intimidation, force, fraud, coercion, threat, deception, use of drugs, or alcohol, or abuse of power or a position of vulnerability. In practice, sexual violence figures are the sum of rape and sexual assault (Eurostat 2021ab).

records in the country increased throughout the last decade, albeit there is a drop in some years. Next and comparatively lower on the scale are France, Germany, and the Netherlands, with France having experienced a progressive increase since 2010. Spain, Poland, and Greece record the lowest levels, without any significant variation over time. However, strong evidence suggests that sexual assault and sexually related crimes are seriously underreported (Spohn and Tellis 2012). One reason is the divergent legal definitions and the typification in the national legal codes for these types of crimes, as well as varying characteristics of police procedures and convictions. Another reason might be the dynamics and complex variables playing a role in the decision-making of women to engage with the criminal justice system or to deal with the police to report a crime. While some officers deliver professional and non-judgmental responses to this type of reporting, others question the victim's narrative or show scepticism, disbelief, or a lack of understanding of the implications of sexual violence in terms of trauma and psychological harm (Johnson 2017). Furthermore, changes in the law have a direct effect on statistics and the absolute numbers for a country in terms of criminality as well. In Sweden, it was reported that rape conviction rates had risen 75% from 2018 to 2020 following a major change in the legal code. The country changed the legal definition of rape in 2018 to encompass sex without explicit consent, departing from the need to prove the use or threat of violence or coercion, as other countries demand the victim to do. This has since led to women's rights groups and campaigns to call on other nations to follow Sweden's initiative and initiate a process of reforms (Batha 2020).

The next indicator constitutes the sum of **theft, burglary, and robbery crimes**, all of which pertain to the unlawful taking or obtention of property from a person.[10] As the lower-left graph of Figure 51 exemplifies, the rate of this grouping of crimes is much higher than the previous indicators, reaching more than 6,000 in one case in 2009, albeit with overall figures descending by 2018. Within this category of crimes, Sweden, France, the Netherlands, and Italy demonstrate the highest records. In clear contrast with Sweden, Greece, Spain, and

[10] In the case of theft, it occurs without the use of force, threat of force or violence, coercion or deception. Burglary is defined as entering a house, apartment, or other dwelling place without explicit authorization. Finally, robbery entails overcoming resistance by force or threat of force (Eurostat 2021ab).

Poland have the lowest numbers, staying around 1,000 for every 100,000, with Poland's records notably decreasing from 2013 onwards. Similarly, to the case of sexually motivated crimes, Sweden stands out with the highest figures, experiencing a steady decrease, but remaining higher compared to the rest of the countries. Nonetheless, in this instance, reporting rates do not necessarily reflect the actual rates either. This category encompasses a range of criminal acts related to the obtention of someone else's personal property of different monetary value, and in certain cases, some crimes might not be reported due to the perception that it is not worth it or that the police is not going to pursue them thoroughly.

Finally, it is useful to examine crimes involving **controlled drugs or precursors**[11] as illustrated by the lower-right graph of Figure 51. Again, Sweden's records surpass those of all other countries. From 2010 onwards and during the entire decade, Sweden exceeds 900 cases per 100,000 citizens, suffering in 2018 from worse numbers than it had in 2009. At a substantially lower number of around 300 cases are Germany, followed by Poland, then France (with a considerable spike from 2015 to 2016), and then Greece. These four remain above an average of 100 cases overall throughout the decade. At the lower end in number of offenses are Spain, Italy, and the Netherlands. Member States have different levels of tolerance to the consumption and distribution of illegal drugs, which directly impacts statistics on this type of crime. Sweden is a country with a relatively restrictive drug policy, in contrast with liberal approaches like the one of the Netherlands. Sweden focuses its efforts on controlling and reducing both the supply and consumption of illicit substances to their minimum, which inevitably increases the number of reported cases and convictions (Chatwin 2018).

[11] This includes the handling, possession, purchase, use, trafficking, cultivation, or production of these substances for both personal consumptions and supply (Eurostat 2021ab).

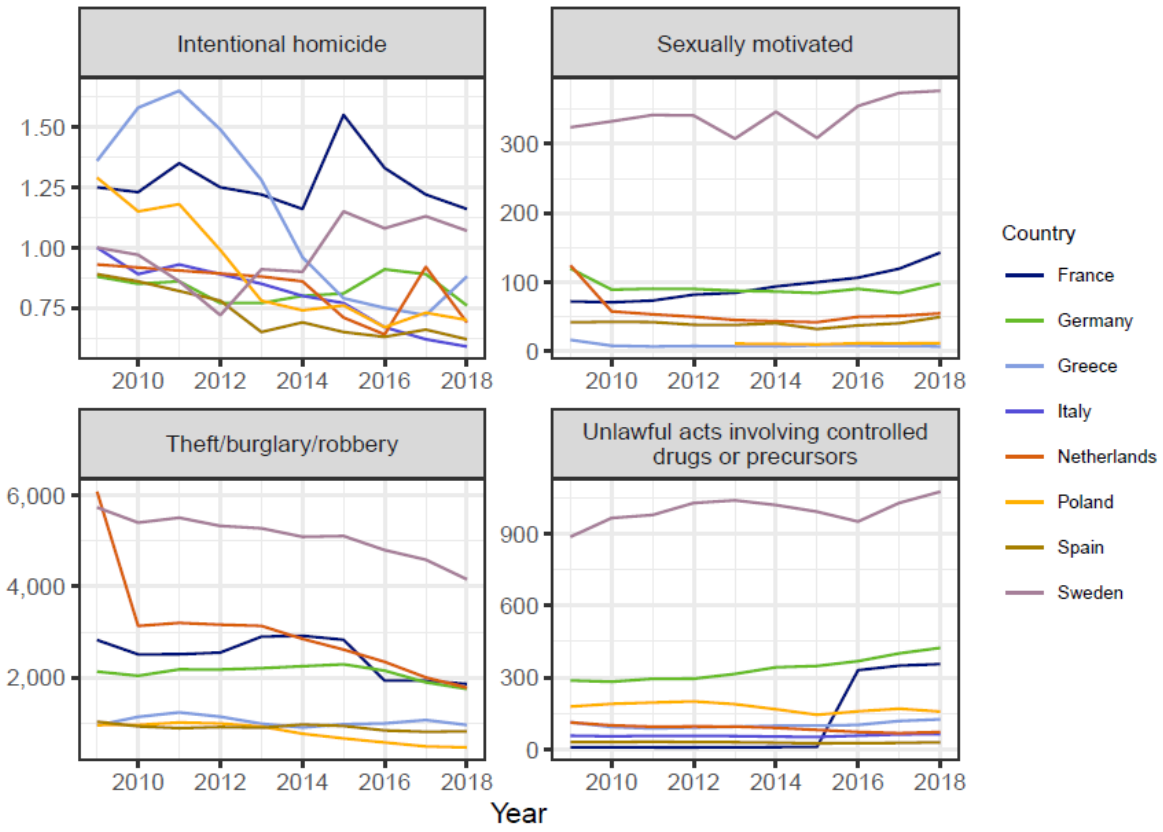

Figure 51: Total number of recorded offenses per 100,000 inhabitants

10 Conclusion

In sum, a wide range of socio-economic indicators and considerations can both, directly and indirectly, affect migrant decision-making as to their desired destinations. Additionally, societal attitudes towards migrants in host societies are influenced by these factors. Through this report, users of the EMT are provided with an understanding of the current socio-economic situations in the Member States, in addition to migration patterns in past years.

The socio-economic areas that were chosen for their relevance and subsequently explored include: income, poverty, inequality, and social expenditure; levels of employment and skills; the gender dimensions of employment, pay and roles; determinants and indicators of health and well-being; levels of material and social deprivation; configurations of justice systems and degrees of corruption; and crime and recorded offenses statistics. The short chapters addressing these aspects describe, analyse and inform those using the EMT. They provide context for the graphs and core statistics (derived from Eurostat) that will be automatically updated within the EMT.

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Code Book (the usage is explained in the code)

API to download the newly available data (in Python)

```
# Download the data

for code in codes:

# For each code name of a dataset obtain the actual code

        code = str(code).lower() if str (code).isupper() else str(code)

        code = re.split(pattern='[$]|%', string=code)[0]

# Try to download this data through the Eurostat API

        try:

                df = Eurostat.get_data_df(code, False)

# If the API fails to download, it throws a message to the console/terminal informing the
code name was not found in Eurostat and it continues with the next code name

        except:

                print(code + 'not found ')

                pass

                continue

        print (code)

# Save the data in a csv file

        filename = filePath + code + '.csv'
```

```
df.to_csv(filename, index = False)
```

