Chapter 9

The Impact of the Demographic Ice Age on Economic Growth, Public Policy, and the Sustainability of Pension Systems

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Abstract

Over the past decades, the demographic conditions of European countries have been characterised by decreasing fertility rates and, consequently, fewer births and an ageing society. The Member States of the European Union face similar demographic problems, with the number of births stagnating or decreasing and the total fertility rate falling beneath the 2.1 value necessary for the simple reproduction of the population. The European Union does not have a family policy, and the Member States deal with the challenges arising from the 'demographic ice age' through different methods at the national level, taking into account their countries' different needs and cultural backgrounds, and especially their ever-shrinking financial possibilities, with little success. This chapter analyses in detail the effects of demographic changes on economic growth, labour markets, monetary policy, budgetary and other government policies, and, ultimately, the sustainability of pension systems and retirement livelihoods. The chapter attempts to demonstrate that a coherent family policy and other related government policies could have a positive effect on the current unfavourable demographic processes within individual countries, as well as on their expected negative consequences, if they were to focus on the demographic challenges in a meaningful way. The conditions in Hungary are described, in addition to international trends.

Keywords: Economic theory of fertility, family policy, demographic winter, demographic ice age, family benefits, family policy, fertility rate, number of live births, pension system, minimum pension, supplementary pension, old age

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1. Introduction

The world's population continues to grow, albeit at a slower pace than at any time since 1950 owing to declining fertility rates. According to some forecasts, the number of people in the world, estimated at 7.7 billion in 2019, may increase to approximately 8.5 billion in 2030, 9.7 billion in 2050, and 10.9 billion in 2100.[1] There are several reasons why the human population is growing despite falling fertility rates. Total fertility has declined significantly in recent decades. Almost half of the world's population lives in a country or area where lifetime fertility is less than 2.1 live births per woman, that is, it does not reach the level where the population growth rate is at least zero in the long term. However, in 2019, fertility was on average above this level in other parts of the world such as sub-Saharan Africa (4.6 live births per woman), Oceania (excluding Australia and New Zealand (3.4), North Africa and Western Asia (2.9), and Central and South Asia (2.4).

In many high-income countries, as well as in Europe and Central Asia, fertility rates have been declining since the 1990s and are now below the replacement rate. In Europe, the effect of the decline in the fertility rate is increased by emigration affecting individual Member States and other European countries. The combination of these two issues is expected to lead to a net population decrease between 2015 and 2050. According to these forecasts, among the high-income countries, the populations of Germany and Japan will decrease by 7.7 and 15.1%, respectively, during this period. However, the most extreme population decline is expected in the developing countries of Europe and Central Asia; for example, according to forecasts, Bulgaria's population is expected to shrink by 27.9% by 2050 due to low fertility and a high net migration rate.[2]

In the EU Member States, forecasts predict that population decline is only one of the problems we face: the phenomenon of an ageing society, that is, the increase in the proportion of people over 65 within the society, also contributes to the demographic challenges. This trend is the combined result of declining fertility (decrease in the number of births) and an increase in life expectancy.

In this chapter, we examine those countries experiencing population decline rather than rapid population growth. We then explore the possible consequences of this issue and whether it makes the various current social and economic systems, and especially pension systems, unsustainable. The chapter's main goal is to comprehensively reveal what demographic problems the European Union (EU) Member States are facing and how these challenges can be remedied. Another goal is to demonstrate which countries have been able to break the negative trends of demographic changes and whether more positive trends can be expected to develop by following their practices. Thereafter, we consider the most important effects of demographic changes on economic growth, labour markets, monetary policy, budgetary and

1 United Nations, 2019.
2 World Bank, 2013, pp. 142–143.

other policies, and, ultimately, the sustainability of pension systems. The purpose of the chapter is not to develop numerical forecasts, as many forecasting companies and professionals already specialise in this; however, we quote the most important findings of these international organisations in several places. In addition to these sources, we refer to the databases and thematic publications of the EU, Eurostat, the United Nations (UN), the Organization for Economic Cooperation and Development (OECD), and the World Bank, as well as articles and studies related to the topic.

2. Demographic trends – the main characteristics of the demographic ice age in Europe

Family patterns have changed significantly over the past 50 years owing to new trends in partnerships and childbearing. The 1960s marked the end of the so-called 'Golden Age', when the rate of marriages and childbearing at a relatively young age was still relatively high, the number of divorces was low, and traditional family forms prevailed. Currently, traditional family forms and a variety of non-traditional relationships coexist.[3] In almost all European countries, the fertility rate is much lower than the population replacement level, the age of marriage and parenthood has been postponed or does not happen at all, and marital and non-marital relationships – even between couples with children – have become fragile.[4] The emphasis on family diversity, thus, requires the modernisation of family support policies. New forms within the family, as well as the needs of 'non-standard' families, must be taken into account. Modernisation, however, is a multifaceted concept as family policies include wide-ranging state interventions in relation to many aspects of the lives of women, men, couples, parents, and children.[5] This includes reconciling work and family responsibilities, mobilising the female workforce, promoting gender equality, ensuring the financial sustainability of social protection systems, combating child and family poverty, promoting child development, and generally strengthening the well-being of children in the early life.[6]

2.1. Development of the total fertility rate in EU Member States

The total fertility rate is one of the most commonly used fertility indicators. This rate shows how many children a woman would give birth to on average during her lifetime if the fertility data for the given year were constant. By projecting the

3 European Commission, 2016.
4 Oláh, 2015.
5 Thévenon and Neyer, 2014.
6 OECD, 2011.

cross-sectional data, we can determine how many children a woman would have in total if she had a chance of having a child during her lifetime and, thus, characterise the propensity to have children among women of childbearing age in the given period. In reality, of course, a woman's life path does not always develop according to this pattern, and, given that the age-specific fertility rate changes from year to year, the total fertility rate also changes. It is important to be aware that the total fertility rate is, therefore, sensitive to changes in the timing of having children, which can result in fluctuations in the ratio in different years. At the same time, fertility conditions are most comprehensively reflected by this indicator, even if it is also subject to distortions in those periods when changes in the timing of childbearing occur. In international comparisons, the total fertility rate is most often used.[7] This rate is the average number of live births that a woman could give birth to in her lifetime if her fertile years were in accordance with the age-specific fertility rates of the given year. This ratio, thus, represents the complete fertility of a hypothetical generation, which is calculated by adding the age-specific fertility rates for women in a given year (assuming that the number of women is the same at each age). The total fertility rate is also used to indicate reproduction-level fertility; in more developed countries, a ratio of 2.1 is considered the reproduction level.[8]

According to some economists,[9] if the economically ideal birth rate is 2.5–3 children per woman, and the replacement rate is 2.1, then it is worth examining where the fertility rate of each country currently stands. Europeans have generally had fewer children in recent decades, and this pattern partly explains the slowdown in EU population growth (see Population and population change statistics for more). Today, no European country meets the ratio of around 2.1 live births per woman, which, according to experts, would be necessary for the population to remain constant in that country, not considering migration. This is one of the reasons why some call today's era the 'demographic winter'.[10]

The total fertility rate is comparable across countries because it takes into account changes in population size and structure. In 2019, the total fertility rate in the EU was 1.53 live births per woman, compared to 1.54 in 2018. This rate rose to 1.57 in 2010, after which a decline began after 2018 to 1.50 in 2020, followed by a modest recovery in 2021 to 1.53.[11] The current total fertility rate in Europe shows that no longer-term supply of the population can be ensured in any European country or the continent as a whole (see Table 1). Among the EU Member States, France reported the highest total fertility rate in 2019, with 1.86 live births per woman, followed by Romania with 1.77 live births, and Ireland, Sweden, and the Czech Republic with 1.71 live births each. In contrast, the lowest total fertility rates in 2019 were

7 Kapitány and Balázs, 2015.
8 United Nations, 2019.
9 Rogers, 2020.
10 Tóth, 2022; Novoszáth, 2022.
11 Eurostat, 2023.

recorded in Malta (1.14 live births per woman), Spain (1.23 live births per woman), Italy (1.27 live births per woman), Cyprus (1.33 live births per woman), and Greece and Luxembourg (both 1.34).[12] A total fertility rate below 1.3 live births per woman is often referred to as 'low-low fertility'. On the Catholic holiday of the Holy Family in December 2021, Pope Francis criticised the 'demographic winter' of his adopted country of Italy, stating that the declining preference for having children harms not only families but also the country and society as a whole.[13]

In the majority of EU Member States, the total fertility rate fell significantly between 1980 and 2000–2003: by 2000, values fell below 1.30 in Bulgaria, the Czech Republic, Greece, Spain, Italy, Latvia, Slovenia, and Slovakia. After the low point between 2000 and 2003, the total fertility rate increased in many Member States. By 2019, all Member States except Malta, Spain, and Italy reported total fertility rates above 1.30 (Table 1).

Table 1. Total fertility rate 1960–2021[14]

	1960	1970	1980	1990	2000	2010	2018	2019	2020	2021
EU						1.57	1.54	1.53	1.50	1.53
Belgium	2.54	2.25	1.68	1.62	1.67	1.86	1.62	1.60	1.55	1.60
Bulgaria	2.31	2.17	2.05	1.82	1.26	1.57	1.56	1.58	1.56	1.58
Czechia	2.09	1.92	2.08	1.90	1.15	1.51	1.71	1.71	1.71	1.83
Denmark	2.57	1.95	1.55	1.67	1.77	1.87	1.73	1.70	1.68	1.72
Germany					1.38	1.39	1.57	1.54	1.53	1.58
Estonia	1.98	2.17	2.02	2.05	1.36	1.72	1.67	1.66	1.58	1.61
Ireland	3.78	3.85	3.21	2.11	1.89	2.05	1.75	1.71	1.63	1.78
Greece	2.23	2.40	2.23	1.39	1.25	1.48	1.35	1.34	1.39	1.43
Spain			2.22	1.36	1.22	1.37	1.26	1.23	1.19	1.19
France					1.89	2.03	1.87	1.86	1.83	1.84
Croatia						1.55	1.47	1.47	1.48	1.58
Italy	2.40	2.38	1.64	1.33	1.26	1.46	1.29	1.27	1.24	1.25
Cyprus				2.41	1.64	1.44	1.32	1.33	1.36	1.39

12 Eurostat, 2022.
13 Allen, 2021.
14 Source: Authors, based on the Eurostat database (Total fertility rate [TPS00199]).

	1960	1970	1980	1990	2000	2010	2018	2019	2020	2021
Latvia					1.25	1.36	1.60	1.61	1.55	1.57
Lithuania		2.4	1.99	2.03	1.39	1.5	1.63	1.61	1.48	1.36
Luxembourg	2.29	1.97	1.5	1.6	1.76	1.63	1.38	1.34	1.36	1.38
Hungary	2.02	1.98	1.91	1.87	1.32	1.25	1.55	1.55	1.59	1.61
Malta			1.99	2.02	1.68	1.36	1.23	1.14	1.13	1.13
Netherlands	3.12	2.57	1.6	1.62	1.72	1.79	1.59	1.57	1.54	1.62
Austria	2.69	2.29	1.65	1.46	1.36	1.44	1.47	1.46	1.44	1.48
Poland				2.06	1.37	1.41	1.46	1.44	1.39	1.33
Portugal	3.16	3.01	2.25	1.56	1.55	1.39	1.42	1.43	1.41	1.45
Romania			2.43	1.83	1.31	1.59	1.76	1.77	1.80	1.81
Slovenia				1.46	1.26	1.57	1.60	1.61	1.59	1.64
Slovakia	3.04	2.41	2.32	2.09	1.30	1.43	1.54	1.57	1.59	1.63
Finland	2.72	1.83	1.63	1.78	1.73	1.87	1.41	1.35	1.37	1.46
Sweden		1.92	1.68	2.13	1.54	1.98	1.76	1.71	1.67	1.67
Iceland						2.20	1.71	1.74	1.72	1.82
Liechtenstein						1.40	1.58	1.48	1.46	1.53
Norway						1.95	1.56	1.53	1.48	1.55
Switzerland						1.52	1.52	1.48	1.46	1.52
United Kingdom						1.92	1.68			
Montenegro						1.7	1.76	1.77	1.75	1.76
Moldova						1.30				
North Macedonia					1.88	1.56	1.42	1.34	1.31	1.44
Albania						1.63	1.37	n.a.	1.34	1.31
Serbia					1.48	1.4	1.49	1.52	1.48	1.52
Turkey						2.04	1.99	1.88		
Ukraine						1.43	1.20	1.14		
Kosovo							1.61	1.55		

Over the past 45 years, total fertility rates in EU Member States have generally converged: while in 1970, the difference between the highest rate (recorded in Ireland) and the lowest rate (recorded in Finland) was about 2.0 live births per woman, by 1990, the difference between the peak in Cyprus and the trough in Italy narrowed to 1.1. By 2010, the difference further decreased, falling to 0.8 live births, with the highest rate in Ireland and the lowest in Hungary. By 2019, the gap had decreased to 0.7, when the highest total fertility rate was recorded in France and the lowest in Malta.[15]

2.2. Trends in the number of live births in EU Member States

The number of births in Europe has been decreasing continuously since 2011 (Table 2), largely as a result of multifaceted, gendered social and economic developments.

