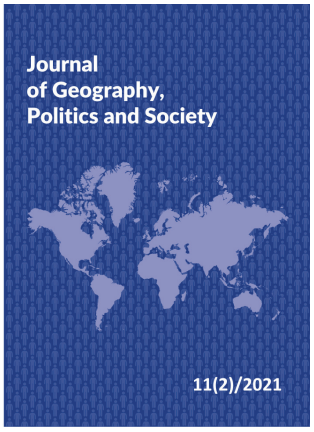

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THE TYPES OF FERTILITY PATTERNS IN EUROPE

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Abstract
The aim of this paper is to present the types of fertility patterns that characterise European countries and their NUTS-1 units in the early 21st c. and in the near future. The types of fertility patterns were defined by ordering six five-year age groups of women aged from 15 to 44 years, according to the groups' fertility rates (from the highest to the lowest). The analysis resulted in the creation of 14 different types of fertility patterns. Countries located in the same European region tend to have the same or similar type of fertility pattern. In most European countries, the postponement transition can be observed, and it will probably continue in the future.

Differences between the fertility rates of the age groups were assessed within countries and between countries with the same type of fertility pattern by calculating the so-called fertility rate ratios. The paper also provides an overview of the main theories and concepts explaining the course of family formation processes in Europe and indicates factors that shape fertility patterns in European countries today.

Key words
demographic processes in European countries, fertility patterns, family formation processes, typology.

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1. Introduction

Europe's population is not only the oldest compared with other continents, but it is also the only one that is projected to decline in the next several decades. Both the ageing and decrease in the population in Europe are attributed to falling fertility rates that usually co-occur with relatively stable or declining mortality rates (as a result, life expectancy increases). The size and socio-demographic structures in Europe are also influenced (positively or negatively) by migration (see, for instance, Goldstein, 2009; Willekens, 2015).

Although fertility rates vary among European countries, all have a total fertility rate (TFR)[1] below

[1] The Total Fertility Rate (TFR) is a measure that allows the fertility levels of different populations to be compared. It is constructed as the sum of age-specific fertility rates representing "the mean number of children who would be born to a woman during her lifetime, if she were to spend her childbearing years conforming to the age-specific fertility rates, which have been measured in a given year" (Eurostat, 2019; see also Thomas, 2018, p. 104). The total fertility rate for first births (TFR1) differs from the TFR in that it is only calculated with age-specific fertility rates for first births (see, for instance, Philipov, 2017).

the population replacement level of 2.1 children per woman (in most countries, the situation has persisted for more than several decades), (see Table 4 in the Appendix).

The family formation patterns and fertility patterns of European countries are significantly different because they are influenced by many demographic, social, cultural and economic factors (Kirk, 1996; Willekens, 2015; Kohler et al., 2002), such as the age and gender structure of the population, adherence to tradition and social norms, the material status of households, and the situation in the labour market. Government policies, including population and social policies, also play a role. An important cause of the differences in fertility patterns between Central and Eastern Europe (CEE) and the rest of Europe lies in the control that the former USSR had over CEE countries for almost five decades in the 20th c., which inhibited the inflow of people, commodities and ideas.

The aim of this paper is to present the types of fertility patterns that characterise selected European countries and their NUTS-1 units in the early 21st c. Fertility patterns are understood as the age-group-specific distribution of fertility rates represented by a quotient between the number of live births and the number of women in a specific age range (see, for instance, Kurek, Lange, 2012; United Nations..., 2017). In addition to an analytical section, the paper contains a theoretical section providing insight into the main theories and concepts that explain the evolution of family formation processes in Europe, and a discussion section that reviews the factors that influence fertility patterns in European countries today.