Pre-Processing of the data (R Script in R)

```
# Cleaning Data Set for D4.3

# Load required packages

library(dplyr)

library(tidyverse)

library(scales)

library(maps)

library(RColorBrewer)

library(spData)

library(tmap)

library(readr)

library(readxl)

library(sf)

library(eurostat)

library(naniar)

setwd("/Users/finja//Dropbox (MEDAM)/H2020 -
ITFLOWS/Research/WP4/WP4.2/Markdown/Script und Datensaetze") #change
accordingly
```

```
#__Preliminary Set-up__

# Getting the shape_file and geometry information from Eurostat

geoeuro <- get_eurostat_geospatial(output_class = "sf", resolution = "60",
nuts_level = 0,year = 2016)   %>% st_crop(map, xmin = -25, xmax = 45, ymin = 30, ymax =
70) %>% st_transform(crs = "+proj=moll") # transform it to equal-distance (Mollweide)

# Leave year=2016, it's just the year the borders are based on (and better resolution, than
newer shapefiles)

# Set year filter for year of interest (change accordingly)

year_filter <- 2019

year_begin <- (year_filter - 10)

year_end <- (year_filter + 1)

year_5 <- (year_filter - 4)

#__Country Level Data set__

# Population Data

population.df <- read.csv2("Population.csv", header=TRUE, sep = ",")

# Cleaning, renaming, recoding variable of interest, creating date variable, filter dataset to
timeframe of interest

population.clean <- population.df %>% select(geo,sex, TIME_PERIOD, OBS_VALUE) %>%
rename(year=TIME_PERIOD, total_population=OBS_VALUE) %>%
mutate(Date=as.Date(paste(year, 1, 1, sep="-"))) %>% filter(year >= year_begin & year <=
year_filter & sex=="T") %>% select(year, geo, total_population, Date)

# Generate population group
```

```
population.group <- read.csv2("estat_tps00010_en.csv", header=TRUE, sep=",")


population.group.clean <- population.group %>%  select(geo, indic_de, TIME_PERIOD, OBS_VALUE) %>% rename(year=TIME_PERIOD) %>% mutate(share_population=as.double(OBS_VALUE)) %>% mutate(Date=as.Date(paste(year, 1, 1, sep="-"))) %>% filter(year >= year_begin & year <= year_filter) %>% select(year, geo, share_population, indic_de, Date)


# Dividing the population into subgroups based on age groups to create share of pop below 25 yrs


pop.l15 <- population.group.clean %>% filter(indic_de=="PC_Y0_14") %>% rename(share_population_15=share_population) %>% select(year, geo, share_population_15, indic_de, Date)


pop.l25 <- population.group.clean %>% filter(indic_de=="PC_Y15_24") %>% rename(share_population_25=share_population) %>% select(year, geo, share_population_25, Date)


# Joining them to back together to create pop share below 25 yrs information


pop.share.l25 <- full_join(pop.l15, pop.l25 ,by = c("geo", "year", "Date")) %>%mutate(share_l25=share_population_15+share_population_25) %>%select(geo, share_l25, Date, year)


# The same for the age group above 65 yrs


pop.o65<- population.group.clean %>% filter(indic_de=="PC_Y65_79") %>% rename(share_population_65=share_population) %>%select(year, geo, share_population_65, Date)


pop.o80 <- population.group.clean %>% filter(indic_de=="PC_Y80_MAX") %>% rename(share_population_max=share_population) %>% select(geo, share_population_max, Date, year)


# Joining them back together
```

```
pop.share.o65 <- full_join(pop.o65, pop.o80 ,by = c("geo", "year", "Date"))
%>%mutate(share_o65=share_population_65+share_population_max) %>% select(geo,
share_o65, Date, year)


data_complete <- left_join(population.clean, pop.share.l25,by=c("geo", "year", "Date"))
%>%mutate(population_l25=total_population*(share_l25/100))


data_complete <- left_join(data_complete, pop.share.o65, by = c("geo", "year", "Date"))
%>%mutate(population_o65=total_population*(share_o65/100))


### Social Expenditure total (SPR_EXP_SUM)


expendituresocial.df <- read.csv2("Expenditure_social.csv", header = TRUE, sep = ",")


# Cleaning, renaming, recoding variable of interest, creating date variable, filter dataset to
timeframe of interest, join to main dataframe


population.clean <- population.df %>% select(geo,sex, TIME


expendituresocial.clean <- expendituresocial.df %>% select(spdeps, unit, geo, OBS_VALUE,
TIME_PERIOD) %>% rename(expenditure_type=spdeps, social_expenditure=OBS_VALUE,
year= TIME_PERIOD) %>% mutate(social_expenditure=as.numeric(social_expenditure))
%>% mutate(Date=as.Date(paste(year, 1, 1, sep="-"))) %>% filter(unit=="EUR_HAB" &
expenditure_type=="TOTALNOREROUTE") %>% select(geo, year, Date, social_expenditure)


data_complete <- left_join(data_complete, expendituresocial.clean, by = c("geo", "year",
"Date"))


### Social Pension (SPR_EXP_PENS)


pension.df <- read.csv2("estat_spr_exp_pens$defaultview_en.csv", header=TRUE, sep=",")


# Cleaning, renaming, recoding variable of interest, creating date variable, filter dataset to
timeframe of interest, join to main dataframe


pension.clean <-pension.df %>%  select(spdepb, spdepm, unit, geo, TIME_PERIOD,
OBS_VALUE) %>%rename(pension_type=spdepb,testing_means=spdepm,
pension_expenditure=OBS_VALUE, year=TIME_PERIOD) %>%
mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>%
```

```
mutate(pension_expenditure=as.numeric(pension_expenditure))
%>%filter(unit=="EUR_HAB_KP10" & pension_type=="TOTAL" &
testing_means=="TOTAL") %>% select(geo, year, Date, pension_expenditure)

data_complete <- left_join(data_complete, pension.clean, by = c("geo", "year", "Date"))

### Gini Coefficient

gini.df <- read.csv2("estat_tessi190_en.csv", header=TRUE, sep= ",")

# Cleaning, renaming, recoding variable of interest, creating date variable, filter dataset to
timeframe of interest, join to main dataframe

gini.clean <- gini.df %>%  select(geo, TIME_PERIOD, OBS_VALUE, indic_il) %>%
rename(year=TIME_PERIOD, gini=OBS_VALUE) %>% mutate(Date=as.Date(paste(year, 1,1,
sep="-"))) %>% mutate(gini=as.double(gini)) %>% select(geo, year, Date, gini)

data_complete <- left_join(data_complete, gini.clean, by = c("geo", "year", "Date"))

### Median Income

income.df <- read.csv2("estat_ilc_di03$defaultview_en.csv", header=TRUE, sep= ",")

# Cleaning, renaming, recoding variable of interest, creating date variable, filter dataset to
timeframe of interest

income.clean <- income.df %>%  select(geo, TIME_PERIOD, OBS_VALUE, age, sex, indic_il,
unit) %>% rename(year=TIME_PERIOD, median_income=OBS_VALUE) %>%
mutate(Date=as.Date(paste(year, 1,1, sep="-")))

income.total <- income.clean %>% filter(age=="TOTAL" & unit=="EUR") %>%
rename(income_all_age=median_income) %>% select(geo, year, Date, income_all_age)

# Divide income data in median income for all and only for age 18 to 24 yrs

income.1824 <- income.clean %>% filter (age=="Y18-24" & unit=="EUR") %>%
rename(income_1824=median_income) %>% select(geo, year, Date, income_1824)
```

```
data_complete <- left_join(data_complete, income.total, by = c("geo", "year", "Date"))

data_complete <- left_join(data_complete, income.1824, by = c("geo", "year", "Date"))

### Recent Immigration in total numbers

immigrationtotal.df <-
read.csv2("migr_imm8__custom_1215425_20210814_132843.sdmx.csv", header=TRUE,
sep=",")

# Cleaning, renaming, recoding variable of interest, creating date variable, filter dataset to
timeframe of interest, join to main dataframe

immigrationtotal.clean <- immigrationtotal.df %>%  select(geo, OBS_VALUE, TIME_PERIOD,
sex) %>% rename(year=TIME_PERIOD, total_immigration=OBS_VALUE) %>%
mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>% filter(year >= year_begin & year <=
year_filter & sex=="T") %>% select(year, geo, total_immigration, Date)

data_complete <- left_join(data_complete, immigrationtotal.clean, by =c ("geo", "year",
"Date"))

# Creating average immigration variable

average.im <- immigrationtotal.df %>%rename(year=TIME_PERIOD,
total_immigration=OBS_VALUE) %>% filter(year >= year_begin & year <= year_filter &
sex=="T") %>% filter(geo %in% country_eu) %>% select(geo, year, total_immigration)

average.year.im<- average.im %>% reshape(idvar="year", timevar="geo",
direction="wide")

average.year.im$sum <- rowSums(average.year.im[2:28],na.rm = TRUE)

### Recent immigration as percentage of population

immigration.df.percent <- read.csv2("lfst_rimgpnga_1_Data.csv", header=TRUE, sep=",")

immigration.clean.percent <- immigration.df.percent %>% rename(year=TIME,
percentage_immigration=Value) %>% mutate(Date=as.Date(paste(year,1,1, sep="-")))
```

```
%>% rename(geo=GEO) %>%
mutate(percentage_immigration=as.double(percentage_immigration)) %>%
filter(UNIT=="Percentage of total population" & CITIZEN=="Foreign country" &
SEX=="Total") %>% select(year, Date, geo, percentage_immigration)


data_complete <- left_join(data_complete, immigration.clean.percent, by = c("geo", "year",
"Date"))


### Recent immigration development over last 10 yrs


immigration.2009 <-immigration.clean.percent  %>%
rename(percentage_immigration_09=percentage_immigration) %>%filter(year %in%
year_begin) %>% select (geo, percentage_immigration_09) %>% replace_with_na(replace =
list(percentage_immigration_09 = 0))


immigration.2019 <- immigration.clean.percent  %>%
rename(percentage_immigration_19=percentage_immigration) %>%filter(year %in%
year_filter) %>% select(geo, percentage_immigration_19)


rate_immigration <- full_join(immigration.2009, immigration.2019, by="geo") %>%
mutate(change_rate=((percentage_immigration_19-
percentage_immigration_09)/percentage_immigration_09)*100) %>%
mutate(year=paste(year_filter)) %>% mutate(year=as.numeric(year)) %>%
mutate(Date=as.Date(paste(year,1,1,sep="-"))) %>% select(geo, change_rate, year, Date)


data_complete <- left_join(data_complete, rate_immigration, by = c("geo", "year", "Date"))


# Increase in recent immigration over the last 5 yrs


immigration.2015 <-immigration.clean.percent  %>%
rename(percentage_immigration_15=percentage_immigration) %>%filter(year %in%
year_5) %>% select (geo, percentage_immigration_15) %>%  replace_with_na(replace =
list(percentage_immigration_15 = 0))


immigration.2019 <- immigration.clean.percent  %>%
rename(percentage_immigration_19=percentage_immigration) %>% filter(year %in%
year_filter) %>% select(geo, percentage_immigration_19)


rate_immigration5 <- full_join(immigration.2015, immigration.2019, by="geo") %>%
mutate(change_rate5yrs=((percentage_immigration_19-
percentage_immigration_15)/percentage_immigration_15)*100) %>%
```

```
mutate(year=paste(year_filter)) %>% mutate(year=as.numeric(year)) %>%
mutate(Date=as.Date(paste(year,1,1,sep="-"))) %>% select(geo, change_rate5yrs, year,
Date)


data_complete <- left_join(data_complete, rate_immigration5, by = c("geo", "year", "Date"))


### Share of recent immigrants ordered to leave compared to all immigrants


expulsion.df <- read.csv2("migr_eiord__custom_1228580_20210820_104036.sdmx.csv",
header=TRUE, sep=",")


expulsion.clean <- expulsion.df %>%  select(geo, TIME_PERIOD, OBS_VALUE, age, sex) %>%
rename(total_ordered=OBS_VALUE, year=TIME_PERIOD) %>%
mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>% filter(year >= year_begin & year <=
year_filter & sex=="T" & age=="TOTAL") %>% select(year, geo, total_ordered, Date)


data_complete <- left_join(data_complete, expulsion.clean, by = c("geo", "year", "Date"))
%>% mutate(share_order_leave=(total_ordered/total_immigration)*100)


# Third country nationals returned following an order to leave


returned.df <- read.csv2("migr_eirtn__custom_1228609_20210820_104657.sdmx.csv",
header=TRUE, sep=",")


# Cleaning, renaming, recoding variable of interest, creating date variable, filter dataset to
timeframe of interest


returned.clean <- returned.df %>%  select(geo , OBS_VALUE, TIME_PERIOD, age, sex) %>%
rename(total_returned=OBS_VALUE, year=TIME_PERIOD) %>%
mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>% filter(year >= year_begin & year <=
year_end & sex=="T" & age=="TOTAL") %>%   mutate(geo = recode(geo, `AT` =
"Austria",`BE` = "Belgium", `BG`= "Bulgaria", `CH` = "Switzerland", `CY`= "Cyprus", `CZ` =
"Czech Republic", `DE` = "Germany", `DK` = "Denmark", `EE` = "Estonia", `EL` = "Greece",
`ES`= "Spain", `FI`= "Finland", `FR`= "France", `HR`= "Croatia",`HU`= "Hungary", `IE` =
"Ireland", `IS`= "Iceland", `IT` = "Italy", `LT`= "Lithuania", `LU`= "Luxembourg",
`LV`="Latvia", `ME`= "Montenegro", `MK`= "North Macedonia", `MT`= "Malta", `NL`=
"Netherlands", `NO` = "Norway", `PL`= "Poland", `PT`= "Portugal", `RO` = "Romania", `RS` =
"Serbia", `SE`= "Sweden", `SI`= "Slovenia", `SK`= "Slovakia", `TR`= "Turkey", `UK`= "UK"))
%>% select(year, geo, total_returned, Date)


write.csv(returned.clean, "returned.clean.csv")
```

```
# Cleaning, renaming, recoding variable of interest, creating date variable, filter dataset to timeframe of interest, join to main dataframe


returned.map <- returned.df %>%  select(geo , OBS_VALUE, TIME_PERIOD, age, sex) %>% rename(total_returned=OBS_VALUE, year=TIME_PERIOD) %>% mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>% filter(year >= year_begin & year <= year_end & sex=="T" & age=="TOTAL") %>% select(year, geo, total_returned, Date)


data_complete <- left_join(data_complete, returned.map, by = c("geo", "year", "Date")) %>% mutate(share_returned=(total_returned/total_immigration)*100)


### Emigration


emigration.df <- read.csv2("migr_emi2__custom_1215441_20210814_135144.sdmx.csv", header=TRUE, sep=",")


# Cleaning, renaming, recoding variable of interest, creating date variable, filter dataset to timeframe of interest, join to main dataframe


emigration.clean <- emigration.df %>% select(geo, TIME_PERIOD, OBS_VALUE, sex) %>% rename(year=TIME_PERIOD, emigration_total=OBS_VALUE) %>% mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>% filter(sex=="T") %>%   select(year, geo, emigration_total, Date)


data_complete <- left_join(data_complete, emigration.clean, by = c("geo", "year", "Date")) %>% mutate(share_emigration=(emigration_total/total_population)*100)


### Educational Attainment


education.df <- read.csv2("edat_lfse_03__custom_506663_20210730_090058.sdmx.csv", header=TRUE, sep= ",")


# Cleaning, renaming, recoding variable of interest, creating date variable, filter dataset to timeframe of interest, join to main dataframe


education.clean <- education.df %>% select(geo, TIME_PERIOD, OBS_VALUE, age, sex, unit, isced11) %>% rename(year=TIME_PERIOD,      educational_attainment=OBS_VALUE) %>% mutate(Date=as.Date(paste(year, 1,1, sep="-"))) %>%
```

```
mutate(educational_attainment=as.double(educational_attainment)) %>%
filter(year>=2010)


education.e02 <- education.clean %>% filter(sex=="T" & isced11=="ED0-2") %>%
rename(percentage_education02=educational_attainment) %>% select(geo,
percentage_education02, year, Date)


education.e5to8 <- education.clean %>% filter(sex=="T" & isced11=="ED5-8") %>%
rename(percentage_education58=educational_attainment) %>%  select(geo,
percentage_education58, year, Date)


data_complete <- left_join(data_complete, education.e02, by = c("geo", "year", "Date"))


data_complete <- left_join(data_complete, education.e5to8, by = c("geo", "year", "Date"))


### Employment recent graduates


employment_graduates_df<- read.csv2("Employment_recent_graduates.csv", header =
TRUE, sep = ",")


# Cleaning, renaming, recoding variable of interest, creating date variable, filter dataset to
timeframe of interest, join to main dataframe


employment_graduates_clean<- employment_graduates_df %>% mutate(OBS_VALUE=
as.double(OBS_VALUE)) %>% select(geo, OBS_VALUE, age, sex, TIME_PERIOD ) %>%
mutate(graduate_unemployment=(100-OBS_VALUE)) %>%
rename(graduate_employment=OBS_VALUE) %>% rename(year=TIME_PERIOD) %>%
mutate(Date=as.Date(paste(year, 1, 1, sep="-")))


employment_graduates_female <- employment_graduates_clean %>% filter(sex=="F")
%>% select(geo, year, Date, graduate_employment, graduate_unemployment) %>%
rename(female_grad_employment=graduate_employment) %>%
rename(female_grad_unemployment=graduate_unemployment)


employment_graduates_male <- employment_graduates_clean %>%  filter(sex=="M") %>%
select(geo, year, Date, graduate_employment, graduate_unemployment) %>%
rename(male_grad_employment=graduate_employment) %>%
rename(male_grad_unemployment=graduate_unemployment)
```

```
data_complete <- left_join(data_complete, employment_graduates_female, by = c("geo", "year", "Date"))

data_complete <- left_join(data_complete, employment_graduates_male, by = c("geo", "year", "Date"))

### Risk of Poverty

Povertyrisk.df <- read.csv2("ilc_peps01__custom_508483_20210803_073638.sdmx.csv", header=TRUE, sep=",")

# Cleaning, renaming, recoding variable of interest, creating date variable, filter dataset to timeframe of interest, join to main dataframe

povertyrisk.clean <-Povertyrisk.df %>% select(geo, TIME_PERIOD, OBS_VALUE, age, sex, unit) %>% rename(risk_poverty=OBS_VALUE,year=TIME_PERIOD) %>% mutate(Date=as.Date(paste(year, 1, 1, sep="-"))) %>% mutate(risk_poverty=as.double(risk_poverty)) %>%  filter(year>= year_begin & unit=="PC" & age=="TOTAL")

# Dividing the data set into risk for female and male

povertyrisk.female <- povertyrisk.clean %>%  filter(sex=="F" & age=="TOTAL") %>% select(geo, year, Date, risk_poverty) %>% rename(risk_povery_female = risk_poverty)

povertyrisk.male <- povertyrisk.clean %>%  filter(sex=="M" & age=="TOTAL") %>% select(geo, year, Date, risk_poverty) %>% rename(risk_poverty_male = risk_poverty)

data_complete <- left_join(data_complete, povertyrisk.female, by = c("geo", "year", "Date"))

data_complete <- left_join(data_complete, povertyrisk.male, by = c("geo", "year", "Date"))

### Aslyum Applicants

asylum.df <- read.csv2("migr_asyappctza__custom_503564_20210803_131814.sdmx.csv", header =TRUE, sep = ",")
```

```
# Cleaning, renaming, recoding variable of interest, creating date variable, filter dataset to timeframe of interest, join to main dataframe

asylum.clean <- asylum.df %>%  select(geo, sex, TIME_PERIOD, OBS_VALUE, age, asyl_app) %>% rename(year=TIME_PERIOD, total_asylum = OBS_VALUE) %>% mutate(Date=as.Date(paste(year, 1, 1, sep="-")))

asylum.all <- asylum.clean %>% filter(age=="TOTAL" & asyl_app=="ASY_APP" & year>= year_begin & sex=="T") %>%select(geo, year, Date, total_asylum)

data_complete <- left_join(data_complete, asylum.all, by = c("geo", "year", "Date"))

data_complete<-data_complete %>% mutate(share_asylum=(total_asylum/total_population)*100) # share of applicants in percent of population

# Dividing the data set in applicants of all ages, between 35-64 and 65+ to get the asylum applicant rate of below 35

asylum.recent.all <- asylum.clean %>% filter(age=="TOTAL" & asyl_app=="NASY_APP" & sex=="T" & year>= year_begin) %>% rename(total_asylum_all=total_asylum) %>% select(year, Date, geo, total_asylum_all)

asylum.recent.3564 <- asylum.clean %>%  filter(age=="Y35-64" & asyl_app=="NASY_APP" & sex=="T" & year>= year_begin) %>% rename(total_asylum_35=total_asylum) %>% select(year, Date, geo, total_asylum_35)

asylum.recent.65 <- asylum.clean %>%  filter(age=="Y_GE65" & asyl_app=="NASY_APP" & sex=="T" & year>= year_begin) %>% rename(total_asylum_65=total_asylum) %>% select(year, Date, geo, total_asylum_65)

asylum.combinded <- left_join(asylum.recent.all, asylum.recent.65  , by=c("geo", "year", "Date"))

asylum.combinded <- left_join(asylum.combinded, asylum.recent.3564 , by=c("geo", "year", "Date"))

asylum.recent <- asylum.combinded %>%  mutate(asylum_recent=total_asylum_all-total_asylum_35-total_asylum_65) %>% select(geo, year, Date, asylum_recent)
```

```
data_complete <- left_join(data_complete, asylum.recent, by = c("geo", "year", "Date"))

data_complete<-data_complete %>%
mutate(rate_asylum_recent=(asylum_recent/total_population)*100) %>%
mutate(share_asylum_young=(asylum_recent/total_asylum)*100)

# 1. Mutate share of applications below 35 in percent of total population

# 2. Mutate share of applications below 35 in percent of total asylum applicants

# Change of Share of Asylum over the last 10 yrs

population.2009 <- population.clean %>% filter(year %in% year_begin)

asylum.2009 <- asylum.all %>% filter(year %in% year_begin)

population.2019 <- population.clean %>% filter(year %in% year_filter)

asylum.2019 <- asylum.all %>% filter(year %in% year_filter)

asylum.09 <- full_join(population.2009, asylum.2009, by=c("geo", "year", "Date")) %>%
mutate(asylum_rate09=total_asylum/total_population) %>% select(geo, asylum_rate09)

asylum.19 <- full_join(population.2019, asylum.2019, by=c("geo", "year", "Date")) %>%
mutate(asylum_rate19=total_asylum/total_population) %>% select(geo, asylum_rate19)

asylum.change <- full_join(asylum.09, asylum.19, by ="geo") %>%
mutate(change_asylum_rate=((asylum_rate19-asylum_rate09)/asylum_rate09)*100) %>%
mutate(year=paste(year_filter)) %>% mutate(year=as.numeric(year)) %>%
mutate(Date=as.Date(paste(year,1,1,sep="-"))) %>% select(geo, year, Date,
change_asylum_rate)

data_complete <- left_join(data_complete, asylum.change, by = c("geo", "year", "Date"))

# Asylum change over the last 5 yrs

population.2015 <- population.clean %>% filter(year %in% year_5)
```

```
asylum.2015 <- asylum.all %>% filter(year %in% year_5)

population.2019 <- population.clean %>% filter(year %in% year_filter)

asylum.2019 <- asylum.all %>% filter(year %in% year_filter)

asylum.15 <- full_join(population.2015, asylum.2015, by=c("geo", "year", "Date")) %>%
mutate(asylum_rate15=total_asylum/total_population) %>% select(geo, asylum_rate15)

asylum.19 <- full_join(population.2019, asylum.2019, by=c("geo", "year", "Date")) %>%
mutate(asylum_rate19=total_asylum/total_population) %>% select(geo, asylum_rate19)

asylum.change5 <- full_join(asylum.15, asylum.19, by ="geo")
%>%mutate(change_asylum_rate5=((asylum_rate19-asylum_rate15)/asylum_rate15)*100)
%>% mutate(year=paste(year_filter)) %>% mutate(year=as.numeric(year)) %>%
mutate(Date=as.Date(paste(year,1,1,sep="-"))) %>% select(geo, year, Date,
change_asylum_rate5)

data_complete <- left_join(data_complete, asylum.change5, by = c("geo", "year", "Date"))

# Share of resettled TNC of the total number of immigrants

resettled.df <- read.csv2("migr_asyresa__custom_503902_20210819_222629.sdmx.csv",
header=TRUE, sep=",")

# Cleaning, renaming, recoding variable of interest, creating date variable, filter dataset to
timeframe of interest, join to main dataframe

resettled.total <- resettled.df %>% select(geo, TIME_PERIOD, OBS_VALUE, age, sex) %>%
rename(total_resettled=OBS_VALUE, year=TIME_PERIOD) %>%
mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>% filter(sex=="T" & age=="TOTAL")
%>% select(year, geo, total_resettled,  Date)

data_complete <- left_join(data_complete, resettled.total, by = c("geo", "year", "Date")) %>%
mutate(share_resettled=(total_resettled/total_asylum)*100)

data_complete<-data_complete%>%filter(year==2019)%>%filter(geo=="DE")
```

```
### Average yearly asylum applicant for EU Members

# Cleaning, renaming, recoding variable of interest, creating date variable, filter dataset to timeframe of interest, join to main dataframe

average.as <- asylum.clean %>%  filter(year >= 2008 & year <= year_end) %>% filter(age=="TOTAL" & asyl_app=="ASY_APP" & sex=="T") %>%   filter(geo %in% country_eu) %>% select(geo, year, total_asylum)

average.year.as<- average.as %>% reshape(idvar="year", timevar="geo", direction="wide")

average.year.as$sum <- rowSums(average.year.as[2:28],na.rm = TRUE)

average.asy.im <- left_join(average.year.as, average.year.im, by="year") %>%rename(total_asylum=sum.x, total_immigration=sum.y) %>% select(year, total_asylum, total_immigration) %>% mutate(date=as.Date(paste(year,1,1, sep="-")))

average.plot <- average.asy.im %>%select(date, total_asylum, total_immigration) %>%gather(key = "variable", value = "value", -date)

write.csv(average.plot,'average.plot.csv')

### Share of Illegally present third-country foreigners of the total population

illegal.df <- read.csv2("migr_eipre__custom_504205_20210803_180954.sdmx.csv", header=TRUE, sep=",")

# Cleaning, renaming, recoding variable of interest, creating date variable, filter dataset to timeframe of interest, join to main dataframe

illegal.clean <- illegal.df %>% select(geo, OBS_VALUE, TIME_PERIOD, sex, unit, citizen, age) %>% rename(year=TIME_PERIOD, total_illegal = OBS_VALUE) %>% mutate(Date=as.Date(paste(year, 1, 1, sep="-")))

illegal.all <- illegal.clean %>% filter(age=="TOTAL" & sex=="T" & year>= year_begin) %>% select(geo, Date, year, total_illegal)
```

```
data_complete <- left_join(data_complete, illegal.all, by = c("geo", "year", "Date"))  %>%
mutate(rate_illegal=(total_illegal/total_population)*100)

# Dividing data set into total and age group older than 34 to create a variable for the illegaly
present younger than 34

illegal.rest <- illegal.clean %>% filter(age=="TOTAL" & sex=="T" & year>= year_begin)
%>% rename(total_illegal_all=total_illegal) %>% select(year, Date, geo, total_illegal_all)

illegal.old <- illegal.clean %>% filter(age=="Y_GE35" & sex=="T" & year>= year_begin)
%>% rename(total_illegal_old=total_illegal) %>% select(year, Date, geo, total_illegal_old,
age)

illegal.combinded <- full_join(illegal.rest, illegal.old , by=c("geo", "year", "Date")) %>%
mutate(illegal_young=total_illegal_all - total_illegal_old) %>% select(geo, year, Date,
illegal_young)

data_complete<-left_join(data_complete, illegal.combinded, by=c("geo", "year", "Date"))
%>% mutate(rate_illegal_young=(illegal_young/total_population)*100)

# Percentage change illegally present from 2009 to 2019

population.2009 <- population.clean %>% filter(year %in% year_begin)

illegal.2009 <-illegal.all %>% filter(year %in% year_begin)

population.2019 <- population.clean %>% filter(year %in% year_filter)

illegal.2019 <- illegal.all %>% filter(year %in% year_filter)

illegal.rate.09 <- full_join(population.2009, illegal.2009, by=c("geo", "year", "Date")) %>%
mutate(illegal_rate09=total_illegal/total_population) %>% select(geo, illegal_rate09)

illegal.rate.19 <- full_join(population.2019, illegal.2019, by=c("geo", "year", "Date")) %>%
mutate(illegal_rate19=total_illegal/total_population) %>% select(geo, illegal_rate19)

illegal.change <- full_join(illegal.rate.09, illegal.rate.19, by ="geo") %>%
mutate(change_illegal_rate=((illegal_rate19-illegal_rate09)/illegal_rate09)*100) %>%
```

```
mutate(year=(paste(year_filter))) %>% mutate(year=as.numeric(year)) %>%
mutate(Date=as.Date(paste(year,1,1,sep="-"))) %>% select(geo, year, Date,
change_illegal_rate)

data_complete<-left_join(data_complete, illegal.change, by=c("geo", "year", "Date"))

# Percentage change illegally present from 2015 to 2019

population.2015 <- population.clean %>% filter(year %in% year_begin)

illegal.2015 <-illegal.all %>% filter(year %in% year_begin)

population.2019 <- population.clean %>% filter(year %in% year_filter)

illegal.2019 <- illegal.all %>% filter(year %in% year_filter)

illegal.rate.15 <- full_join(population.2015, illegal.2015, by=c("geo", "year", "Date")) %>%
mutate(illegal_rate15=total_illegal/total_population) %>% select(geo, illegal_rate15)

illegal.rate.19 <- full_join(population.2019, illegal.2019, by=c("geo", "year", "Date")) %>%
mutate(illegal_rate19=total_illegal/total_population) %>% select(geo, illegal_rate19)

illegal.change5yrs <- full_join(illegal.rate.15, illegal.rate.19, by ="geo") %>%
mutate(change_illegal_rate_5yrs=((illegal_rate19-illegal_rate15)/illegal_rate15)*100) %>%
mutate(year=year_filter) %>% mutate(year=as.numeric(year)) %>%
mutate(Date=as.Date(paste(year,1,1,sep="-"))) %>% select(geo, year, Date,
change_illegal_rate_5yrs)

data_complete<-left_join(data_complete, illegal.change5yrs, by=c("geo", "year", "Date"))

### Employment recent immigrants

employment.immigrants<- read.csv2("lfst_rimgenga_1_Data.csv", header=TRUE, sep=",")

# Cleaning, renaming, recoding variable of interest, creating date variable, filter dataset to
timeframe of interest, join to main dataframe
```

```
employment.immigrants.clean <- employment.immigrants %>% rename(year=TIME,
percentage_employed=Value) %>% mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>%
mutate(percentage_employed=as.double(percentage_employed)) %>% rename(geo=GEO)
%>% filter(UNIT=="Percentage of total recent immigrants" & CITIZEN=="Foreign country")
%>%select(year, Date, geo, percentage_employed)


data_complete<-left_join(data_complete, employment.immigrants.clean, by=c("geo", "year",
"Date"))


### Long-term unemployment by sex


unemployment_bysex <-
read.csv2("une_ltu_q__custom_1194299_20210804_130045.sdmx.csv", header=TRUE,
sep=",")


unemployment_bysex_clean <- unemployment_bysex %>% select(geo, age, s_adj, unit, sex,
TIME_PERIOD, OBS_VALUE, indic_em) %>% rename(year=TIME_PERIOD,
unemployment_rate=OBS_VALUE)


# Create facet of long term unemplyoment


unemployment.facet <- unemployment_bysex_clean %>%  filter(unit=="PC_ACT") %>%
filter(sex=="M" | sex=="F") %>%
mutate(unemployment_rate=as.double(unemployment_rate)) %>% mutate(sex=
recode(sex, `M` = "Male", `F`= "Female"))


write.csv(unemployment.facet, "unemployment.facet.csv")


# Dividing the data set into long-term unemployment female and male


unemployment.female <- unemployment_bysex_clean %>% filter(sex=="F" &
unit=="PC_ACT") %>%
mutate(unemployment_rate_female=as.double(unemployment_rate)) %>% select(geo,
year, unemployment_rate_female)


unemployment.male <- unemployment_bysex_clean %>% filter(sex=="M" &
unit=="PC_ACT") %>% mutate(unemployment_rate_male=as.double(unemployment_rate))
%>% select(geo, year, unemployment_rate_male)
```

```
data_quarterly <- left_join(geoeuro, unemployment.female, by ="geo")

data_quarterly <- data_quarterly %>%
filter(!is.na(data_quarterly$unemployment_rate_female | geo=="UK"))

data_quarterly <- left_join(data_quarterly, unemployment.male, by =c("geo", "year")) %>%
filter(year=="2019-Q1" | geo=="UK")

#__Facet Data for Tmaps__

### Facet Data median income by Age Group

# Creating facet data set 18-24yrs compared to total age group

income.facet.young <- income.clean %>% filter(unit=="EUR") %>% filter(age=="TOTAL" |
age=="Y18-24") %>% select(geo, year, Date, median_income, age)  %>% mutate(age=
recode(age, `TOTAL` = " Total", `Y18-24`= "18-24 years of age"))

write.csv(income.facet.young,"income.facet.young.csv")

### Facet Education

education.facet <- education.clean %>% filter(age=="Y15-64" & sex=="T" & unit=="PC")
%>% filter(isced11=="ED0-2" | isced11=="ED5-8") %>%  mutate(isced11= recode(isced11,
`ED0-2` = "Less than primary to secondary education", `ED5-8`= "Tertiary education"))
%>% select(geo, year, Date, educational_attainment, isced11)

write.csv(education.facet, "education.facet.csv")

### Facet Data for Employment of recent graduates

employment.graduates.facet <- employment_graduates_clean %>% filter(sex=="F" |
sex=="M") %>% select(geo, year, Date, graduate_employment, sex) %>% mutate(sex=
recode(sex, `F` = "Female", `M`= "Male")) %>% filter(year %in% year_filter)

write.csv(employment.graduates.facet, "employment.graduates.facet.csv")

### Facet data for poverty risk
```

```
poverty.facet <- povertyrisk.clean %>% filter(age=="TOTAL" & sex=="F" | sex=="M") %>%
select(geo, year, Date, risk_poverty, sex) %>% mutate(sex= recode(sex, `F` = "Female", `M`=
"Male"))

write.csv(poverty.facet,'poverty.facet.csv')

### Facet Data for asylum applications by age compared to total pop

asylum.total.facet<-asylum.clean %>% filter(age=="TOTAL" & asyl_app=="NASY_APP" &
sex=="T" & year>= year_begin) %>% select(year, Date, geo, total_asylum, age)

asylum.facet <- left_join(asylum.total.facet, population.clean, by=c("geo", "year", "Date") )
%>% mutate(share_asylum=(total_asylum/total_population)*100)

write.csv(asylum.facet, "facet.asylum.csv")