Table 2. Trends in the number of live births in EU Member States, number 2011–2022[16]

	2011	2015	2016	2017	2018	2019	2020	2021	2022	Change 2011–2022
EU*	4,458	4,331	4,380	4,328	4,253	4,169	4,071	4,088	3,885	–573
Belgium	128,705	122,274	121,896	119,690	118,319	117,695	114,350	118,349	114,095	–14,610
Bulgaria	70,846	65,950	64,984	63,955	62,197	61,538	59,086	58,678	56,596	–14,250
Czechia	108,673	101,764	112,663	114,405	114,036	112,231	110,200	111,793	101,299	–7,374
Denmark	58,998	58,205	61,614	61,397	61,476	61,167	60,937	63,473	58,430	–568
Germany	662,685	737,575	792,141	784,901	787,523	778,090	773,144	795,492	738,856	+76,171
Estonia	14,679	13,907	14,053	13,784	14,367	14,099	13,209	13,272	11,646	–3,033
Ireland	74,033	65,536	63,841	61,824	61,022	59,289	55,959	60,553	57,634	–16,399
Greece	106,428	91,847	92,898	88,553	86,440	83,763	84,764	85,346	75,899	–30,529
Spain	470,553	418,432	408,734	391,265	370,827	358,747	340,635	336,823	329,892	–140,661
France	824,263	799,671	784,325	770,045	759,199	754,008	735,775	742,602	723,567	–100,696
Croatia	41,197	37,503	37,537	36,556	36,945	36,135	35,845	36,508	33,883	–7,314

15 Eurostat, 2023a.

16 Source: Authors, based on the Eurostat database (Live births and crude birth rate [TPS00204]). *thousand persons; **2011–19; ***2011–18; ****2011–20.

	2011	2015	2016	2017	2018	2019	2020	2021	2022	Change 2011–2022
Italy	546,585	485,780	473,438	458,151	439,747	420,084	404,892	400,249	392,598	–153,987
Cyprus	9,622	9,170	9,455	9,229	9,329	9,548	9,930	10,309	10,151	+529
Latvia	18,825	21,979	21,968	20,828	19,314	18,786	17,552	17,421	15,954	–2,871
Lithuania	30,268	31,475	30,623	28,696	28,149	27,393	25,144	23,330	22,068	–8,200
Luxembourg	5,639	6,115	6,050	6,174	6,274	6,230	6,459	6,690	6,495	+820
Hungary	88,049	92,135	95,361	94,646	93,467	93,100	93,807	94,003	89,669	+1,620
Malta	4,165	4,325	4,476	4,319	4,444	4,350	4,414	4,395	4,309	+144
Netherlands	180,060	170,510	172,520	169,836	168,525	169,680	168,681	179,441	167,504	–12,556
Austria	78,109	84,381	87,675	87,633	85,535	84,952	83,603	86,078	82,627	+4,518
Poland	388,416	369,308	382,257	401,982	388,178	374,954	355,309	331,511	305,132	–83 284
Portugal	96,855	85,500	87,126	86,154	87,020	86,579	84,530	79,582	83,671	–13,184
Romania	196,242	201,995	205,773	210,590	210,290	199,720	198,302	193,191	183,630	–12,612
Slovenia	21,947	20,641	20,345	20,241	19,585	19,328	18,767	18,984	17,627	–4,320
Slovakia	60,813	55,602	57,557	57,969	57,639	57,054	56,650	56,565	52,668	–8,145
Finland	59,961	55,472	52,814	50,321	47,577	45,613	46,463	49,594	44,951	–15,010
Sweden	111,770	114,870	117,425	115,416	115,832	114,523	113,077	114,263	104,734	–7,036
Iceland	4,492	4,129	4,034	4,071	4,228	4,452	4,512	4,879	4,391	+101
Liechtenstein	395	325	378	338	378	356	353	375	364	–31
Norway	60,220	58,815	58,890	56,633	55,120	54,495	52,979	56,060	51,480	–8,740
Switzerland	80,808	86,559	87,883	87,381	87,851	86,172	85,914	89,644	82,371	+1,563
United Kingdom**	807,776	776,746	774,386	754,754	730,918	712,699				–95,077
Bosnia-Herzegovina***	31,875		29,276	29,158	29,467					–2,408
Montenegro	7,215	7,386	7,569	7,432	7,264	7,223	7,097	7,033	7,021	–194
Moldova	39,182	40,855	39,961	36,640	34,764	32,022	30,730		26,952	–12,230

	2011	2015	2016	2017	2018	2019	2020	2021	2022	Change 2011–2022
North Macedonia	22,770	23,075	23,002	21,754	21,333	19,845	19,031	18,648	18,073	–4,697
Albania	34,285	32,715	31,733	30,869	28,934	28,561	28,075	27,211	24,688	–9,597
Serbia	65,598	65,657	64,734	64,894	63,975	64,399	61,692	62,180	62,700	–2,898
Turkey*	1,241	1,326	1,310	1,291	1,249	1,184	1,113	1,080	1,036	–205
Ukraine	502,595	411,781	397,037	363,987	335,874	308,817	293,457	271,983		–230,612
Kosovo ****	27,626	24,594	23,416	23,402	22,761	21,798	27,709			+83

Although the birth rate improved somewhat in the 2000s and stabilised in the following decade, the number of live births continued to decline starting in 2011. This decline accelerated during the COVID-19 pandemic, likely due to uncertainty about the pandemic's development and consequences. Contrastingly, the number of live births increased somewhat in 2021, although it did not yet approach the pre-pandemic level. Among the EU Member States, the largest absolute decrease in the number of live births (153,987) occurred in Italy in the period between 2011 and 2022. A greater decrease occurred only in Ukraine, where the number of live births decreased by 230,612 people in the same period, which clearly supports the impact of the war on the development of the number of live births. In addition to Italy, the decrease in the number of live births exceeded 100,000 from 2011–2022 in two other countries, Spain and France, and 80,000 in two countries, the United Kingdom and Poland. On the other hand, in some European countries, the number of live births increased in the period between 2011 and 2022, although these increases were relatively small. For example, the number of live births increased by 76,171 in Germany, 4,518 in Austria, 1,620 in Hungary, 1,563 in Switzerland, 820 in Luxembourg, 529 in Cyprus, 144 in Malta, 101 in Iceland, and 83 in Kosovo.

The occurrence of the demographic ice age is indicated if, on the one hand, the total fertility rate in a country does not reach the value of 2.1 necessary for the simple reproduction of the population. The number of live births is also decreasing. The examined data clearly show that, based on these criteria, most countries in Europe have now reached the period of the demographic ice age. According to the American economist Rogers, just as the ice age in geohistorical history caused a prolonged standstill in the biological development of life on earth, the 'ice age' we are now entering will cause a long stagnation or even a regression in the economic development of mankind. Our standard of living may rise rapidly for a long time to come, or it may remain unchanged. Innovation will be gradual and concentrated in certain areas, as opposed to the widespread leaps and bounds of the 20th century.

There are many factors at play in today's world economy that are leading to this new global economic ice age.[17]

2.3. Development of demographic trends in the NUTS-2 regions of the EU

In recent years, Eurostat has expanded the range of statistics it provides in order to cover, in addition to national and regional information, other territorial typologies, taking into account the growing needs of political decision-makers, especially in the context of cohesion and territorial development. This new regional classification of EU Member States is based on a hierarchy of regions and divides each Member State into regions that are classified according to the Nomenclature of Territorial Units for Statistics (NUTS) levels 1, 2, and 3 (from largest to smallest). NUTS is based on Regulation 1059/2003/EC of the European Parliament and of the Council of 26 May 2003 on the creation of a common classification of territorial units for statistical purposes (NUTS), which is regularly updated. Some EU Member States have a relatively small population and/or area, and therefore, it may not be possible to divide them into some (or even all) of the different levels of the NUTS classification. For example, Estonia, Cyprus, Latvia, Luxembourg, and Malta each consist of one NUTS level 2 region according to the 2021 version of the NUTS classification, which is also the basis for the classification of regional information in this chapter. Most of the regional statistics in this chapter refer to NUTS level 2 regions and come from Eurostat's regional database. However, depending on the availability of data, some maps and figures are also shown for NUTS level 1 regions (more aggregated geographical information) or NUTS level 3 regions (the most detailed level of regional information). The latter were only available for a limited number of demographic or economic indicators. There may also be special cases (usually due to limited data availability) where certain regions are compared at different NUTS levels in the same map or figure: these cases are included to improve data coverage. If there is little or no regional data available for a given EU Member State, then national data are used. In all cases where we use source data (online data) rather than data from Eurostat's various publications, we have applied them in such a way as to reflect any additional national data tables that may have been used. Where the maps and/or figures are based on different territorial levels, the determination of the number of regions in the accompanying commentaries is systematically based on the different territorial levels for which data were available in each country at that time.[18]

If we examine the development of demographic trends by region in the EU Member States, we can see notable and significant differences. On the one hand, the sad fact that, despite the importance of the topic, Eurostat does not have up-to-date data on many regions can be determined. In the case of the United Kingdom, this may be partially justified by Brexit, but in the case of the German regions, it is not.

17 Rogers, 2020.
18 Eurostat, 2023b.

On the other hand, this figure still gives a comprehensive picture of the EU Member States as a whole, primarily of the large differences that can be experienced today between the individual regions of these states.

To explore the causes of the significant differences in detail, further investigations are needed to establish what different social, economic, governmental, and regional policies underpin them. In this chapter, owing to scope limitations, we only show which regions have particularly high or low fertility rates.

From the data, it can be established at first glance that currently only five EU Member States have regions where the total fertility rate is clearly higher than the other regions (Table 3). Ten regions of France, four regions of the Czech Republic, three regions of Romania, two regions of Ireland, and one region of Hungary were among the 19 regions with the highest fertility rates in the EU. The small beauty of the matter is that five of these French regions (Mayotte, Guyane, La Réunion, Guadeloupe, and Martinique) are not located in Europe. As a result, there is only one region in the EU where the total fertility rate reached the value of 2.1 corresponding to the reproduction level: this region is in Romania and covers the north-eastern part of the country, hence the name 'Nord-Est', and is traditionally part of the historical region of Moldavia (mainly Western Moldavia and South Bukovina).

Table 3. Development of the total fertility rate in the EU NUTS-2 regions for the 19 regions with the highest fertility rates in 2021 2010–2021[19]

	2010	2013	2014	2015	2016	2017	2018	2019	2020	2021
Mayotte			4.12	4.88	4.96	4.92	4.66	4.60	4.17	4.66
Guyane	3.37	3.46	3.43	3.43	3.60	3.91	3.78	3.73	3.68	3.67
La Réunion	2.36	2.41	2.44	2.46	2.43	2.44	2.40	2.39	2.37	2.44
Guadeloupe		2.27	2.27	2.18	2.21	1.98	2.10	2.30	2.35	2.20
Nord-Est	1.41	1.80	1.92	2.01	1.95	2.16	2.09	2.14	2.17	2.17
Martinique	2.02	1.91	2.08	1.94	1.90	1.87	1.91	2.00	1.89	1.94
Provence-Alpes-Côte d'Azur	2.05	2.07	2.06	2.02	2.00	1.98	1.96	1.96	1.91	1.93
Střední Čechy	1.58	1.54	1.61	1.64	1.69	1.79	1.74	1.76	1.75	1.90
Northern and Western		1.98	1.94	1.94	1.94	1.88	1.89	1.87	1.77	1.90

19 Source: Authors, based on the Eurostat database [Total fertility rate by NUTS 2 region (TGS00100)].

	2010	2013	2014	2015	2016	2017	2018	2019	2020	2021
Pays-de-la-Loire	2.13	2.07	2.03	1.96	1.91	1.88	1.86	1.85	1.83	1.88
Sud-Est	1.32	1.57	1.67	1.72	1.77	1.89	1.84	1.84	1.86	1.88
Southern		1.96	1.93	1.93	1.86	1.84	1.85	1.76	1.72	1.88
Centre – Val de Loire	2.09	2.02	2.02	1.94	1.93	1.88	1.87	1.88	1.86	1.88
Jihovýchod	1.49	1.47	1.57	1.59	1.66	1.73	1.76	1.77	1.75	1.87
Île de France	2.05	2.01	2.04	2.00	1.98	1.95	1.94	1.93	1.88	1.86
Haute-Normandie	2.10	2.03	2.00	1.97	1.95	1.91	1.90	1.88	1.84	1.86
Centru	1.40	1.60	1.70	1.71	1.76	1.88	1.84	1.85	1.86	1.86
Észak-Magyarország	1.41	1.52	1.65	1.66	1.77	1.82	1.84	1.83	1.88	1.85
Střední Morava	1.46	1.42	1.47	1.55	1.61	1.67	1.71	1.67	1.75	1.85

Currently, we can find regions in five EU Member States where the total fertility rate is clearly the lowest compared to other regions (Table 4). Eights regions each of Spain and Italy, two regions of Poland, and one region each of Malta and Portugal were among the 20 regions with the lowest fertility rates in the EU. Among these regions, there were also three where the total fertility rate did not even reach 1, two of them in Spain (Canarias and Principado de Asturias) and one in Italy (Sardegna).