2. The theoretical framework

In the last fifty to seventy years, Europe's family formation patterns have changed significantly. "Following the era of the 'golden age of marriage' and the baby boom in the 1950s and 1960s, marriage has declined in importance. […] Family forms and living arrangements other than the nuclear families of (married) couples with children" have become increasingly common, with "the pace of change in family life and living arrangements [varying] across countries, cohorts, and social groups" (Sobotka, Toulemon, 2008, pp. 85–87). Those changes were described in theories, such as the (first) demographic transition theory (see, for instance, Kirk, 1944; Notestein, 1945; van de Kaa, 1987) and the second demographic transition theory.

Today, in almost the whole of Europe, changes in the reproduction of populations described by the (first) demographic transition theory have faded into history. According to this theory, "societies that experience modernization progress from a pre-modern regime of high fertility and high mortality to a post-modern one, in which both are low" (Kirk, 1996, p. 361)[2].

The end of the (first) demographic transition was marked by changes in marital and procreative attitudes and behaviours that reduced fertility rates even more. The changes were called the second demographic transition and involved the postponement of marriage, fewer couples deciding to get married and more couples choosing cohabitation, rising divorce rates, total fertility rates falling below the population replacement level, the postponement of first births[3], fewer families with more than one child, and increasing rates of out-of-wedlock births and voluntarily childless couples (Lesthaeghe, 2010; van de Kaa, 1997; van de Kaa, 2003). The changes that were first observed in the 1960s in western and northern European countries spread to the rest of the continent, reaching the former Eastern-bloc countries in the 1990s. Thus, they coincided with the turbulent political and economic transformations in this part of Europe triggered by the collapse of the USSR (see, for instance, Philipov, 2003; Philipov, Kohler, 2001; van de Kaa, 1997).

The changes in family formation patterns described by the second demographic transition were mainly caused by economic, social and ideological factors (see, e.g. Philipov, 2003), such as people feeling a stronger need for self-realisation in different life roles and making rational and voluntary life choices, and the empowerment of couples (women in particular). The changes were partly enabled by access to effective contraceptives and abortion services (van de Kaa, 1997) and coincided with the gender revolution (Sobotka, 2008), driven by greater economic activity of women and their efforts to continue education and pursue professional careers (Castles, 2003).

A major contributing factor to the evolution of family formation patterns has also been the advancing secularisation of society and the steadily

[2] In an effort to explain why birth rates fell, many scientific theories and concepts have been created, most of which point to economic, social and psychological factors (see, for instance, Becker, 1960; Becker, Barro, 1988; Caldwell, 1978, 1980, 1982; Easterlin, 1978; Hoffman, Hoffman, 1973; Hoffman et al., 1978; Leibenstein, 1957, 1975).

[3] The term "postponement transition" is understood as a fast and permanent passage "from early to late age patterns of fertility" (Kohler et al., 2002, p. 642), characterised by the increasing mean age at which women have their first child.

weakening attachment to tradition[4], which coincided with global advancements in technology and the economic growth of countries improving the living standard of populations. Also of importance have been the development of mass media and the emergence of the Internet, which spurred globalisation processes (Willekens, 2015). A factor that also influences procreation decisions is the economic situation in the country and in the world, as illustrated by the Great Recession which hit the USA in 2007 and then most European economies, reducing fertility rates in many of them (Matysiak et al., 2018).

Changes described by the second demographic transition are still taking place in several developing countries in Central and Eastern Europe. Developed countries have left the second demographic transition behind, but in many of them (especially Western countries), a so-called third demographic transition has begun (Coleman, 2006). These countries are characterised by high and positive net migration rates resulting from their attractiveness to migrants. Processes resulting from "low fertility combined with high immigration are significant because they are changing the composition of national populations and thereby the culture, physical appearance, social experiences, and self-perceived identity of the inhabitants of European nations" (Coleman, 2006, p. 402; see also: López-González, González-González, 2018).

