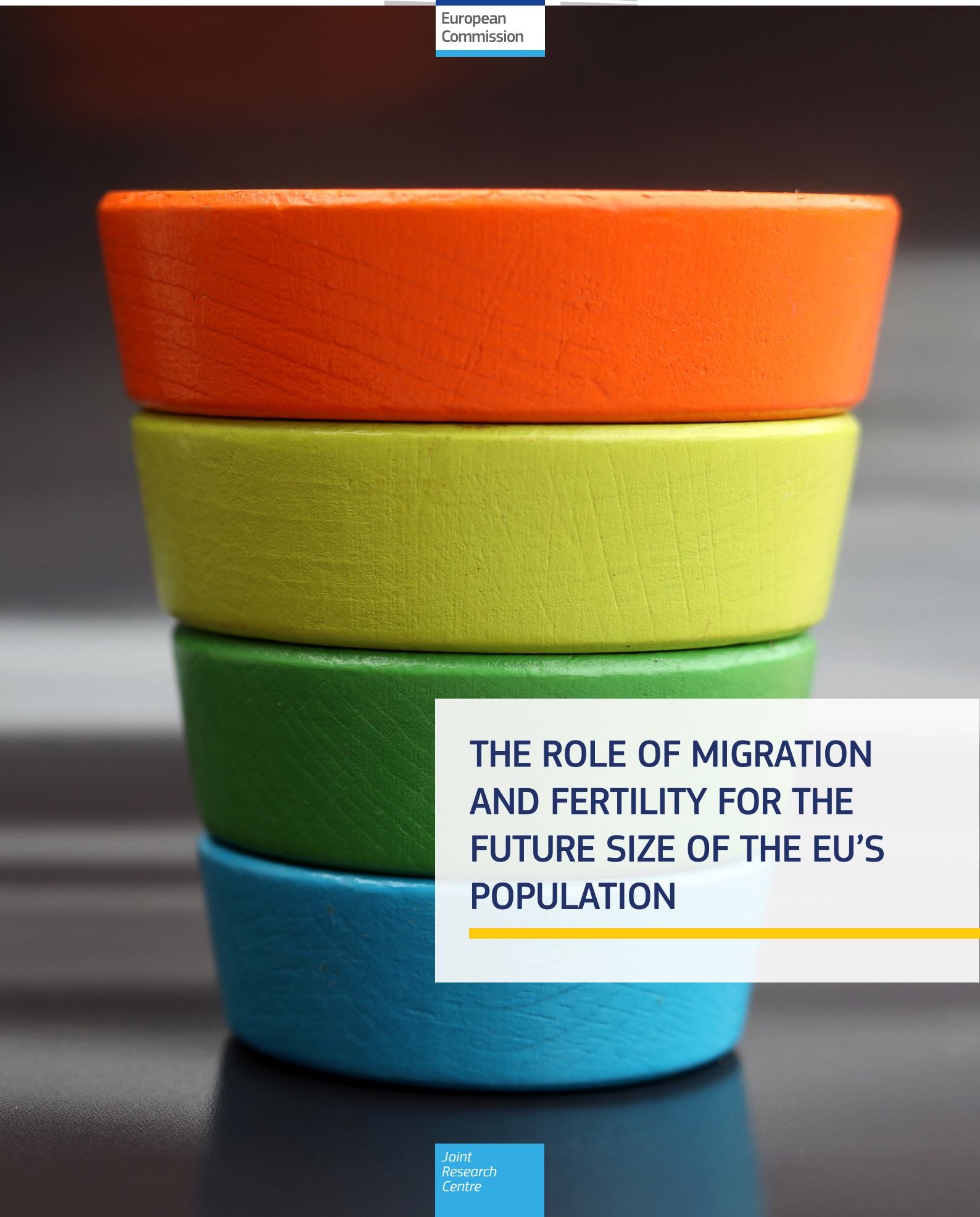


European Commission

THE ROLE OF MIGRATION AND FERTILITY FOR THE FUTURE SIZE OF THE EU'S POPULATION

Joint Research Centre

Contact information
Name: Philipp Ueffing
Email: philipp.ueffing@ec.europa.eu

EU Science Hub
https://joint-research-centre.ec.europa.eu

JRC141069

PDF ISBN 978-92-68-25619-0 doi:10.2760/8696792 KJ-01-25-176-EN-N

Luxembourg: Publications Office of the European Union, 2025

How to cite this report: European Commission: Joint Research Centre, Ueffing, P., Zubeldia Razquin, M., Natale, F., *The Role of Migration and Fertility for the Future Size of the EU's Population,* Publications Office of the European Union, Luxembourg, 2025, JRC141069.

TABLE OF CONTENTS

ABSTRACT

The EU population is set to decline due to lasting low levels of fertility in the near future. Without migration from third Countries, the EU population would have started to decline already about a decade ago. However, the demographic landscape across Member States is complex: migration is accelerating population decline in many Eastern Member States, while slowing-down or even holding-off a decrease in population in some Western and Northern Member States. This report examines how fertility and migration, along with their interaction, contribute to population changes within the EU. It specifically looks at the impact of migratory movements within and from outside the EU. Our findings show that with an aging population structure and a diminishing proportion of young people, many Member States are on course for population decline in the coming decades, irrespective of short-term fertility rate improvements. While positive net-migration reduces the fertility level needed to prevent population decline, few Member States currently meet this threshold.