Table 4. Development of the total fertility rate in the EU NUTS-2 regions for the 20 regions with the lowest fertility rates in 2021
2010-2021[20]

	2010	2013	2014	2015	2016	2017	2018	2019	2020	2021
Canarias	1.11	0.99	1.04	1.05	1.06	1.05	0.98	0.94	0.88	0.86
Principado de Asturias	1.04	0.96	0.99	1.01	1.04	1.03	1.03	0.96	0.92	0.95
Sardegna	1.19	1.11	1.10	1.09	1.07	1.06	1.02	1.00	0.97	0.99

20 Source: Authors, based on the Eurostat database (Total fertility rate by NUTS 2 region [TGS00100]).

	2010	2013	2014	2015	2016	2017	2018	2019	2020	2021
Galicia	1.09	1.04	1.07	1.10	1.12	1.12	1.04	1.02	1.02	1.01
Cantabria	1.26	1.18	1.15	1.15	1.15	1.17	1.12	1.07	1.07	1.04
Castilla y León	1.20	1.13	1.17	1.18	1.18	1.14	1.14	1.13	1.10	1.08
Molise	1.24	1.17	1.16	1.17	1.15	1.19	1.09	1.15	1.06	1.08
Basilicata	1.20	1.12	1.15	1.17	1.17	1.19	1.13	1.15	1.14	1.11
Illes Balears	1.35	1.22	1.24	1.24	1.26	1.22	1.22	1.14	1.12	1.13
Malta	1.36	1.36	1.38	1.37	1.37	1.26	1.23	1.14	1.13	1.13
Swieto-krzyskie		1.19	1.21	1.21	1.23	1.29	1.29	1.26	1.20	1.13
Comunidad de Madrid	1.37	1.29	1.35	1.37	1.36	1.33	1.27	1.23	1.16	1.15
Warminsko-Mazurskie	1.40	1.27	1.32	1.27	1.32	1.45	1.39	1.35	1.30	1.16
Umbria	1.42	1.37	1.32	1.27	1.26	1.24	1.21	1.20	1.16	1.18
Lazio	1.46	1.42	1.35	1.32	1.33	1.27	1.22	1.18	1.18	1.18
Extremadura	1.34	1.22	1.29	1.28	1.30	1.29	1.22	1.22	1.20	1.19
Toscana	1.42	1.35	1.35	1.30	1.30	1.28	1.25	1.21	1.17	1.20
Marche	1.42	1.34	1.35	1.33	1.32	1.25	1.22	1.19	1.19	1.20
Puglia	1.35	1.28	1.28	1.24	1.25	1.24	1.22	1.20	1.18	1.20
Norte	1.27	1.10	1.09	1.17	1.24	1.24	1.26	1.26	1.26	1.20

The transformation of the demographic situation has an impact on the structure of the population of the EU regions, which (among other things) results in the following:[21] a) metropolitan areas, which are often characterised by relatively young populations, large numbers of people living alone, high costs of living, diverse educational opportunities, and a vibrant labour market; b) cities in former industrial centres that are economically backward and characterised by relatively high levels of unemployment, poverty, and social exclusion; c) commuter zones/suburban areas often inhabited by families; d) coastal and rural locations, some of which can be considered retirement locations for relatively well-to-do retirees; e) other rural

21 Eurostat, 2023.

and remote regions with declining populations and a relatively ageing population structure, which are also characterised by limited labour market opportunities and relatively poor access to many services.

The current family policies differ in the development of special tools for meeting various needs; however, there are also significant differences in the extent and at what pace individual countries react to the new family patterns. Based on this diversity, experts distinguish three main clusters among OECD countries:[22]a) The Nordic countries (Denmark, Finland, Iceland, Norway, and Sweden) provide comprehensive support for working parents with children of all ages through a combination of generous parental leave and widely available childcare services. Family policies place great emphasis on social and gender equality, providing both parents with the opportunity to take care of their children. They support children of all ages to receive high-quality care and education. b) English-speaking countries (Ireland and the United Kingdom, Australia, New Zealand, and to some extent Canada and the United States) offer much less time and in-kind support for parents with young children. Financial support is primarily aimed at low-income families and preschool children. The level of support varies. c) Western continental and Eastern European countries form a more heterogeneous group and occupy an intermediate position between the English and Scandinavian countries. These countries generally focus on financial support, whereas in-kind support for children under the age of three and assistance to dual-earner families are more limited. France stands out from other continental countries, with relatively high public spending for families with children and support for working women. Southern European countries support working families to a lesser extent, and public spending on family cash benefits and childcare services in these countries is moderate.

The data on the evolution of the total fertility rates more or less reflect the clusters established by experts, although many differences also appear. In most of the Scandinavian countries (Sweden, Denmark, Iceland, Norway), fertility is above average compared to other European countries. At the same time, Finland's fertility level does not even reach the EU average. The reasons for this are analysed by Rotkirch and Miettinen.[23] In terms of the fertility rate, the Western continental and Eastern European countries are not located between the English and Scandinavian countries but behind the countries of these two clusters, with the exception of France. Among the EU Member States, France undoubtedly has the highest total fertility rate, which is assumed to be closely related to public spending on families with children. Useful information on the relationship between family policy and high fertility in France can be found in the works of Zsuzsanna Stefán-Makay.[24] In the case of the Anglo-Saxon countries (Ireland and Great Britain), the fertility index is outstanding and higher the than average among European countries. The southern

22 Thévenon, 2011.
23 Rotkirch and Miettinen, 2017.
24 Stefán-Makay, 2009, 2010.

countries (Greece, Cyprus, Malta, Portugal, Italy, and Spain) are separated from the rest of the European countries at the end of the list as they currently have the lowest fertility rate in Europe. While the value of the total fertility rate indicator is above average in Montenegro, Latvia, Lithuania, Romania, and the Czech Republic among the Eastern-Central European countries, the other countries belonging to this group can be found in the lower-middle part of the European ranking. At the beginning of the 1990s, the fertility level in Latvia, Poland, Macedonia, and Slovakia exceeded the value of 2 and almost reached the level of 2.1 necessary for population reproduction. Among the Central and Eastern European countries, the total fertility rate in Hungary was the lowest between 2008 and 2012 (1.25) (Table 1). At that time, forecasts regarding the expected development of Hungary's population predicted that it would decrease significantly over the next half-century, in addition to the low fertility rate.[25] In the years that followed, fertility demonstrated an upward trend, and from 2016, at a higher than previous level of 1.49 total fertility rate, the growth came to a halt.[26] The total fertility rate began to increase in 2020 and 2021 (1.59) but fell in 2022 to 1.52. This was presumably influenced by the COVID-19 pandemic.[27]

In Hungary, the Family Protection Action Plan resulted in the introduction of many new family protection measures. As part of this, primary school children receive support such as free textbooks and free meals. Women who have children receive various types of financial support: they can stay at home with state support until the child is 3 years old, but if they return to work, they can also receive family support. Women who foster three or more children may receive special support. The family allowance is allocated to families with children, depending on the number of children. Mothers raising four or more children are exempt from personal income tax. Those raising young children receive tax relief and labour law benefits. In addition, those who have children receive housing support, and those with large families receive car purchase support. The newly married can receive baby support, which takes the form of a discounted loan, with the repayment and interest rate conditions of this loan becoming increasingly favourable as the number of children increases. Grandparents can also receive a childcare fee if they are actively involved in the care of a young child so that the parent can work.[28]

The effect of the Family Protection Action Plan was evident in 2020 and 2021,[29] which saw a significant increase in the number of births in Hungary, a trend that was broken by the COVID-19 pandemic. The effect of this plan was also then moderated by the inflation and economic crisis following the outbreak of the war in Ukraine.[30] According to the theory of the second demographic transition, a qualitatively new

25 Földházi, 2014.
26 KSH, n.d.a.
27 KSH, n.d.b.
28 Barzó summarises the Hungarian family support policy and the forms of family support. Barzó, 2023.
29 Kapitány and Spéder, 2021.
30 Kapitány and Spéder, 2021.

era had already emerged in the population history of Europe and the developed countries of the world in the 1960s and 1970s, whereas in the less developed countries, such as those of Eastern and Central Europe, this era began significantly later, from the beginning of the 1990s. The representatives of this theory consider the two main elements of the comprehensive transition to be the change in childbearing behaviour and the transformation of family and marriage-cohabitation relationships. Marriage rates go down, divorce rates go up, and single-parent families become more common. The rate of cohabitation outside of marriage increases, becoming an alternative 'family' form. In addition, new forms of coexistence emerge. As a result of the changes in fertility and mortality, the affected populations begin to age rapidly, and in several cases, a permanent decrease in the size of the population can be observed. According to the second demographic transition theory, fundamental changes in values are behind the transformation of behaviour related to the family, relationships, and fertility. The essence of these changes is that the traditional value system mediated by local and religious communities has weakened and been replaced by the values of self-realisation and self-fulfilment. The focus has shifted from the family to the individual. The quality of relationships has increased, and the expectations of partners have increased, which is why relationships have also become fragile. As a result of such changes in values, individuals prefer forms of cohabitation with less commitment, opting for cohabitation or visiting relationships over marriage and postponing having children. The theory of the second demographic transition is quite strongly contested, and serious doubts arise as to how generalisable this theoretical framework is. For example, it is highly questionable how far the demographic processes of post-socialist countries can be fitted into this theory.

Overall, it can be said that favourable, renewable, and multi-element family policies have an encouraging effect on having children and a positive effect on the fertility rate. This conclusion is supported by the Hungarian example: according to statistical data, the new family allowances introduced in 2019 had an encouraging effect. However, the effects of family policy can be moderated or diverted by other factors (pandemics, economic crises, etc.).

3. Consequences of insufficient reproduction in Europe

The consequence of persistently low fertility is the ageing of the population. In the EU, there is currently one person over 60 years old for every three working-age residents (a ratio of 1:3). However, if the current demographic trends continue, this ratio will be only 1:2 in 20 years as the former baby boom generations reach this age limit. Consequently, the affected societies must prepare for much higher expenses

than at present. The European Commission's Fiscal Sustainability Report[31] provides a detailed forecast of the expected magnitude of additional expenditures. It is clear from the above that a low fertility level causes serious economic surpluses and a loss of yield for the affected societies; thus, increasing the fertility rate is a significant economic issue throughout Europe. Demographic changes can affect the underlying growth rate of the economy, structural productivity growth, living standards, savings rates, consumption, and investment, as well as long-term unemployment, equilibrium interest rates, housing market trends, and demand for financial assets.

3.1. Demographic effects on economic growth

The expected slowdown in population growth and labour market participation will affect long-term economic growth and the composition of this growth. The key determinants of an economy's longer-term growth rate are growth in the labour force and structural productivity, that is, how efficiently the economy combines its labour and capital inputs to create output. Demographic data suggest that labour force growth in the future will be much slower than in recent decades, which will affect long-term economic growth.[32]

Demographic factors influence the participation rate of the working-age population and those who take up work. Due to the decrease in the fertility rate, the future growth of the working-age population is slowing down. The other relevant demographic dimension is the age composition of the working-age population. It is important that at a specific age threshold, typically in the early 50s, the willingness to participate in work begins to decline sharply. An increase in the proportion of older adults in the population reduces the average participation rate and, thus, the number of potentially employable people.[33]

Based on the composition of GDP, the growth of a country's economy can be driven by exports, investment, and consumption. Until 2008, most countries placed great emphasis on the role of exports as the driving force of their economies. Thereafter, in view of the severe impact of the subprime market crisis on export demand, the focus of the economic growth strategies of several countries shifted to investments and consumption. Investment in human development has become a key factor for future economic growth. According to the World Bank Group, achieving the ambitious goals of the future will, therefore, require the fullest possible use of human resources. Households' contribution to general growth and their own well-being depends mostly on the wealth they control, the return on these assets, and how intensively these assets can be used. Assets come in many forms, including human capital (education, health, nutrition), financial capital, physical capital (land, machinery), and social capital. Many of these assets – especially human and social capital – have

31 European Commission, 2020c.
32 Mester, 2018.
33 World Bank, 2016.

their own intrinsic and asset value. In themselves, they are types of goods that both contribute to well-being and increase people's ability to generate income.[34]

In 2022 there were 18 NUTS level 2 regions in the EU where the GDP per capita exceeded the EU average by at least 50%. Among these relatively 'rich' regions, the highest level of regional GDP per capita was observed in Luxembourg, where the rate was 2.7 times the EU average. The GDP per capita in Luxembourg was almost 10 times higher than in the French archipelago of Mayotte.[35] The example of Mayotte confirms that a high GDP per capita is not a prerequisite for high fertility but that it raises much more complex questions. The example of Luxembourg also supports the fact that if the GDP per capita is high somewhere, this does not automatically result in high productivity. Consequently, we need to separately analyse the relationships between fertility, employment rates, and labour productivity in order to understand how low fertility, a low employment rate, and low labour productivity cause low economic growth, and how high fertility, a high employment rate, and high labour productivity can result in high levels of economic growth.