### Facet data set for illegally present TCN

illegal <- illegal.clean %>% filter(age=="Y_GE35" & sex=="T" & year>= year_begin) %>%
rename(total_illegal_old=total_illegal) %>% select(year, Date, geo, total_illegal_old, age)

illegal.combi <- full_join(illegal.rest, illegal , by=c("geo", "year", "Date")) %>%
mutate(illegal_young=total_illegal_all - total_illegal_old) %>% select(geo, year, Date,
illegal_young, age) %>% rename(total_illegal=illegal_young)

illegal.total<-illegal.clean %>% filter(age=="TOTAL" & sex=="T" & year>= year_begin) %>%
select(year, Date, geo, total_illegal, age)

illegal.facet <- full_join(illegal.combi,illegal.total, by=c("geo", "year", "Date", "total_illegal",
"age"))

illegal.facet <- left_join(illegal.facet, population.clean, by=c("geo", "year", "Date") ) %>%
mutate(share_illegal=(total_illegal/total_population)*100) %>%mutate(age= recode(age,
`Y_GE35` = "Younger than 35 years of age", `TOTAL`= "Total"))

write.csv(illegal.facet, "illegal.facet.csv")

#Population on 1 January by age and sex [DEMO_PJAN__custom_1158617]
```

```
population.df <-read.csv2("demo_pjan__custom_1326921_20210924_100555.sdmx.csv",
header=TRUE, sep=",")


population.map <- population.df %>% select(geo,sex, TIME_PERIOD, OBS_VALUE) %>%
rename(year=TIME_PERIOD, total_population=OBS_VALUE) %>%
mutate(Date=as.Date(paste(year, 1, 1, sep="-"))) %>% filter(year >= year_begin & year <=
year_end & sex=="T") %>% select(year, geo, total_population, Date)


#Gender employment gap [SDG_05_30__custom_1158952]


employmentgap.df <- read.csv2("estat_sdg_05_30_en.csv", header=TRUE, sep=",")


employmentgap.map <- employmentgap.df %>% select(geo, TIME_PERIOD ,OBS_VALUE)
%>% mutate(employment_gap=as.double(OBS_VALUE)) %>%
rename(year=TIME_PERIOD) %>% mutate(Date=as.Date(paste(year, 1, 1, sep="-"))) %>%
filter(year >= year_begin & year <= year_end) %>% select(year, geo, employment_gap ,
Date)


complete.uab <- left_join(population.map, employmentgap.map,  by=c("geo", "year",
"Date"))


#Deaths and crude death rate [TPS00029__custom_1158568]


deathrate.df <- read.csv2("tps00029__custom_1112727_20210813_094942.sdmx.csv",
header=TRUE, sep=",")


head(deathrate.df)


deathrate.map <- deathrate.df %>% select(indic_de, geo, TIME_PERIOD, OBS_VALUE) %>%
mutate(crude_death_rate=as.double(OBS_VALUE)) %>%  rename(year=TIME_PERIOD)
%>% mutate(Date=as.Date(paste(year, 1, 1, sep="-"))) %>% filter(year >= year_begin &
year <= year_end) %>% select(year, geo, crude_death_rate , Date)


complete.uab <- left_join(complete.uab, deathrate.map, by=c("geo", "year", "Date"))


# Life expectancy by age and sex [DEMO_MLEXPEC__custom_1158687]
```

```
lifeexpectancy.df <-
read.csv2("demo_mlexpec__custom_1213622_20210813_103921.sdmx.csv", header=TRUE,
sep=",")


head(lifeexpectancy.df)


lifeexpectancy.map.facet <- lifeexpectancy.df %>% select(sex, age, geo, TIME_PERIOD,
OBS_VALUE) %>% mutate(life_expectancy=as.double(OBS_VALUE)) %>%
rename(year=TIME_PERIOD) %>% mutate(Date=as.Date(paste(year, 1, 1, sep="-"))) %>%
filter(year >= year_begin & year <= year_end) %>%  filter(sex=="F" | sex=="M") %>%
mutate(sex=recode(sex, `F`="Female", `M`= "Male")) %>% select(year, geo, life_expectancy ,
sex, Date)


write.csv(lifeexpectancy.map.facet, "lifeexpectancy.map.facet.csv")


#Gender pay gap in unadjusted form [SDG_05_20__custom_1158850]


paygap.df <- read.csv2("estat_sdg_05_20_en.csv", header=TRUE, sep=",")


paygap.map <- paygap.df %>% select(geo, TIME_PERIOD, OBS_VALUE) %>%
mutate(pay_gap=as.double(OBS_VALUE)) %>% rename(year=TIME_PERIOD) %>%
mutate(Date=as.Date(paste(year, 1, 1, sep="-"))) %>% filter(year >= year_begin & year <=
year_end) %>% select(year, geo, pay_gap , Date)


complete.uab <- left_join(complete.uab, paygap.map, by=c("geo", "year", "Date"))


#Inactive population due to caring responsibilities by sex [SDG_05_40__custom_1158981]


Inactive.population <- read.csv2("estat_sdg_05_40_en.csv", header=TRUE, sep=",")


inactive.map.facet <- Inactive.population %>%  select(geo, OBS_VALUE, TIME_PERIOD, sex)
%>% mutate(percentage_inactive=as.double(OBS_VALUE)) %>%
rename(year=TIME_PERIOD) %>% mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>%
filter(year >= year_begin & year <= year_end) %>% filter(sex=="F" | sex=="M") %>%
mutate(sex=recode(sex, `F`="Female", `M`="Male")) %>% select(year, geo,
percentage_inactive , sex ,Date)


write.csv(inactive.map.facet, "inactive.map.facet.csv")
```

```
#Material and social deprivation rate by age, sex and most frequent activity status [ILC_MDSD01__custom_1159351]

deprivation.df <- read.csv2("ilc_mdsd01__custom_509268_20210814_144155.sdmx.csv", header=TRUE, sep=",")

deprivation.map.facet <- deprivation.df %>%  select(geo, sex, TIME_PERIOD, OBS_VALUE, age, wstatus) %>% mutate(deprivation_rate=as.double(OBS_VALUE)) %>% rename(year=TIME_PERIOD) %>% mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>% filter(year >= year_begin & year <= year_end & sex=="T") %>% select(year, geo, deprivation_rate, Date, wstatus) %>% filter(wstatus=="EMP" | wstatus=="NEMP") %>% mutate(wstatus=recode(wstatus, `EMP`="Employed", `NEMP`="Not employed"))

write.csv(deprivation.map.facet, "deprivation.map.facet.csv")

#Severe material deprivation rate by age and sex [ILC_MDDD11__custom_1159386]

severe.deprivation.df <- read.csv2("ilc_mddd11__custom_509358_20210814_145753.sdmx.csv", header=TRUE, sep=",")

severe.deprivation.map <- severe.deprivation.df %>%  select(age, sex, geo, TIME_PERIOD, OBS_VALUE) %>% mutate(severe_deprivation_rate=as.double(OBS_VALUE)) %>% rename(year=TIME_PERIOD) %>% mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>% filter(year >= year_begin & year <= year_end & sex=="T") %>% select(year, geo, severe_deprivation_rate, Date)

complete.uab <- left_join(complete.uab, severe.deprivation.map, by=c("geo", "year", "Date"))

#Population living in a dwelling with a leaking roof, damp walls, floors or foundation or rot in window frames of floor by poverty status [SDG_01_60__custom_1159443]

dwelling.df <- read.csv2("estat_sdg_01_60_en.csv", header = TRUE, sep=",")

dwelling.map <- dwelling.df %>%  select(sex, age, geo, incgrp, TIME_PERIOD, OBS_VALUE) %>% mutate(poor_dwelling=as.double(OBS_VALUE)) %>% rename(year=TIME_PERIOD) %>% mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>% filter(year >= year_begin & year <= year_end & incgrp=="TOTAL") %>% select(year, geo, poor_dwelling, Date)
```

```
complete.uab <- left_join(complete.uab, dwelling.map, by=c("geo", "year", "Date"))

#Population having neither a bath, nor a shower, nor indoor flushing toilet in their household by poverty status [SDG_06_10__custom_1159500]

nobath.df <- read.csv2("estat_sdg_06_10_en.csv", header=TRUE, sep=",")

nobath.map <- nobath.df %>%  select(sex, age, geo, incgrp, TIME_PERIOD, OBS_VALUE) %>% mutate(rate_nobath=as.double(OBS_VALUE)) %>% rename(year=TIME_PERIOD) %>% mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>% filter(year >= year_begin & year <= year_end & incgrp=="TOTAL") %>% select(year, geo, rate_nobath, Date)

complete.uab <- left_join(complete.uab, nobath.map, by=c("geo", "year", "Date"))

#Population unable to keep home adequately warm by poverty status [SDG_07_60__custom_1159541]

warmhome.df <- read.csv2("estat_sdg_07_60_en.csv", header=TRUE, sep=",")

warmhome.map <- warmhome.df %>%  select(geo, TIME_PERIOD, OBS_VALUE, incgrp) %>% mutate(rate_nowarm_home=as.double(OBS_VALUE)) %>% rename(year=TIME_PERIOD) %>% mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>% filter(year >= year_begin & year <= year_end & incgrp=="TOTAL") %>% select(year, geo, rate_nowarm_home, Date)

complete.uab <- left_join(complete.uab, warmhome.map, by=c("geo", "year", "Date"))

#Self-reported unmet needs for medical examination by sex, age, main reason declared and educational attainment level [HLTH_SILC_14__custom_1160249]

unmet.medical.df <- read.csv2("hlth_silc_14__custom_1215606_20210814_172510.sdmx.csv", header=TRUE, sep=",")

unmet.medical.map <- unmet.medical.df %>%  select(age, sex, reason, geo, TIME_PERIOD, OBS_VALUE) %>% mutate(rate_unmet_medical=as.double(OBS_VALUE)) %>% rename(year=TIME_PERIOD) %>% mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>% filter(year >= year_begin & year <= year_end & reason=="TOOEFW") %>% select(year, geo,
```

```
rate_unmet_medical, Date) complete.uab <- left_join(complete.uab, unmet.medical.map,
by=c("geo", "year", "Date"))


#Third country nationals refused entry at the external borders - annual data (rounded)
[MIGR_EIRFS__custom_1160401]


refused.entry.df <- read.csv2("migr_eirfs__custom_1228517_20210820_102215.sdmx.csv",
header = TRUE, sep=",")


refused.entry.map <- refused.entry.df %>% select(geo, indic_mg, TIME_PERIOD,
OBS_VALUE, reason) %>% rename(total_refused=OBS_VALUE, year=TIME_PERIOD) %>%
mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>% filter(year >= year_begin & year <=
year_end) %>% select(year, geo, total_refused, Date, indic_mg, reason) %>%
filter(indic_mg=="TOT_REF"& reason=="TOTAL")


complete.uab <- left_join(complete.uab, refused.entry.map, by=c("geo", "year", "Date"))


#First permits by reason, length of validity and citizenship
[MIGR_RESFIRST__custom_1160551]


length.permit.df <-
read.csv2("migr_resfirst__custom_506015_20210820_105130.sdmx.csv", header=TRUE,
sep=",")


length.permit.map <- length.permit.df %>% select(geo, OBS_VALUE, TIME_PERIOD, reason,
duration) %>% rename(total_permit=OBS_VALUE, year=TIME_PERIOD) %>%
mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>% filter(year >= year_begin & year <=
year_end & reason=="TOTAL") %>% select(year, geo, total_permit, duration, Date) %>%
filter(duration=="TOTAL")


complete.uab <- left_join(complete.uab, length.permit.map, by=c("geo", "year", "Date"))


#Corruption Perceptions Index (source: Transparency International)
[SDG_16_50__custom_1162162]


corruption.df <- read.csv2("estat_sdg_16_50_en.csv", header = TRUE, sep=",")


corruption.map <- corruption.df %>%  select(geo, OBS_VALUE, TIME_PERIOD) %>%
rename(year=TIME_PERIOD, perceived_corruption=OBS_VALUE) %>%
```

```
mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>% filter(year >= year_begin & year <= year_end) %>% select(year, geo, perceived_corruption, Date)

complete.uab <- left_join(complete.uab, corruption.map, by=c("geo", "year", "Date"))

write.csv(complete.uab, "complete.uab.csv")

#__Line Graph Cleaning__

# Unemployment Rate is reported in monthly format, thus a unique df is created

### Unemployment rate

unemployment.df <- read.csv("une_rt_m__custom_1180986_20210729_154238.sdmx.csv", header=TRUE, sep =",")

unemployment.clean <- unemployment.df %>%  select(geo, TIME_PERIOD, OBS_VALUE, age, sex, s_adj, unit) %>% rename(month=TIME_PERIOD, unemployment_rate=OBS_VALUE) %>% mutate(Date=as.Date(paste(month,1, sep="-"))) %>% mutate(geo = recode(geo, `AT` = "Austria",`BE` = "Belgium", `BG`= "Bulgaria", `CH` = "Switzerland", `CY`= "Cyprus", `CZ` = "Czech Republic", `DE` = "Germany", `DK` = "Denmark", `EE` = "Estonia", `EL` = "Greece", `ES`= "Spain", `FI`= "Finland", `FR`= "France", `HR`= "Croatia",`HU`= "Hungary", `IE` = "Ireland", `IS`= "Iceland", `IT` = "Italy", `LT`= "Lithuania", `LU`= "Luxembourg", `LV`="Latvia", `ME`= "Montenegro", `MK`= "North Macedonia", `MT`= "Malta", `NL`= "Netherlands", `NO` = "Norway", `PL`= "Poland", `PT`= "Portugal", `RO` = "Romania", `RS` = "Serbia", `SE`= "Sweden", `SI`= "Slovenia", `SK`= "Slovakia", `TR`= "Turkey", `UK`= "UK")) %>% filter(unit=="PC_ACT" & s_adj=="SA") %>% filter(sex=="F" | sex=="M") %>% select(geo, month, Date, unemployment_rate, age, sex) %>% mutate(age =recode(age, `Y_LT25` = " Younger than 25 years of age", `Y25-74` = "25 to 74 years of age")) %>% mutate(sex = recode(sex, `F` = "Female", `M` = "Male"))

# Date Format is due to monthly time dimensions different

write.csv(unemployment.clean, "unemployment.clean.csv")

# Divide the data by sex(female and male) and by age(below 25 and 25 to 74 yrs, respectively)

# Differentiate the data by sex
```

```
unemployment_female <- unemployment.clean %>%  filter(sex=="Female") %>%
rename(unemployment_rate=unemployment_rate) %>% select(geo, month, Date,
unemployment_rate, age, sex) %>% mutate(age =recode(age, `Y_LT25` = "Younger than 25
years of age", `Y25-74` = "25 to 74 years of age"))

unemployment_male <- unemployment.clean %>%  filter(sex=="Male") %>%
rename(unemployment_rate=unemployment_rate) %>% select(geo, month, Date,
unemployment_rate, age, sex) %>% mutate(age =recode(age, `Y_LT25` = " Younger than 25
years of age", `Y25-74` = "25 to 74 years of age"))

# Creating age groups below 25 and 25 til 74 differentiated by sex

unemplyoment_female_L25 <- unemployment.clean %>%  filter(age=="Younger than 25
years of age" & sex=="Female") %>%
rename(unemployment_rate_f_l25=unemployment_rate) %>% select(geo, month, Date,
unemployment_rate_f_l25)

unemplyoment_female_2574 <- unemployment.clean %>%  filter(age=="25 to 74 years of
age" & sex=="Female") %>%  rename(unemployment_rate_f_2574=unemployment_rate)
%>% select(geo, month, Date, unemployment_rate_f_2574)

unemplyoment_male_L25 <- unemployment.clean %>%  filter(age==" Younger than 25
years of age" & sex=="Male") %>%
rename(unemployment_rate_m_l25=unemployment_rate) %>% select(geo, month, Date,
unemployment_rate_m_l25)

unemplyoment_male_2574 <- unemployment.clean %>%  filter(age=="25 to 74 years of
age" & sex=="Male") %>%  rename(unemployment_rate_m_2574=unemployment_rate)
%>% select(geo, month, Date, unemployment_rate_m_2574)

unemployment_over_years <- full_join(unemplyoment_female_L25,
unemplyoment_female_2574, by= c("geo", "Date"))

unemployment_over_years <- full_join(unemployment_over_years,
unemplyoment_male_L25, by= c("geo", "Date"))

unemployment_over_years <- full_join(unemployment_over_years,
unemplyoment_male_2574, by= c("geo", "Date"))

### Severe material deprivation rate by age and sex [ILC_MDDD11__custom_1159386]
```

```
severe.deprivation.df <-
read.csv2("ilc_mddd11__custom_509358_20210814_145753.sdmx.csv", header=TRUE,
sep=",")


severe.deprivation.clean <- severe.deprivation.df %>%  select(age, sex, geo, TIME_PERIOD,
OBS_VALUE) %>%  mutate(deprivation_rate=as.double(OBS_VALUE)) %>%
rename(year=TIME_PERIOD) %>% mutate(geo = recode(geo, `AT` = "Austria",`BE` =
"Belgium", `BG`= "Bulgaria", `CH` = "Switzerland", `CY`= "Cyprus", `CZ` = "Czech Republic",
`DE` = "Germany", `DK` = "Denmark", `EE` = "Estonia", `EL` = "Greece", `ES`= "Spain", `FI`=
"Finland", `FR`= "France", `HR`= "Croatia",`HU`= "Hungary", `IE` = "Ireland", `IS`= "Iceland",
`IT` = "Italy", `LT`= "Lithuania", `LU`= "Luxembourg", `LV`="Latvia", `ME`= "Montenegro",
`MK`= "North Macedonia", `MT`= "Malta", `NL`= "Netherlands", `NO` = "Norway", `PL`=
"Poland", `PT`= "Portugal", `RO` = "Romania", `RS` = "Serbia", `SE`= "Sweden", `SI`=
"Slovenia", `SK`= "Slovakia", `TR`= "Turkey", `UK`= "UK")) %>%
mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>% filter(year >= year_begin & year <=
year_end & sex=="T") %>% select(year, geo, deprivation_rate, Date)


write.csv(severe.deprivation.clean, "severe.deprivation.clean.csv")


### Population living in a dwelling with a leaking roof, damp walls, floors or foundation or
rot in window frames of floor by poverty status [SDG_01_60__custom_1159443]


dwelling.df <- read.csv2("estat_sdg_01_60_en.csv", header = TRUE, sep=",")


dwelling.clean <- dwelling.df %>%  select(sex, age, geo, incgrp, TIME_PERIOD, OBS_VALUE)
%>% mutate(poor_dwelling=as.double(OBS_VALUE)) %>% rename(year=TIME_PERIOD)
%>% mutate(geo = recode(geo, `AT` = "Austria",`BE` = "Belgium", `BG`= "Bulgaria", `CH` =
"Switzerland", `CY`= "Cyprus", `CZ` = "Czech Republic", `DE` = "Germany", `DK` = "Denmark",
`EE` = "Estonia", `EL` = "Greece", `ES`= "Spain", `FI`= "Finland", `FR`= "France", `HR`=
"Croatia",`HU`= "Hungary", `IE` = "Ireland", `IS`= "Iceland", `IT` = "Italy", `LT`= "Lithuania",
`LU`= "Luxembourg", `LV`="Latvia", `ME`= "Montenegro", `MK`= "North Macedonia", `MT`=
"Malta", `NL`= "Netherlands", `NO` = "Norway", `PL`= "Poland", `PT`= "Portugal", `RO` =
"Romania", `RS` = "Serbia", `SE`= "Sweden", `SI`= "Slovenia", `SK`= "Slovakia", `TR`=
"Turkey", `UK`= "UK")) %>% mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>%
filter(year >= year_begin & year <= year_end & incgrp=="TOTAL") %>% select(year, geo,
poor_dwelling, Date)


write.csv(dwelling.clean, "dwelling.clean.csv")


### Population having neither a bath, nor a shower, nor indoor flushing toilet in their
household by poverty status [SDG_06_10__custom_1159500]
```

```
nobath.df <- read.csv2("estat_sdg_06_10_en.csv", header=TRUE, sep=",")


nobath.clean <- nobath.df %>%  select(sex, age, geo, incgrp, TIME_PERIOD, OBS_VALUE)
%>% mutate(rate_nobath=as.double(OBS_VALUE)) %>% rename(year=TIME_PERIOD)
%>% mutate(geo = recode(geo, `AT` = "Austria",`BE` = "Belgium", `BG`= "Bulgaria", `CH` =
"Switzerland", `CY`= "Cyprus", `CZ` = "Czech Republic", `DE` = "Germany", `DK` = "Denmark",
`EE` = "Estonia", `EL` = "Greece", `ES`= "Spain", `FI`= "Finland", `FR`= "France", `HR`=
"Croatia",`HU`= "Hungary", `IE` = "Ireland", `IS`= "Iceland", `IT` = "Italy", `LT`= "Lithuania",
`LU`= "Luxembourg", `LV`="Latvia", `ME`= "Montenegro", `MK`= "North Macedonia", `MT`=
"Malta", `NL`= "Netherlands", `NO` = "Norway", `PL`= "Poland", `PT`= "Portugal", `RO` =
"Romania", `RS` = "Serbia", `SE`= "Sweden", `SI`= "Slovenia", `SK`= "Slovakia", `TR`=
"Turkey", `UK`= "UK")) %>% mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>%
filter(year >= year_begin & year <= year_end & incgrp=="TOTAL") %>% select(year, geo,
rate_nobath, Date)


write.csv(nobath.clean, "nobath.clean.csv")


### Population unable to keep home adequately warm by poverty status
[SDG_07_60__custom_1159541]


warmhome.df <- read.csv2("estat_sdg_07_60_en.csv", header=TRUE, sep=",")


warmhome.clean <- warmhome.df %>%  select(geo, TIME_PERIOD, OBS_VALUE, incgrp)
%>% mutate(rate_nowarm_home=as.double(OBS_VALUE)) %>%
rename(year=TIME_PERIOD) %>% mutate(geo = recode(geo, `AT` = "Austria",`BE` =
"Belgium", `BG`= "Bulgaria", `CH` = "Switzerland", `CY`= "Cyprus", `CZ` = "Czech Republic",
`DE` = "Germany", `DK` = "Denmark", `EE` = "Estonia", `EL` = "Greece", `ES`= "Spain", `FI`=
"Finland", `FR`= "France", `HR`= "Croatia",`HU`= "Hungary", `IE` = "Ireland", `IS`= "Iceland",
`IT` = "Italy", `LT`= "Lithuania", `LU`= "Luxembourg", `LV`="Latvia", `ME`= "Montenegro",
`MK`= "North Macedonia", `MT`= "Malta", `NL`= "Netherlands", `NO` = "Norway", `PL`=
"Poland", `PT`= "Portugal", `RO` = "Romania", `RS` = "Serbia", `SE`= "Sweden", `SI`=
"Slovenia", `SK`= "Slovakia", `TR`= "Turkey", `UK`= "UK")) %>%
mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>% filter(year >= year_begin & year <=
year_end & incgrp=="TOTAL") %>% select(year, geo, rate_nowarm_home, Date)


write.csv(warmhome.clean, "warmhome.clean.csv")


### Self-reported unmet needs for medical examination by sex, age, main reason declared
and educational attainment level [HLTH_SILC_14__custom_1160249]
```

```
unmet.medical.df <-
read.csv2("hlth_silc_14__custom_1215606_20210814_172510.sdmx.csv", header=TRUE,
sep=",")


unmet.medical.clean <- unmet.medical.df %>%  select(age, sex, reason, geo, TIME_PERIOD,
OBS_VALUE) %>% mutate(rate_unmet_medical=as.double(OBS_VALUE)) %>%
rename(year=TIME_PERIOD) %>% mutate(geo = recode(geo, `AT` = "Austria",`BE` =
"Belgium", `BG`= "Bulgaria", `CH` = "Switzerland", `CY`= "Cyprus", `CZ` = "Czech Republic",
`DE` = "Germany", `DK` = "Denmark", `EE` = "Estonia", `EL` = "Greece", `ES`= "Spain", `FI`=
"Finland", `FR`= "France", `HR`= "Croatia",`HU`= "Hungary", `IE` = "Ireland", `IS`= "Iceland",
`IT` = "Italy", `LT`= "Lithuania", `LU`= "Luxembourg", `LV`="Latvia", `ME`= "Montenegro",
`MK`= "North Macedonia", `MT`= "Malta", `NL`= "Netherlands", `NO` = "Norway", `PL`=
"Poland", `PT`= "Portugal", `RO` = "Romania", `RS` = "Serbia", `SE`= "Sweden", `SI`=
"Slovenia", `SK`= "Slovakia", `TR`= "Turkey", `UK`= "UK")) %>%
mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>% filter(year >= year_begin & year <=
year_end & reason=="TOOEFW") %>% select(year, geo, rate_unmet_medical, Date)


write.csv(unmet.medical.clean, "unmet.medical.clean.csv")


### Self-perceived health by sex, age and educational attainment level
[HLTH_SILC_02__custom_1160278]


selfperceived_health.df <- read.csv2("estat_hlth_silc_02$dv_381_en.csv", header=TRUE,
sep=",")


selfperceived_health.clean <- selfperceived_health.df %>%  select(levels, geo,
TIME_PERIOD, OBS_VALUE) %>%
mutate(percentage_perceived_health=as.double(OBS_VALUE)) %>%
rename(year=TIME_PERIOD) %>% mutate(geo = recode(geo, `AT` = "Austria",`BE` =
"Belgium", `BG`= "Bulgaria", `CH` = "Switzerland", `CY`= "Cyprus", `CZ` = "Czech Republic",
`DE` = "Germany", `DK` = "Denmark", `EE` = "Estonia", `EL` = "Greece", `ES`= "Spain", `FI`=
"Finland", `FR`= "France", `HR`= "Croatia",`HU`= "Hungary", `IE` = "Ireland", `IS`= "Iceland",
`IT` = "Italy", `LT`= "Lithuania", `LU`= "Luxembourg", `LV`="Latvia", `ME`= "Montenegro",
`MK`= "North Macedonia", `MT`= "Malta", `NL`= "Netherlands", `NO` = "Norway", `PL`=
"Poland", `PT`= "Portugal", `RO` = "Romania", `RS` = "Serbia", `SE`= "Sweden", `SI`=
"Slovenia", `SK`= "Slovakia", `TR`= "Turkey", `UK`= "UK")) %>%
mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>% filter(year >= year_begin & year <=
year_end) %>% select(year, geo, percentage_perceived_health, levels, Date)


selfperceived_health.levelbad <- selfperceived_health.clean %>% filter(levels=="B_VB")


write.csv(selfperceived_health.levelbad, "selfperceived_health.levelbad.csv")
```

```
selfperceived_health.fair <- selfperceived_health.clean %>% filter(levels=="FAIR")

write.csv(selfperceived_health.fair, "selfperceived_health.fair.csv")

selfperceived_health.levelgood <- selfperceived_health.clean %>% filter(levels=="VG_G")

write.csv(selfperceived_health.levelgood, "selfperceived_health.levelgood.csv")

### Third country nationals refused entry at the external borders - way of entry

refused.entry.df <- read.csv2("migr_eirfs__custom_1228517_20210820_102215.sdmx.csv",
header = TRUE, sep=",")

refused.entry.clean <- refused.entry.df %>% select(geo, indic_mg, TIME_PERIOD,
OBS_VALUE, reason) %>% rename(total_refused=OBS_VALUE, year=TIME_PERIOD) %>%
mutate(geo = recode(geo, `AT` = "Austria",`BE` = "Belgium", `BG`= "Bulgaria", `CH` =
"Switzerland", `CY`= "Cyprus", `CZ` = "Czech Republic", `DE` = "Germany", `DK` = "Denmark",
`EE` = "Estonia", `EL` = "Greece", `ES`= "Spain", `FI`= "Finland", `FR`= "France", `HR`=
"Croatia",`HU`= "Hungary", `IE` = "Ireland", `IS`= "Iceland", `IT` = "Italy", `LT`= "Lithuania",
`LU`= "Luxembourg", `LV`="Latvia", `ME`= "Montenegro", `MK`= "North Macedonia", `MT`=
"Malta", `NL`= "Netherlands", `NO` = "Norway", `PL`= "Poland", `PT`= "Portugal", `RO` =
"Romania", `RS` = "Serbia", `SE`= "Sweden", `SI`= "Slovenia", `SK`= "Slovakia", `TR`=
"Turkey", `UK`= "UK")) %>% mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>%
filter(year >= year_begin & year <= year_end) %>% select(year, geo, total_refused, Date,
indic_mg, reason)

refused.entry.total <- refused.entry.clean %>% filter(indic_mg=="TOT_REF"&
reason=="TOTAL")

write.csv(refused.entry.total, "refused.entry.total.csv")

refused.entry.land <- refused.entry.clean %>% filter(indic_mg=="REF_LAND" &
reason=="TOTAL")

write.csv(refused.entry.land, "refused.entry.land.csv")

refused.entry.sea <- refused.entry.clean %>% filter(indic_mg=="REF_SEA"&
reason=="TOTAL")
```

```
write.csv(refused.entry.sea, "refused.entry.sea.csv")

refused.entry.air <- refused.entry.clean %>% filter(indic_mg=="REF_AIR"&
reason=="TOTAL")

write.csv(refused.entry.air, "refused.entry.air.csv")

### Third country nationals refused entry at the external borders - reason

refused.entry.nonvalid <- refused.entry.clean %>% filter(reason=="NRP_NVV" &
indic_mg=="TOT_REF")

write.csv(refused.entry.nonvalid, "refused.entry.nonvalid.csv")

refused.entry.false <- refused.entry.clean %>% filter(reason=="FV_FRP" &
indic_mg=="TOT_REF")

write.csv(refused.entry.false, "refused.entry.false.csv")

refused.entry.notjustified <- refused.entry.clean %>% filter(reason=="STAY_NJ" &
indic_mg=="TOT_REF")

write.csv(refused.entry.notjustified, "refused.entry.notjustified.csv")

refused.entry.overstayed <- refused.entry.clean %>% filter(reason=="PERM_3" &
indic_mg=="TOT_REF")

write.csv(refused.entry.overstayed, "refused.entry.overstayed.csv")

### First permits by reason, length of validity and citizenship
[MIGR_RESFIRST__custom_1160551]

length.permit.df <-
read.csv2("migr_resfirst__custom_506015_20210820_105130.sdmx.csv", header=TRUE,
sep=",")

length.permit.clean <- length.permit.df %>% select(geo, OBS_VALUE, TIME_PERIOD, reason,
duration) %>% rename(total_permit=OBS_VALUE, year=TIME_PERIOD) %>% mutate(geo
```

```
= recode(geo, `AT` = "Austria",`BE` = "Belgium", `BG`= "Bulgaria", `CH` = "Switzerland", `CY`= "Cyprus", `CZ` = "Czech Republic", `DE` = "Germany", `DK` = "Denmark", `EE` = "Estonia", `EL` = "Greece", `ES`= "Spain", `FI`= "Finland", `FR`= "France", `HR`= "Croatia",`HU`= "Hungary", `IE` = "Ireland", `IS`= "Iceland", `IT` = "Italy", `LT`= "Lithuania", `LU`= "Luxembourg", `LV`="Latvia", `ME`= "Montenegro", `MK`= "North Macedonia", `MT`= "Malta", `NL`= "Netherlands", `NO` = "Norway", `PL`= "Poland", `PT`= "Portugal", `RO` = "Romania", `RS` = "Serbia", `SE`= "Sweden", `SI`= "Slovenia", `SK`= "Slovakia", `TR`= "Turkey", `UK`= "UK")) %>% mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>% filter(year >= year_begin & year <= year_end & reason=="TOTAL") %>%  select(year, geo, total_permit, duration, Date)

length.permit.total <- length.permit.clean %>% filter(duration=="TOTAL")

write.csv(length.permit.total, "length.permit.total.csv")

length.permit.3to5 <- length.permit.clean %>% filter(duration=="M3-5")

write.csv(length.permit.3to5, "length.permit.3to5.csv")

length.permit.6to11 <- length.permit.clean %>% filter(duration=="M6-11")

write.csv(length.permit.6to11, "length.permit.6to11.csv")

length.permit.over12 <- length.permit.clean %>% filter(duration=="M_GE12")

write.csv(length.permit.over12, "length.permit.over12.csv")

### Perceived independence of the justice system (source: DG COMM) [SDG_16_40__custom_1162098]

independence.justice.df <- read.csv2("estat_sdg_16_40_en.csv", header=TRUE, sep=",")

independence.justice.clean <- independence.justice.df %>%  select(geo, OBS_VALUE, TIME_PERIOD, lev_perc) %>% rename(year=TIME_PERIOD, perceived_justice=OBS_VALUE) %>% mutate(geo = recode(geo, `AT` = "Austria",`BE` = "Belgium", `BG`= "Bulgaria", `CH` = "Switzerland", `CY`= "Cyprus", `CZ` = "Czech Republic", `DE` = "Germany", `DK` = "Denmark", `EE` = "Estonia", `EL` = "Greece", `ES`= "Spain", `FI`= "Finland", `FR`= "France", `HR`= "Croatia",`HU`= "Hungary", `IE` = "Ireland", `IS`= "Iceland", `IT` = "Italy", `LT`= "Lithuania", `LU`= "Luxembourg", `LV`="Latvia", `ME`= "Montenegro", `MK`= "North Macedonia", `MT`= "Malta", `NL`= "Netherlands", `NO` = "Norway", `PL`=
```

```
"Poland", `PT`= "Portugal", `RO` = "Romania", `RS` = "Serbia", `SE`= "Sweden", `SI`=
"Slovenia", `SK`= "Slovakia", `TR`= "Turkey", `UK`= "UK")) %>%
mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>% filter(year >= year_begin & year <=
year_end) %>% select(year, geo, perceived_justice, Date, lev_perc)


independence.justice.verygood <- independence.justice.clean %>%
filter(lev_perc=="VG_FG")


write.csv(independence.justice.verygood, "independence.justice.verygood.csv")


independence.justice.verybad <- independence.justice.clean %>%
filter(lev_perc=="VB_FB")


write.csv(independence.justice.verybad, "independence.justice.verybad.csv")


### Corruption Perceptions Index (source: Transparency International)
[SDG_16_50__custom_1162162]


corruption.df <- read.csv2("estat_sdg_16_50_en.csv", header = TRUE, sep=",")


corruption.clean <- corruption.df %>%  select(geo, OBS_VALUE, TIME_PERIOD) %>%
rename(year=TIME_PERIOD, perceived_corruption=OBS_VALUE) %>%  mutate(geo =
recode(geo, `AT` = "Austria",`BE` = "Belgium", `BG`= "Bulgaria", `CH` = "Switzerland", `CY`=
"Cyprus", `CZ` = "Czech Republic", `DE` = "Germany", `DK` = "Denmark", `EE` = "Estonia",
`EL` = "Greece", `ES`= "Spain", `FI`= "Finland", `FR`= "France", `HR`= "Croatia",`HU`=
"Hungary", `IE` = "Ireland", `IS`= "Iceland", `IT` = "Italy", `LT`= "Lithuania", `LU`=
"Luxembourg", `LV`="Latvia", `ME`= "Montenegro", `MK`= "North Macedonia", `MT`=
"Malta", `NL`= "Netherlands", `NO` = "Norway", `PL`= "Poland", `PT`= "Portugal", `RO` =
"Romania", `RS` = "Serbia", `SE`= "Sweden", `SI`= "Slovenia", `SK`= "Slovakia", `TR`=
"Turkey", `UK`= "UK")) %>% mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>%
filter(year >= year_begin & year <= year_end) %>% select(year, geo, perceived_corruption,
Date)


write.csv(corruption.clean, "corruption.clean.csv")


### Recorded offences by offence category - police data
[CRIM_OFF_CAT__custom_1162255]


offences.df <- read.csv2("crim_off_cat__custom_1245041_20210827_142611.sdmx.csv",
header=TRUE, sep=",")
```

```
offences.clean <- offences.df %>% select(iccs, unit, geo, TIME_PERIOD, OBS_VALUE) %>%
rename(year=TIME_PERIOD) %>%  mutate(total_offences=as.double(OBS_VALUE)) %>%
mutate(geo = recode(geo, `AT` = "Austria",`BE` = "Belgium", `BG`= "Bulgaria", `CH` =
"Switzerland", `CY`= "Cyprus", `CZ` = "Czech Republic", `DE` = "Germany", `DK` = "Denmark",
`EE` = "Estonia", `EL` = "Greece", `ES`= "Spain", `FI`= "Finland", `FR`= "France", `HR`=
"Croatia",`HU`= "Hungary", `IE` = "Ireland", `IS`= "Iceland", `IT` = "Italy", `LT`= "Lithuania",
`LU`= "Luxembourg", `LV`="Latvia", `ME`= "Montenegro", `MK`= "North Macedonia", `MT`=
"Malta", `NL`= "Netherlands", `NO` = "Norway", `PL`= "Poland", `PT`= "Portugal", `RO` =
"Romania", `RS` = "Serbia", `SE`= "Sweden", `SI`= "Slovenia", `SK`= "Slovakia", `TR`=
"Turkey", `UK`= "UK")) %>%  mutate(Date=as.Date(paste(year,1,1, sep="-"))) %>%
filter(year >= year_begin & year <= year_end) %>% filter(unit=="P_HTHAB") %>%
select(geo, year, Date, total_offences, iccs)

#Homicide

offences.homicide <- offences.clean %>%  filter(iccs=="ICCS0101")

write.csv(offences.homicide, "offences.homicide.csv")

#Drugs

offences.drugs <- offences.clean %>%  filter(iccs=="ICCS0601")

write.csv(offences.drugs, "offences.drugs.csv")

#Sexual violence

offences.sexualviolence <- offences.clean %>%  filter(iccs=="ICCS0301")

offences.sexualaussault <- offences.clean %>%  filter(iccs=="ICCS03012")

offences.rape <- offences.clean %>%  filter(iccs=="ICCS03011")

sexual.violence <- left_join(offences.sexualviolence, offences.rape, by= c("geo", "year",
"Date"))

sexual.violence <- left_join(sexual.violence, offences.sexualaussault, by= c("geo", "year",
"Date")) %>% select(geo, year, Date, total_offences.x, total_offences.y, total_offences) %>%
```

```
mutate(total_commited=(total_offences.x + total_offences.y + total_offences)) %>%
select(geo, year, Date, total_commited)

write.csv(sexual.violence, "sexual.violence.csv")

# Theft

offences.robbery <- offences.clean %>%  filter(iccs=="ICCS0401")

offences.theft <- offences.clean %>%  filter(iccs=="ICCS0502")

offences.buglary<- offences.clean %>%  filter(iccs=="ICCS0501")

theft.all <- left_join(offences.robbery, offences.theft, by=c("geo", "year", "Date"))

theft.all <- left_join(theft.all, offences.buglary, by=c("geo", "year", "Date")) %>% select(geo,
year, Date, total_offences.x, total_offences.y, total_offences) %>%
mutate(total_commited=(total_offences.x + total_offences.y + total_offences)) %>%
select(geo, year, Date, total_commited)

write.csv(theft.all, "theft.all.csv")
```