INTRODUCTION AND POLICY CONTEXT

According to the latest projections from EUROSTAT,[1] the size of the population of the European Union (EU) is reaching its peak. Persistently low fertility rates have driven the demographic shift, leading to 'ageing from the bottom' as younger age-cohorts shrink in size, resulting in a significant demographic imbalance.

The recent Draghi[2] and Letta[3] reports on the future of Europe's competitiveness and its single market highlight the economic risks associated with a declining workforce and an ageing population. Additionally, the European Commission's ninth Cohesion Report[4] warns that demographic changes can exacerbate regional disparities. These reports emphasise the importance of addressing demographic challenges to ensure the EU's future international competitiveness, global influence, and regional and intergenerational fairness within the Union.

Results from a flash Eurobarometer in 2023 highlight that around 50% of EU citizens think that addressing demographic change should be a priority for policymakers, requiring action at both EU and Member States levels.[5] The European Commission's 2024-2029 political guidelines[6] emphasise the need to 'tackle the root causes of demographic change and adapt to new realities', hence to address the underlying causes of demographic change, which is driven by mortality, fertility, and migration.

Low levels of fertility have received increasing attention from policymakers across EU Member States. To bridge the significant gap between fertility intentions and fertility outcomes,[7] policy approaches have focused on improving the reconciliation of family and work goals through measures such as the provision of better childcare options, parental leave and the support for returning to labour market after having a child. At the same time, there are policy efforts to address challenges from an ageing population by improving the integration of older workers in the labour market, strengthening financial and health and long-term care support systems and ensuring the fiscal sustainability and adequacy of social protection systems.

The policy approaches to migration are more complex. While attracting talent from outside the EU to fill labour market gaps is a common strategy, movements within the EU can potentially exacerbate regional disparities through 'brain drain'. Furthermore, irregular migration has become a polarising topic in many elections with policies increasingly focused on curbing the arrival of asylum seekers, including through the reintroduction of internal borders in the EU.

This report seeks to provide a quantitative understanding of the complementary role of migration and fertility for the EU's long-term population future. It employs an 'accounting perspective' to analyse how migration and fertility influence the size of the population in the EU and across Member States over the next decades, until mid-century. In the following, this report will first focus on the current population trends and the underlying demographic factors that influence future population size. A subsequent analytical section looks closer into the interdependent levels of fertility and migration for achieving a stable population long-term, distinguishing the role of migration from outside the EU and between Member States.

It is important to highlight that this report concentrates on analysing the impact of fertility and migration trends on the size of the EU population in the context of the projected future decline. It does not look into changes in the age structure. Demographic research has comprehensively demonstrated that migration cannot realistically prevent population ageing in low fertility settings.[8] Migrants become part of an ageing population and tend to adapt to the fertility regimes of that population over time.

1 EUROSTAT (2023) EUROPOP2023: Population projections at national level (2022-2100) (proj_23n)
2 European Commission (2024) The future of European competitiveness: Report by Mario Draghi
3 European Commission (2024) Much more than a market: Empowering the Single Market to deliver a sustainable future and prosperity for all EU Citizens: Report by Enrico Letta
4 European Commission (2024) Ninth Report on Economic, Social and Territorial Cohesion
5 European Commission (2023) Flash Eurobarometer FL534: Demographic change in Europe
6 European Commission (2024) Europe's choice: Political guidelines for the next European Commission 2024-2029, Ursula von der Leyen, Candidate for the European Commission President
7 European Commission Joint Research Centre (2024) Policy Brief: Low Fertility in the EU: A Review of Trends and Drivers
8 Bijak, J., Kupiszewska, D., & Kupiszewski, M. (2008). Replacement Migration Revisited: Simulations of the Effects of Selected Population and Labor Market Strategies for the Aging Europe, 2002–2052. Population Research and Policy Review, 27(3), 321–342. https://doi.org/10.1007/s11113-007-9065-2

1. DEMOGRAPHIC DYNAMICS

THE EU POPULATION IS SET TO REACH ITS HISTORIC PEAK IN THE NEAR FUTURE

According to both Eurostat and United Nations (UN) projections, the EU population[9] is expected to peak at 453 million people, around 2026 (Figure 1), after a long period of continuous growth. It will then begin a gradual decline. According to Eurostat's reference projection (the baseline projection), the EU population will decline slightly to 448 million by 2050. The United Nations medium projection shows a stronger decline down to 422 million in 2050, in line with the Eurostat's projection based on assuming a lower net-migration scenario.[10]