Despite the effects of population growth and the expected slowdown in labour market participation, EU forecasters predict stable potential GDP growth in the long term, but only based on productivity (Table 5). According to the EU forecast, labour productivity growth will be higher in countries with relatively low per capita GDP by EU standards, especially in the first half of the forecast period. This reflects the assumed process of catch-up economies, to which the development of human capital and the rapid growth of total factor productivity contribute to a very large extent. This is the case, for example, in Romania, Poland, and the Baltic countries. Overall, therefore, in their prognoses, EU experts predict stable, albeit undoubtedly not very large, economic growth in all EU Member States until 2070, despite the well-known negative demographic effects.[36] At the same time, a big question is what would happen if the member countries acted much more forcefully and effectively against the negative demographic effects than at present, or if these effects were to worsen further. In any case, it is already surprising that EU forecasters predict better prospects for countries outside the eurozone than for those in the eurozone.

34 World Bank, 2014.
35 Eurostat, 2023.
36 European Commission, 2020c.

Table 5. Breakdown of annual average potential GDP growth rates 2019–2070 (%)[37]

Country	GDP growth in 2019-2070	Labour productivity (GDP per hour worked)	TFP*	Capital deepening	Labour input	Total population	Employment rate	Share of working age population	Change in average hours worked	GDP per capita growth from 2019–2070
Belgium	1.2	1.2	0.8	0.4	0.0	0.1	0.1	–0.2	0.0	1.2
Bulgaria	1.2	2.1	1.3	0.8	–0.9	–0.6	0.0	–0.3	0.0	1.9
Czechia	1.6	2.0	1.3	0.7	–0.3	–0.1	0.0	–0.3	0.0	1.7
Denmark	1.7	1.5	1.0	0.5	0.2	0.1	0.3	–0.2	0.0	1.6
Germany	1.2	1.4	0.9	0.5	–0.2	0.0	0.0	–0.2	0.0	1.3
Estonia	1.9	2.2	1.4	0.8	–0.3	–0.2	0.1	–0.2	–0.1	2.1
Ireland	1.8	1.5	1.1	0.5	0.2	0.6	–0.2	–0.1	0.0	1.1
Greece	1.2	1.5	1.0	0.4	–0.3	–0.4	0.3	–0.2	0.0	1.6
Spain	1.4	1.5	1.0	0.5	0.0	0.0	0.2	–0.2	0.0	1.4
France	1.3	1.3	0.8	0.5	0.1	0.1	0.1	–0.2	0.0	1.3
Croatia	1.1	1.8	1.1	0.7	–0.7	–0.6	0.1	–0.2	0.0	1.7
Italy	1.0	1.3	0.8	0.4	–0.2	–0.2	0.2	–0.2	0.0	1.3
Cyprus	1.9	1.5	0.9	0.6	0.4	0.5	0.2	–0.2	0.0	1.4
Latvia	1.2	2.3	1.4	0.9	–1.1	–0.9	0.1	–0.2	0.0	2.2
Lithuania	1.2	2.2	1.3	0.9	–1.0	–0.8	0.1	–0.2	0.0	2.1
Luxem-bourg	1.8	1.1	0.7	0.4	0.7	0.5	0.4	–0.2	0.0	1.3
Hungary	1.8	2.1	1.3	0.7	–0.3	–0.2	0.2	–0.2	0.0	2.0

37 Source: European Commission, 2021, p. 42. *Labour productivity, defined as output per hour worked, depends on the amount of capital stock per worker and technological and institutional factors grouped under total factor productivity (TFP).

Country	GDP growth in 2019-2070	Labour productivity (GDP per hour worked)	TFP*	Capital deepening	Labour input	Total population	Employment rate	Share of working age population	Change in average hours worked	GDP per capita growth from 2019–2070
Malta	2.2	1.8	1.2	0.6	0.4	0.7	0.1	–0.3	–0.1	1.5
Nether-lands	1.3	1.3	0.9	0.5	0.0	0.1	0.1	–0.2	0.0	1.2
Austria	1.3	1.4	0.9	0.5	0.0	0.1	0.1	–0.2	0.0	1.2
Poland	1.5	2.3	1.5	0.9	–0.8	–0.4	–0.1	–0.3	0.0	1.9
Portugal	1.2	1.7	1.1	0.6	–0.5	–0.4	0.1	–0.3	0.0	1.6
Romania	1.7	2.6	1.6	0.9	–0.9	–0.7	0.0	–0.2	0.0	2.4
Slovenia	1.6	1.9	1.3	0.6	–0.3	–0.1	0.1	–0.2	0.0	1.7
Slovakia	1.3	2.1	1.3	0.8	–0.7	–0.3	–0.1	–0.3	0.0	1.6
Finland	1.2	1.5	0.9	0.5	–0.3	–0.2	0.1	–0.2	0.0	1.4
Sweden	1.8	1.4	0.9	0.5	0.4	0.5	0.1	–0.1	0.0	1.3
Norway	1.7	1.5	0.9	0.5	0.2	0.5	–0.1	–0.1	0.0	1.2
EA	1.3	1.4	0.9	0.5	–0.1	0.0	0.1	–0.2	0.0	1.3
EU	1.3	1.6	1.0	0.5	–0.2	–0.1	0.1	–0.2	0.0	1.4

3.2. Demographic effects on the labour market

Demographics affect labour supply. Typically, as death rates fall and people live longer, the supply of labour increases – although increased life expectancy means that individuals need to work longer to have more savings for retirement. However, the ageing of the population generally leads to an overall downward trend in labour market participation.[38]

The COVID-19 crisis had a significant impact on the EU labour market. With the exception of key workers, the number of people working from home has generally increased. Other members of the workforce were affected in different ways

38 Mester, 2018, pp. 402, 399–413.

by the changed situation: some were furloughed, others became unemployed, and many self-employed individuals lost their sources of income. The crisis has more strongly affected certain labour market groups, such as young people, temporary employees, those in precarious employment, or those engaged in leisure, hospitality, and transport activities. In this chapter, we present data for people aged 20–64. The reason for defining this age range is that the proportion of young people staying in education until their late teens (and beyond) is increasing, potentially limiting their participation in the labour market, whereas, at the other end of the age spectrum, the vast majority of people in the EU retire after the age of 64. [39]

In recent decades, one of the EU's main political objectives has been to increase the number of workers. This goal has been part of the European Employment Strategy since its inception in 1997 and was later incorporated into the Lisbon and Europe 2020 strategies. The employment rate is included as one of the indicators of the social scoreboard, which is used to monitor the implementation of the European Pillar of Social Rights. The EU has set an employment rate target that by 2030, at least 78% of the population aged 20–64 will be employed. The employment rate is the ratio of employed persons (of a given age) to the total population (of the same age). Before the outbreak of the COVID-19 crisis, the employment rate of the EU's working-age population (20–64 years) had risen for six consecutive years to 73.1% by 2019; this pattern came to an abrupt end in 2020 as the rate fell by 0.9 percentage points. In 2021, the employment rate of the EU recovered from the loss that occurred during the initial phase of the pandemic. In 2022, there was even faster growth, with the ratio increasing by 1.5 percentage points to reach an all-time high of 74.6%. In more detail, the highest regional employment rate in 2022 was in the Finnish Åland Islands at 89.7%. The next highest rates were in the Polish capital region of Warszawski stołeczny (85.4%), the Dutch city of Utrecht (85.1%), and the Swedish capital region of Stockholm (also 85.1%). Several other capital regions had relatively high employment rates, including Budapest in Hungary (84.7%), Bratislavský kraj in Slovakia (84.5%), Praha in the Czech Republic (84.4%), Sostinės regionas in Lithuania (84.4%), and Noord-Holland in the Netherlands (83.5 %).[40]

In 2022, more than two-fifths of EU regions had already reached or exceeded the EU's employment rate target (in 102 out of 241 countries for which data are available; no recent data are available for French Mayotte). These regions are mainly concentrated in the Czech Republic (all eight regions), Denmark (all five regions), Germany (36 out of 38 regions; the exceptions are Bremen and Düsseldorf), Estonia, Malta, the Netherlands (all 12 regions), and Sweden (all eight regions). Most of the regions characterised by a relatively low employment rate were rural, sparsely populated, or peripheral regions of the EU, including regions in Spain and Italy (especially in the south), most of Greece, some regions of Romania, and the outermost regions of France. The majority of these regions are characterised by a lack of employment

39 Eurostat, 2023
40 Eurostat, 2023.

opportunities for people with medium and high qualifications. Economically unadapted former industrial regions form another group that demonstrates relatively low employment rates. For some of these regions, globalisation has had a negative impact on traditional areas of their economy (e.g. coal mining, steel or textile production). Examples include a group of regions from north-eastern France to Région Wallonia in Belgium.

Around a quarter of all EU regions (61 out of 241) for which data are available had an employment rate below 71.5% in 2022. Among these were three regions in southern Italy – Sicily, Calabria, and Campania – where less than half of the working population was employed. The lowest regional employment rate was in Sicily at 46.2%. The largest regional differences in employment rates were observed in Italy. Within individual EU Member States, there were often significant differences between regions in employment rates in 2022; for example, it was common for the highest employment rates in most multi-regional Eastern and Baltic Member States to be in the capital regions, as was the case in Bulgaria, the Czech Republic, Croatia, Lithuania, Hungary, Poland, Romania, Slovenia, and Slovakia. This pattern was also observed in Denmark, Ireland, Greece, and Sweden. However, the situation was reversed in many western Member States, such as Belgium and Austria, where the capital regions had some of the lowest regional employment rates. Between 2011 and 2021, there was modest convergence in regional employment rates across the EU as the coefficient of variation fell from 11.9% to 11.2%. Eight (out of 17) EU Member States reported a decrease in differences within the regions during this period; the largest decreases – in relative terms – were experienced in Finland, the Czech Republic, and Hungary. By contrast, the largest increase was registered in Poland, where regional differences increased by more than a third; Portugal and Austria reported growth by more than a quarter.[41]

Overall, it can be concluded that in those countries and regions where the employment rate and labour productivity are higher, significant economic development can be achieved with appropriate policies, even despite lower productivity.

3.3. Demographic effects on monetary policy

According to some experts, monetary policy cannot significantly affect the rate of growth, the level of potential output, or the long-term natural rate of unemployment, which must be considered as part of the economic environment. It is also necessary to take demographic downward pressure into account when shaping monetary policy. In addition, demographic changes can also affect the transmission mechanism of monetary policy to the economy, especially the strength of wealth effects and income effects. Older people tend to have more wealth than younger people and typically have investments, while using their wealth to finance their consumption during retirement. Younger people tend to be borrowers, but they face stricter credit

41 Eurostat, 2023.

conditions than older people because they have fewer assets. Young borrowers will enjoy the reduction in interest rates to a lesser extent, but older people will benefit more from the higher returns on invested assets; the converse applies when interest rates are raised. Demographic change may mean that wealth effects become an important channel through which monetary policy affects the economy.[42]

Another important monetary policy consequence of demographic change is its effect on the equilibrium long-term interest rate. For example, participants of the Federal Open Market Committee have lowered their estimates of the pooled funds rate, which will be consistent with maximum employment and price stability over the longer term: the median estimate dropped from 4% in March 2014 to 2.8% today. The empirical estimates of the equilibrium real feed base interest rate, the so-called 'r-star', although very uncertain, are also lower than in the past. Demographic change may play a role in this decline if it results in a lower long-term growth rate of consumption and, thus, output, which is a key determinant of equilibrium interest rate in the longer term. The magnitude of any effect is difficult to determine because it operates along complicated dynamics. Static analysis might suggest that as longevity increases, people will want to accumulate more assets to finance their retirement, and this would put upward pressure on asset prices and, therefore, yields. In addition, as people tend to reduce their exposure to risk as they age, they are expected to shift towards fixed-income assets, which increases risk premiums and lowers risk-free interest rates. This is the offsetting effect that puts upward pressure on interest rates from these exchanges, as well as from government spending on retirement benefits. The magnitude and even the signs of the effect of demographic change on interest rates is, therefore, an empirical question.[43]

As income is the most important and fundamental factor affecting household consumption, there is considerable literature on its impact. Examples include the Keynesian theory of absolute income consumption,[44] the Duesenberry theory of relative income consumption,[45] the Modigliani theory of life cycle consumption,[46] and the Friedman theory of constant income consumption.[47] However, in recent years, few scholars have used direct data on income to study its effects on consumption. Nevertheless, from the perspective of the formation of monetary policy and the sustainability of pension systems, the extent to which the population of a country or a region is able and willing to accumulate savings is of particular importance. Therefore, in our research, we first examined how the profile of net primary incomes per capita developed in the EU Member States and regions. Thereafter, we also explored how much debt households have, that is, how much room for manoeuvre they have in terms of spending their income. Overall, we were interested in to what

42 Bean, 2004; Imam, 2013.
43 Mester, 2018.
44 Keynes, 1965.
45 Duesenberry, 1949.
46 Modigliani, 1986.
47 Milton 1986.

extent people in each country would be able to invest part of their income in long-term pension savings based on their income. A separate question in this regard is whether they are willing to spend their available income in this way and to what extent they would spend it on pension savings; however, due to scope limitations, we do not deal with these considerations in this chapter.