Generating the report (R Markdown in R)

```
---

title: "**Overview report on relevant socio-economic indicators in EU Member States**"

#author: "Colleen Boland (UAB), Daniel Morente Gonzalez (UAB), Tobias Heidland (IfW),
Finja Krüger (IfW)"

date: "`r format(Sys.time(), '%d %B %Y')`"

output:

  word_document:
```

```
    toc: yes
    number_sections: true
    fig_caption: yes
  html_document:
    toc: yes
    number_sections: true
    fig_caption: yes
  pdf_document:
    toc: yes
    number_sections: true
    fig_caption: yes
header-includes:
  \usepackage{float}
  \floatplacement{figure}{H}
bibliography: references.bib
csl: harvard.csl
link-citations: true
linkcolor: blue
```

```
fontsize: 12pt

mainfont: Cambria

sansfont: Cambria

monofont: Cambria

linestretch: 1.5

---

```{r setup, include=FALSE}

knitr::opts_chunk$set(fig.align = 'center', out.width = '80%', echo = FALSE, message = FALSE, warning=FALSE)

#knitr::opts_knit$set(root.dir= "/Users/finja//Dropbox (MEDAM)/H2020 - ITFLOWS/Research/WP4/WP4.2/Markdown/Script und Datensaetze")

#echo --> No code included

#fig.align--> align all figures in the center of the report.

#out.width--> output width of all figures are 80%.

```

```{r data, message = FALSE, warning=FALSE}

#will not show warning etc.

library(dplyr)

library(tidyverse)
```
```

```
library(scales)

library(ggplot2)

library(maps)

library(RColorBrewer)

library(tmap)

library(readr)

library(readxl)

library(sf)

library(eurostat)

library(scales)

library(cowplot)

year_filter <- 2019 #change the year of interest here! Changing the year here will

#also automatically change the year in the title of graphs, as well as restrict

#our data set to the year of interest

year_begin <- (year_filter - 10)

year_5 <- (year_filter - 4)

year_special<-2018

#get the geometry data for plotting
```

```
geoeuro <- get_eurostat_geospatial(output_class = "sf",

                          resolution = "60",

                          nuts_level = 0,

                          year = 2016)   %>%

 st_crop(map, xmin = -25, xmax = 45, ymin = 30, ymax = 70) %>%

 st_transform(crs = "+proj=moll")

#Loading the median income data set into the environment (facet)

income.facet.young <- read.csv("income.facet.young.csv")

facet.income.young <- left_join(geoeuro, income.facet.young) %>% filter(year %in%
year_filter) #filter for the year of interest

#Loading the data set for Risk of poverty indicator (facet)

povertyrisk <- read.csv("poverty.facet.csv")

facet.poverty <- left_join(geoeuro, povertyrisk) %>% filter(year %in% year_filter) #filter
for the year of interest

#Loading Data complete set

data_complete <- read_csv("data.complete.csv")

data_world <- left_join(geoeuro, data_complete, by="geo")

data_world <- data_world %>%

 mutate(gini=as.double(gini)) %>%
```

```
  mutate(social_expenditure=as.double(social_expenditure)) %>%

  mutate(pension_expenditure=as.double(pension_expenditure)) %>%

  mutate(income_all_age=as.double(income_all_age)) # converts variables back to doubles

#something converts them to chr when uploaded in markdown, will solve later, just converted them quickly this ways

data_world_year <- data_world %>%  filter(year %in% year_filter) # filter for the year of interest

data_world_18 <- data_world %>% filter(year %in% year_special) #special case for social expenditure since the data for 2019

#has not been reported at creation of the file (check if can be deleted later)

#creating average medain income of the 10 EU countries with the lowest medain income in EUR

country_eu <- c("BE", "BG", "DK", "CZ", "DE", "EE", "IE", "FI", "FR", "EL", "IT", "HR", "LT", "LV", "LU", "MT", "NL", "AT", "PL", "PT", "RO", "SE", "SK", "SI", "ES", "HU", "CY")

#Country Filter for countries of Interest

country_filter <- c("Netherlands", "Poland", "Germany", "Greece", "Spain", "Italy","Sweden", "France") #change countries to plot in line graph here

#corresponding manual color scheme

color_sheme <- c("#001378", "#66bc29", "#839EE0", "#554DD8", "#d95f0e", "#FFB000", "#A67F00", "#A67F99") #manual color_sheme for the 8 countries above

#load the average migration data

average.plot <- read.csv("average.plot.csv", header=TRUE, sep=",") %>%
mutate(date=as.Date(date))
```

```
#filter only for asylum applications and immigration

average.plot.immigration <- average.plot %>% filter(variable=="total_immigration")

average.plot.asylum <- average.plot %>%  filter(variable=="total_asylum")

#Loading the data set for share of first-time asylum applications by age group (facet)

asylum <- read.csv("facet.asylum.csv", header=TRUE, sep=",")

facet.asylum<-left_join(geoeuro, asylum) %>% filter(year %in% year_filter)

#Loading the data set for Share of third-country nationals found to be illegally present by
age group (facet)

illegal <- read.csv("illegal.facet.csv", header=TRUE, sep=",")

facet.illegal <- left_join(geoeuro, illegal) %>%  filter(year %in% year_filter)

#Loading data for Employment of Recent Graduates (Facet)

employment.graduates.facet<- read.csv("employment.graduates.facet.csv")

facet.graduates <- left_join(geoeuro, employment.graduates.facet) %>% filter(year %in%
year_filter)

#Loading the data set for Unemployment Rate by quarter (due to this own dataset)

unemployment.clean<- read.csv("unemployment.clean.csv", header=TRUE, sep= ",") %>%

  mutate(Date=as.Date(Date))

#Loading long-term unemployment data (Facet)

year_filter_quarter<-"2019-Q4"
```

```
unemployment.facet  <- read.csv("unemployment.facet.csv", header=TRUE, sep= ",")

facet.unemployment <- left_join(geoeuro, unemployment.facet)%>% filter(year %in%
year_filter_quarter)

#Loading the data set for Educational Attainment (Facet)

education.facet <- read.csv("education.facet.csv", header=TRUE, sep= ",")

facet.education <- left_join(geoeuro, education.facet) %>% filter(year %in% year_filter)

##########UAB#####

cmplete.uab <- read.csv("complete.uab.csv", header=TRUE, sep=",")

data_uab <- left_join(geoeuro, complete.uab)

data_year <- data_uab %>% filter(year %in% year_filter)

########### Variablen ################################

data_world_year_EU <-data_world_year %>% filter(geo %in% country_eu)

#calculating the average income of the poorest 10 EU members

income_low10 <-data_world_year_EU  %>% slice_min(income_all_age, n=10)  # get 10
lowest

average <-  mean(income_low10$income_all_age) #average

average <- round(average) #round it

average<-comma_format()(average)

#Max share of asylum seeker
```

```
asylum <-facet.asylum %>% filter(geo %in% country_eu)

max_asylum<-max(asylum$share_asylum)

max_asylum<-round(max_asylum, digits=2 )

#Average share of asylum seeker

avg_asylum<-mean(asylum$share_asylum)

avg_asylum<-round(avg_asylum, digits=2 )

#Total resettled

total_resettled<-sum(data_world_year_EU$total_resettled, na.rm=TRUE)

total_resettled<-comma_format()(total_resettled)

#Total asylum

total_asylum<-sum(data_world_year_EU$total_asylum, na.rm=TRUE)

total_asylum<-comma_format()(total_asylum)

#Employment immigrants

employ_immi<-mean(data_world_year_EU$percentage_employed, na.rm=TRUE)

employ_immi<-round(employ_immi, digits=0)

share_leave<-mean(data_world_year_EU$share_order_leave, na.rm=TRUE)

share_leave<-round(share_leave, digits=2 )

facet.illegal_EU<-facet.illegal%>% filter(geo %in% country_eu)
```

```
share_illegal<- mean(facet.illegal_EU$share_illegal, na.rm=TRUE)

share_illegal<-round(share_illegal, digits=2 )

```

Introduction

This report gives an overview of relevant EU Member States' economic and social situation, compiling indicators that can affect migration decisions, planned destinations, and integration trajectories after arrival. All data used in the report originates from the Eurostat database. We identified the database as the most suitable source of live data as it is regularly updated and presents the data in a standardized form that makes it comparable across countries. Furthermore, the Eurostat database provides wide geographic coverage and an extensive set of variables that cover the key economic and social indicators relevant to the context of migration decision-making and attitudes towards migration. The raw data for each chart can be downloaded from @eurostat_database_2021 using the link provided for the respective figure. This raw data is also integrated into the EUMigraTool and serves as an input to other work packages.

All figures use the most recently available information that is regularly updated from the Eurostat database by the EUMigraTool (EMT). While the text remains static, the graphs and core statistics (e.g., averages across the EU) cited in the text thus update automatically as new data become available. Specifically, an API automatically downloads new data when it comes available and feds it into the preprocessing process. Afterwards, the preprocessed data is fed into the code generating the report. Since the process is automatized, the updated report and its data will be available from the EMT website for as long as it exists. An example of the API, the code for the preprocessing of the data and the code generating the report can be found at the end of the deliverable.

The report does not follow a linear structure with an introduction and conclusion that tie together all the content. Instead, the report is meant to be read online as individual chapters to provide short overviews of the recent data to the interested reader. Furthermore, the report is purely descriptive and does not contain any causal analysis since that is not the aim of the electronic reports in the EUMigraTool. The electronic reports are meant to provide an overview of key statistics to the users of the EUMigraTool and include some links to the research literature to highlight the ways in which certain indicators matter for migration decisions or attitudes towards migration.

The report can be viewed in HTML format online or downloaded as a PDF.

```{r}

```

Immigration to Europe

Migration to Europe and the EU Member States is not a new phenomenon. Nevertheless, the number of immigrants has grown considerably in the last few years. While many migrants seek better job opportunities or education, an increasing share arrives in search of international protection. Regardless of the motive for migration, large numbers of people request a residence permit in an EU Member State. However, there is also a considerable share of individuals who tries to access the EU irregularly, whereby the channels of irregular migration depend on the destination countries' geographical location and other traits.

*This section characterises immigration trends to Europe in the last years. Given the salience of the topic, a particular focus is put on refugees. The section also provides an overview of the residence permits issued by EU Member States. Lastly, it gives insights into irregular migration. *

Figure \ref{fig:immigration} below depicts recent **immigration** in absolute terms (left panel) and relative to countries' population sizes (right panel) [@eurostat_immigration_2021; @eurostat_population_2021-2]. Currently, the most popular immigrant destination countries in Europe are Germany, Spain, Great Britain, and France. However, their figures are relatively low when compared to the countries' population size. In per capita terms, the top immigrant recipient countries are Luxemburg, Malta, Cyprus, Ireland, Switzerland, and Sweden. Shares tend to be higher in northern and central Europe, compared to the south and east. Interestingly, by 2021 neither Italy nor Greece were in the top ranks of either indicator, even though the public debates about immigration in Europe tended to focus on these two countries of first arrival. Note, however, that in both countries the immigration figures do not include asylum seekers. ^[Asylum seekers are included in the data on migration reported to Eurostat in: Belgium, Germany, Estonia, Greece, Spain, France, Italy, Cyprus, Luxembourg, the Netherlands, Austria, Portugal, the United Kingdom, Norway (only with residence permit), and Switzerland. They are excluded in: Belgium, the Czech Republic, Denmark, Ireland, Croatia, Latvia, Lithuania, Hungary, Malta, Poland, Romania, Slovenia, Slovakia, Finland, Sweden, Iceland, and Liechtenstein [@eurostat_international_2019].]

```{r immigration, fig.align = 'center', out.width = '100%', fig.cap = paste('Numbers of recent immigrants,', year_filter, sep=" " )}

w1<-tm_shape(data_world_year) +
```

```
  tm_polygons(col = "total_immigration", style="cont", palette= "YlGnBu", title="Total
number", legend.reverse = T) +

  tm_layout(frame = FALSE, legend.position = c(0.68, 0.5),

          legend.title.size = 0.8,

          legend.frame=F)

w2<-tm_shape(data_world_year) +

  tm_polygons(col = "percentage_immigration", style="cont", palette= "YlGnBu",
title="Percent of population", legend.reverse = T) +

  tm_layout(frame = FALSE, legend.position = c(0.68, 0.505),

          legend.title.size = 0.8,

          legend.frame=F)

current.mode <- tmap_mode("plot")

tmap_arrange(w1, w2, ncol=2, widths = c(1, 1))

tmap_mode(current.mode)

```

Compared to ten years ago, immigration to the EU has grown substantially. After a plunge in the aftermath of the financial crisis, the development has been rather steady, as illustrated by Figure \ref{fig:immigration_dev} [@eurostat_immigration_2021]. Immigrant numbers peaked in 2015 due to the arrival of unprecedented numbers of asylum seekers. In 2018, however, this maximum was surpassed again.

The maps in Figure \ref{fig:increase_immigration} illustrate country trends [@eurostat_immigration_2021]. By far the most significant increase of immigrants has been witnessed in Malta. In the rest of Europe, figures have grown at most four- to five-fold while most countries saw figures growing two- to three-fold. On the other hand, no change or a

decrease in immigration figures was recorded, for example, in Spain, Greece, and Italy over the past decade. Note that a different picture arises when considering asylum applications (Figure \ref{fig:increase_asylum}). When considering only the last five years, the pattern is very similar. There are increasing numbers in key destinations of immigrants such as Germany. Several central European countries, such as Slovakia, have seen increasing annual immigration. However, in a few countries, the sign has changed, and immigration numbers have been increasing. That pattern can be found in Spain and Greece, both of which experienced a fall in immigration in 2009-2014 due to their economic crises.

```{r immigration_dev, fig.align = 'center', out.width= '50%', fig.cap = paste('Total annual immigration inflow in the EU')}

ggplot(average.plot.immigration, aes(x = date, y = value)) +

 geom_line(aes(color = variable)) +

 scale_color_manual(values = c("darkblue"), labels = c("Total immigration")) + xlab("Year") +

 guides(color = guide_legend(title = "")) +

 ylab("") + scale_y_continuous(labels=function(y) format(y, big.mark = ",", scientific = FALSE)) +

 theme_bw()+ theme (legend.text = element_text(size=14), axis.title=element_text(size=14), axis.text=element_text(size=12))

```

```{r increase_immigration, fig.align = 'center' , out.width = '100%', fig.cap = paste('Increase in percent in immigration from', year_begin, "to", year_filter, "and", year_5, "to", year_filter, "excluding outlier (Malta)", sep=" " )}

data_world.wo.Malta<-data_world_year

data_world.wo.Malta $change_rate[data_world.wo.Malta$geo == "MT"] <- NA

data_world.wo.Malta $change_rate5yrs[data_world.wo.Malta$geo == "MT"] <- NA
```

```
w1 <- tm_shape(data_world.wo.Malta) +

  tm_polygons(col = "change_rate", style="pretty", palette= "YlGnBu", title="Increase in percent", legend.reverse = T) +

  tm_layout(frame = FALSE, legend.position = c(0.68, 0.5),

            legend.title.size = 0.8,

            legend.frame=F)

w2 <- tm_shape(data_world.wo.Malta) +

  tm_polygons(col = "change_rate5yrs", style="pretty", palette= "YlGnBu", title="Increase in percent", legend.reverse = T) +

  tm_layout(frame = FALSE, legend.position = c(0.68, 0.5),

            legend.title.size = 0.8,

            legend.frame=F)

current.mode <- tmap_mode("plot")

tmap_arrange(w1, w2, ncol=2, widths = c(.5, .5))

tmap_mode(current.mode)
```

The countries receiving most immigrants in absolute terms are also among the top recipients of **asylum applications**. Figure \ref{fig:asylum_total} illustrates this observation [@eurostat_asylum_2021]. For example, Germany and France are not only among the top destinations for migrants but also for refugees. On the other hand, countries with extensive Mediterranean coastlines, namely Greece, Italy, Cyprus, Malta, and Spain, are common target locations for asylum seekers, especially those from North Africa and the Middle East. In 2019, most of the newcomers in Greece came from Afghanistan and Syria. In Italy, the most common origin countries were Tunisia, Ivory Coast, and Algeria, and in

Spain, the most common origins were Morocco, Algeria, and Mali. In Malta, it was Morocco and, in Cyprus, it was Syria [@unhcr_refugee_2019]. Relative to the population size, by far the most asylum applications were registered in Cyprus, Greece, and Malta. These southern European countries have borne the brunt of arriving asylum seekers hoping to enter the EU. In all other countries, figures were significantly lower.

```{r asylum_total, fig.align = 'center' , out.width = '50%', fig.cap = paste('Total numbers of asylum applications,',year_filter, sep=" ")}

tm_shape(data_world_year) +

 tm_polygons(col = "total_asylum",  style="cont", palette= "YlGnBu", title="Total applications", legend.reverse = T) +

 tm_layout(frame = FALSE, legend.position = c(0.68, 0.5),

        legend.title.size = 1.4, legend.text.size = 1.1,

        legend.frame=F)

```

When looking at the share of asylum applicants of the total population, it becomes clear that in the average EU country for which data exists, asylum applicants only represent `r avg_asylum ` % of the population and never more than `r max_asylum` % (Figure \ref{fig:asylum_share} [@eurostat_asylum_2021; @eurostat_population_2021-2]).

Figure \ref{fig:asylum_share_age} illustrates that people under 35 years of age make up the largest share of asylum seekers (ibid.).

```{r asylum_share, fig.align = 'center', out.width= '50%', fig.cap = paste("Share of first-time asylum applications of population, ", year_filter, sep= " ")}

tm_shape(geoeuro) + #malen erst die gesamte EU Karte (tm_shape) und alles in grau

 tm_polygons('grey75') +

 tm_shape(facet.asylum) +#Tm_shape übermalt dann die Länder für die Infos vorhanden sind
```

```
  tm_polygons(

    col = "share_asylum",

    style="cont", palette= "YlGnBu", title="Percent of population", legend.reverse = T,
showNA = TRUE) +

  tm_layout(frame= FALSE,  legend.position = c(0.68, 0.5), legend.title.size = 1.4,
legend.text.size = 1.1)
```

```{r asylum_share_age, fig.align = 'center', out.width= '50%', fig.cap = paste("Share of first-time asylum applicants below 35 years of age of all asylum applicants, ", year_filter, sep= " ")}

tm_shape(data_world_year) +

  tm_polygons(col = "share_asylum_young",  style="cont", palette= "YlGnBu", title="Percent of applications", legend.reverse = T) +

  tm_layout(frame = FALSE, legend.position = c(0.68, 0.5),

            legend.title.size = 1.4, legend.text.size = 1.1,

            legend.frame=F)
```

When looking at the development over time, one can see that asylum applications slowly increased before 2015, then surged, and have since been decreasing again (blue line in Figure \ref{fig:migration_asylum_dev} [@eurostat_asylum_2021; @eurostat_immigration_2021]). Furthermore, refugees have always constituted only a fraction of total immigration. Since 2015, their share has been declining, illustrated by the diverging yellow and the blue lines in the figure.