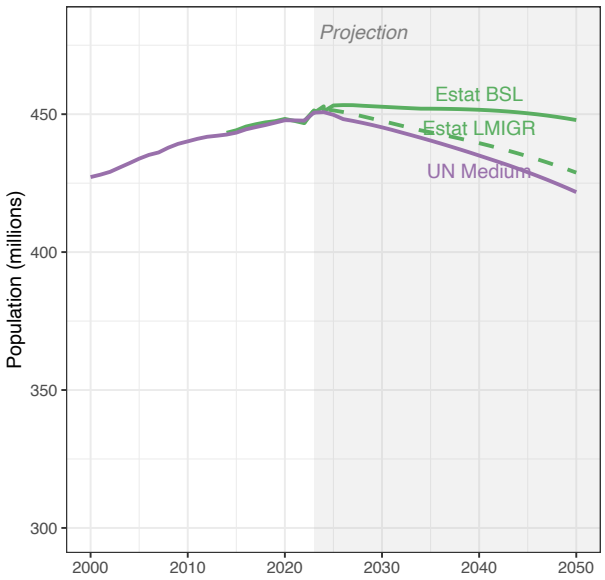
Until the 2000s, the change of the EU population was mainly driven by natural population growth (births exceeding deaths). It turned negative in 2012 when, for the first time, deaths exceeded births. The number of births is projected to continue to decline while the ageing of the EU population generates more deaths despite increasing life expectancy. Population growth has continued over the last decade due to positive net-migration, but the EU population is now projected to start declining soon as the widening gap between births and deaths outweighs the continued gains from positive net-migration assumed in the EUROSTAT and the UN projection models.

The reason for a decreasing numbers of births in the EU is the long period of low fertility rate[11] that in the 1970s, In most Member States dipped below 'the natural replacement level' of about 2.1 births per woman,[12] namely the level necessary for each generation to replace itself.

NOT ALL MEMBER STATES ARE EXPECTED TO EXPERIENCE POPULATION DECLINE

Population decline is already a reality across the EU.

FIGURE 1. EU population over time (1990-2050). yellow) and 1997 (dark green).



Notes: : Estat BSL = Eurostat Baseline Scenario, Estat LMIGR = Eurostat Low Migration Scenario, UN Medium = United Nations Medium Scenario.
Source: : Eurostat (2023), United Nations (2022).

Eastern Member States, in particular, have long-standing negative growth dating back as far as the early 1990s. The decline was driven by a combination of low birth rates and negative migration balances, with high emigration numbers directed mostly to Western Europe and, therefore, remaining in the EU as a whole. Since their population peaks in the 1990s, countries such as Estonia, Croatia, Hungary, and Romania have seen population declines of more than 10%. In Bulgaria, Lithuania, and Latvia, the decrease has been even more pronounced, exceeding 20%.

9 In the context of this report the EU population refers to the combined population of the current 27 Member States at all times

10 Population projections are estimates of future population size, age structure, and geographic distribution. They are based on assumptions about fertility, mortality, and migration rates. While critical for policy planning, projections are inherently uncertain, especially for long-term horizons of several decades into the future. Eurostat and United Nations produce a range of different projection scenarios that combine varying assumptions on fertility, mortality and migration rates to capture possible population futures. Their most commonly used scenarios are Eurostat's Baseline Scenario and the UN's Medium Scenario. Regarding the main projection scenarios for the EU and its Member States, the projected levels of fertility and mortality of Eurostat and the UN are closely aligned. The main differences between Eurostat's Baseline Scenario and the UN's Medium Scenario lies in the assumptions about future migration levels. The UN migration assumptions in its Medium Scenario are much closer to the level of migration assumed by Eurostat in its 'Low Migration' scenario

11 Throughout this report, 'Fertility rate' refers to the Total Fertility Rate (TFR), which estimates the average number of children a woman would have in her lifetime if she experienced current age-specific birth rates throughout her reproductive years. It is a standardised demographic indicator to describe and compare the overall level of childbearing in a population.

12 The 'natural replacement level', the number of births per woman at which each generation bears the exact number of children needed to replace itself, varies across countries due to differences in mortality levels. In high income countries with relatively low mortality it is about 2.1 births per woman, but can go up to about 2.4 births per woman populations with higher mortality

Projections indicate that in the coming decades, most Member States will experience population decline, although the extent will vary considerably (Figure 2). Many Eastern Member States are expected to see further reductions in population size, and several Southern European countries are also projected to experience significant declines by 2050. However, not all Member States will see a decrease; countries like Luxembourg, Ireland, Sweden, the Netherlands, and France are anticipated to continue growing in population size.

AN INTERPLAY OF DEMOGRAPHIC FORCES DRIVES FUTURE CHANGE

Population change is the net difference in the size of a population over a specific period as a result of the underlying factors of fertility, mortality, and migration. An important additional factor is the age structure of the population, which is shaped by past demographic trends. This generates what is known as "population momentum," a phenomenon where population changes continue to occur even if fertility, mortality, and migration rates remain constant.

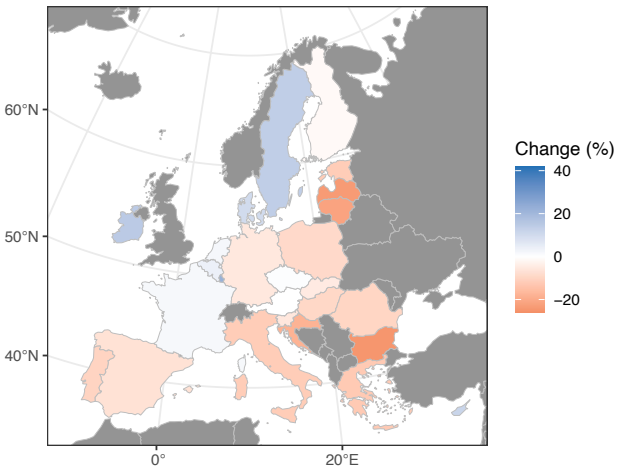
In a population with an older age structure, this population momentum is 'negative' and contributes significantly to future population decline. Even if fertility rates were to return to the natural replacement level, the population could still decline for several decades. This is due to the smaller size of cohorts of younger generations with respect to the previous generations they are going to replace as they become older.