In 2020, there were 24 regions in seven different EU Member States with a per capita income of at least a purchasing power standard (PPS) of 26,500. These regions were concentrated in Germany (16 regions), and the highest income levels were predominantly in the western (and not the eastern) regions. A further five regions were located in the Benelux countries, and the remaining three were in France, Italy, and Austria. At the other end of the range, primary income per capita in 25 regions in eight different EU Member States was less than PPS 10,750 in 2020. With the exception of the two outermost French regions, Mayotte and Guyane, these regions were concentrated in Greece or Eastern Europe and included eight of the 13 regions that comprise Greece and five of the six regions that make up Bulgaria (with the exception of the capital region Yugozapaden), four of the eight regions in Romania, three in Hungary, two in Croatia, and one in Slovakia. Upper Bavaria had the highest primary income per capita. In 2020, primary income per capita ranged from PPS 36,800 in Oberbayern (Southern Germany) to PPS 6,100 in Severozapan (Bulgaria), meaning the average income level in Oberbayern was about six times the level registered in Severozapaden. The ranking was topped by three other German regions with the highest per capita primary income – Stuttgart, Hamburg, and Darmstadt – followed by Luxembourg.[48]

Regional differences in income levels tend to be lower when analysed based on disposable (rather than net primary) income, given the redistributive nature of tax and welfare systems. In the EU, the average disposable income per capita was €17,200 in 2020, while the GDP per capita was €30,000 on average. There were 17 NUTS level 2 regions that showed a positive change in 2020 in terms of both disposable income per capita and GDP per capita. These regions were mainly concentrated in the northern or eastern Member States of the EU: four regions in Poland; three in Bulgaria; two each in Denmark, Ireland, and Sweden; both regions in Lithuania; and one region each in Finland and Luxembourg. Conversely, in 85 NUTS level 2 regions, a decrease was registered for both indicators. This group included all regions of Greece, Hungary, Austria, and Portugal, as well as the vast majority of regions in Italy (16 out of 21) and Spain (15 out of 19).

The indebtedness of households is another limitation in terms of the use of available income. According to the 2021 report issued by the EU Macroeconomic Imbalance Alert Mechanism, household debt exceeded the reference value in several Member States in 2019: in Denmark, Finland, France, Greece, the Netherlands, Portugal, Spain, and Sweden, debt levels in this year exceeded both the fundamental reference value and the prudential threshold.[49]

48 Eurostat, 2023, p. 130.
49 European Commission, 2020a, p. 42.

Overall, we found that there are currently significant differences in the EU countries in terms of how much available income people have, from which, if they wanted, they could spend more on long-term pension savings than at present. This spending is influenced by several public policy measures, which can significantly improve or significantly worsen people's spending situation.

3.4. Demographic implications for fiscal and other government policies

The growing population of seniors will put significant pressure on the social security and medical care systems in states where these systems are structured as pay-as-you-go programmes, with current workers subsidising current retirees. However, in other developed countries, in which the pension and health funds are financed on a different principle, demographic changes will also have a similarly significant impact. Projected longer-term fiscal imbalances are unlikely to be sustainable, and it seems probable that governments will need to respond with a combination of increased borrowing, reduced benefits, higher taxes, programme restructuring, and policies aimed at stemming the rate of growth in healthcare costs. Longer-term fiscal sustainability depends on which combination of these approaches is used and how effective the measures are. According to the projections of the US Congressional Budget Office, the federal deficit in the United States as a proportion of GDP will more than triple over the next 30 years, from 2.9% in 2017 to 9.8% in 2047.[50] During this period, social security and healthcare spending is projected to rise from 8% to 12.4% of GDP. As a result, the federal government debt-to-GDP ratio will rise dramatically, from 77% in 2017 to 150% by 2047. This growth is dwarfed by the increase in debt used to finance World War II. It is debatable to what extent such growth alone will crowd out productive investment and lower economic growth. However, the European sovereign debt crisis of 2009–2012 shows that high debt levels can cause serious problems if investors lose confidence in governments' ability to service debt, which resulted in a jump in interest rates that were previously considered risk-free.[51]

If financing the lack of resources with increased government borrowing is not desirable, then raising taxes and reducing benefits or other expenses is not very attractive either. Depending on how they are implemented, such policies could ultimately hurt the economy's longer-term growth prospects and worsen the fiscal outlook. Moreover, in a world where countercyclical fiscal policy is limited, business cycle volatility may increase and monetary policy may move closer to the zero lower bound more often, potentially necessitating the use of non-traditional policy tools such as asset purchases and forward guidance that match monetary policy to the economic goals of policymakers.[52] More effective policies to combat the effects of an

50 Congressional Budget Office, 2017.
51 Mester, 2018.
52 Kiley and Roberts, 2017, pp. 317–396.

ageing population on fiscal imbalances, focused on reducing rising deficits such as healthcare costs, could achieve far greater results than they currently do. Moreover, policies to increase labour force growth and productivity would address not only fiscal imbalances but also pressures on longer-term growth from demographic or other sources. Attention should be paid to policies that support further training; promote research, development, and innovation; and encourage people to work longer. However, the latter is largely a matter of people's health status.

On average, OECD countries spend 2.29% of GDP on family benefits, with large differences between countries. While public spending on family benefits in France and Sweden is close to 3.5% of GDP, in Costa Rica, Mexico, Spain, Turkey, and the United States, these expenditures are much lower at below 1.5% of GDP. The OECD data clearly indicates that there are significant differences between individual countries in terms of spending on family benefits, from which it unequivocally follows that they could spend significantly more on this than at present in order to achieve much greater results in addressing the unfavourable demographic situation. It can also be seen from the OECD data that, of the three available options, family tax benefits are used the least by the countries concerned, with France, Germany, Hungary, Switzerland, Italy, and Portugal making use of the family tax benefits to a greater extent.[53]

3.4.1. Impact of demographic changes on people's health status and the development of healthy life expectancy

Health is an important priority for most Europeans, who expect to receive effective health services, for example, if they have an illness or accident, as well as timely and reliable public health information. In 2021, about 8.9% of the population of the Anatolikí Makedonía ke Thráki region of Greece had an unmet need for medical examination. Further, in the same year, 2.0% of the EU population aged 16 and over reported not having access to necessary medical examination or treatment in the past 12 months due to issues with funding, distance/transportation, and/or waiting lists (hereinafter, unsatisfied needs for medical examination). An analysis of NUTS level 2 regions shows that this ratio ranged from 0.1% in Germany (national data), Cyprus and Malta to 8.9% in the Anatolikí Makedonía ke Thráki region of Greece (the data for Belgium, Italy, and Serbia refer to level 1 regions; for the Czech Republic, Germany, Spain, France, the Netherlands, Austria, Portugal, and Turkey only national data are available).[54] The regional distribution of this indicator was balanced: 53 regions had a share higher than the EU average, 50 regions had a share lower than the EU average, and two regions had a share equal to the EU average. At the top end of the distribution were 12 regions with at least 6.0% of people aged 16 and over that self-reported not having a medical examination in

53 OECD, 2023.
54 Eurostat, 2023.

2021. These regions were mainly located in Greece (six regions) and Romania (three regions); the remaining three regions with a relatively high share were Estonia, Stredné Slovensko in Slovakia (2020 data), and Wielkopolskie in Poland. At the other end of the distribution were nine regions in the EU where less than 0.5% of the population aged 16 and over reported an unmet need for medical tests in 2021. This group included three Hungarian regions – Central Transdanubia, Southern Transdanubia, and Southern Great Plain – Cyprus, and Malta, as well as the Czech Republic, Austria, the Netherlands, and Germany (only national-level data are available for the latter four).

In the EU, the number of healthy life years at birth was 64.2 years for women in 2021 and 63.1 years for men, which is approximately 77.4% and 81.7% of the total life expectancy for women and men, respectively.[55] An important question is whether EU citizens spend the additional years of life gained through longer lifespan in good or bad health. Given that life expectancy at birth cannot fully answer this question, indicators of health expectancy, such as the number of healthy life years (also known as 'chronic disease-free life expectancy'), have been developed. These indicators focus on the quality of life spent in a healthy state, rather than the number of life years expected, as measured by indicators such as life expectancy. Healthy life years are important indicators of the relative health of the population in the EU.

The expected number of healthy life years at birth was higher for women than for men in 18 Member States. In 2021 the gender gap is generally relatively small, with only six Member States reporting a gap of more than 3 years in favour of women: Lithuania, Poland, Slovenia, Bulgaria, Latvia, and Estonia (see Table 6). It may seem surprising when considering public perceptions, but in several countries, especially those that are not EU Member States such as Iceland, Norway, and Switzerland, the life expectancy of men at birth exceeds that of women. However, the same situation can be observed in some EU Member States, such as Denmark, Portugal, the Netherlands, and Sweden, although to a lesser extent than in the non-Member States mentioned above. Among the EU Member States, the number of healthy life years expected for women at birth in 2021 was the highest in Malta at 68.5 years, whereas the lowest was in Denmark at only 54.8 years, a difference of 13.7 years. A similar comparison of men shows that in 2021, the lowest number of expected healthy years was 52.2 years in Latvia, whereas the highest was 68.9 years in both Malta and Sweden, a difference of 16.7 years. These data also clearly show how large the differences are between the individual member countries in terms of their citizens' quality of life. If we compare the data on healthy years of life with that on retirement ages, it is striking that in the vast majority of EU Member States, both women and men still spend their healthy years at work. Only four countries (Malta, Italy, Ireland, and Sweden) deviate somewhat from this.

55 Eurostat, 2023c.

Table 6. Development of healthy life years and retirement ages in EU Member States in 2021[56]

	Healthy years of life at birth			Retirement age	
	Female	**Male**	**Deviation**	**Female**	**Male**
EU	64.2	63.1	1.1		
Malta	68.5	68.9	–0.4	63	
Italy	68.5	67.7	0.8	67	
Ireland	68.0	66.4	1.6	66	
Sweden	67.9	68.9	–1.0	62–68	
Slovenia	67.3	63.7	3.6	60–65	
France	66.9	65.5	1.4	66 years 7 months	
Cyprus	66.8	64.5	2.3	65	
Greece	66.6	64.7	1.9	67	
Germany	66.5	64.7	1.8	65 years 9 months	
Bulgaria	65.1	61.6	3.5	66	
Poland	64.6	60.7	3.9	60	65
Belgium	64.4	64.8	–0.4	65	
Hungary	63.5	61.6	1.9	65	
Czechia	63.4	60.7	2.7	63 years and 10 months	
Spain	62.6	63.0	–0.4	66	
Finland	61.7	61.6	0.1	63 years and 9 months – 68 years	
Luxembourg	61.6	62.3	–0.7	65	
Austria	61.3	61.5	–0.2	60	65
Lithuania	59.8	55.4	4.4	63 years and 4 months	64 years and 2 months
Netherlands	59.6	61.0	–1.4	66 years and 4 months	

56 Source: Authors own work based on Eurostat, 2023, and Harker, 2022.

	Healthy years of life at birth			Retirement age	
	Female	**Male**	**Deviation**	**Female**	**Male**
Croatia	59.3	57.9	1.4	62 years and 9 months	65
Romania	58.2	57.3	0.9	61 years and 6 months	65
Estonia	58.0	54.9	3.1	64	
Slovakia	57.5	56.2	1.3	62 years and 8 months	
Portugal	57.4	59.3	–1.9	66 years and 6 months	
Latvia	55.4	52.2	3.2	64	
Denmark	54.8	58.2	–3.4	67	
Norway	66.7	70.5	.3.8		
Switzerland	59.3	63.2	–3.9		
Iceland	59.0	65.7	–6.7		

The total number of deaths in the EU increased by more than half a million between 2019 and 2020. Although excess deaths were observed across Europe for most of the period, the peaks and intensity of outbreaks varied widely across countries. Italy was the first country to reach a peak in excess deaths in March 2020, followed by Spain, Belgium, Luxembourg, the Netherlands, and Sweden in March and April that year. In the countries of Central and Eastern Europe, the death rate was higher in the autumn months of 2020 and in the spring of 2021. According to the most recent data available, excess mortality continues to vary across the EU. In October 2022, little or no excess deaths were registered in Bulgaria and Romania, whereas an excess mortality rate of 23.0% was registered in the most affected country, Germany.

Table 7 contains data that are generally available for 2020 on both the relative number of NUTS level 1 regions and the main causes of death. Eight regions in the EU had a standardised mortality rate of at least 1,500 deaths per 100,000 inhabitants. Most of the deceased had a relatively low standard of living as their GDP per capita (expressed in PPS) was generally less than two-thirds of the EU average. This situation was most notable in Severna i Yugoiztochna (Bulgaria), which recorded the highest mortality rate in the EU (1,854 deaths per 100,000 inhabitants) and the lowest GDP per capita (39% of the EU average). Other regions with particularly high mortality rates included all four regions of Romania, two non-capital regions of Hungary, and the other Bulgarian region (Yugozapadna i Yuzhna tsentralna). A similar pattern was frequently observed in different regions of each EU Member State. For example, in the three largest Member States, the highest standardised mortality rates in 2020

were recorded in Sachsen-Anhalt (eastern Germany), Sur (southern Spain), and Hauts-de-France (northern France). These regions are relatively disadvantaged, and the level of GDP per inhabitant is much lower than their corresponding national average. However, a different pattern was observed in Italy as the highest death rate in 2020 was registered in Nord-Ovest, which is a relatively wealthy region. This can be linked to the impact of the COVID-19 crisis because many areas of northern Italy were particularly affected in the early stages of the outbreak (as hospitals were overwhelmed in some regions). In 2020, almost a third of all deaths in the EU were attributable to diseases of the circulatory system. In 2020, the three main causes of death in the EU were diseases of the circulatory system, malignant tumours (hereafter, cancer), and COVID-19. Diseases of the circulatory system, including heart disease, hypertension, and pulmonary disease, accounted for nearly one-third (32.4%) of all deaths. Cancer accounted for 22.8% of all deaths in the EU.