As shown in Figure \ref{fig:increase_asylum}, by far the most significant increases in asylum applications were recorded in Spain, Slovenia, and Portugal

[@eurostat_asylum_2021]. While at a significantly lower scale, numbers also increased substantially in Germany, France, Italy, Greece, Cyprus, and most Balkan countries. The pattern does not change much when considering only the last five years.

```{r migration_asylum_dev, fig.align = 'center', out.width= '50%', fig.cap = paste('Total immigration inflow and total asylum applications in the EU')}

average.plot$variable<-factor(average.plot$variable, levels=c("total_immigration", "total_asylum"))

ggplot(average.plot, aes(x = date, y = value)) +

  geom_line(aes(color = variable)) +

  scale_color_manual(values = c("darkblue", "yellow2"), labels = c("Total immigration", "Total asylum applications")) + xlab("Year") +

  guides(color = guide_legend(title = "")) +

  ylab("") + scale_y_continuous(labels=function(y) format(y, big.mark = ",", scientific = FALSE)) +

  theme_bw()+ theme (legend.text = element_text(size=14), axis.title=element_text(size=14), axis.text=element_text(size=12))

```

```{r increase_asylum, fig.align = 'center', out.width= '100%', fig.cap = paste("Percentage increase in asylum applications from", year_begin, "to", year_filter, "and", year_5, "to", year_filter, sep=" " )}

w1<-tm_shape(data_world_year) +

  tm_polygons(col = "change_asylum_rate", style="pretty", palette= "YlGnBu", title="Increase in percent", legend.reverse = T) +

  tm_layout(frame = FALSE, legend.position = c(0.68, 0.53),
```

```
        legend.title.size = 0.8,

        legend.frame=F)

w2<-tm_shape(data_world_year) +

 tm_polygons(col = "change_asylum_rate5",style = "fixed", breaks=c(-100, 0, 100, 200, 400, 800, 1000 ,Inf), palette= "YlGnBu", title="Increase in percent", legend.reverse = T) +

 tm_layout(frame = FALSE, legend.position = c(0.68, 0.47),

        legend.title.size = 0.8,

        legend.frame=F)

current.mode <- tmap_mode("plot")

tmap_arrange(w1, w2, ncol=2, widths = c(.5, .5))

tmap_mode(current.mode)

```

Speaking of the attractiveness of a destination country for asylum seekers may not be appropriate because they cannot freely choose their destinations. According to the Dublin III Regulation, refugees must apply for asylum in the country through which they have entered the European Union [@european_commission_country_2020]. Therefore, a country's geographic location is one of the main determinants of the number of asylum applicants. That is also one of the reasons why Greece, Malta, and Cyprus record such a high number of asylum applications. Hence, one cannot conclude that many asylum applicants signifies a high willingness to host people in need.

A more suitable measure is the number of people a country receives through a voluntary **resettlement scheme**.^[Resettled persons have been granted authorization to reside in a Member State within the framework of a national or Community resettlement scheme. Resettlement means the transfer of third-country nationals or stateless persons based on their need for international protection and a durable solution to a Member State, where they are permitted to reside with secure legal status [@eurostat_resettled_2021].] As Figure \ref{fig:resettled}'s left side illustrates, resettlement is more common in northern and

western Europe, particularly in Great Britain and France, Sweden, as well as Germany and Norway [@eurostat_asylum_2021; @eurostat_resettled_2021].

In absolute numbers and relative to the number of annual asylum seekers, resettlement numbers are low. While there were `r total_asylum` asylum claims in `r year_filter` across the whole EU, only `r total_resettled` persons were resettled (ibid.). Disposing of the outlier Norway with resettlement numbers almost equal to asylum claim numbers, northern and western countries have the highest resettlement rate compared to their asylum claims.

```{r resettled, fig.align = 'center', out.width= '100%', fig.cap = paste("Total number of resettled persons and resettled persons as a share of all asylum seekers,",year_filter, sep=" ")}

w1<-tm_shape(data_world_year) +

tm_polygons(col = "total_resettled",  style="cont", palette= "YlGnBu", title="Total number", legend.reverse = T) +

  tm_layout(frame = FALSE, legend.position = c(0.635, 0.53),

          legend.title.size = 0.8,

          legend.frame=F)

data_world.wo.Norway <- data_world_year

data_world.wo.Norway$share_resettled[data_world.wo.Norway$geo == "NO"] <- NA

w2<-tm_shape(data_world.wo.Norway) +

  tm_polygons(col = "share_resettled",  style="cont", palette= "YlGnBu", title="Percent of applications", legend.reverse = T) +

  tm_layout(main.title.size=1.2 ,frame = FALSE, legend.position = c(0.635, 0.56),

          legend.title.size = 0.8,

          legend.frame=F)
```

```
current.mode <- tmap_mode("plot")

tmap_arrange(w1, w2, ncol=2, widths = c(.5, .5))

tmap_mode(current.mode)

```

Regardless of their motive for migration or channel of arrival, immigrants need a **residence permit** to be legally recognised and granted rights in their destination countries. Figures \ref{fig:permits} and \ref{fig:permitsline} represent the number of first residence permits granted by EU countries in absolute terms [@eurostat_first_2021].^[A residence permit is considered any type of authorisation valid for at least three months, issued by the authorities of a Member State, allowing a third-country national to legally stay in its territory. These statistics relate to permits granted to a person for the first time and to cases where the time gap between the expiry of the old permit and the start of validity of the new permit issued for the same reason is at least six months, irrespective of the year of issuance of the document [@eurostat_first_2021].] Currently, Poland constitutes the country with the largest quantity of first permits. Though traditionally an emigration country, figures of arrivals and issuance of residence permits skyrocketed from 2013 onwards. This trend followed the liberalisation of access to the national labour market for foreign workers through the simplification of administrative processes. Poland is closely followed by Germany and, with notably fewer permits, Spain and France. The map in Figure \ref{fig:permits} illustrates that the records from the Balkans, Scandinavia, and the Baltics are comparatively lower.

The graph in Figure \ref{fig:permitsline} reflects a steady and linear increase in Poland, the leading country, throughout the entire decade of the 2010s, reaching its highest record in 2019. Concurrently, there was a sudden spike in Germany in 2015, while overall immigration numbers rose exponentially in many Member States as a result of unprecedented numbers of asylum seeker arrivals to the EU. The pattern in these two countries contrasts with the relatively stable and lower numbers in most of the others during that same timespan. Italy is an exception with a decreasing trend from 2010 to 2015 due to certain legislative decisions on entry quotas. Italy manages annual quotas of legal entries through an annual decree, and while in 2011 this quota was around 100,000 entries, in the following years, it plummeted to below 15,000.

```{r permits, fig.align = 'center' , out.width = '50%', fig.cap = paste('Total number of first permits issued,',year_filter, sep=" ")}

tm_shape(data_year) +
```

```
  tm_polygons(col = "total_permit", style="cont", palette= "YlGnBu", title="Number of
permits", legend.reverse = T) +

  tm_layout(frame = FALSE, legend.position = c(0.68, 0.5),

          legend.title.size = 1.4, legend.text.size = 1.1,

          legend.frame=F)
```

```{r permitsline, fig.align = 'center' , out.width = '50%', fig.cap = paste('Number of first
permits issued')}

length.permit.total <- read.csv("length.permit.total.csv", header=TRUE, sep=",") %>%

  mutate(Date=as.Date(Date))

length.permit.total  %>% filter(geo %in% country_filter) %>%

  ggplot(aes(Date,total_permit, color=geo)) + geom_line() +

  scale_color_manual(values = color_sheme) + scale_y_continuous(labels=function(y)
format(y, big.mark = ",", scientific = FALSE)) +

 xlab("Year") +

  ylab("")+ labs(color= "Country") +theme_bw()+ theme (legend.text =
element_text(size=14), axis.title=element_text(size=14), axis.text=element_text(size=12),
legend.title=element_text(size=14))
```

The right of residence in a Member State is a key principle within the EU legal framework on the social rights to which foreign citizens have access. Consequently, its management applies to the national legislation on social affairs in each EU country [@bruzelius_freedom_2019]. At a European level, residence permits are classified within

three categories of length of validity: the first from three to five months, the second from six to eleven months, and the third from twelve months or more.

As illustrated by Figure \ref{fig:length_permit}, there exists a large heterogeneity across countries regarding the length of first permits issued [@eurostat_first_2021]. For example, Poland stands out as the country that issues the greatest number of first permits in absolute terms, but these permits are mostly short-term. Germany, on the other hand, has issued many long-term permits in recent years.

```{r length_permit, fig.align = 'center' , out.width = '100%', fig.height=3, fig.cap = paste('Total number of first permits issued by length')}

length.permit.3to5 <- read.csv("length.permit.3to5.csv", header=TRUE, sep=",") %>%

 mutate(Date=as.Date(Date))%>% mutate(length= "3 to 5 months")

length.permit.6to11 <- read.csv("length.permit.6to11.csv", header=TRUE, sep=",") %>%

 mutate(Date=as.Date(Date))%>% mutate(length= "6 to 11 months")

length.permit.over12 <- read.csv("length.permit.over12.csv", header=TRUE, sep=",") %>%

 mutate(Date=as.Date(Date))%>% mutate(length= "12 months and over")

permits_length<-bind_rows(length.permit.3to5, length.permit.6to11, length.permit.over12)%>% mutate(across(length, factor, levels=c("3 to 5 months","6 to 11 months","12 months and over")))

permits_length %>% filter(geo %in% country_filter) %>%

 ggplot(aes(Date,total_permit, color=geo)) + geom_line() +

 scale_color_manual(values = color_sheme) + scale_y_continuous(labels=function(y) format(y, big.mark = ",", scientific = FALSE)) +

 xlab("Year") + scale_x_date(breaks = "3 year", labels=date_format("%Y"))+

 ylab("")+ labs(color= "Country") +
```

```
  facet_wrap(~ length) + theme_bw()+ theme (legend.title = element_text(size=8),
legend.text = element_text(size=7))

```

Apart from the migrants that successfully acquire a residence permit, some are being refused to access a Member State's external border. This is often due to non-valid documentation or, in other cases, due to the inability to properly justify the reason for entry and stay. Figure \ref{fig:TNCRefusedTotal} illustrates the absolute numbers of third-country nationals that are formally **refused permission to enter the territory** of a Member State at its borders, with each person being counted only once within the determined period irrespective of the number of refusals issued to that same individual [@eurostat_third_2021].

First, the left graph of Figure \ref{fig:TNCRefusedTotal} reflects how, albeit constituting the country with the greatest number of third-country nationals refused entry at its external borders, Spain experienced a significant decrease in refusals following the 2008 economic crisis, as mentioned earlier. The number of arrivals may have decreased due to precarious labour market conditions for non-qualified migrant workers, translating into reduced refusals at the border. Nonetheless, the combination of two factors could have generated a sudden and evident rise in 2019. The first includes the deteriorating situation in the Moroccan Rif, where widespread social protest erupted in late 2016 due to police violence, endemic political corruption, low levels of development, and the economic abandonment of the region by the national government [@zaireg_king_2018]. This led to a cycle of violence and repression at the hands of the state security forces, leading large numbers of Moroccans to abandon their homeland and travel to Spain. Second, in 2018, Morocco became the principal point of departure for citizens from different Sub-Saharan countries attempting to reach the EU, using Morocco as a transit territory and Spain as the closest point of entry. Finally, the 2020 drop might be related to the abovementioned restrictions applied as a result of the transnational COVID-19 pandemic.

Second, the right graph of Figure \ref{fig:TNCRefusedTotal} shows the patterns in the other seven countries, with Poland and France constituting the two Member States with the largest rejections at their external borders. In the case of Poland, the bordering states of Belarus and Ukraine as countries of transit and origin might lead to high levels of arrivals, and thus, rejections. In the case of France, the increased security efforts in the country's fight against terrorism following the 2015 jihadist attacks at the hands of the Islamic State, together with the securitisation of borders and the use of profiling practices, may have led to the notable increase in external border rejections. As we can see, the rest of the countries maintained a relatively stable number of rejections throughout the entire decade, except for Greece experiencing a slight increase between 2015 and 2017.

```{r TNCRefusedTotal, fig.align = 'center' , out.width = '100%', fig.height=3, fig.cap = paste('Total number of third-country nationals refused entry at the external borders')}

Refused_entry_total <- read.csv("refused.entry.total.csv", header=TRUE, sep=",")%>% filter(geo %in% country_filter) %>% mutate(Date=as.Date(Date))%>% mutate(country= "")

Refused_entry_Spain<-read.csv("refused.entry.total.csv", header=TRUE, sep=",")%>% filter(geo %in% country_filter & geo!="Spain") %>% mutate(Date=as.Date(Date))%>% mutate(country= "Excluding Spain")

Refused_entry<-bind_rows(Refused_entry_total, Refused_entry_Spain)

Refused_entry %>% filter(geo %in% country_filter) %>%

 ggplot(aes(Date,total_refused, color=geo)) + geom_line() +

 scale_color_manual(values = color_sheme) + scale_y_continuous(labels=function(y) format(y, big.mark = ",", scientific = FALSE)) +

 xlab("Year") +

 ylab("")+ labs(color= "Country") +

 facet_wrap(~ country, scales = "free") + theme_bw()+ theme (legend.title = element_text(size=8), legend.text = element_text(size=7))

```

Within the analysis of third-country nationals refused entry at the external borders, we can disaggregate the data by different subsamples, for example, depending on the migrants' point of entry. As illustrated by Figure \ref{fig:TNCRefusedland}, Spain is by far the Member State with the highest records of refusals at the land border [@eurostat_third_2021]. The greatest number of rejections take place in the autonomous cities of Ceuta and Melilla. Italy has the largest number of individuals refused entry at the sea border, experiencing two spikes in 2011 and 2017, after which numbers plumed. In the latter year, the collaboration between Italy and the Libyan Coastal Guard initiated. This constituted a policy change that strongly affected the number of refusals. Finally, refusals at the air border are more significant in France, Spain, Italy, and Germany. While France had

high numbers with little variation, Spain experiences a fluctuation throughout the decade, and the numbers in Italy and Germany rise steadily from 2010 onwards.

```{r TNCRefusedland, fig.align = 'center' , out.width = '100%', fig.height=3, fig.cap = paste('Total number of third-country nationals refused entry')}

refused.entry.land <- read.csv("refused.entry.land.csv", header=TRUE, sep=",") %>%

mutate(Date=as.Date(Date))%>% mutate(entry= "At land border")

refused.entry.sea <- read.csv("refused.entry.sea.csv", header=TRUE, sep=",") %>%

mutate(Date=as.Date(Date))%>% mutate(entry= "At sea border")

refused.entry.air <- read.csv("refused.entry.air.csv", header=TRUE, sep=",") %>%

mutate(Date=as.Date(Date))%>% mutate(entry= "At air border")

Entry_way<-bind_rows(refused.entry.land, refused.entry.sea,refused.entry.air )%>% mutate(across(entry, factor, levels=c("At land border","At sea border", "At air border")))

Entry_way %>% filter(geo %in% country_filter) %>%

ggplot(aes(Date,total_refused, color=geo)) + geom_line() +

scale_color_manual(values = color_sheme) + scale_y_continuous(labels=function(y) format(y, big.mark = ",", scientific = FALSE)) +

xlab("Year") +

ylab("")+ labs(color= "Country") +

facet_wrap(~ entry, scales = "free")+theme_bw()+ theme (legend.title = element_text(size=8), legend.text = element_text(size=7))

```

Another demonstrative subsample includes the reason for the refusal (Figure \ref{fig:TNCRefusednonvalid} [@eurostat_third_2021]). In this regard, the upper-left graph of the figure displays how not having a valid legal document, as well as the inability to justify the reason for entry, are the two most common rationales for refusal. First, Poland is by far the country with the highest numbers of this type of refusals. While the rest of the analysed countries register around two thousands of these rejections per year—except for France between 2015 and 2019—Poland reaches above ten thousand in most years, peaking at 30,000 in 2013. The 2013 spike could be due to the aforementioned policy changes affecting access of Eastern European migrant workers.

Second, the absolute numbers of third-country nationals rejected at an external border due to a false visa or residence permit are much lower. The refusals in the upper-right graph of the figure rarely surpass 300 per year, with general patterns decreasing progressively from 2011 onwards. An attempted channel often includes family reunification purposes, with false declarations of parenthood and marriages of convenience as two of the most frequently employed strategies [@muller_misuse_2012]. In response to the use of fake documents, the EU has designed and implemented an online image-archiving system named FADO, which allows images of genuine and false travel documents to be shared in real time between all Member States [@etias_fado_2021].

Third, lack of justification for the purpose and conditions of stay comprises another reason behind refusals at the Member States' external borders. Almost all the selected countries move within a range of 500 to a maximum of 7,500 rejections per year. At the same time, from 2015 onwards, Poland surpassed these numbers and reached 35,000 refusals in 2019, as illustrated by the lower-left graph of the figure. Poland, while accepting many migrant workers for non-qualified jobs, simultaneously rejects large numbers of people, alleging that their purpose and conditions of stay in the country do not correspond to national or international legal frameworks.

Fourth and last, a reason for rejections includes that a person has already stayed three months in a six-month period. The lower-right graph of the figure illustrates how the absolute numbers of people refused due to this reason are significantly lower than those involving invalid or false legal documents. In 2012, Poland and Greece began to reject more individuals due to overstaying the three months, with these rejections steadily increasing until 2016, when Poland's numbers skyrocketed to surpass 5,000 in 2018 slightly. The remainder of the countries usually has only 500 cases annually.

```{r TNCRefusednonvalid, fig.align = 'center' , out.width = '100%', fig.cap = paste('Total number of third-country nationals refused entry due to...')}

refused.entry.nonvalid <- read.csv("refused.entry.nonvalid.csv", header=TRUE, sep=",") %>%
```

```
  mutate(Date=as.Date(Date))%>% mutate(reason= "No valid visa or residence permit")



refused.entry.false <- read.csv("refused.entry.false.csv", header=TRUE, sep=",") %>%

  mutate(Date=as.Date(Date))%>% mutate(reason= "False visa or residence permit")

refused.entry.overstayed <- read.csv("refused.entry.overstayed.csv", header=TRUE, sep=",")
%>% mutate(Date=as.Date(Date))%>% mutate(reason= "Stayed 3 months in a 6-months
period")

refused.entry.notjustified  <- read.csv("refused.entry.notjustified.csv", header=TRUE,
sep=",") %>% mutate(Date=as.Date(Date))%>% mutate(reason= "Purpose/conditions of
stay not justified")

reson_entry<-bind_rows(refused.entry.notjustified, refused.entry.nonvalid,
refused.entry.false, refused.entry.overstayed)%>% mutate(across(reason, factor,
levels=c("No valid visa or residence permit", "False visa or residence permit",
"Purpose/conditions of stay not justified","Stayed 3 months in a 6-months period" )))

reson_entry %>% filter(geo %in% country_filter) %>%

  ggplot(aes(Date,total_refused, color=geo)) + geom_line() +

  scale_color_manual(values = color_sheme) + scale_y_continuous(labels=function(y)
format(y, big.mark = ",", scientific = FALSE)) +

   xlab("Year") +facet_wrap(~ reason, scales = "free", labeller = label_wrap_gen(width=30))
+

  ylab("")+ labs(color= "Country") +theme_bw()+ theme (legend.title =
element_text(size=8), legend.text = element_text(size=7))

```

It is also important to address trends in **irregular immigration** to Europe, i.e., cases in which individuals enter a destination country without formal permission. Some see

irregular migration as a sign of inconsequential border management. Others argue it is a stress signal, showing that the current European asylum and refugee policies and the options for legal immigration are deficient. Moreover, the presence of undocumented immigrants poses challenges in terms of integration. For example, irregular immigrants cannot get a work permit and are not entitled to social services. They remain separated and hidden from the rest of society. Data on irregular immigration to Europe exists even though its very nature renders it difficult to quantify. We rely on the official statistic on *illegally present third-country nationals*. This indicator is easily confused with irregular border crossings or other statistics, so in the following paragraphs, illegal should be understood as being based on this specific variable compiled by Eurostat.

Greece and Cyprus stand out with a high share of illegally present third-country nationals (Figure \ref{fig:illegal} [@eurostat_third_2021-1; @eurostat_population_2021-2]. The situation in these countries is associated with the large influx of asylum seekers in recent years. Due to their location at the external border of the EU, these countries received more asylum seekers than any other country and were therefore exposed to considerable organizational and bureaucratic challenges. Thus, many asylum seekers have been falling through the grid. Beyond that, the Dublin regulation, which stipulates that refugees have to claim asylum in the EU country where they arrive first, disincentives official registration for those who wish to move to another EU country [@frontex_risk_2016; @medam_2019_2019]. The second-highest level of illegal immigration was recorded in Hungary and Croatia, i.e., the countries where many of the refugees passing illegally through Greece and the Balkans eventually applied for asylum (ibid.). It must be noted that no Eurostat data is available for the Balkan countries. However, for some of them, other sources report levels of magnitudes like those in Hungary and Croatia [@selec_2019_2019]. In the rest of Europe, the share of illegal immigration is at a low level.

Overall, in the average EU country for which data exists, only `r share_illegal`% of the population is estimated to be illegally present [@eurostat_third_2021-1; @eurostat_population_2021-2]). Moreover, in international comparison, illegal immigration to Europe is generally happening on a small scale. For example, in the United States, undocumented immigrants make up an estimated three percent of the population [@budiman_key_2020]. Lastly, the map looks very similar when considering only individuals below the age of 35. That indicates that this age group makes up most of all illegally present third-country nationals. That mirrors the finding for the age distribution of asylum applicants (Figure \ref{fig:asylum_share_age}).

```{r illegal, fig.align = 'center', out.width= '100%', fig.cap = paste('Share of third-country nationals found to be illegally present by age group,', year_filter, sep=" ")}

tm_shape(geoeuro) +

  tm_polygons('grey75') +
```

```
  tm_shape(facet.illegal) +

  tm_polygons(

    col = "share_illegal",

   style="cont", palette= "YlGnBu", title="Percent of population", legend.reverse = T,
showNA = TRUE) +

  tm_facets(by = "age", ncol = 2, drop.NA.facets = T ) +

  tm_layout(frame= FALSE,

          legend.outside.position = 'right',

          legend.outside.size = 0.2)
```

```
Although European countries increased border protection, the number of illegally present third-country nationals has grown substantially in recent years (Figure \ref{fig:illegal_increase} [@eurostat_third_2021-1]). Compared to ten years ago, the number of illegal immigrants has at least doubled in almost all European countries. The increase was highest in Poland, followed by Hungary and Slovenia. Iceland and Germany saw considerable increases, too (left panel of the figure). Over the last five years, Slovenia, Croatia, and Cyprus have witnessed the most significant increases, while the growth has slowed down in Poland, Hungary, and Germany (right panel of the figure). A note of caution when interpreting these data: From the raw data alone, it cannot be inferred whether this increase was due to higher numbers or whether closer policing led to an a more representative picture of the actual situation.

```{r illegal_increase, fig.align = 'center', out.width= '100%', fig.cap = paste('Percent increase in illegally present third-country nationals from', year_begin, "to", year_filter, "and", year_5, "to", year_filter, sep=" " )}

w1<-tm_shape(data_world_year) +

  tm_polygons(col = "change_illegal_rate",  style="pretty", palette= "YlGnBu", title="Percent increase", legend.reverse = T) +
```
```

```
  tm_layout(frame = FALSE, legend.position = c(0.68, 0.5),

            legend.title.size = 0.8,

            legend.frame=F)

w2<-tm_shape(data_world_year) +

  tm_polygons(col = "change_illegal_rate_5yrs",  style="pretty", palette= "YlGnBu",
title="Percent increase", legend.reverse = T) +

  tm_layout(frame = FALSE, legend.position = c(0.68, 0.5),

            legend.title.size = 0.8,

            legend.frame=F)

current.mode <- tmap_mode("plot")

tmap_arrange(w1, w2, ncol=2, widths = c(.5, .5))

tmap_mode(current.mode)
```

```

Not all immigrants or asylum seekers can stay in their destination countries. Asylum claims are often refused and if there are no other reasons to receive a permit to stay, such as subsidiary protection under the Geneva convention, the individual will be ordered to leave. The same holds if immigrants overstay their visas. In the average EU country for which data exists, `r share_leave`% of all immigrants present are ordered to leave [@eurostat_immigration_2021; @eurostat_third-country_2021].

This **return migration** is supposed to happen at a large scale all over the continent, such that at least ten percent of all immigrants in a country are ordered to leave (Figure \ref{fig:ordered} (ibid.)). Not all of these orders are actually enforced, as discussed next. Nonetheless, in Greece, more than half of all immigrants are third-country nationals who are ordered to leave the country. This large-scale return migration is related to the EU-Turkey Statement, in which Turkey agreed to the return of one illegally present third-
```

country national from Greece for every Syrian refugee resettled from Turkey to one of the EU Member States [@moreno-lax_eu_2021].

```{r ordered, fig.align = 'center', out.width= '50%', fig.cap = paste("Share of illegally present third-country nationals ordered to leave compared to all immigrants,", year_filter, sep=" ")}

tm_shape(data_world_year) +

 tm_polygons(col = "share_order_leave", style="cont", palette= "YlGnBu", title="Percent of immigrants", legend.reverse = T) +

 tm_layout(frame = FALSE, legend.position = c(0.68, 0.5),

 legend.title.size = 1.4, legend.text.size = 1.1,

 legend.frame=F)

```

The last relevant indicator is the number of third-country nationals who have left the territory of a Member State following an administrative or judicial act stating that their stay is illegal and that the third-country national is obligated to leave the territory.^[When working with this statistic, it is important to note how third-country nationals who leave the territory within the year may have been subject to an obligation to leave in a previous year; this means the number of people who leave the country may sometimes be greater than those who were ordered to leave in the same year. Moreover, the data include forced returns and assisted voluntary returns, whereas unassisted voluntary returns are only included when and where these are reliably recorded [@eurostat_third-country_2021].]