The opposite effect of 'positive momentum' is embedded in a youthful population with a large proportion of people of younger age. It can lead to continuous population growth even if fertility falls below the natural replacement level.

In the following, by applying decomposition analysis,[13] this report will evaluate the relative weight of these four demographic forces of fertility, mortality, migration, and population momentum in driving population growth in the EU.[14]

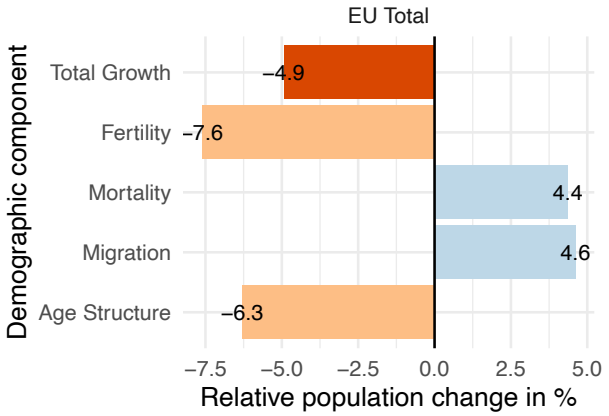
For the EU population, low fertility and the old age structure are the driving forces behind a projected 5% decline by 2050 (Figure 3). They contributes almost equally to a negative population momentum. Together these two factors account for a 14% of the EU population. However, projected improvements in life expectancy due to lower mortality rates and population gains from migration partly offset these losses accounting in isolation for a combined 9% growth.

FIGURE 2. Projected change in population size in EU countries between 2023 and 2050.



Source: United Nations (2022).

FIGURE 3. Demographic components of change in EU population size, 2023 to 2050.