Table 7. Mortality rates and leading causes of death in 2020: regions with the five highest rates (% of all deaths, based on standardised death rates per 100,000 inhabitants by NUTS 1 region)[57]

Diseases of the circulatory system	**Circulatory system**	**Cancer**
1. Yugozapadna i Yuzhna tsentralna Bulgaria (BG4)	63.5	13.9
2. Severna i Yugoiztochna Bulgaria (BG3)	62.2	13.5
3. Macroregiunea Patru (RO4)	59.7	15.0
4. Macroregiunea Trei (RO3)	56.6	16.0
5. Macroregiunea Unu (RO1)	56.0	16.3
EU	32.4	22.8
Cancer	Cancer	Circulatory system
1. Pays de la Loire (FRG)	29.1	21.0
2. Nouvelle-Aquitaine (FRI)	28.8	21.0
3. Åland (FI2)	28.7	35.0
4. Ireland (IE0)	28.5	27.7
5. Noord-Nederland (NL1)	28.1	24.5

57 Source: Authors own work based on the Eurostat database.

Diseases of the circulatory system	Circulatory system	Cancer
EU	22.8	32.4
COVID-19	COVID-19	Circulatory system
1. Comunidad de Madrid (ES3)	29.2	18.2
2. Région de Bruxelles/ Brussels Hoofdstedelijk (BE1)	23.9	17.9
3. Centro (ES4)	20.0	21.8
4. Région wallonne (BE3)	19.4	19.9
5. Ile-de-France (FR1)	18.0	16.7
EU	8.4	32.4
Diseases of the respiratory system	Respiratory system	Circulatory system
1. Região Autónoma da Madeira (PT3)	17.1	37.5
2. Canarias (ES7)	12.0	27.8
3. Malta (MT0)	11.0	31.0
4. Danmark (DK0)	10.4	21.4
5. Ireland (IE0)	10.3	27.7
EU	6.7	32.4

Overall, the population of the EU currently spends its healthy years working. By the time the period of long-term illness begins, this population will be retired, which assumes that health expenditure will increase during its retirement years. From the above data, we can conclude that effective measures in many regions could significantly reduce the occurrence of some causes of death (e.g. those related to COVID-19). As a result, many more people could stay healthy and able to work for longer. It is also clear that effective healthcare is a key issue in this regard.

4. The impact of demographic changes on the sustainability of pension systems

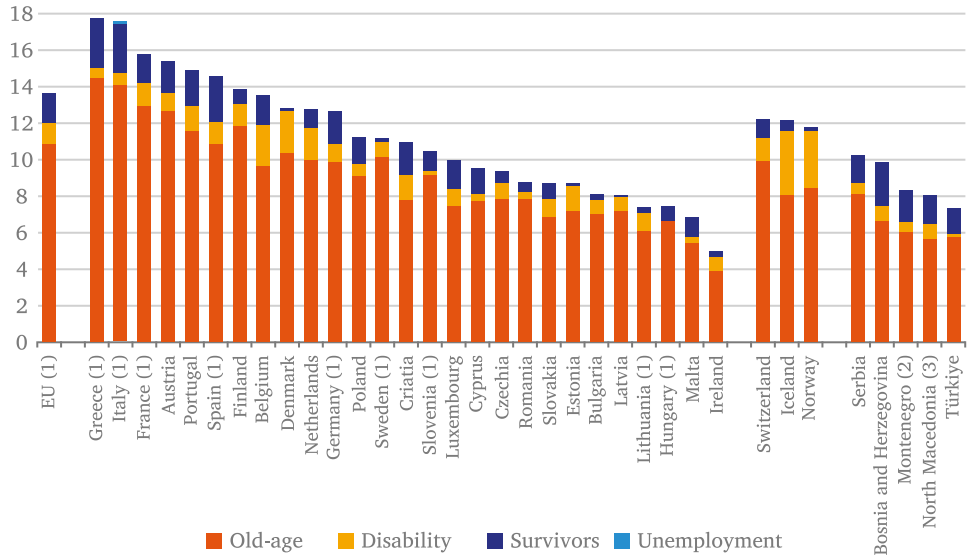
Among EU residents, the proportion of older adults in the total population is increasing every year. In 2020, 20.6% of the EU population was aged 65 or over, which is 3.0 percentage points higher than the ratio a decade ago. Among the EU Member States, Italy had the highest proportion of older adults in the total population in 2020 (23.2%), followed by Greece and Finland (22.3%), Portugal (22.1%), Germany (21.8%), and Bulgaria (21.6%). The lowest shares were recorded in Ireland (14.4%) and Luxembourg (14.5%). At the regional level, the highest proportion of older adults was found in Chemnitz in Germany (29.3%), followed by Liguria in Italy (28.7%), Epirus in Greece (27.3%), Limousin in France (27.1%), and Saxony-Anhalt in Germany (27.0%). The lowest shares were recorded in France's two overseas regions, Mayotte (2.7%) and French Guiana (6.1%), and the Spanish autonomous region of Melilla (11.1%).[58]

Around €1,832 billion was spent on pensions in EU Member States in 2020. This amount is increasing with the ageing of the population, although in 2012, it already amounted to €1,485 billion. Relative to GDP, EU pension expenditure accounted for 13.6% of total economic output in 2020. The relative importance of pension spending varied widely among EU Member States: in 2020, this ratio peaked in Greece, at 17.8% of GDP, followed by Italy, where this spending amounted to 17.6% of GDP. At the other end of the range, Lithuania, Hungary, Malta, and Ireland reported that pension expenditure was less than 8.0% of their GDP (see Figure 1). When examined in more detail, the largest part of the aggregated pension expenditure of the EU Member States comprised old-age pension benefits, which amounted to €1,384 billion in 2020. The distribution of expenses between the different types of pensions (old-age, disability, surviving relatives) and unemployment benefits varied depending on the differences in the design of countries' social protection systems. However, it is important to note that though a pension can perform several functions at the same time, based on its primary purpose, it can be recorded under a single function, which may affect the reported distribution of expenses.

Each country provides pension benefits under different circumstances and for different purposes. For example, the statistics presented refer to aggregated data, although different pension systems invariably provide different levels of benefits, often reflecting contribution levels that are not necessarily comparable across countries or that are not even uniform within countries. Consequently, it is not advisable to combine data on total expenditure and the total number of beneficiaries, and a more detailed comparison of information on expenditure and beneficiaries is likely to provide more meaningful results. However, it is important to be aware that even at a more detailed level, data are often aggregates, and the characteristics of their components can vary significantly.

58 Eurostat News, 2021.

Figure 1. Pension expenses as a proportion of GDP by type of pension in EU Member States in 2020[59]



4.1. The impact of population ageing on the sustainability of old-age pension systems based on social solidarity and living in old age

In 2020, more than 17% of the EU population was aged 65 or over. Eurostat estimates that this share will reach 30% by 2060. In 2019, for every person aged 65 or over, there were on average 2.9 working-age people, which represents the number of working-age contributions (including employer contributions) that could, in principle, cover an average old-age pension. This figure is projected to fall to 1.7 by 2070, that is, 1.7 working-age people for every person over 65.[60] Another document confirms, even though a little later in time, that the EU working age population is projected to fall (by 57.4 million by 2100) and that the old-age dependency ratio is expected to rise (from 30% to 60% by 2100, i.e., 1.7 working-age people for every person over 65).[61] The old-age dependency ratio indicates the ratio between the number of people aged 65 and over and the number of people aged 20–64 (i.e. working age).

59 Source: Eurostat.

60 Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the impact of demographic change, COM/2020/241 final.

61 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on Demographic change in Europe: a toolbox for action, COM/2023/577 final.

In the absence of reforms, an increase in the number of pensioners and a decrease in the number of working-age people could trigger a crisis in the public pension systems that are based on social solidarity and funded on a pay-as-you-go basis. In the compact nature of pay-as-you-go funding, contributions paid by active workers are used to pay current pensions. If the number of contributors decreases, with a corresponding decrease in the amount of contributions paid, but the number of funded pensioners remains the same or increases, the system will run a deficit for the same level of old-age pension. The state may be the primary source of the shortfall, but, according to EU rules, this should not be excessive and should not lead to significant budgetary expenditure as this could hamper growth. One option is to increase the level of contributions paid or to impose new taxes to raise resources; however, either way, the burden falls on the working-age population.

In sum, the growing number of pensioners will have to be supported by a steadily shrinking working-age population to generate the resources needed to pay pensions and finance health services.[62] 'Such developments can place a double burden on younger generations, raising questions about intergenerational equity'.[63] The double burden on the younger generation can be avoided if the state reduces the level of initial pensions and indexes current pensions. These solutions will lead to a reduction in the level of state pensions, worsening the replacement rate. Projections show that in most Member States, the pension-to-earnings ratio for retirees in 2059 will be lower than for retirees with similar careers in 2019.[64] In this situation, pensioners will need some additional support in the form of additional income, such as a supplementary pension.

In July 2010, the European Commission launched a European-level debate on the main challenges facing pension systems and published a Green Paper on pensions. The results are summarised in the Commission's communication 'White Paper – An Agenda for Adequate, Safe and Sustainable Pensions in Europe' of 16 February 2012.[65] According to this White Paper, the current challenges include ensuring the long-term financial sustainability of pension systems and the adequacy of pensions, including improving replacement rates and avoiding poverty in old age. In its resolution of 21 May 2013 on an adequate, safe, and sustainable European pensions agenda,[66] the European Parliament stressed that first pillar public pensions should remain the main source of income for pensioners. In the future, however, there will be a greater need for supplementary pensions. The Parliament's resolution proposes a multi-pillar pension system for Member States, with the following combination as the optimal one: a) a universal, pay-as-you-go, public pension; b) a funded, occupational, supplementary pension, resulting from collective agreements at the national,

62 Council Conclusions on 'Demographic Challenges – the Way Ahead' 2020/C 205/03.
63 Green Paper on Ageing – Fostering solidarity and responsibility between generations, COM/2021/50 final.
64 European Commission, 2021, p. 15.
65 White Paper – An Agenda for Adequate, Safe and Sustainable Pensions, COM(2012) 55 final.
66 European Parliament resolution of 21 May 2013 on an Agenda for Adequate, Safe and Sustainable Pensions (2012/C 188 E/03).

sector, or company level, or resulting from national legislation, accessible to all workers concerned; c) an individual third-pillar pension based on private savings.

Subsequent projections have also confirmed[67] the need for funded or unfunded public and/or private pensions to complement public pay-as-you-go pensions in most Member States. 'Supplementary pensions can play a key role, especially when the level of public pay-as-you-go pensions is expected to decline'.[68] The EU advises and expects the reform of public pension systems to improve their financial sustainability, considering it important to extend working lives (i.e. to raise the retirement age). According to Eurostat's latest population projections, the old-age dependency ratio in the EU in 2040 would only remain at the 2020 level if the working life were extended to 70. However, there is considerable variation between Member States, indicating different challenges across Europe. For the old-age dependency ratio to remain constant in 2040 compared to 2020, it is projected that Malta, Hungary, and Sweden would only need to extend working life to 68 years, whereas Lithuania and Luxembourg would need to extend it to 72 years.[69]

In addition to raising the retirement age, the EU proposes to make postponing retirement more attractive and to support working during retirement as a solution.[70] To prevent poverty in old age, the so-called Green Paper on pensions suggested that it would be a good idea to set a guaranteed minimum old-age pension rate, even at the EU level, which would ensure that people of retirement age could live on their pension. However, the European Parliament's resolution in response to the Green Paper[71] pointed out that there is no possibility of setting an adequate pension level at this level because of differences in earnings and living conditions across the Member States. At the same time, this resolution called on the Commission to draw up guidelines that allow Member States to set criteria for minimum levels of adequate pensions. It expected Member States to define adequacy as a condition for older people to have a decent living. Reflecting on this, the 'Towards adequate, sustainable and safe European pension systems' Green Paper by the Committee on Employment and Social Affairs notes that the different income conditions and social security arrangements in the Member States do not allow or justify a single minimum pension rate set at the EU level.[72]

67 European Commission, 2018.

68 Draft Joint Employment Report from the Commission and the Council accompanying the Communication from the Commission on the Annual Growth Survey 2017, COM/2016/0729 final.

69 Green Paper on Ageing – Fostering solidarity and responsibility between generations, COM/2021/50 final

70 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Demographic change in Europe: a toolbox for action, COM/2023/577 final.