Figures \ref{fig:returned} and \ref{fig:returnedline} depict third-country nationals **returned following an order to leave** [@eurostat_immigration_2021; @eurostat_third-country_2021]. As the map in Figure \ref{fig:returned} reflects, in absolute terms, Germany is the country that enforces the greatest number of expulsions of individuals. The Balkans and the Baltic countries are those that have the lower numbers, while Western and Northern Europe accumulate the most. Relative to the immigrant population in the respective country, eastern European countries return relatively the most immigrants. Simultaneously, the graph in Figure \ref{fig:returnedline} shows that, apart from Germany, Poland is the only country with an increasing pattern of realised expulsions from 2012 onwards, progressively converging to the numbers of Germany.

```{r returned, fig.align = 'center' , out.width = '100%', fig.cap = paste('Third-country nationals returned following an order to leave,',year_filter, sep=" ")}

w1<-tm_shape(data_world_year) +

  tm_polygons(col = "total_returned", style="cont", palette= "YlGnBu", title="Total number ", legend.reverse = T) +

  tm_layout(frame = FALSE, legend.position = c(0.63, 0.5),

          legend.title.size = 0.8,

          legend.frame=F)

w2<-tm_shape(data_world_year) +

  tm_polygons(col="share_returned", style="cont", palette= "YlGnBu", title="Percent of immigrants  ", legend.reverse = T) +

  tm_layout(frame = FALSE, legend.position = c(0.63, 0.535),

          legend.title.size = 0.8,

          legend.frame=F)

current.mode <- tmap_mode("plot")

tmap_arrange(w1, w2, ncol=2, widths = c(.64, .5))

tmap_mode(current.mode)

```

```{r returnedline, fig.align = 'center' , out.width = '50%', fig.cap = paste('Total number of third-country nationals returned following an order to leave')}
```

```
returned.clean <- read.csv("returned.clean.csv", header = TRUE, sep = ",") %>%

  mutate(Date=as.Date(Date))

returned.clean  %>% filter(geo %in% country_filter) %>%

  ggplot(aes(Date,total_returned, color=geo)) + geom_line() +

  scale_color_manual(values = color_sheme) + scale_y_continuous(labels=function(y)
format(y, big.mark = ",", scientific = FALSE)) +

  xlab("Year") +

  ylab("")+ labs(color= "Country") +theme_bw()+ theme (legend.text =
element_text(size=14), axis.title=element_text(size=14), axis.text=element_text(size=12),
legend.title=element_text(size=14))
```

```

# Income, poverty, inequality, and social expenditure

*Income levels, the prevalence of poverty and inequality, and the provision of social security benefits can directly affect migrants' choices for a destination country. At the same time, these factors are intimately connected to the capacity of destination countries to integrate migrants into the labour market and societies. There is also an indirect effect via the attitudes towards immigration among destination country residents. In the following section, we provide an overview of the current conditions across the EU Member States. *

Migration comes at considerable costs. In financial terms, migrants need to pay for visas and other permits, transportation fees, accommodation, and potentially higher living expenses in the destination country. On the other hand, leaving behind family and friends and embarking on the risk of starting a new life elsewhere is emotionally challenging. Thus, whether a person decides to migrate or not crucially hinges on whether the expected benefits from doing so outweigh the associated costs. When deciding for a destination country, prospective migrants gauge political, social and environmental factors, and consider the presence of family or diaspora networks. In purely economic terms, however, these benefits often take the form of higher incomes. Basic economic theory and many empirical studies suggest that higher expected wages drive the decision to migrate in destination countries. Equivalently, migrants prefer to go to countries where the risk of falling into poverty is low. The income differential between origin and destination countries
```

is particularly relevant for labour migrants, especially those who plan to send home remittances to support left-behind family members [@helms_global_2019]. At the same time, the income level of a destination country is an important determinant of its capacity to integrate immigrants because richer countries command over a larger public budget. Thus, governments can allocate more funds to spending related to the provision for and integration of immigrants. Lastly, citizens in more affluent societies tend to show more solidarity with immigrants [@paskov_income_2012; @drazanova_meta-analysis_2021].

While **median income levels** vary considerably among the European countries, a clear regional pattern is observable. Figure \ref{fig:medianincome} serves to illustrate this observation [@eurostat_mean_2021]. In northern and central Europe, half of the population earns at least EUR 20,000 per year, thereby making it the most affluent region on the continent. Two non-EU countries, Norway and Switzerland, are by far the richest countries in Europe, with median income values beyond EUR 40,000. Southern Europe, including the Iberian Peninsula, Italy, Greece, and Cyprus, constitutes the second-richest region, with median incomes between EUR 15,000 and EUR 20,000. Lastly, the populations of eastern Europe earn the least, with median values below EUR 15,000. When considering the age cohort of 18 to 24 years, the regional pattern remains the same, but income levels are slightly lower.

```{r medianincome, fig.align = 'center', out.width = '100%', fig.cap = paste('Annual median income by total population and age group,',year_filter, sep=" " )}

tm_shape(geoeuro) +

 tm_polygons('grey75') +

 tm_shape(facet.income.young) +

 tm_polygons(

  col = "median_income",

  style="cont", palette= "YlGnBu", title="Median income in EUR", legend.reverse = T, showNA = TRUE) +

 tm_facets(by = "age", ncol = 2, drop.NA.facets = T ) +

 tm_layout(frame= FALSE, legend.outside.position = 'right',
```

```
        legend.outside.size = 0.2,

        main.title.size = 0.8)
```

```

As illustrated in Figure \ref{fig:povertyrisk}, a rather similar but inverse pattern arises regarding the population's **risk of falling into poverty or social exclusion** [@eurostat_people_2021]. According to the common definition used in the EU, persons are at risk of poverty if their income after social transfers amounts to less than 60 percent of the national median income.^[This relative definition of poverty risk stands in contrast to absolute thresholds such as the extreme poverty threshold of 1,95 USD at purchasing power parity. The risk of poverty thus does not account for differences between EU Member States.] At high risk of social exclusion are individuals who are severely materially deprived or living in households with very low work intensity.^[Severely materially deprived persons have living conditions severely constrained by a lack of resources. They experience at least 4 out of 9 following deprivations items: cannot afford i) to pay rent or utility bills, ii) keep home adequately warm, iii) face unexpected expenses, iv) eat meat, fish or a protein equivalent every second day, v) a week holiday away from home, vi) a car, vii) a washing machine, viii) a colour TV, or ix) a telephone. People living in households with very low work intensity are those aged 0-59 living in households where the adults (aged 18-59) work 20% or less of their total work potential during the past year. To measure child poverty, the same indicator is available for the subgroup aged 0-17 [@eurostat_people_2020].] The south-eastern countries stand out with the highest levels, with about 30 to 35 percent of the population being at risk. The risk is lowest in the north and centre of the EU, while the south and northeast exhibit intermediate levels. Moreover, in most countries, women face a higher risk of falling into poverty.

```{r povertyrisk, fig.align = 'center', out.width = '100%', fig.cap = paste('Share of the population at risk of poverty and social exclusion by sex,',year_filter, sep=" " )}

tm_shape(geoeuro) +

 tm_polygons('grey75') +

 tm_shape(facet.poverty) +

 tm_polygons(

  col = "risk_poverty",
```
```

```
   style="cont", palette= "YlGnBu", title="Percent of population", legend.reverse = T,
showNA = TRUE) +

 tm_facets(by = "sex", ncol = 2, drop.NA.facets = T ) +

 tm_layout(frame= FALSE,

          legend.outside.position = 'right',

          legend.outside.size = 0.2,

          main.title.size = 0.8)
```

Despite the large differences in median incomes and poverty risk across the continent, the poorest European countries are still relatively well-off by global standards, thereby explaining its general attractiveness as a destination area for migrants. The average GDP per capita in the ten poorest EU Member States for which data exists amounts to about EUR `r average` [@eurostat_real_2021] That figure is like the levels in better-off Latin American countries, such as Chile, Panama or, Uruguay. Most non-oil exporting Middle Eastern and Northern African countries are substantially poorer, with less than EUR 3,000 per capita on average. Income levels in Sub-Saharan Africa are even lower [@world_bank_gdp_2021]. Similarly, poverty levels and the risk of falling into poverty are much higher in many regions outside Europe. These circumstances create a large income gap at the EU's external borders.

Next to the absolute income level, its distribution within countries can influence migration decisions. When migrating for labour, immigrants seek the highest possible returns to their skills while accounting for psychological costs, like losing family links, and monetary migration costs. Given the same average income levels between countries, wages of high-skilled workers are higher the more unequally wages are distributed. Conversely, low-skilled workers earn more if wages are more evenly distributed. Therefore, high-skilled migrants tend to be more attracted by destination countries with higher **wage inequality**, while low-skilled migrants prefer countries with more equal wage distributions [@borjas_self-selection_1987]. Most studies investigating this type of migrant selection rely on data from the United States and not all find support for the theoretical argument (see review provided by @ruhose_selection_2015).

A few case studies that include European countries, however, provide at least partial evidence that high-skilled migrants cluster in more unequal countries, while low-skilled

migrants predominantly live in more equal ones [@beenstock_immigration_2015; @belot_immigrant_2012; @brucker_inequality_2009; @stolz_brain_2012].

In terms of integration, there exists no evidence that income inequality causes solidarity with immigrants in societies to change [@paskov_income_2012]. However, an indirect effect of inequality on immigration attitudes has been detected: in more unequal societies, poorer and less skilled people tend to have more negative attitudes towards immigrants than in more equal ones. The reverse is true for wealthier or high-skilled individuals [@borjas_self-selection_1987; @orourke_determinants_2006].

A standard measure for income inequality is the Gini coefficient. It is calculated based on the distribution of equivalised disposable income, i.e., after tax and other deductions, across households within a given country. It ranges from 0 percentage (complete equality) to 100 percentage (complete inequality). Figure \ref{fig:gini} visualises the inverse relation between inequality as measured by the Gini and median income levels [@eurostat_gini_2021]. It is highest in southeast, south, and northeast Europe, which are also among the poorest regions. In the north and centre, income inequality is comparatively low, though the Scandinavian and Benelux states stand out with the lowest levels. The inverse relationship does not hold for the east of the continent (Poland, Czech Republic, Slovakia, and Slovenia) as both income and inequality are among the lowest. Although differences are observable between European countries, it is worth noting that Europe is among the world's most equal regions [@world_bank_gini_2021].

```{r gini, fig.align = 'center' ,out.width = '50%',fig.cap = paste('Gini coefficient of equivalised disposable income,', year_filter ,sep=" ")}

tm_shape(data_world_year) +

  tm_polygons(col = "gini", style="cont", palette= "YlGnBu", title="Gini coefficient", legend.reverse = T) +

  tm_layout(frame = FALSE, legend.position = c(0.68, 0.5),

            legend.title.size = 1.4, legend.text.size = 1.1,

            legend.frame=F)

```

Another important income-related factor is the level of countries' **social expenditure**. It can be linked to migration decisions through the so-called "welfare chasing hypothesis",

which suggests that immigrants tend to cluster where generous welfare benefits are offered. This theory was developed and tested for the case of the United States [@borjas_immigration_1999]. For Europe, recent evidence suggests that generous welfare benefits attract high-skilled immigrants who wish to settle in the long run [@cebolla-boado_are_2019]. In more general terms, evidence is mixed. Moreover, the effect often depends on the particular immigration and welfare policies in destination countries and its magnitude is usually small [@beenstock_immigration_2015; @cigagna_potential_2015; @giulietti_welfare_2012; @razin_welfare_2015; @agersnap_welfare_2020]. However, in terms of integration capacity, it is plausible that countries with a larger social spending budget can better buffer costs associated with immigration. That is particularly relevant for asylum seekers, who require accommodation and provisions but face restrictions to participate in the labour market.

Within Europe, Member States can be stratified in both their welfare state models, including the models' generosity, as well according to which conditions migrants have access to social protection [@corrigan_migrant_2014]. Migrants can be restricted in terms of work-based, residence-based, or citizenship-based criteria [@shutes_work-related_2016]. This means that depending on migrant access to welfare state benefits, they may be exposed to social risks like material deprivation and inadequate living conditions. Such conditionalities can create inequalities among migrant and non-migrant populations, with exclusionary consequences for the entirety of the population and overall societal wellbeing.

Figure \ref{fig:socialexpenditure} shows that, unsurprisingly, levels of social expenditure are very much in line with income [@eurostat_expenditure_2021; @eurostat_pensions_2021]. If people earn more, a country's tax base is larger, and thus, more funds are available for expenditures such as old-age pensions, unemployment benefits, or public healthcare. The same holds for pensions, which usually make up a large share of a country's social budget.

The analysis of income levels, the prevalence of poverty and inequality, and the provision of social security benefits can be linked with the observed migration patterns. In general, Europe's high income levels and low poverty rates attract immigrants from poorer countries. Another explanation for Europe's particular attractiveness as a destination country among low-skilled immigrants is that inequality in Europe is low in international comparison.

Some patterns arise when looking at the regional distribution of recent immigrants across Europe. A large share of immigrants and asylum seekers are present in northern and central Europe, i.e., in regions with high income levels, low inequality, low poverty risk, and generous social benefits. However, the highest numbers of immigrants relative to the population are found in southern and south-eastern Member States, where economic conditions are less favourable. The eastern region, which performs well in terms of poverty

and inequality, receives only very few immigrants. However, more recently, numbers have been on the rise in this region.

```{r socialexpenditure, fig.align = 'center' , out.width = '100%', fig.cap = paste('Total social expenditure and expenditure on pensions per capita,',year_filter, sep=" " )}

w1 <- tm_shape(data_world_18) +

  tm_polygons(col = "social_expenditure", style="cont", palette= "YlGnBu", title="Expenditure in EUR", legend.reverse = T) +

  tm_layout(frame = FALSE, legend.position = c(0.68, 0.5),

          legend.title.size = 0.8,

          legend.frame=F)

w2 <- tm_shape(data_world_18) +

  tm_polygons(col = "pension_expenditure", style="cont", palette= "YlGnBu", title="Expenditure in EUR", legend.reverse = T) +

  tm_layout(frame = FALSE, legend.position = c(0.68, 0.505),

          legend.title.size = 0.8,

          legend.frame=F)

#tm_layout(frame = FALSE, legend.position = c("right", "centre"),

#tmap_arrange(w1, w2, nrow=2, widths = c(.25, .75))

current.mode <- tmap_mode("plot")

tmap_arrange(w1, w2, ncol=2, widths = c(.5, .5))

tmap_mode(current.mode)
```

```

# Employment and skills

*The labour market situation in a destination country plays a vital role in migrants' decisions about where to move. Likewise, it is crucial from the destination country's perspective because immigrants can only be integrated into the labour market if sufficient and suitable jobs are available. Furthermore, the employment status of natives shapes their attitudes towards immigration. Against this background, this section provides an overview of the labour market situation in European countries [@padilla_health_2009].*

The integration of immigrants into the labour market is of utmost importance. For two-thirds of all international migrants, finding employment is why they leave their home countries in the first place [@ilo_infographic_2021]. Within the EU, however, the share of labour migrants is substantially smaller. Between 2008 and 2016, 25 percent of all residence permits have been issued for employment-related reasons. Nonetheless, employment ranks second in the list of motives for immigration, preceded by "other reasons", which includes international protection [@burmann_highly_2018]. Besides, regardless of the motive for migration, employment enables immigrants to provide for themselves and become a part of society.

The odds of finding a suitable job as a migrant are higher in countries where unemployment is low. Accordingly, several studies have identified employment prospects in terms of low unemployment in a destination country as one of the most important pull factors of migration [@ferwerda_pull_2021; @matsui_push_2020]. However, while the pull effect is powerful for voluntary (labour) migrants, it is not necessarily a factor influencing asylum people who flee persecution or conflict [@kang_refugee_2021].

Regarding the integration of immigrants into the labour market of destination countries, the availability of sufficient and suitable employment opportunities is crucial. Furthermore, the employment situation of the native population is associated with attitudes towards immigration. Specifically, unemployed natives, especially those with a relatively low skill level, may feel threatened by immigrants due to increased competition for scarce jobs [@drazanova_meta-analysis_2021; @hellwig_taking_2016; @pardos-prado_skill_2019]. However, not all studies find evidence for this hypothesis of labour market competition [@young_building_2018].

Across Europe, there are clear regional differences in terms of unemployment. As Figure \ref{fig:longtermunemployment} below demonstrates, **long-term unemployment** is relatively high in southern Europe, e.g., Greece, North Macedonia, Montenegro, and Spain [@eurostat_long-term_2021]. In contrast, unemployment is very low in most of northern, central, and eastern Europe.
```

```{r longtermunemployment, fig.align = 'center' , out.width = '100%', fig.cap = paste('Long-term unemployment rate by sex,',year_filter, sep=" " )}

tm_shape(geoeuro) +

 tm_polygons('grey75') +

 tm_shape(facet.unemployment) +

 tm_polygons(

  col = "unemployment_rate",

  style="cont", palette= "YlGnBu", title="Rate among population", legend.reverse = T, showNA = TRUE) +

 tm_facets(by = "sex", ncol = 2, drop.NA.facets = T ) +

 tm_layout(frame= FALSE,

        legend.outside.position = 'right',

        legend.outside.size = 0.2)

```

In all European countries, women are more likely to be unemployed compared to men. This observation is corroborated in Figure \ref{fig:unemploymentline}, which visualises the development of **unemployment rates** in selected countries [@eurostat_long-term_2021]. Similarly, unemployment rates are higher among the younger population, i.e., those younger than 25. Youth unemployment rates are a particularly important indicator when considering the labour market prospects of recent immigrants. First, as Figure \ref{fig:asylum_share_age} shows, first-time asylum seekers are typically young. Second, younger adults have the least experience and have thus a much harder time finding jobs. The highest value of **youth unemployment** is currently recorded in Greece, followed by Spain and Italy, i.e., countries with generally high unemployment. Furthermore, Italy and Spain have a high share of low-skilled workers (see Figure \ref{fig:educationalattainment} and the related discussion below) and strong labour protections for older workers, making it difficult for younger job-seekers to find work.

Figure \ref{fig:unemploymentline} also highlights that unemployment rates were rather stable in all selected countries before the Great Financial Crisis. An exception is Poland, where the numbers were declining rapidly. In the direct aftermath of the crisis, unemployment increased only briefly in Poland, while Greece and Spain witnessed sustained surges during the Euro crisis. In Italy, only youth unemployment spiked, which is a consequence of the young's more precarious labour market position. More recently, the Italian unemployment rate has started falling towards that of other countries again. In contrast, rates have been relatively stable at a medium level in Sweden and France and a low level in Germany and the Netherlands.

```{r unemploymentline, fig.align = 'center' , out.width = '100%', fig.cap = paste('Long-term unemployment rate by sex and age group')}

unemployment.clean %>% filter(geo %in% country_filter) %>%

 ggplot(aes(Date,unemployment_rate, color=geo)) + geom_line() +

 scale_color_manual(values = color_sheme) +

 xlab("Year") +

 ylab("Percent")+ labs(color= "Country") +

 facet_wrap(~ age + sex) + theme_bw()+ theme (legend.title = element_text(size=8), legend.text = element_text(size=7))

```

Figure \ref{fig:employmentgraduates} reinforces these patterns by visualising the employment rates of people graduating with at least an upper secondary degree in the last three years [@eurostat_employment_2021]. In most parts of Europe, graduates transition very smoothly into their first employment. However, in the south and southeast, the share of graduates who find work within three years is rather low. Furthermore, throughout the continent, female graduates are less likely to be employed within three years after graduation than male graduates.

```{r employmentgraduates, fig.align = 'center' , out.width = '100%', fig.cap = paste('Employment rate of graduates within the last three years,',year_filter, sep=" " )}
```

```
tm_shape(geoeuro) +

 tm_polygons('grey75') +

 tm_shape(facet.graduates) +

 tm_polygons(

  col = "graduate_employment",

  style="cont", palette= "YlGnBu", title="Rate among graduates", legend.reverse = T,
showNA = TRUE) +

 tm_facets(by = "sex", ncol = 2, drop.NA.facets = T ) +

 tm_layout(frame= FALSE,

        legend.outside.position = 'right',

        legend.outside.size = 0.2)
```

The **employment rate of immigrants** in the EU countries for which data exists averages out at `r employ_immi`% [@eurostat_employed_2021]. Compared to the native population this rate is lower as immigrants, who do not migrate following a job offer, need to establish themselves in the labour market. Especially asylum applicants also often first need to obtain relevant skills like language skills.

In Europe employment levels of immigrants were highest in Iceland, Luxemburg, and Switzerland (Figure \ref{fig:employmentimmigrants} [@eurostat_employed_2021]). That corroborates the theoretical assumption that the labour market integration of immigrants hinges crucially on the general situation of the labour market. Interestingly, immigrant employment rates are also very high in some eastern and north-eastern countries like Poland, the Czech Republic, Slovakia, Lithuania, and Estonia, while they were the lowest in Greece.

The high immigrant employment rates in central and northern Europe are in line with the popularity of these countries as immigration destinations. An exception is France, which hosts many immigrants, although their employment rates are among the lowest. The high employment rates of immigrants in eastern Europe can be explained by the low migration rate into these countries. In many central and eastern Member States, labour migrants have historically made up a larger share of immigration. In countries that also host many refugees, employment rates of recent immigrants are naturally lower. Depending on the rigidity of labour market regulation and the support they receive, even refugees who tend to arrive unprepared for the host country labour market's specific requirements catch up in terms of their employment rates over time.

```{r employmentimmigrants, fig.align = 'center' , out.width = '50%', fig.cap = paste('Employment rate of recent immigrants,',year_filter, sep=" " )}

tm_shape(data_world_year) +

 tm_polygons(col = "percentage_employed", style="cont", palette= "YlGnBu", title="Rate among recent immigrants", legend.reverse = T) +

 tm_layout(frame = FALSE, legend.position = c(0.65, 0.5),

 legend.title.size = 1.4, legend.text.size = 1.1,

 legend.frame=F)

```

In addition to employment levels, the **skill endowments** of destination country populations can affect migration decisions. A high skill level among natives signals the availability of quality education and opportunities for career advancement through professional training. Furthermore, it makes for an environment that is conducive to innovation. However, high-skilled immigrants often take on jobs for which they are overqualified. In many cases, this is due to insufficient language skills, lacking transferability of skills, or non-recognition of certification related to education and work experience [@bonfanti_migrants_2014; @oecd_immigrant_2019].

Furthermore, natives' skill levels are essential from a destination country perspective. Skill endowments affect not only integration outcomes but also the extent to which natives accept or appreciate the presence of immigrants in society. Evidence shows that highly qualified individuals tend to have more positive attitudes towards migration [@cavaille_education_2019; @drazanova_meta-analysis_2021; @lee_relational_2015].

However, as indicated earlier, attitudes also depend on the extent to which immigrants are perceived as a competition for jobs, which also holds in the high-skilled sector [@pardos-prado_skill_2019].