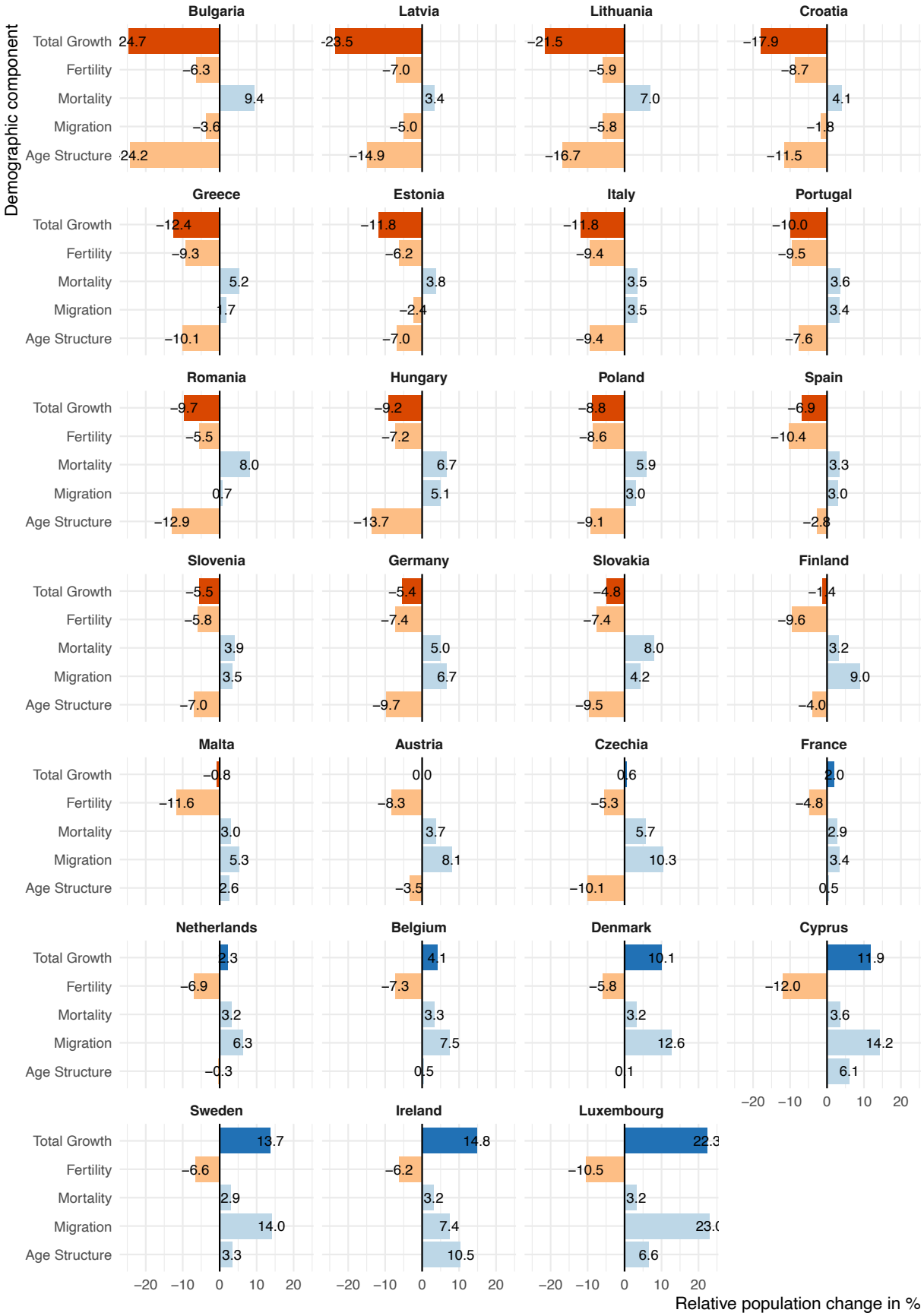


Notes: The top bar shows the total projected population change between 2023 and 2050. The individual contributions of each of the four demographic components shown in the lower bars sum to the total change. Their individual contributions indicates the change in population size if there had been no change in the other components. Dark red and dark blue show negative and positive total change. Light red and light blue show negative and positive change contributions of individual components.
Source: authors' elaborations based on United Nations (2022)

13 K Andreev, V Kantorová, & J Bongaarts (2013) Demographic Components of Future Population Growth, Technical report, Population Division, United Nations.

14 Data from the UN are used as they readily provide the necessary input data for the analysis. Several projection variants available from the United Nations World Population Prospects (UN 2024) are combined to estimate the contribution of demographic components of fertility, mortality, migration and population momentum to future population change in the EU and its Member States. The required projection variants are the UN's medium projection, the zero-migration projection, the instant-replacement fertility projection, and the population momentum projection.

FIGURE 4. Demographic components of change in population size between 2023-2050 in EU Member States.



Notes: The data used for the statistical calculation of relative change of the population for Cyprus, being sourced from United Nations, include the entire territory

Source: authors' elaborations based on United Nations (2022)

A COMPLEX LANDSCAPE OF DEMOGRAPHIC DRIVERS ACROSS MEMBER STATES

The demographic outlook varies significantly across different regions within the EU (Figure 4). While projected increases in life-expectancy will lower mortality and contribute positively to population change in all Member States, the contribution of other factors varies. However, for most countries the contribution of mortality to the total change in population size is moderate and less significant than the impact of the other demographic components.

Central and Eastern European Member States are projected to experience the most significant population declines. This is due to a combination of low fertility rates, migration patterns, and notably, negative population momentum. In many cases, this momentum alone is projected to contribute to more than 10% of the population decline by 2050.

Some Western European Member States, such as France, Germany or the Netherlands, may experience more moderate population changes. This is due to higher immigration levels and slight improvements in mortality rates, which help offset losses caused by low fertility and negative momentum. In contrast, Southern European Member States, where birth rates are as low as 1.3 births per woman—the lowest in the EU—are primarily driven by this low fertility. This factor alone is responsible for an approximately 10% population decline in Portugal, Spain, Italy, Malta, and Greece.

Migration is the strongest driver for countries projected to continue to growth by 2050. This growth is strongest for those populations that additionally benefit from a still relatively youthful age structure and positive momentum. This is the case of Sweden and Luxembourg, that, before a drop to 1.5 children per woman after 2010, had a relatively high fertility level of around 1.8 births. In Ireland, where the population is expected to grow by more than 10%, the positive momentum results from experiencing fertility rates above the replacement level of 2.1 births per woman until the end of the 20th century, much longer than in other Member States.

2. THE RELATIONSHIP OF FERTILITY AND MIGRATION

COULD FERTILITY AND MIGRATION PREVENT POPULATION DECLINE?

We have seen that migration has emerged as a major demographic driver of population change in the EU that, in some Member States, might compensate the decreases in population size from low fertility. Hence, fertility levels need to be considered within a specific migration context, rather than looking universally at the natural replacement level as aspirational standard. This brings a new perspective[15] to the implications of low fertility in EU Member States and other advanced economies like the US, which are also projected to continue to grow despite fertility below the natural replacement level.

The concept of the "migration-adjusted replacement fertility rate"[16] (MAFR) is used to examine the relationship between current fertility and migration levels in EU Member States in the context of future population changes. The MAFR measures the level of fertility needed to maintain a stable population size accounting for current levels of migration (and mortality). It offers an alternative perspective to the traditional natural replacement level, which assumes a closed population without migration.

CURRENT MIGRATION LEVELS WOULD CHANGE THE LEVEL OF REQUIRED FERTILITY FOR A STABLE POPULATION IF THEY CONTINUE IN THE FUTURE

The MAFR varies considerably across the EU (Figure 6). For most Member States, the MAFR is below the natural replacement level. They are experiencing more immigration than emigration, but not enough to prevent long-term population decline.

Comparing the MAFR to the actual fertility rates in the EU reveals that only Sweden, Austria, Germany and the Netherlands will experience long-term population growth if current demographic conditions continued in the future (Figure 6). In Sweden, for example, the MAFR indicates that a fertility rate of 1.23 births per woman, almost one births per woman less than the natural replacement level, would stabilise population size in the long-term at current levels of net-migration.