71 Adequate, sustainable and safe European pension systems. European Parliament resolution of 16 February 2011 on 'Towards adequate, sustainable and safe European pension systems' (2012/C 188 E/03).

72 Green Paper – 'Towards adequate, sustainable and safe European pension systems' of 3 February 2011 (2010/2239(INI)).

The EU-funded research has not yet gone beyond a theoretical approach, nor have concrete criteria for determining an adequate minimum pension been established. The Pensions Adequacy Report 2021, produced every 3 years since 2012 by the Social Protection Committee and the European Commission, also only indicates the efforts made by some Member States to protect low-income pensioners and which Member States have introduced a basic or minimum pension to cover daily living costs.[73] Based on the data extracted from Hungary's 2022 census, there were 6.2 million people aged 15–64 and 2 million older adults (65 and over) in 2022. According to this data, there are currently three working-age people for every pensioner. By 2070, this ratio will fall below two.[74] The proportion of the population aged 65 and over was below 10% of the total population until 1970, rising to 21% in 2022.[75] Hungary's working-age population is expected to fall by 4%, or around 250,000 people, by 2030.[76] As one of the highest in the EU, the projected long-term increase in pension expenditure in Hungary is expected to rise from 8.3% of GDP in 2019 to over 12.4% in 2070, further increasing the burden on future taxpayers.[77] To stabilise public debt in the long term, the Commission's assessment of the country report is that budgetary pressures as a result of ageing populations, in particular expenditures of public pensions and healthcare, need to be addressed.[78] Reform solutions for the state pension system in Hungary are currently being developed.

The Hungarian pension system is based on two pillars: a compulsory social security pension scheme (hereinafter, 'the state pension')[79] and a system of voluntary institutions allowing individual provision. Act LXXXI of 1997 on Social Security Pension Benefits and Act CXXII of 2019 on Entitlements to Social Security Benefits and on Funding These Services contain rules on the old-age state pension.

The amount of the initial old-age pension depends mainly on the earnings during working age and the length of service. It is also influenced by the so-called valorisation multiplier, which is used to calculate the present value of previous active-age earnings. The pension is indexed in order to maintain its real value. Hungary has a price index, with pensions rising in line with inflation. If the rate of increase in

73 European Commission, 2021, p. 62 and pp. 113–118.
74 European Commission, 2022, p. 7.
75 KSH, n.d.d.
76 European Commission, 2022, p. 7.
77 European Commission, 2022, p. 8.
78 Commission Staff Working Document 2022, Country Report – Hungary, Accompanying the document Recommendation for a Council Recommendation on the 2022 National Reform Programme of Hungary and delivering a Council opinion on the 2022 Convergence Programme of Hungary, SWD/2022/614 final.
79 According to Act LXXXI of 1997 on Social Security Pension Benefits Section 1, the operation and improvement of the compulsory social security pension scheme is the responsibility of the state. The social security pension system is designed to provide benefits to insured persons in their older years or to their relatives in the event of their death.

average earnings is higher than the increase in annual inflation and, hence, the increase in pensions, pensions become devalued relative to average earnings and the replacement rate of pensions decreases.[80]

The retirement age in Hungary has risen relatively rapidly in recent years, from 62 in 2014 to 65 in 2022. Life expectancy at birth has not followed this dynamic: it is projected to be 72.55 years for men and 79.05 years for women in 2022, an increase of 1 year for men and about 6 months for women compared to 2012.[81] If a person does not retire at retirement age but continues to work, their pension increases by 2 percentage points per year. After 40 years of work, the pensioner receives 80% of the present value of their earnings, and after 2 years of additional work, they will receive 84%. The final pension amount may also be affected by the valorisation multiplier at retirement, which follows the increase in average wages. It is, therefore, possible that the income calculated in present value terms could have also increased significantly over the 2 years; in other words, the retiree would receive 84% of the higher income.

The second, supplementary pension pillar emerged after the change of regime (1989) and is operated by several state-recognised institutions. The first legislation allowing institutional voluntary pension provision, Act XCVI of 1993 on Voluntary Mutual Insurance Funds, was adopted in 1993. This was followed by the mandatory funded pension scheme,[82] Act LXXXII of 1997 on Private Pensions and Private Pension Funds, which introduced the private pension fund system and was amended in 2011 to remove its mandatory nature and make it voluntary. The amendment abolished mandatory pension provision in Hungary.

As a consequence of the mandatory implementation of Directive 2003/41/EC, Act CXVII of 2007 on Occupational Retirement Pensions and Institutions was adopted in Hungary, which allowed the establishment of an occupational pension provider from 2008. In voluntary provision, the occupational pension does not play a role as the focus of this form of pension saving is on the commitment of the employer, not the pension provider. It is the employer who decides whether to introduce an

80 The pension replacement rate shows how the starting pension rate compares with the average wage in the last year of work. Among the Member States, the replacement rate in Hungary has been relatively high for many years, although this has recently changed. The pension replacement rate was 67% in 2016, the fourth highest in the EU. Despite all the extra benefits (pension premiums), pensions grew by only 2.8%, while wage growth was 9.2% per year. As a result, the replacement rate, expressed as the ratio of average pension to average net wage, fell from 67% in 2016 to 53% in 2019. The trend continued after 2020, with average pensions now at just over half of the average Hungarian wage due to the faster rate of wage growth and pensions rising, KSH, 2018, pp. 66–67; European Commission, 2022, p. 28; Note: The average replacement rate in OECD countries is 63% of the average wage. See: http://www.oecd.org/australia/PAG2017-AUS.pdf (Table 4.8) (Accessed: 25 January 2024); Süle-Szigeti, 2020.

81 KSH, n.d.c.

82 The idea behind funded pension schemes is that members' monthly contributions are set aside and invested during the so-called 'accumulation period', or vesting period, to provide the funding for future pension provision. Biometric risks (death or disability during the accumulation period) and investment risks are borne by the member.

occupational pension scheme, and those who wish to make this provision cannot be members individually or join such an institution as members.

With Act CLVI of 2005, the state also made it possible to save for pensions not only through institutions, but also individually, with the introduction of the so-called 'pension savings account', which any person can open voluntarily. Those who want to save for their retirement can also choose from a range of life insurance products. These contracts can be concluded with market insurers and are, therefore, not institutions and legal arrangements set up by the state for the purpose of saving for retirement. However, the state has been supportive of such contracts, introducing a tax relief in 2014: if the life insurance contract taken out meets the criteria laid down in the Personal Income Tax Act, the state will credit a certain amount of the tax paid to the insurance contract.

The second pillar now includes the pan-European individual pension product, introduced by Regulation (EU) 2019/1238 of the European Parliament and of the Council, which any citizen of a Member State can use through providers registered for this purpose. There are, therefore, several options for working-age people to supplement their future social security pension. The state also provides tax relief for certain institutions, such as voluntary pension savings, pension insurance, and pension savings accounts. The existing institutions have the potential to provide a supplementary pension that supports old age living, with the possibility to choose an annuity and no limit on the amount that can be paid.

However, it should be pointed out that in Hungary, occupational pensions have not been promoted and are not popular among employers. This could be helped primarily by tax relief, and the role of the state could be strengthened. The way to do this is for public employers to join the scheme or to set up providers. In their current state, occupational pensions are not well suited to play the role of a second pillar. Experience shows that employers in Hungary will support their employees' pension savings if they receive some form of tax relief. Currently, there are no such incentives.

According to Article 20(3) of Act LXXX of 1997 on the Eligibility for Social Security Benefits and Private Pensions, the amount of the old-age full pension may not be less than the minimum amount of the old-age pension determined by a separate law. Article 11 of Government Decree 168/1997 (X. 6.) on the implementation of Act LXXXI of 1997 on the Eligibility for Social Security Benefits and Private Pensions stipulates the minimum amount of the old-age full pension, which was HUF 28,500 per month as of 1 January 2008. The original purpose of the old-age pension minimum was to set a minimum amount in order to determine the lowest limit that ensures a (albeit scarce) living. However, this minimum amount has now lost its practical relevance. On the one hand, even the lowest amount of the full old-age pension exceeds this amount and, on the other hand, in today's economic conditions, it is not even sufficient to provide a scarce old-age living.

The state's only obligation under the Fundamental Law is to contribute to the provision of an old-age living by maintaining the state pension system and enabling the operation of social institutions established on a voluntary basis. The Fundamental Law is silent on the need for the state to ensure the necessary level of subsistence in old age. If we compare the Hungarian old-age pension minimum with the minimum pensions (basic pensions) provided by other Member States, it is almost the lowest.[83]

The sustainability of pay-as-you-go public pension systems is significantly affected by the phenomenon of an ageing society: though it will still be possible to fund them, they will be able to provide fewer services in the future, which will jeopardise livelihoods in old age. The EU and its Member States are seeking to mitigate the negative effects on the sustainability of old-age pension systems not through family policy instruments (support for childbearing) but rather through pension reforms, in particular, by raising the retirement age and keeping people of retirement age in the labour market. In addition, the aim is to avoid the impoverishment of pensioners and strongly encourage supplementary pension savings among those who can afford them.

5. Accuracy and uncertainty of various population forecasts – main findings of EU long-term forecasting

Many different national and multilateral institutions estimate historical population data and make projections. The United Nations Population Division (UNPD) has published population estimates, vital statistics, and projections for all countries since 1951, and currently from 1950 to 2100. The World Bank Group also produces population projections that rely on UNPD data but include country-specific differences that have been well-identified and discussed with the UNPD. Several research institutes have demographic programmes, including the Wittgenstein Center, which is affiliated with the International Institute for Applied Systems Analysis (IIASA).

A wide range of methodologies are used to predict future populations. The dominant methods of making forecasts are deterministic models, which use 'cohort components' based on the age structure of the population and the components of change: births, deaths, and migration. Future uncertainty is conveyed through alternative assumptions about these key variables to develop different scenarios.[84] The UN World Population Projection for 2015 covers different scenarios with different

83 European Commission, 2021, pp. 114–115.
84 Cohen, 2001; Lutz, Sanderson, and Scherbov, 2001.

assumptions on fertility, mortality, and migration.[85] Among the high (+ half child), medium, and low (- half child) fertility variants, the medium variant typically receives the most attention, and the other two convey uncertainty about the predictions, especially in the outer years. Uncertainty in population projections that adopt this deterministic approach is related to assumptions about fertility, mortality, and migration.

UN projections are also methodologically advanced by using parametric functions to model demographic change.[86] Currently, total fertility rates and life expectancy for a given country are modelled using a Bayesian hierarchical model that relies on information from other countries to estimate parameters around the world average. This method provides estimates of, for example, the total fertility rate where uncertainty increases over time and is higher in countries with higher initial fertility. The UNPD now uses probabilistic approaches, along with the presentation of alternative scenarios, to illustrate uncertainty about future trends. Other projections, such as those of the IIASA, take a more structural approach, specifically considering the effect of education on fertility rates: as the populations of high-fertility countries become more educated, their fertility rates decline. This is one of the reasons why the IIASA's long-term forecasts tend to differ significantly from those of the UN. The former predict that global population growth will most likely reach its peak by the end of this century, whereas the latter holds that the global population will continue to grow even after 2100.[87] The main sources of this difference are the projections for Asia and Africa, where many countries have high fertility rates and low levels of education.[88]

The EU's long-term forecasts are based on commonly agreed methods and assumptions. These are included in the relevant studies by the European Commission and the European Economic Policy Committee (EPC).[89] The starting point was the Eurostat population forecast for 2019–2070. Population projections are based on Eurostat's demographic projections with a base year of 2019, named EUROPOP2019. GDP growth projections were based on the T+10 medium-term projections of the EPC Output Gap Working Group, according to the Commission's 2020 spring forecast (with EUROPOP2018 as the base year and 2018 as the most recent at that time). These forecasts do not take into account the impact of the COVID-19 pandemic as the EUROPOP2019 forecasts were finalised by Eurostat in April 2020. In addition, the EPC agreed on common assumptions and methodologies for forecasting key macroeconomic variables for all Member States based on proposals made by the Commission services (DG ECFIN) and the EPC Working Group on Ageing Populations and Sustainability. (AGW). These include labour

85 World Bank, 2016.
86 Wilmoth, 2015.
87 Gerland, 2014; Lutz et al., 2007.
88 World Bank, 2016, pp. 138, 283.
89 European Commission (DG ECFIN) and Economic Policy Committee (AWG), 2020.