It is common practice in migration research to utilise educational attainment as a proxy for skill levels [e.g., @oecd_immigrant_2019]. For this variable, a clear regional pattern arises within Europe, which, as Figure \ref{fig:educationalattainment} illustrates, is similar to unemployment [@eurostat_population_2021-1]. The south and east are characterised by high shares of people with low education levels. Within the EU, Portugal, Spain, and Italy host the highest percentage of people with less than secondary education. In contrast, almost half of the population obtain tertiary education in the north and centre of the continent. Interestingly, among these countries, Germany has the smallest share of people with tertiary education. This observation can be attributed to the country's dual education system, in which job qualifications can be obtained either through a tertiary university degree or through non-tertiary vocational training [@destatis_2_2020].

```{r educationalattainment, fig.align = 'center' , out.width = '100%', fig.cap = paste('Educational attainment of the population by level of education,',year_filter, sep=" " )}

tm_shape(geoeuro) +

 tm_polygons('grey75') +

 tm_shape(facet.education) +

 tm_polygons(

  col = "educational_attainment",

  style="cont", palette= "YlGnBu", title="Percent of population", legend.reverse = T, showNA = TRUE) +

 tm_facets(by = "isced11", ncol = 2, drop.NA.facets = T ) +

 tm_layout(frame= FALSE,

        legend.outside.position = 'right',

        legend.outside.size = 0.2)
```

```

A growing number of countries depend on targeted immigration as their native **population ageing** is increasingly putting native labour forces under pressure. For example, in the absence of immigration, Germany's population would have been shrinking since 1972 [@destatis_population_2020]. The labour shortage is particularly pronounced for highly skilled labour [@burmann_highly_2018]. In general, migration is the main driver of regional population growth [@padilla_health_2009]. Many countries have passed migration policies aimed at actively attracting skilled immigrants. For example, EU Member States issue immigration permits, so-called "EU Blue Cards," for high-skilled immigrants so that they can work and live in the EU. This system is implemented in all Member States except Ireland and Denmark. It establishes standardised requirements to be fulfilled by candidates, such as a binding job offer, qualification certificates, and work experience [@burmann_highly_2018]. However, immigration via Blue Card permits is still happening at a relatively small scale. In 2019, European authorities issued 37,000 Blue Cards, with 80 percent issued in Germany alone, followed by France and Poland with just over five percent each [@eurostat_residence_2021]. Furthermore, some governments have introduced national policies, such as point systems, to actively recruit highly skilled labour migrants [@burmann_highly_2018]. Overall, these initiatives are making an impact. In 2019, more than half of the employment-related residence permits in the EU were issued to highly-skilled workers and researchers [@eurostat_first_2021-1].

However, it is not only the highly skilled who are sought after. Immigrants play an important role in filling lower skilled occupations, such as in the health, hospitality, and transport sectors. Demographic change across the EU will further increase the need for foreign workers. If integration into the labour market and society is successful, immigration is thus in the interest of both the migrant and the destination country. For immigrants with suitable skills, countries with a high labour force shortage are particularly attractive.

Beyond the labour force shortage argument, it is commonly assumed that population age also matters regarding natives' attitudes to immigration. Indeed, some studies show that older people tend to view immigration less favourably [@hellwig_taking_2016; @meeusen_relation_2016]. However, a recent meta-study that systematically reviewed earlier research suggests that age often has an insignificant role in predicting attitudes towards migration [@drazanova_meta-analysis_2021].

Figure \ref{fig:populationabove65} depicts the share of individuals older than 65 years of age in European countries [@eurostat_population_2021-2]. In every country except Turkey, they make up a considerable share of the population. The highest ratios are reported in Italy, Greece, Finland, Germany, and Portugal. In regional comparison, the shares tend to be somewhat lower in the east and southeast, but there are outliers like Greece, Bulgaria or, the Baltics.
```

```{r populationabove65, fig.align = 'center' , out.width = '50%', fig.cap = paste('Share of the population above 65 years of age,',year_filter, sep=" " )}

tm_shape(data_world_year) +

  tm_polygons(col = "share_o65", style="cont", palette= "YlGnBu", title="Percent of population", legend.reverse = T) +

  tm_layout(frame = FALSE, legend.position = c(0.68, 0.5), legend.title.size = 1.4, legend.text.size = 1.1,

          legend.frame=F)

```

Besides population aging, **emigration** can add additional pressure on labour markets. However, natives do not leave European countries at a large scale, with most countries exhibiting emigration rates below 2 percent (Figure \ref{fig:shareemigration} [@eurostat_emigration_2021; @eurostat_population_2021-2]). In some countries of Latin America and Sub-Saharan Africa, on the other hand, emigration rates reach levels of over 20 percent, and in a few cases, even more than 50 percent [@oecdafd_new_2019].

```{r shareemigration, fig.align = 'center' , out.width = '50%', fig.cap = paste('Emigration as share of the population,',year_filter, sep=" " )}

tm_shape(data_world_year) +

  tm_polygons(col = "share_emigration", style="cont", palette= "YlGnBu", title="Percent of population", legend.reverse = T) +

  tm_layout(frame = FALSE, legend.position = c(0.66, 0.5),

          legend.title.size = 1.4, legend.text.size = 1.1,

          legend.frame=F)

```

Gender dimensions in terms of employment, pay, and roles

*Gender roles and inequalities may, both directly and indirectly, affect migrant decision-making in determining their destination country. Taken together, the EU Member States scored 67.4 out of 100 on the 2019 EU Gender Equality Index 2019 [@european_institute_for_gender_equality_eige_gender_2021]. While not a perfect score, migrants may find this situation more attractive than those in their origin countries, offering more equal opportunities and influencing family livelihood strategies. At the same time, in 2020, the European Commission reported only a slight improvement in gender equality since 2005 [@european_commission_communication_2020]. Furthermore, EU Member States continue to differ along gender dimensions, which affects migration flows and migrant labour dynamics across the continent. Moreover, gendered differences in opportunities and constraints reflect host countries' overall capacity to provide for the whole of their population and to ensure social and economic integration. In addition, different host country societies have different perceptions regarding gender roles, identities, and expressions. This affects the way they relate to certain migrant populations. While gender considerations are not limited to these indicators, this section explores EU Member States' gender employment gaps, gender pay gaps, and the relative size of the population that is inactive due to caring responsibilities. *

Gender and employment are significant from a migrant perspective. Both globally and in Europe, women undertake most of the unpaid care and domestic work, often related to childcare or attending to other family members [@ryan_call_2020]. Moreover, women, girls, and LGBTQI+ individuals continue to face inequalities in access to employment and employment conditions. These can compound precarity and vulnerability not only for this group of the native population but for migrants as well. Migrant women in the EU generally assume particular roles in the labour market, including in the service sector via low-paid and flexible labour, and in care and domestic work. While they may be overqualified in this work, it can serve as a means of access to the EU. At the same time, systems of feminised global care chains can assist origin countries in generating money flows via remittances [@sassen_globalization_1998; @hochschild_global_2014].

Indeed, the right to employment can be one of the most effective ways to achieve migrant integration in host countries [@crul_comparative_2010; @wrench_diversity_2016]. However, integration policies in the EU Member States that appear neutral may in reality target women and men differently, resulting in diverging outcomes [@kofman_gendered_2015]. For example, inadequate recognition of the qualifications of women migrant workers can be an obstacle to integration, as can a lack of appropriate support structures, including childcare facilities. Social and legal inequalities in destination countries can also be exacerbated given the often informal nature of migrant women's work. Furthermore, female migrants frequently face breaches of fundamental rights if they enter the EU irregularly.

Finally, it is important to consider host societies' perceptions of gendered social roles. For example, Muslim migrants may be associated with racialised and gendered categories and stigmas inconducive to overalls societal cohesion. These may include that Muslim migrant woman are forced to stay at home and are not able to work, or that they should not be permitted to wear traditional head coverings at their workplaces (which can preclude their hiring or continued employment) [@bracke_is_2012]. Against this background, Figure \ref{fig:employmentgap} demonstrates the difference in employment rates between men and women aged 20 to 64 in the respective Member States [@eurostat_gender_2021-1]. Out of the selected countries, the greatest gaps are found in Greece and Italy, followed by the eastern European countries. This indicates a regional pattern of greater gaps in southern and eastern European regions. In Scandinavia, the gender employment gap is the lowest compared to the rest of Europe.

```{r employmentgap, fig.align = 'center' , out.width = '50%', fig.cap = paste('Gender employment gap,',year_filter, sep=" ")}

tm_shape(data_year) +

 tm_polygons(col = "employment_gap", style="cont", palette= "YlGnBu", title="Gender employment gap", legend.reverse = T) +

 tm_layout(frame = FALSE, legend.position = c(0.68, 0.5),

 legend.title.size = 1.4, legend.text.size = 1.1,

 legend.frame=F)

```

While women's equality is emphasised in EU frameworks and goals as well as international human rights norms, they continue to earn disproportionality less than men. This difference is captured by the **gender pay gap**.

Migrant women, who are already in a vulnerable and precarious socio-economic position, face compounded disadvantages from gender pay gaps. Moreover, they may encounter prohibitive family immigration regimes or sponsorship requirements in the EU Member States. For example, women wishing to enter the EU may be unable to meet income requirements due to gender gaps in employment and pay in host countries [@kofman_gendered_2015]. Overall, gendered social roles in the EU Member States can continue to subject women to disadvantage. Employment, policies, and structures do not remain gender-neutral, and there is continued difficulty in reconciling work and family.

Furthermore, gender pay gaps produce overall socio-economic repercussions for societal integration and reflect the dynamism of inequalities and the market power of different societal groups and stakeholders [@oreilly_equal_2015]. Their lower earnings put women at an increased risk of falling into poverty, thereby impacting both women's and children's well-being in host countries [@harkness_womens_2013].

Figure \ref{fig:paygap} displays the difference between the average gross hourly earnings of male paid employees versus that of female paid employees, expressed as a percentage of the earnings of male paid employees [@eurostat_gender_2021]. It is defined here as "unadjusted" given that gender inequalities cannot be solely measured via the concept of equal pay for equal work. In general, patterns in this figure do not correspond to the employment rates displayed previously. For example, Germany has one of the greatest differences in pay. Other western European countries like France, the Netherlands, Austria, and Spain display large differences between male and female earnings, while Italy and Poland maintain the lowest gaps. Central Europe demonstrates a greater gender gap in pay, and southern Europe is in the lower range. In this sense, the gender pay gap must be understood within a more comprehensive understanding of gender equality. A low gender gap in pay, for example, could be attributed to lower female employment rates. This may be the case in Italy, where a lower female employment rate was recorded, and where a low gender pay gap is present.

```{r paygap, fig.align = 'center' , out.width = '50%', fig.cap = paste('Unadjusted gender pay-gap,',year_filter, sep=" ")}

tm_shape(data_year) +

 tm_polygons(col = "pay_gap", style="cont", palette= "YlGnBu", title="Gender pay-gap", legend.reverse = T) +

 tm_layout(frame = FALSE, legend.position = c(0.68, 0.5),

 legend.title.size = 1.4, legend.text.size = 1.1,

 legend.frame=F)

```

Finally, social roles and expectations are prominent features in debates about both gender equality and migration trends. Crucially, such gender roles still contribute to a paradigm of men being freer to engage in productive roles, while women are expected to engage in reproductive ones. Some migrants and women groups may reflect low rates of participation

in the labour market due to their potential role as primary caregivers [@kofman_gender_2000].

```{r}

inactive.map.facet <-read.csv("inactive.map.facet.csv", header=TRUE, sep=",")

inactive.facet <-left_join(geoeuro, inactive.map.facet)%>% filter(year %in% year_filter)

#Max share of inactive male

inactive.facet_male <-inactive.facet %>% filter(geo %in% country_eu)%>%
filter(sex=="Male")

inactive.male <-max(inactive.facet_male$percentage_inactive, na.rm=TRUE)

inactive.male<-round(inactive.male, digits=2 )

#Max share of inactive male

inactive.facet_female <-inactive.facet %>% filter(geo %in% country_eu)%>%
filter(sex=="Female")

inactive.female <-max(inactive.facet_female$percentage_inactive, na.rm=TRUE)

inactive.female<-round(inactive.female, digits=2 )

```

Figure \ref{fig:inactivepopulationfacet} illustrates the population that is economically **inactive due to care responsibilities** [@eurostat_inactive_2021]. ^[Those not working, not actively seeking work, or not available to work, and thus considered outside the labour force, due to care work [@eurostat_inactive_2021]. These statistics define inactivity due to caring responsibilities as “looking after children or incapacitated adults” or “other family or personal responsibilities.” As such, it is only referring to unremunerated or undeclared work [@kofman_rethinking_2012].] Care work is important to host societies as it not only maintains the elderly population but also raises and nurtures society’s future citizens. The figure shows that the inactive populations are largely feminised. Across the whole of Europe, women make up a considerably larger share of the inactive population compared to

men. In those countries for which data is available, the share of men inactive due to care responsibilities never reaches more than `r inactive.male` percent [@eurostat_inactive_2021]. This stands in stark contrast with women, where those inactive due to caring responsibilities constitute up to `r inactive.female` percent of the female population (ibid.). These overall percentages reflect the dynamics of migrant labour chains, as well as family welfare state structural or societal configurations [@pfau-effinger_welfare_2005; @sassen_globalization_1998].

```{r inactivepopulationfacet, fig.align = 'center' , out.width = '100%', fig.cap = paste('Share of population inactive due to caring responsibilities by sex,',year_filter, sep=" ")}

tm_shape(geoeuro) +

 tm_polygons('grey75') +

 tm_shape(inactive.facet) +

 tm_polygons(

  col = "percentage_inactive",

  style="cont", palette= "YlGnBu", title="Percent of population", legend.reverse = T, showNA = TRUE) +

 tm_facets(by = "sex", ncol = 2, drop.NA.facets = T ) +

 tm_layout(frame= FALSE,

        legend.outside.position = 'right',

        legend.outside.size = 0.2,

        main.title.size = 1.2)

```

Determinants and indicators of health and wellbeing

This section addresses population health and health system performance in the EU by examining life expectancy, crude death rates, citizens' self-perceived health, and self-reported unmet medical needs in the selected Member States. While these considerations are not exhaustive, they help to explore how health relates to migrant decision-making and choice of destination, as well as to integration trajectories. When comparing the destination with the origin country, evidence of comparatively more healthy societies, including longer life spans, lower mortality rates, or improved health systems and access to health services, can be perceived by migrants as an opportunity for an enhanced quality of life. From the host society perspective, and as defined in EU human rights frameworks, the potential of its populations (including its migrants), cannot be fully achieved if these populations are unhealthy or have difficulty accessing healthcare services (Padilla 2009).

Health is shaped by the social context in which an individual lives, and it may directly or indirectly influence migrants' decisions. Social determinants of migrant health include the conditions in the country of origin, the transit journey, or destination country policies. Most EU countries offer universal coverage for a basic set of health services, with some countries having the best health care systems in the world [@oecd_health_2019]. EU countries also rank relatively high in indicators of health status, like life expectancy, as compared to the rest of the world [@eurostat_eu_2020]. Migrants consider these aspects in their family and livelihood planning, as various factors and inequalities in their origin countries can contribute to health inequalities or a lack of access to healthcare [@castelli_drivers_2018; @oecd_executive_2020].

There exists a gap in the literature regarding migrants' health literacy in the EU, as well as to how health systems and services impact migrants' decision-making [@kuschminder_role_2017; @ward_migrant_2019]. However, some smaller qualitative studies illustrate migrants' expectations regarding health systems and services in current or potential EU host countries. For example, a recent study surveyed migrants who arrived in Greece and intended Germany, Sweden, or the Netherlands as their destination countries. 85% of these respondents revealed that the good social assistance and health policies in their intended destinations influenced their choice[@kuschminder_role_2017]. Other evidence points to how migrants with chronic health conditions may decide to rather stay in an EU Member State than to return to their country of origin due to better access to healthcare [@kristiansen_migrants_2015].

Moreover, the operation of EU health care systems depends on the international migration of healthcare workers. These immigrants compensate for labour shortages, which can be related to aging European population structures and projected decreasing populations [@eurostat_eu_2020]. Depending on the situation and policies at the destination, demand for health and care work offers migrants not only labour opportunities but also simplifies integration.

On average, **life expectancy** in the EU has increased by two years per decade since the 1960s [@eurostat_mortality_2021]. As of 2020, the expected number of healthy life years for men and women combined was higher than 70 years. Thereby, the EU was only surpassed by the G20 members Japan, Canada, Australia, South Korea, and the United Kingdom [@eurostat_eu_2020]. This health aspect may be a mitigating influence on migrants' choice of the destination country.

At the same time, recent data indicate stagnation or decline in life expectancy in most of the EU Member States [@eurostat_mortality_2021]. In combination with fertility and death rates, the life expectancy reflects whether a society has an aging population structure. On average, the EU countries have an older population compared to all other G20 member countries, except for Japan [@eurostat_eu_2020]. Migration can mitigate the societal and economic consequences of an aging society.

Figure \ref{fig:lifeexpectancy_facet} demonstrates how life expectancy in the Member States remains above 80 years, except for some eastern European countries [@eurostat_life_2021]. In all the countries, women have a higher life expectancy compared to men. Research attributes biological differences as playing somewhat of a role, but also increasingly observes the influence of social relationships or health-risk behaviours. Furthermore, a weak but positive correlation between gender equality measures and longer life expectancy has been observed in the EU [@kolip_gender_2018].

```{r lifeexpectancy_facet, fig.align = 'center', out.width = '100%', fig.cap = paste("Life expectancy by sex,",year_filter, sep=" ")}

lifeexpectancy.map.facet <- read.csv("lifeexpectancy.map.facet.csv", header=TRUE, sep=",")

lifeexpectancy.facet <- left_join(geoeuro, lifeexpectancy.map.facet)%>% filter(year %in% year_filter)

tm_shape(geoeuro) +

 tm_polygons('grey75') +

 tm_shape(lifeexpectancy.facet) +

 tm_polygons(

  col = "life_expectancy",
```

```
   style="cont", palette= "YlGnBu", title="Life expectancy in years", legend.reverse = T,
showNA = TRUE) +

 tm_facets(by = "sex", ncol = 2, drop.NA.facets = T ) +

 tm_layout(frame= FALSE,

        legend.outside.position = 'right',

        legend.outside.size = 0.2,

        main.title.size = 1.2)
```

In addition, the EU features one of the highest average **crude death rates** in the world. Figure \ref{fig:crudedeath} displays the crude death rate, defined as the ratio of the number of deaths to the average population, per year and 1,000 persons [@eurostat_deaths_2021]. Overall, Greece and Germany show the highest rates, while the Netherlands and Sweden have some of the lowest. High crude death rates are not necessarily a consequence of bad living conditions but can be caused by a large share of old people in the population. In 2017, only Japan and Russia outstripped the EU [@eurostat_eu_2020]. While in Japan the high crude death rates is a consequence of the old population that experiences some of the longest life expectancies in the world. In Russia, by contrast, the high crude death rate comes with a relatively low life expectancy, which is a consequence of unhealthy lifestyle choices, especially high alcoholism among men.

```{r crudedeath, fig.align = 'center' , out.width = '50%', fig.cap = paste('Crude death rate,',year_filter, sep=" ")}

tm_shape(data_year) +

 tm_polygons(col = "crude_death_rate", style="cont", palette= "YlGnBu", title="Crude death rate", legend.reverse = T) +

 tm_layout(frame = FALSE, legend.position = c(0.68, 0.5),

        legend.title.size = 1.4, legend.text.size = 1.1,
```

```
        legend.frame=F)

```

Furthermore, EU citizens' health status as indicated by their **self-perceived health** helps to elucidate the relation between health, migration, and integration. Combinations of social privilege and disadvantage can have negative effects on health [@gkiouleka_intersectional_2020]. Moreover, health can be interconnected with a range of socio-political factors, including economic stability, education and access to health care and quality thereof, social or community contexts, and the environment. The indicator of perceived health refers to health in general, rather than its current state, and encompasses biological, social, and emotional dimensions [@bonner_determinants_2017]. From the migrant perspective, a country may be more attractive as a destination if the overall health status is perceived as favourable. In terms of the destination country, health perceptions inform not only migrant integration but also overall societal wellbeing. In this regard, migrants' perceptions may be shaped by transnational networks connecting origin and destination through kinship and ethnicity. Moreover, technology and communication tools, including new media sources like social media, can assist in developing such perceptions [@dekker_how_2014].

Figure \ref{fig:health_three} illustrates the percentage of the population in the selected Member States that perceive their health as (very) good, fair, or (very) bad [@eurostat_self-perceived_2021]. Notably, more than half of the populations in all selected countries perceive their health as good or very good. In Sweden, the Netherlands, Spain, and Greece, the figure has been standing at well above 70 percent. In Sweden and the Netherlands, this may be attributable to their health systems providing preventative care in addition to primary medical care through social insurance or public funds [@tikkanen_international_2020]. Italy joined the high ranks in 2017. Studies indicate that significant population ageing contributes to improvements in perceived health in Italy [@cislaghi_self-rated_2019]. On the other hand, more than a quarter of the German and Polish populations perceive their health as fair, and Poland also shows the largest proportion of people in bad self-perceived health. Lastly, health perceptions in France are slightly better than in Germany.

```{r health_three, fig.align = 'center' , out.width = '100%', fig.height=3, fig.cap = paste('Self-perceived health')}

selfperceived_health.levelgood <-read.csv("selfperceived_health.levelgood.csv", header=TRUE, sep=",") %>% mutate(Date=as.Date(Date)) %>% mutate (Type="Very good or good")
```

```
selfperceived_health.levelbad <-read.csv("selfperceived_health.levelbad.csv", header=TRUE, sep=",") %>% mutate(Date=as.Date(Date)) %>% mutate (Type="Very bad or bad")

selfperceived_health.fair <- read.csv("selfperceived_health.fair.csv", header=TRUE, sep=",") %>% mutate(Date=as.Date(Date)) %>% mutate (Type="Fair")

perceived_health<-bind_rows(selfperceived_health.levelgood, selfperceived_health.levelbad, selfperceived_health.fair)%>% mutate(across(Type, factor, levels=c("Very good or good","Fair","Very bad or bad")))

perceived_health %>% filter(geo %in% country_filter) %>%

 ggplot(aes(Date,percentage_perceived_health, color=geo)) + geom_line() +

 scale_color_manual(values = color_sheme) +

 xlab("Year") +

 ylab("Percent")+ labs(color= "Country") +

 facet_wrap(~ Type) + theme_bw()+ theme (legend.title = element_text(size=8), legend.text = element_text(size=7))
```

Populations in the EU countries may feel they are **limited in having their health needs met** due to lacking accessibility of health care in terms of costs, waiting times, and proximity. Access to health care is especially relevant for migrants as they are more vulnerable to communicable disease and more exposed to environmental and occupational risks than the national population. Within the migrant population, women, children, unaccompanied minors, irregular migrants, refugees, and asylum seekers, trafficked or smuggled migrants, or migrant workers in high-risk occupations remain the most exposed [@cole_human_2007]. Furthermore, migration is a social determinant of health and a risk factor for mental health [@the_lancet_migration_2006]. While most countries allow immigrants to access healthcare services in emergency cases, broader universal health access and coverage can vary [@ledoux_migrants_2018]. Moreover, health inequalities may contribute to vulnerable populations forgoing care. For example, a migrant's irregular status may influence decisions to attempt to access care. A final consideration is how anti-immigration attitudes in EU destination countries can include perceptions that low-skilled migrants, irregular forced migrants, including asylum-seekers or refugees can impose a

burden on or abuse of public services provided by welfare states, including health systems. These attitudes may affect the overall integration of migrants [@lesinska_european_2014].

As a proxy of unmet health needs in general, Figure \ref{fig:healthmap} illustrates the percentage of the population aged 16 and older reporting unmet needs for medical examination due to either financial reasons, waiting times, or because the travel to the point of medical examination was too far [@eurostat_self-reported_2021]. While the figures are low across the continent, Estonia and Greece stand out as outliers.

In general, the literature suggests that there exists a gender difference in terms of self-perceived health. In this sense, gender inequalities, dynamic gender-related experiences, and constructions of gender roles relate in complex ways to health [@annandale_gender_2000]. Recent research studying gendered dynamics of self-perceived health in Europe attributes women reporting worse self-perceived health than men partially to gender inequalities in the individual social determinants of health, but not by their Gender Empowerment Measure or Gross Domestic Product [@palencia_influence_2014].

Figure \ref{fig:healthline} zooms in on time trends in the selected Member States [@eurostat_self-reported_2021]. Here, Greece generally has the highest percentage of self-reported unmet needs, with Poland following and Italy coming in third Interestingly, all three experienced a decrease in self-reported unmet needs from the year 2016 to 2017. Meanwhile, Netherlands and Spain consistently record the lowest self-reported unmet needs. This may reflect health care system configurations, such as the engagement in cost-sharing in the Netherlands with its system of mixed compulsory social insurance and private voluntary insurance, secondarily funded by public taxation [@bertens_small_2020].

```{r healthmap, fig.align = 'center' , out.width = '50%', fig.cap = paste('Self-reported unmet needs for medical examination,',year_filter, sep=" ")}

tm_shape(data_year) +

  tm_polygons(col = "rate_unmet_medical", style="cont", palette= "YlGnBu", title="Percent of population", legend.reverse = T) +

  tm_layout(frame = FALSE, legend.position = c(0.68, 0.5),

        legend.title.size = 1.4, legend.text.size = 1.1,

        legend.frame=F)
```

```
```

```{r healthline, fig.align = 'center' , out.width = '50%', fig.cap = paste('Self-reported unmet needs for medical examination')}

unmet.medical.clean <- read.csv("unmet.medical.clean.csv", header=TRUE, sep= ",") %>%

 mutate(Date=as.Date(Date))

unmet.medical.clean  %>% filter(geo %in% country_filter) %>%

 ggplot(aes(Date,rate_unmet_medical, color=geo)) + geom_line() +

 scale_color_manual(values = color_sheme) +

 xlab("Year") +

 ylab("Percent")+ labs(color= "Country") +theme_bw()+ theme (legend.text = element_text(size=14), axis.title=element_text(size=14), axis.text=element_text(size=12), legend.title=element_text(size=14))

```

Material and social deprivation

*Migrants' decision-making can be influenced by the perception of conditions in the destination country, in the country of origin, and transit. Countries with a strong welfare state system or robust social protection nets may be perceived as offering improved wellbeing. In comparison to other nations globally, EU Member States have relatively comprehensive welfare systems, with higher levels of social expenditure than the OECD average [@arts_models_2010; @oecd_social_2020]. Furthermore, better living conditions bolster the efforts of destination countries to integrate newcomers, inter alia, through increased societal cohesion and more favourable attitudes towards immigration. In this light, this section seeks an understanding of the levels of wellbeing in Europe and examines the prevalence of lacking basic needs or inadequate living standards within the context of welfare states providing certain social protections. *

Some literature argues that migrant populations are at lower risk for poverty in welfare states with comparatively more extensive policies [@eugster_immigrants_2018]. It is

theorised that more generous welfare states are more likely to offer welfare benefits and social protections that provide for basic needs and living standards. At the same time, others caution that such policies may in practice not extend to migrants [@romer_generous_2017; @gschwind_generous_2021]. From the migrant perspective, access to welfare policies providing social protections ensures basic needs and improved wellbeing, as well as aid in their integration in the chosen destination country. Again, while the drivers of migration are not fully understood, literature shows that poverty and deprivation in the origin country are a push factor of migration. On the other hand, comparably lower deprivation in the host country is perceived as a pull factor [@cummings_why_2015]. Furthermore, research proves that while emigration policies in EU Member States do not substantially shape migrant intentions, policies like welfare state conditions and services can influence the decisions [@gubert_is_2016].