On the other hand, several Member States, particularly in Eastern Europe, have a MAFR above the natural replacement rate due to net-migration losses. This is the case for Croatia, Lithuania, Latvia, Romania, and Slovakia. The MAFR is highest in Lithuania, where the fertility rate would need to be above 2.6 births per woman, if current negative net-migration will continue.

These results underline the complex interplay between fertility and migration in shaping future population trends in the EU. While the range of current fertility rates across EU countries is relatively narrow, from 1.2 to 1.8 births per woman, the MAFR shows a much wider range, highlighting the different impact of migration on long-term population dynamics. The picture becomes even more nuanced when differentiating between intra-EU migration and migration from outside the EU.

WHILE MEMBER STATES GAIN IN POPULATION FROM MIGRATION FROM OUTSIDE THE EU, MIGRATION WITHIN THE EU UNEVENLY REDISTRIBUTES POPULATION ACROSS THEM

Intra-EU migration,[17] the movement of people between EU Member States, creates a zero-sum game where movement within the EU is not mitigating the demographic decline, only shifting it from one Member State to another. Every immigrant to a Member States is also an emigrant from another Member State so that one country's gain in population is the other country's loss in population.

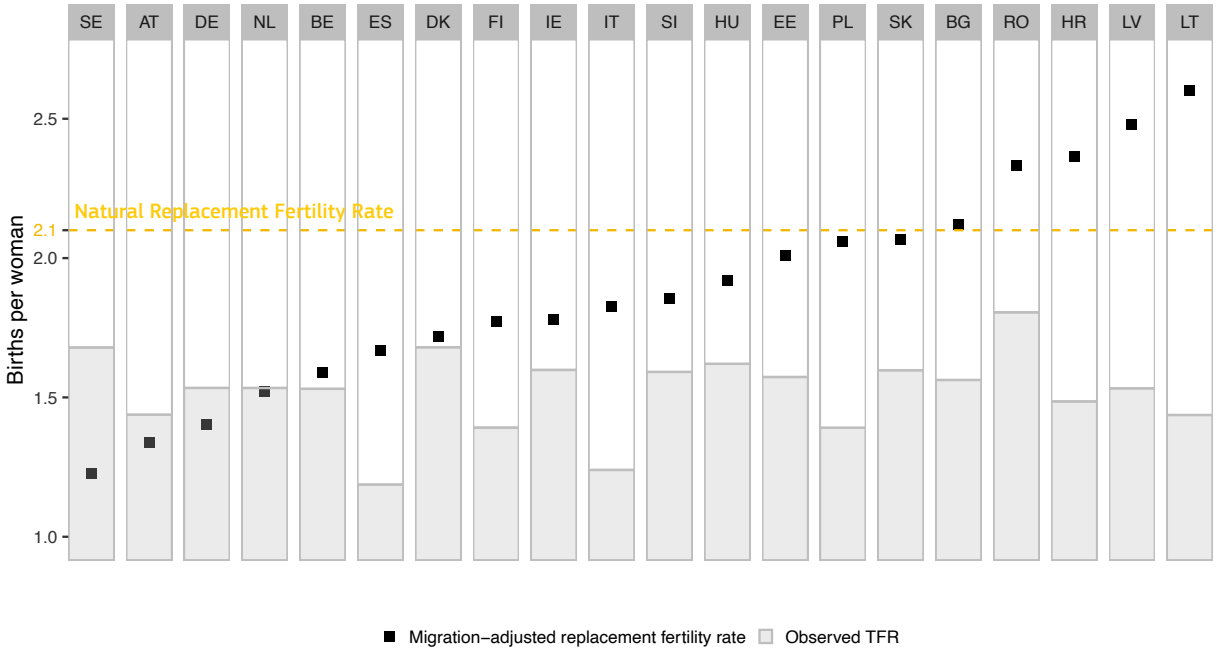
Extra-EU migration, the movement of people from non-EU countries into a Member States, is not a zero-sum game. Member States can gain population without another Member State losing population. Furthermore, while the

15 Parr, N. (2023). An Alternative Perspective on the Changing Relationships between Fertility and Replacement Level in European Countries. Population and Development Review, 49(2), https://doi.org/10.1111/padr.12559.

16 Parr, N. (2021). A New Measure of Fertility Replacement Level in the Presence of Positive Net Immigration. European Journal of Population, 37(1), 243–262. https://doi.org/10.1007/s10680-020-09566-w

17 In this report we use the term intra-EU migration instead of EU mobility for the movement across Member States as a technical exception for terminological symmetry

FIGURE 5. Current levels of fertility compared to the theoretical fertility level required to maintain a stable population long-term at recent levels of migration, selected EU Member States



Notes: 1) When net-migration is positive, the migration-adjusted replacement fertility rate is below the natural replacement fertility rate and vice-versa. 2) When the migration-adjusted replacement fertility rate is below the observed fertility rate in a country, black square inside the grey box, the population will grow long-term. When it is higher than the observed fertility rate, black square above the grey box, the population will decline long-term. 3) Data not available for all EU Member States
Source: authors' elaborations based on estimates provided by Eurostat

EU population has started to decline, the main countries of origin of migrants to the EU still have growing populations.