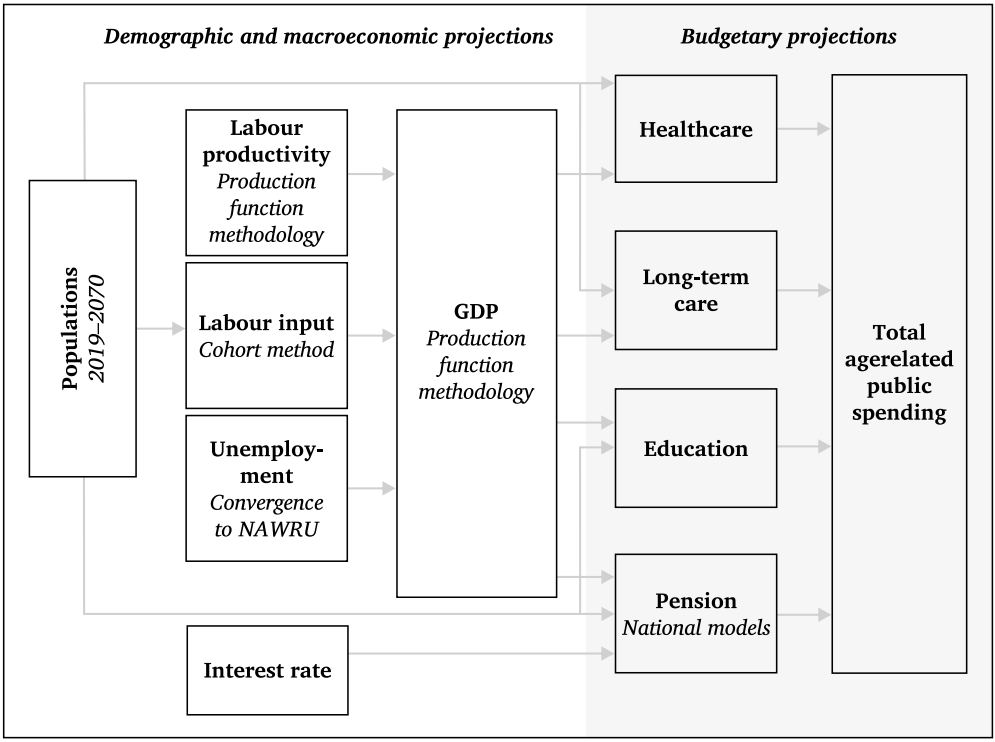
force coverage (participation, employment, and unemployment rates), labour productivity, and the interest rate. This set of variables made it possible to derive the GDP of all Member States until 2070. The macroeconomic assumptions underlying the report were agreed upon in the first half of 2020 and published in November 2020.

Based on these assumptions, a separate budget forecast was prepared for four government expenditure items: pensions, healthcare, long-term care, and education. From this round onwards, the EPC decided not to include unemployment benefit projections, which were already considered not a strictly age-related expenditure item. The pension forecasts are based on the Member States' own national models, reflecting current pension legislation. To ensure the high quality and comparability of the pension forecast results, the AWG and the Commission services conducted an in-depth peer review in several meetings between September and December 2020. The forecasts include the pension legislation in force at the time. This report does not include further reform measures after 31 December 2020. In this way, the forecasts have the advantage of capturing the country-specific circumstances prevailing in different Member States owing to different pension legislation while ensuring consistency by basing the forecasts on commonly agreed basic assumptions. The forecasts for healthcare, long-term care, and education were prepared by the European Commission services (DG ECFIN) on the basis of the common forecast model for each expenditure item, taking into account country-specific settings where appropriate. The results of these separate projections were aggregated to provide an overall projection of public expenditure on ageing (see Figure 2).[90]

Long-term projections show where (i.e. in which countries), when, and to what extent ageing pressures will accelerate as the baby-boom generation retires and the EU population is expected to live longer in the future. The forecasts are, therefore, useful in highlighting the immediate and future policy challenges for governments posed by projected demographic trends. At the level of individual countries, the report provides a very rich set of information covering a long period (up to 2070), compiled in a comparable and transparent manner. At the same time, one of the main weaknesses of the EU's forecasts is that, although they take many factors into account, they also ignore several other factors (e.g. those that are presented in this chapter) that can have a significant impact on the development of individual Member States.

90 European Commission, 2020c, pp. 1–3, 375.

Figure 2. Overview of the EU's 2021 forecasting practice[91]



The other main weakness of these forecasts is that they do not show any development alternatives or breaking points that would encourage individual countries to make decisions and adopt measures for the future that differ from the previous ones.

The main findings of the latest EU long-term base case forecast can be summarised as follows. Under the baseline scenario, the total cost of ageing (including spending on pensions, healthcare, long-term care, and education) will increase in the long term at the EU/EA aggregate level. This cost, which accounted for 24% of GDP in 2019, is forecast to rise by 1.9 percentage points for the EU as a whole. Table 8 indicates the expected changes for each member country; however, there are significant differences in long-term spending trends between EU Member States and over time. According to EU forecasts,[92] a decrease in all ageing-related expenditure relative to GDP is expected in eight Member States (Greece, Estonia, Portugal, France, Latvia, Spain, Croatia, and Italy). In all of these countries, a long-term decline in the pension ratio relative to GDP is expected (in Greece and Portugal, this

91 Source: European Commission, 2021, p. 2.
92 European Commission, 2021, p. 8.

rate exceeds 3 percentage points of GDP). However, with the exception of Greece, Estonia. and Latvia, overall spending declines are expected to rise above the current EU average, particularly for Italy and Portugal (2.5 percentage points of GDP or above). The ageing-related expenditure ratio is expected to rise moderately (by up to 3 percentage points of GDP) for another five countries (Denmark, Lithuania, Cyprus, Bulgaria, and Sweden). With the exception of Denmark and Sweden, spending on ageing in these countries is currently well below the EU average.

Table 8. The total cost of ageing as a percentage of GDP – base case, changes in expenditure from 2019–2070[93]

Country	Pensions	Healthcare	Long-term care	Education	Total
Slovakia	5.9	2.5	2.1	0.4	10.8
Luxembourg	8.7	1.1	1.4	–0.8	10.4
Slovenia	6.0	1.5	1.3	0.1	8.9
Malta	3.8	2.6	1.9	–0.3	8.0
Norway	2.6	1.1	3.9	–0.6	7.1
Ireland	3.0	1.4	1.9	–0.1	6.2
Czechia	2.9	0.9	1.7	0.6	6.1
Hungary	4.1	0.9	0.7	–0.1	5.5
Belgium	3.0	0.6	2.1	–0.4	5.4
Netherlands	2.3	0.8	2.7	–0.5	5.5
Romania	3.8	0.9	0.4	–0.1	5.1
Poland	–0.2	2.6	1.6	–0.1	4.0
Austria	1.0	1.2	1.8	–0.1	3.8
Finland	1.3	0.8	2.1	–0.9	3.4
Germany	2.1	0.4	0.2	0.5	3.3
Sweden	–0.1	0.8	2.2	–0.5	2.3
Bulgaria	1.4	0.2	0.1	0.4	2.1
Cyprus	2.1	0.3	0.3	–0.7	2.0

93 Source: Authors own work based on European Commission, 2021. Created with Datawrapper.

Country	Pensions	Healthcare	Long-term care	Education	Total
Lithuania	0.4	0.6	0.8	–0.1	1.6
Denmark	–2.0	0.9	3.4	–0.8	1.5
Italy	–1.8	1.2	1.0	0.4	–0.1
Croatia	–0.7	0.7	0.2	–0.5	–0.3
Spain	–2.1	1.3	0.8	–0.4	–0.4
Latvia	–1.2	0.4	0.2	0.0	–0.6
France	–2.2	1.1	0.8	–0.6	–0.8
Portugal	–3.2	1.6	0.4	–0.1	–1.3
Estonia	–2.3	0.8	0.3	–0.4	–1.6
Greece	–3.8	0.8	0.0	–0.6	–3.7
EU	0.1	0.9	1.1	–0.2	1.9

The increase in the ageing-related expenditure ratio is projected to be the largest in the remaining 15 countries (Germany, Finland, Austria, Poland, Romania, the Netherlands, Belgium, Hungary, the Czech Republic, Ireland, Norway, Malta, Slovenia, Luxembourg, and Slovakia), rising by 3 percentage points at or above GDP. Pension spending is increasing in all of these countries, and by more than 3 percentage points of GDP in Luxembourg, Slovenia, Slovakia, Hungary, Malta, Romania, and Ireland. In Finland, Austria, and Belgium, the expenses related to ageing already exceed the EU average. Looking at the base-scenario components of ageing-related expenditures, the growth until 2070 will be determined mostly by long-term care and health expenditures.

All in all, although these forecasts are undoubtedly useful in that they shed light on certain future challenges, they fundamentally allow the continuation of previous bad habits and practices without changes or with only minor changes. From this perspective, the practice adopted by the World Bank is particularly noteworthy, according to which different assumptions about future fertility rates can lead to significantly different population forecasts in the long term. It would be worthwhile for the EU to conduct a similar exercise in order to ensure that the Member States are aware that they have both considerable room for manoeuvre and a particularly great responsibility in shaping future processes related to demography. Several decisions and measures could be implemented that could even cause a significant shift that contributes to successfully overcoming the current demographic ice age.

6. Conclusions – more effective public policies could encourage favourable demographic changes within countries and regions

In summary, demographic changes are leading to a slower-growing and older population. This transition is likely to exert downward pressure on the growth rate of potential output, the natural rate of unemployment, and long-term equilibrium interest rates. The magnitude and timing of these effects are uncertain because they depend on complex dynamics and the behaviour of consumers and businesses. Demographic change can also affect business cycles and the transmission mechanism of monetary policy. Monetary policymakers should continually assess these structural and cyclical effects when determining appropriate policy. Demographic trends are also a challenge for fiscal decision-makers. Growing fiscal imbalances are projected to lead to higher levels of government debt-to-GDP, potentially putting upward pressure on interest rates and crowding out productive investment.

Ultimately, the decreasing preference for having children causes damage not only to families but also to countries and the affected societies as a whole. In this regard, the President of the Hungarian Republic stated that the affected countries may end up in a worse situation as a result of the demographic ice age than as a result of global warming.[94] Despite this, there are practically no studies that have considered these negative consequences in sufficient detail, analysed them, or explored the possible damage – thus far, most studies have only examined the negative consequences of high fertility.[95] Consequently, as a kind of exploratory research, this chapter undertook a detailed investigation of the main negative effects caused by the demographic ice age. Thereby, it gives an initial impetus to further research, which we hope will analyse these effects in more detail and attempt to quantify the damage that the processes of the demographic ice age will cause.

As we have established, there are many forecasts in this area. Although these forecasts are undoubtedly useful in terms of drawing the attention of the concerned countries and EU leaders to several negative prospects, in fact, these countries and leaders currently significantly underestimate the true magnitude of the problem and, thus, tend to believe that it is not really urgent. They have a lot to do in the future. Even today, as this chapter shows, the situation is worse than these forecasts predict. An even bigger mistake is that the forecasts do not shed light on which areas and which public policies (economic policy, employment policy, monetary policy, budgetary policy, health policy, regional development policy, etc.) and measures could achieve significant changes, even in the short term, by stimulating the number of live births and not only employing financial means. At the same time, each member country should rethink these forecasts within its own jurisdiction and create a

94 Gennarini, 2023.
95 For example, see: World Bank, 2010.

database that can be used to make much more accurate and realistic estimates of the social and economic effects of demographic changes than at present. These estimates should be determined much more precisely for the respective countries and regions in order for their governments to determine the scope and possibilities of future measures.

Through this chapter, above all, we wish to emphasise the fact that much more attention should be paid to solving the everyday problems and difficulties of single people than at present, and especially to why people have far fewer children today than even a decade ago. While the decreasing number of live births should be addressed, it should also be ensured that far fewer people than at present die prematurely as a result of often incredibly trivial, preventable causes, such as high child mortality, road and other accidents, air pollution,[96] diseases caused by other environmental hazards, various epidemics, and chronic diseases. We are convinced that the majority of these could be significantly reduced and prevented with minimal expenditure. Today, the EU and all its Member States have a huge institutional system and a range of public policies available to achieve the necessary changes in these areas. Even a minimal improvement could bring about positive effects on the number of people of working age and entrants, improving the balance of the active and inactive populations.

Though we have dealt with it extensively before, one area is not addressed by this chapter: the level of happiness of societies. Many studies have already shown that those who have and raise one or more children are much happier than single people who do not have children, and the positive effects of this are often incalculable.[97] Finally, let us mention one more important issue:

> Globalization in its current form marks the end. Instead of being open, accessible and integrated as it has been for decades, the world is now filled with technology-based walls and barriers. Technology is causing the world to split and crack on almost every level. The world has become vertical …. The nation that will be among the first to formulate national future programmes in the MI reality will rule the entire world and the era.[98]

Consequently, the formulation of an appropriate future concept also becomes a key issue in terms of demographics, that is, how many of the young people living in the EU will want to have children and raise and educate them, and how much of their time and income they are willing to devote to this. The signs in this regard are not at all encouraging: in many countries and regions of the EU, an increasing

96 According to a European Environment Agency report, 400,000 people died in Europe due to air pollution in 2021 alone. Deaths from fine particulate matter were highest in Poland, Italy, and Germany, whereas nitrogen dioxide and ozone had the greatest impact on deaths in Turkey, Italy and Germany. Reuters, 2023: 'Almost 400,000 deaths in Europe in 2021 attributable to filthy air.

97 Balásházy, Major and Farkas, 2018.

98 Prakash, 2021.

number of people no longer want to bring children into today's world owing to wars, epidemics, climate change, and many other reasons and come to the conclusion that the world that is corrupted to the core. In our opinion, this is what needs to be radically changed as soon as possible.

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