From the societal perspective, improved incorporation of migrants and equal distribution of resources among the entire population decreases societal fragmentation, as well as possibly shapes more favourable public attitudes towards redistribution, welfare abuse, and dependency [@crepaz_constructing_2009; @kymlicka_immigration_2006]. Moreover, migration is key for the functioning of industrialised economies, and therefore ensuring the wellbeing of migrants is significant.

Several indicators can provide a picture of the state of material and social deprivation and living conditions in the selected EU Member States. Figure \ref{fig:depriviation} compares the rates of **material and social deprivation** experienced by employed versus non-employed persons in the selected Member States, aged 16 and above [@eurostat_material_2021]. Material and social deprivation refers to indicators related to economic strain, durable goods, and the characteristics and conditions of a dwelling space. In all the Member States, there are lower rates of deprivation among the employed versus the unemployed. Greece has the highest rates of material and social deprivation. Countries such as France, Italy, and Spain experience similar rates. Finally, the Netherlands and Sweden display the lowest rates of deprivation.

```{r depriviation, fig.align = 'center' , out.width = '100%', fig.cap = paste('Share of population materially and socially deprived by working status,',year_filter, sep=" ")}

deprivation.map.facet <- read.csv("deprivation.map.facet.csv", header= TRUE, sep= ",")

depriviation.facet <- left_join(geoeuro, deprivation.map.facet)%>% filter(year %in% year_filter)

tm_shape(geoeuro) +

  tm_polygons('grey75') +
```

```
  tm_shape(depriviation.facet) +

  tm_polygons(

    col = "deprivation_rate",

    style="cont", palette= "YlGnBu", title="Percent of population", legend.reverse = T,
showNA = TRUE) +

  tm_facets(by = "wstatus", ncol = 2, drop.NA.facets = T ) +

  tm_layout(frame= FALSE,

          legend.outside.position = 'right',

          legend.outside.size = 0.2)
```

An almost identical pattern arises in terms of **severe material deprivation rates**, as demonstrated by Figures \ref{fig:severedepreviation} and \ref{fig:severedepriviationline} [@eurostat_severe_2021]. Sweden remains the country with the consistently lowest rates, with the Netherlands holding only a slightly higher percentage. Italy and Poland follow, but over time the percentage of the population experiencing severe deprivation has decreased, thereby beginning to close the gap between them and the other selected Member States. In Greece, repercussions from the financial crisis beginning in 2008 and its ongoing economic strain could explain the high level of material deprivation [@luczak_assessing_2020]. It also explains why many migrants move from Greece and Italy as a point of entry into Europe on to other Member States [@stevens_greece_2018; @brekke_stuck_2015].

```
```{r severedepreviation, fig.align = 'center' , out.width = '50%', fig.cap = paste('Share of the
population severely materially deprived,',year_filter, sep=" ")}

tm_shape(data_year) +

  tm_polygons(col = "severe_deprivation_rate", style="cont", palette= "YlGnBu",
title="Percent of population", legend.reverse = T) +
```
```

```
 tm_layout(frame = FALSE, legend.position = c(0.68, 0.5),

          legend.title.size = 1.4, legend.text.size = 1.1,

          legend.frame=F)
```

```{r severedepriviationline, fig.align = 'center' , out.width = '50%', fig.cap = paste('Share of the population severely materially deprived')}

severe.deprivation.clean <- read.csv("severe.deprivation.clean.csv", header = TRUE, sep=",") %>%

 mutate(Date=as.Date(Date))



severe.deprivation.clean  %>% filter(geo %in% country_filter) %>%

 ggplot(aes(Date, deprivation_rate, color=geo)) + geom_line() +

 scale_color_manual(values = color_sheme) +

 xlab("Year") +

 ylab("Percent")+ labs(color= "Country") +theme_bw()+ theme (legend.text = element_text(size=14), axis.title=element_text(size=14), axis.text=element_text(size=12), legend.title=element_text(size=14))
```

In terms of living conditions contributing to an understanding of material deprivation, Figures \ref{fig:poordwelling} and \ref{fig:poordwellingline} display the percentages of households with **dwellings that lack adequate conditions**, i.e., those with a leaking roof, damp walls, floors or foundation, or that have rotting window frames or floor [@eurostat_total_2021-1]. Italy generally has the highest percentage of the population living in such conditions, albeit the numbers had been decreasing in recent years before the

COVID-19 pandemic. Sweden again has the lowest numbers. Most countries exhibit approximately the same percentage of the population experiencing the indicated inadequate conditions over time, and any gender gap does not seem to be particularly significant.

```{r poordwelling, fig.align = 'center' , out.width = '50%', fig.cap = paste('Share of the population living in a dwelling with a leaking roof, damp walls, floors, or foundation or rot in window frames of floor,',year_filter, sep=" ")}

tm_shape(data_year) +

 tm_polygons(col = "poor_dwelling", style="cont", palette= "YlGnBu", title="Share of population", legend.reverse = T) +

 tm_layout(frame = FALSE, legend.position = c(0.68, 0.5),

        legend.title.size = 1.4, legend.text.size = 1.1,

        legend.frame=F)

```

```{r poordwellingline, fig.align = 'center' , out.width = '50%', fig.cap = paste('Share of the population living in a dwelling with a leaking roof, damp walls, floors, or foundation or rot in window frames of floor')}

dwelling.clean <- read.csv("dwelling.clean.csv", header=TRUE, sep=",") %>%

 mutate(Date=as.Date(Date))

dwelling.clean  %>% filter(geo %in% country_filter) %>%

 ggplot(aes(Date,poor_dwelling, color=geo)) + geom_line() +

 scale_color_manual(values = color_sheme) +
```

```
  xlab("Year") +

  ylab("Percent")+ labs(color= "Country") +theme_bw()+ theme (legend.text =
element_text(size=14), axis.title=element_text(size=14), axis.text=element_text(size=12),
legend.title=element_text(size=14))
```

```
Looking at households without basic amenities also helps to inform the overall picture of
whether the population has adequate living conditions. Figure \ref{fig:nobath}  and Figure
\ref{fig:nobathline} illustrate the percentages of **households having neither a bath,
shower, nor flushing toilet** [@eurostat_total_2021]. In this regard, Poland has a
significantly higher share of deprived population, which could reflect the country's social
expenditure. While Poland is one of the highest spenders out of the group of central and
eastern European countries, it is one of the lowest in the EU-15. Moreover, compared to the
rest of the Member States, Poland's spending on housing benefits and social assistance for
the marginalised is relatively low [@sawulski_is_2017]. Sweden records no population
lacking these amenities, and Germany virtually none.

```{r nobath, fig.align = 'center' , out.width = '50%', fig.cap = paste('Share of the population
having neither a bath, nor a shower, nor indoor flushing toilet in their
household,',year_filter, sep=" ")}

tm_shape(data_year) +

  tm_polygons(col = "rate_nobath", style="cont", palette= "YlGnBu", title="Share of
population", legend.reverse = T) +

  tm_layout(frame = FALSE, legend.position = c(0.68, 0.5),

            legend.title.size = 1.4, legend.text.size = 1.1,

            legend.frame=F)
```

```{r nobathline, fig.align = 'center' , out.width = '50%', fig.cap = paste('Share of the
population having neither a bath, nor a shower, nor indoor flushing toilet in their
household')}
```
```

```
nobath.clean <- read.csv("nobath.clean.csv", header=TRUE, sep=",") %>%

 mutate(Date=as.Date(Date))

nobath.clean  %>% filter(geo %in% country_filter) %>%

 ggplot(aes(Date,rate_nobath, color=geo)) + geom_line() +

 scale_color_manual(values = color_sheme) +

 xlab("Year") +

 ylab("Percent")+ labs(color= "Country") +theme_bw()+ theme (legend.text =
element_text(size=14), axis.title=element_text(size=14), axis.text=element_text(size=12),
legend.title=element_text(size=14))
```

```

Finally, Figures \ref{fig:nowarmhouse}  and Figure \ref{fig:nowarmhouseline} depict the percentage of the selected Member States' populations that self-report they are **unable to maintain their homes at an adequately warm temperature** [@eurostat_population_2021]. The percentages in Greece and Italy remain higher than in the rest of Europe, with the Netherlands and Sweden on the other end of the spectrum. Again, the Greek example could pertain to the economic crisis.

For all indicators considered here, Sweden exhibits low or the lowest levels of deprivation. This may relate to Sweden's comparatively more extensive welfare regime. For example, childcare policies include publicly subsidised childcare facilities, benefits for children's material needs, and generous parental or family leave policies to allow for care work [@lohmann_family_2016; @szebehely_changing_1998]. Addressing work-family conflict and gendered regimes of paid work and unpaid care work via such policies is known to have a positive effect on overall material resources and wellbeing [@lin_ranking_2018; @lohmann_family_2016].

Reflecting on the observations in this section overall, it is important to note that measures of material deprivation are self-declarative. Thus, the way the surveyed population perceives well-being can be relative. For example, in examining European survey data, one study indicates that the surveyed population in Italy finds keeping the house warm is a relatively important category, while that of Spain found it comparatively negligible [@mussida_households_2019].
```

```{r nowarmhouse, fig.align = 'center' , out.width = '50%', fig.cap = paste('Share of the population unable to keep home adequately warm,',year_filter, sep=" ")}

tm_shape(data_year) +

 tm_polygons(col = "rate_nowarm_home", style="cont", palette= "YlGnBu", title="Share of population", legend.reverse = T) +

 tm_layout(frame = FALSE, legend.position = c(0.68, 0.5),

        legend.title.size = 1.4, legend.text.size = 1.1,

        legend.frame=F)

```

```{r nowarmhouseline, fig.align = 'center' , out.width = '50%', fig.cap = paste('Share of the population unable to keep home adequately warm ')}

warmhome.clean <- read.csv("warmhome.clean.csv", header=TRUE, sep=",") %>%

 mutate(Date=as.Date(Date))

warmhome.clean  %>% filter(geo %in% country_filter) %>%

 ggplot(aes(Date,rate_nowarm_home, color=geo)) + geom_line() +

 scale_color_manual(values = color_sheme) +

 xlab("Year") +

 ylab("Percent")+ labs(color= "Country") +theme_bw()+ theme (legend.text = element_text(size=14), axis.title=element_text(size=14), axis.text=element_text(size=12), legend.title=element_text(size=14))

```

Justice system and levels of corruption

In full democracies, inclusivity and respect for human rights are key principles, together with the protection of the most vulnerable, the rule of law, and proper governance at all administrative levels. To that end, political and judicial institutions must be transparent and efficient, working to uphold the principle of accountability, promote non-discriminatory laws and policies, prevent, and combat endemic corruption, bribery, or organised crime, and defend citizen safety in the face of criminality and violence [@eurostat_perceived_2021]. The levels of transparency and accountability of public institutions, together with the application of non-discriminatory policies and the scale of corruption, may have an impact on the migrants' decision-making when determining a destination country. These indicators are useful to reveal the countries' capacities both to adhere to democratic values and to adequately use and not mismanage the state public resources collected through taxes.

According to the core principles of the EU, respect for the rule of law and the independence of the legislative branch are prerequisites for protecting all fundamental rights and democratic values. Under the core principle of the separation of powers, judicial entities must be provided with adequate financial resources, and be able to make decisions without interference or pressure from policy or other economic actors. This way, they can ensure that individuals and businesses operating within a country can fairly and fully enjoy their rights. Within a timeframe between 2016 and 2020, Figure \ref{fig:justic.system} illustrates the citizen perceptions about the **independence of the judiciary **in the eight selected Member States, specifically in relation to the courts and judges of their respective countries [@eurostat_perceived_2021]. The graphs on the right and left of the figure divide the citizen opinion between perception of "very good or fairly good" or "very bad or fairly bad", respectively.

Sweden, the Netherlands, and Germany stand out as the top three countries with the highest shares of confidence in their respective national judicial systems. They all consistently surpass 75 percent confidence—with the single exception of Germany in 2016. Confidence in Sweden notably rises above 80 percent in 2020. Next, France and Greece remain nearer to 50 percent, demonstrating increased levels of confidence over time, especially in the case of Greece. Poland is the only country where citizens experience a clear decline in their trust in the judiciary, dropping from around 45 percent to almost the lowest levels displayed. Finally, Spain and Italy record the lowest numbers overall, but with two different tendencies. On one hand, Spain progresses from a low 30 percent confidence in 2016 to approximately 45 percent in 2020, which means that the population has acquired more trust in the judiciary throughout the last five years. On the other hand, Italy, albeit augmenting in levels of trust overall, demonstrates a drop from 2019 to 2020 that puts the country back to 2017 levels.

In terms of negative perceptions, the numbers are reversed. However, it is notable that the scale of percentages varies between the two subsamples, with positive perceptions reaching 80 percent at their greatest, whereas the negative perceptions only surpass 60 percent in 2016 in Italy.

```{r justic.system, fig.align = 'center' , out.width = '100%',  fig.height=3, fig.cap = paste('Perceived independence of the justice system')}

independence.justice.verygood <- read.csv("independence.justice.verygood.csv", header = TRUE, sep = ",") %>%

 mutate(Date=as.Date(Date))%>% mutate (Type="Very good or fairly good")

independence.justice.verybad <- read.csv("independence.justice.verybad.csv", header = TRUE, sep = ",") %>%

 mutate(Date=as.Date(Date))%>% mutate (Type="Very bad or fairly bad")

independence.justice<-bind_rows(independence.justice.verygood, independence.justice.verybad)%>% mutate(across(Type, factor, levels=c("Very good or fairly good","Very bad or fairly bad")))

independence.justice %>% filter(geo %in% country_filter) %>%

 ggplot(aes(Date,perceived_justice, color=geo)) + geom_line() +

 scale_color_manual(values = color_sheme) +

 xlab("Year") +scale_y_continuous(labels=function(y) format(y, big.mark = ",", scientific = FALSE)) +

 ylab("Percent")+ labs(color= "Country") + scale_x_date(breaks = "2 year", labels=date_format("%Y"))+

 facet_wrap(~ Type) + theme_bw()+ theme (legend.title = element_text(size=8), legend.text = element_text(size=7))

```

Furthermore, perception of **corruption** is useful in considering the strength of a democratic state. Corruption inflicts financial damage on a country by lowering investment levels, hampering the fair operation of the internal market, and reducing public finances. It also harms the society as organised crime actors engage in corruption to commit other types of crimes, such as trafficking illicit substances or human beings. Since there is no reliable way to measure absolute corruption levels in countries or territories via hard empirical data, analysing citizens' perceptions of corruption serves as a method of comparing relative corruption levels across EU Member States. The indicator examined here is a composite index based on a combination of surveys and assessments of corruption from thirteen different sources. These surveys evaluate how corrupt the public sector of the analysed country is perceived to be, with a score of 0 representing a very high level of corruption, and a score of 100 meant to represent a corruption-free country.

Figure \ref{fig:corruption.index} shows that, for most of the selected countries, the perception of corruption levels does not vary significantly, with only Greece and Italy experiencing a steady improvement [@eurostat_corruption_2021]. Overall, Sweden and the Netherlands are the two countries with the highest index of perception of a corruption-free country, always surpassing 80. Germany also ranks high, close to those two countries, followed by France, Poland, and Spain at the middle of the figure. In 2020, more than two-thirds of the world's countries scored below the mark of 50, with an average of 43 out of 100. The highest scoring region was western Europe and the European Union, having an average regional score of 66 out of 100. Concurrently, the lowest-scoring region was Sub-Saharan Africa, with an average mark of 32 [@transparency_international_corruption_2020].

```{r corruption.index,  fig.align = 'center' , out.width = '50%', fig.cap = paste('Corruption Perceptions Index ')}

corruption.clean <- read.csv("corruption.clean.csv", header= TRUE, sep = ",") %>%

 mutate(Date=as.Date(Date))

corruption.clean  %>% filter(geo %in% country_filter) %>%

 ggplot(aes(Date,perceived_corruption, color=geo)) + geom_line() +

 scale_color_manual(values = color_sheme) + scale_y_continuous(labels=function(y) format(y, big.mark = ",", scientific = FALSE)) +

 xlab("Year") +
```

```
 ylab("")+ labs(color= "Country") +theme_bw()+ theme (legend.text =
element_text(size=14), axis.title=element_text(size=14), axis.text=element_text(size=12),
legend.title=element_text(size=14))

```

Crime and recorded offenses

*Citizens' security and the eradication of crime and violence are core objectives of democratic governments. For both citizens and foreign nationals, as well as resident third-country nationals, physical safety is likely to factor into perceptions of quality of life in a given territory. Furthermore, the decision process of migrants can be influenced and vary significantly depending on the levels of the criminality of destination countries. States that maintain low levels of crime and wherein the rule of law is respected are likely to be perceived as more stable and safer. Low levels of criminality can also have an impact on the social body of destination countries, strengthening the levels of unity and trust both among citizens and towards residing foreigners whilst also increasing the level of confidence in the public institutions. There are different types of crimes and recorded offenses by the police, and this section of the report presents data on four of those, generally more present in everyday life [@eurostat_recorded_2021]. The unit of measure used for these indicators is the rate by population size of 100,000. *

First, **intentional homicides** are defined as unlawful death inflicted upon a person with the intent to cause death or serious harm. ^[In most Member States, the category of intentional homicide includes crimes of murder, voluntary manslaughter, extrajudicial killings, killings caused by excessive use of force by law enforcement or state officials, honour killing, serious assault leading to death, death as a result of terrorist offenses, dowry-related killing, femicide, and infanticide [@eurostat_recorded_2021].] The upper-left graph of Figure \ref{fig:offenses} presents the data on intentional homicides in the eight analysed EU Member States. For this category of crimes, the records rarely surpass 1.5 intentional homicides for every 100,000 citizens, with Greece displaying the highest records during the first half of the 2010s, and figures decreasing radically until reaching low levels in 2018. Overall, France is the country with the greatest number of intentional homicides, followed by Greece and Sweden. Conversely, Spain, Italy, and the Netherlands are the three Member States with the lowest records.

Second, the upper-left graph of Figure \ref{fig:offenses} presents data on **sexually motivated offenses**^[They are defined as unwanted sexual acts, attempts to obtain a sexual act, or contact or communication with unwanted sexual attention without valid consent or with consent as a result of intimidation, force, fraud, coercion, threat, deception, use of drugs, or alcohol, or abuse of power or a position of vulnerability. In practice, sexual violence figures are the sum of rape and sexual assault [@eurostat_recorded_2021].], and shows that this type of crime is reported most frequently in Sweden. Moreover, the records

in the country increased throughout the last decade, albeit there is a drop in some years. Next and comparatively lower on the scale are France, Germany, and the Netherlands, with France having experienced a progressive increase since 2010. Spain, Poland, and Greece record the lowest levels, without any significant variation over time.

However, strong evidence suggests that sexual assault and sexually related crimes are seriously underreported [@spohn_criminal_2012]. One reason is the divergent legal definitions and the typification in the national legal codes for these types of crimes, as well as varying characteristics of police procedures and convictions. Another reason might be the dynamics and complex variables playing a role in the decision-making of women to engage with the criminal justice system or to deal with the police to report a crime. While some officers deliver professional and non-judgmental responses to this type of reporting, others question the victim's narrative or show scepticism, disbelief, or a lack of understanding of the implications of sexual violence in terms of trauma and psychological harm [@johnson_why_2017].

Furthermore, changes in the law have a direct effect on statistics and the absolute numbers for a country in terms of criminality as well. In Sweden, it was reported that rape conviction rates had risen 75% from 2018 to 2020 following a major change in the legal code. The country changed the legal definition of rape in 2018 to encompass sex without explicit consent, departing from the need to prove the use or threat of violence or coercion, as other countries demand the victim to do. This has since led to women's rights groups and campaigns to call on other nations to follow Sweden's initiative and initiate a process of reforms [@batha_rape_2020].

The next indicator constitutes the sum of **theft, burglary, and robbery crimes**, all of which pertain to the unlawful taking or obtention of property from a person. ^[In the case of theft, it occurs without the use of force, threat of force or violence, coercion or deception. Burglary is defined as entering a house, apartment, or other dwelling place without explicit authorization. Finally, robbery entails overcoming resistance by force or threat of force [@eurostat_recorded_2021].] As the lower-left graph of Figure \ref{fig:offenses} exemplifies, the rate of this grouping of crimes is much higher than the previous indicators, reaching more than 6,000 in one case in 2009, albeit with overall figures descending by 2018. Within this category of crimes, Sweden, France, the Netherlands, and Italy demonstrate the highest records. In clear contrast with Sweden, Greece, Spain, and Poland have the lowest numbers, staying around 1,000 for every 100,000, with Poland's records notably decreasing from 2013 onwards. Similarly, to the case of sexually motivated crimes, Sweden stands out with the highest figures, experiencing a steady decrease, but remaining higher compared to the rest of the countries. Nonetheless, in this instance, reporting rates do not necessarily reflect the actual rates either. This category encompasses a range of criminal acts related to the obtention of someone else's personal property of different monetary value, and in certain cases, some crimes might not be reported due to the perception that it is not worth it or that the police is not going to pursue them thoroughly.

Finally, it is useful to examine crimes involving **controlled drugs or precursors** ^[This includes the handling, possession, purchase, use, trafficking, cultivation, or production of these substances for both personal consumptions and supply [@eurostat_recorded_2021].] as illustrated by the lower-right graph of Figure \ref{fig:offenses}. Again, Sweden's records surpass those of all other countries. From 2010 onwards and during the entire decade, Sweden exceeds 900 cases per 100,000 citizens, suffering in 2018 from worse numbers than it had in 2009. At a substantially lower number of around 300 cases are Germany, followed by Poland, then France (with a considerable spike from 2015 to 2016), and then Greece. These four remain above an average of 100 cases overall throughout the decade. At the lower end in number of offenses are Spain, Italy, and the Netherlands. Member States have different levels of tolerance to the consumption and distribution of illegal drugs, which directly impacts statistics on this type of crime. Sweden is a country with a relatively restrictive drug policy, in contrast with liberal approaches like the one of the Netherlands. Sweden focuses its efforts on controlling and reducing both the supply and consumption of illicit substances to their minimum, which inevitably increases the number of reported cases and convictions [@chatwin_mixed_2018].

```{r offenses, fig.align = 'center' , out.width = '100%', fig.cap = paste('Total number of recorded offenses per 100,000 inhabitants')}

offences.homicide <- read.csv("offences.homicide.csv", header=TRUE, sep = ",") %>%

  mutate(Date=as.Date(Date))%>% mutate(reason= "Intentional homicide") %>% mutate(total_commited=total_offences)

offences.sexual.violence <- read.csv("sexual.violence.csv", header=TRUE, sep =",") %>%

  mutate(Date=as.Date(Date))%>% mutate(reason= "Sexually motivated")

offences.theft <- read.csv("theft.all.csv", header=TRUE, sep = ",") %>%

  mutate(Date=as.Date(Date))%>% mutate(reason= "Theft/burglary/robbery")

offences.drugs <- read.csv("offences.drugs.csv", header=TRUE, sep= ",") %>%

  mutate(Date=as.Date(Date))%>% mutate(reason= "Unlawful acts involving controlled drugs or precursors")%>% mutate(total_commited=total_offences)

offences<-bind_rows(offences.homicide, offences.sexual.violence, offences.theft, offences.drugs)%>% mutate(across(reason, factor, levels=c("Intentional homicide",
```

```
"Sexually motivated", "Theft/burglary/robbery", "Unlawful acts involving controlled drugs or precursors")))

offences %>% filter(geo %in% country_filter) %>%

 ggplot(aes(Date,total_commited, color=geo)) + geom_line() +

 scale_color_manual(values = color_sheme) + scale_y_continuous(labels=function(y) format(y, big.mark = ",", scientific = FALSE)) +

  xlab("Year") +facet_wrap(~ reason, scales = "free", labeller = label_wrap_gen(width=40)) +

 ylab("")+ labs(color= "Country") +theme_bw()+ theme (legend.title = element_text(size=8), legend.text = element_text(size=7))
```

```
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# Conclusion

In sum, a wide range of socio-economic indicators and considerations can both, directly and indirectly, affect migrant decision-making as to their desired destinations. Additionally, societal attitudes towards migrants in host societies are influenced by these factors. Through this report, users of the EMT are provided with an understanding of the current socio-economic situations in the Member States, in addition to migration patterns in past years.

The socio-economic areas that were chosen for their relevance and subsequently explored include: income, poverty, inequality, and social expenditure; levels of employment and skills; the gender dimensions of employment, pay and roles; determinants and indicators of health and well-being; levels of material and social deprivation; configurations of justice systems and degrees of corruption; and crime and recorded offenses statistics. The short chapters addressing these aspects describe, analyse and inform those using the EMT. They provide context for the graphs and core statistics (derived from Eurostat) that will be automatically updated within the EMT.

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```

References