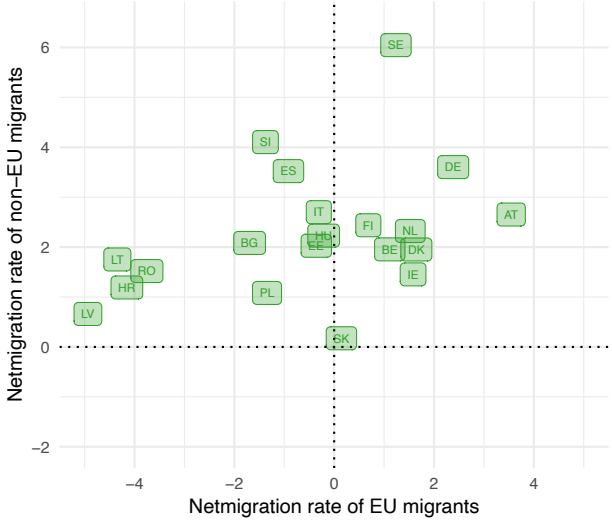
Western and Northern Member States have positive net-migration balances for both, migrants from other Member States and migrants from outside the EU within and outside the EU (Figure 7). The Southern Member States Greece, Italy and Spain have a mixed migration patterns. They attract non-EU migrants, but have slightly negative intra-EU migration balances. Eastern Member States, on the other hand, often experience significant emigration to other Member States, while benefitting slightly from migration from outside the EU. This has different effects on the interplay with the level of fertility necessary for a stable population in the long-term.

MIGRATION FROM OUTSIDE THE EU REDUCES THE LEVEL OF FERTILITY ACROSS THE EU, WHILE INTRA-EU MIGRATION CAN PUSH IT SIGNIFICANTLY ABOVE THE NATURAL REPLACEMENT FERTILITY LEVEL

The MAFR necessary to maintain a stable population is shown separately for intra-EU and extra-EU migration for Member States in Figure 7 (It splits the MAFR for all migration as seen in Figure 5). Sweden is the only country where one of the two forms of migration in isolation - specifically from outside the EU – would be sufficient to maintain a stable population long-term. In Austria, Germany and the Netherlands, this is the case only considering the cumulative effect of intra-EU and extra-EU migration. In Belgium, Denmark, Finland and Ireland, while intra and extra-EU net-migration are both positive, they are not sufficient to compensate for the current low fertility.

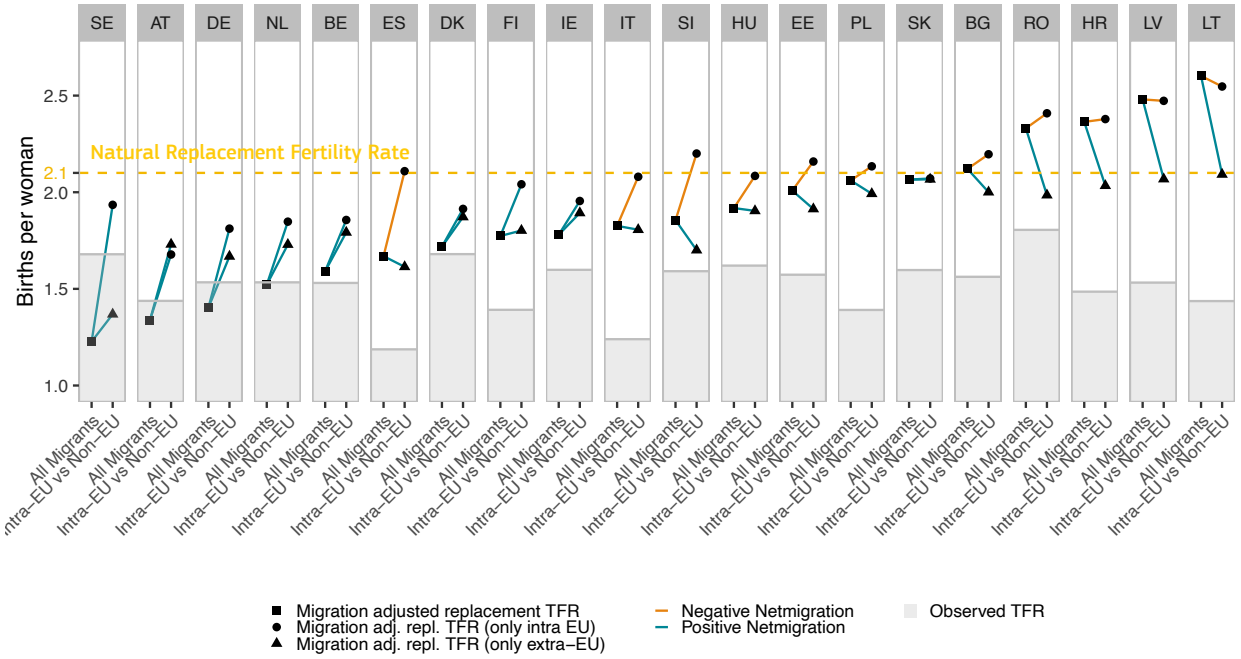
In many Southern and Eastern Member States, the gains from immigration from outside the EU explain a

FIGURE 6. Net-migration rates of intra-EU migration and extra-EU migration for selected EU Member States.



Note: Data not available for all EU Member States
Source: authors' elaborations based on estimates provided by Eurostat

FIGURE 7. Migration-adjusted fertility levels to maintain a stable population long-term by type of migration



Note: 1) When the migration adjusted replacement level is calculated for only one type of migration (intra-EU or extra-EU), the other type is set to zero in the calculation. 2) The change from using total migration numbers to only one type of migration is indicated by the lines from square (total) to circle (intra-EU only) or to triangle (extra-EU only). 3) Data not available for all EU Member States
Source: authors' elaborations based on estimates provided by Eurostat

MAFR below the natural replacement level. In the case of Spain, Italy or Poland the slightly negative intra-EU migration balances lead to a higher required fertility level to maintain a stable population. However, despite the effect of migration from outside the EU, the gap between current fertility levels and combined MAFR is large.

In Romania, Croatia, Latvia and Lithuania, the negative intra-EU migration balances push the MAFR above the natural replacement level. Without the net losses from intra-EU migration, the small surplus of international immigrants over international emigrants would slightly reduce the needed fertility level to stabilise population long-term, but it does not have a strong effect on the combined MAFR.

3. OUTLOOK

The demographic accounting exercise in this report touches on the often ideologically driven discussion on the compensatory nature of fertility versus migration as two possible leavers to prevent population decline. Our analysis is not meant to indicate that policies should pursue a target of stabilising population in the first place nor that one or the other forms of interventions should be favoured. The main purpose was to shed some light on the respective role of the different components acting on demographic change of the EU population.

Population change in the EU is - as in most advanced economies that have gone through the demographic transition - increasingly influenced by migration. Low fertility and negative population momentum due an old age structure are projected to lead to population decline. However, migration, while unlikely to halt the change in age structure towards older populations, could at least slow down the decline in population size in some countries, while potentially accelerating decline in others. Given the prominent demographic role played by both intra- and extra-EU migration in the EU, these results provide nuances to the often-cited natural replacement fertility rate of 2.1 births per woman as an indicator and target when assessing long-term population dynamics.

The same levels of fertility or migration can lead to vastly different population outcomes. Even relatively low levels of fertility of 1.5 or 1.6 births per woman, could result in continued population growth in Member States with high net-migration such as Sweden or Austria. Conversely, the same level of fertility would be insufficient to maintain a stable population in Member States with lower net-migration such as Germany or Italy. Member States with negative net-migration such as Croatia or the Baltic countries would even need higher levels of fertility than the natural replacement rate of 2.1 births per woman to stabilise their population. For many Southern and Eastern Member States movement within the EU accelerates population decline.

While our analysis highlights the contributions of fertility and migration, it is important to recognize that they are not competing solutions to the EU's demographic challenges. Both factors influence population change; they operate on distinct timeframes and through different mechanisms. Fertility rates change slowly over time and, even if significantly increased, would take decades to impact the working-age population. Migration trends, on the other hand, are much more volatile and migratory movements can provide a quicker inflow of workers, particularly in sectors experiencing labour shortages. However, where net-migration is negative, it also has the opposite effect and accelerates population decline. Migration is already acting as a slowing force or accelerator of population decline from low fertility levels across EU Member States.

The report confirms the horizontal nature of population change in the EU and the necessity for a comprehensive strategy beyond demographic solutions as formulated in the European Commission's Demographic Toolbox Communication.[18] The interplay of fertility and migration are altering but not changing demographic challenges, while affecting Member States differently and possibly widening regional, economic and social divergences.

18 European Commission (2023) Demographic change in Europe: a toolbox for action, COM(2023) 577

DISCLAIMER AND ACKNOWLEDGEMENTS

The views expressed are purely those of the authors and may not in any circumstances be regarded as stating an official position of the European Commission.

The authors thank the Members of the Cabinet of Commissioner for the Mediterranean, Dubravka Šuica; and Argyrios Pisiotis from DG Employment for comments and suggestions; as well as Hannah Kiiver from Eurostat for assisting with migration data.

AUTHORS

Ueffing Philipp, (C.A.) Corresponding Author
Zubeldia Razquin Marije
Natale Fabrizio

GETTING IN TOUCH WITH THE EU

In person

All over the European Union there are hundreds of Europe Direct centres. You can find the address of the centre nearest you online (european-union.europa.eu/contact-eu/meet-us_en).

On the phone or in writing

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

— by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),

— at the following standard number: +32 22999696,

— via the following form: european-union.europa.eu/contact-eu/write-us_en.

FINDING INFORMATION ABOUT THE EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website (european-union.europa.eu).

EU publications

You can view or order EU publications at op.europa.eu/en/publications. Multiple copies of free publications can be obtained by contacting Europe Direct or your local documentation centre (european-union.europa.eu/contact-eu/meet-us_en).

EU law and related documents

For access to legal information from the EU, including all EU law since 1951 in all the official language versions, go to EUR-Lex (eur-lex.europa.eu).

EU open data

The portal data.europa.eu provides access to open datasets from the EU institutions, bodies and agencies. These can be downloaded and reused for free, for both commercial and non-commercial purposes. The portal also provides access to a wealth of datasets from European countries.

Science for policy

The Joint Research Centre (JRC) provides independent, evidence-based knowledge and science, supporting EU policies to positively impact society

EU Science Hub
joint-research-centre.ec.europa.eu

Publications Office
of the European Union