3. Data and methods

The paper presents total fertility patterns (i.e. created for live births of all orders) in 2000, 2005, 2010, 2015, and 2017[5], their projections for 2025, and fertility patterns for first births in 2017 in selected European countries, as well as total fertility patterns in NUTS-1 units[6] in 2017. It is notable that some types of fertility patterns do not occur in some years or at some levels of analysis[7]. The data used in the research were obtained from the Eurostat Database, and the calculations were performed in MS Excel 2010 and STATISTICA 13. The data and results are presented in tables, graphs and choropleth maps (that were drawn in QGIS (ver. 1.6.0) using geographical data from the Eurostat – GISCO website[8]).

The types of fertility patterns were constructed by dividing women aged from 15 to 44 years[9] into six five-year age groups and ordering them according to the groups' fertility rates, starting with the highest one. Thus, 14 unique types of fertility patterns were obtained (see Table 1).

In the next step, the quotients between the fertility rates of particular age groups were calculated by dividing the fertility rate of an older age group by the fertility rate of a younger age group to obtain the so-called fertility rate ratios (FRRs)[10], which allow the fertility rates of different age groups to be compared within countries, as well as between countries representing the same type of fertility pattern. The FRRs

[4] It is believed that religiousness frequently has a positive influence on fertility (see, e.g. Baudin, 2015; Hubert, 2015).

[5] The author is aware that the first year of the 21st c. was 2001. The decision to use 2000 as the starting year of the analysis aimed to ensure equal time intervals. The analysis of *ex-post* data ends in 2017 due to the unavailability of later Eurostat data at the time of the study. The year 2025 should be understood as representing the near future.

[6] "The NUTS classification (Nomenclature of territorial units for statistics) is a hierarchical system for dividing up the economic territory of the EU for the purpose of the collection, development and harmonisation of European regional statistics; socio-economic analyses of the regions (…) and framing of EU regional policies" (Eurostat – Nuts).

[7] The types of total fertility patterns characterising the selected European countries in years 2000, 2005, 2010, 2015 and 2017 were determined using fertility rates for age groups 15–19, 20–24, 25–29, 30–34, 35–39 and 40–44 years obtained from the Eurostat database. The 2025 types of total fertility patterns were developed by multiplying fertility rates projected by Eurostat for particular ages from 15 to 44 years in 2025 by the average number of women at particular ages in that year. Finally, age-specific fertility rates were calculated for five year-age groups. The typology of countries according to fertility patterns for first births was derived from age-specific fertility rates calculated by dividing the number of births in particular five-year age groups in the age range of 15 to 44 years by the average number of women that comprised the groups in 2017. Based on the same approach, the age-specific fertility rates for NUTS-1 units in 2017 were calculated.

[8] © EuroGeographics for the administrative boundaries (Eurostat).

[9] In the early stage of the analysis, fertility rates for girls between 10 and 14 years and women aged 45–49 years and older than 50 years were also considered. Because their fertility rates in each of the analysed countries were much lower than the fertility rates for the other age groups, they were not used in creating the typology of fertility patterns for European countries.

[10] The FFRs were constructed based on the concept of rate ratios (otherwise risk ratios or relative risk ratios), which are the quotients between the probabilities of an event occurring in two different groups (see, for instance, Niu, Xia, 2015; Noordzij et al., 2017; Nurminen, 1995; Stare, Maucort-Boulch, 2016; Walter, 2000). The original concept of rate ratios had to be modified because it would be necessary to assume that there were as many live births in a year per woman as they became mothers, whereas Eurostat birth statistics also account for multiple births. Fortunately, their proportion of all births in European countries is relatively low.

are also useful in determining temporal changes in the relationships between age-group-specific fertility rates in countries, which show the course (direction) of fertility and family formation patterns.

The FRR can also be instrumental in predicting how fertility patterns in the studied countries may change in the near future[11]. Naturally, the predictive value of the quotients is hypothetical and based on the following assumption: if the value of a quotient calculated for two age groups rises in the long term in the 0–1 interval but does not exceed 1, then the birth rate for the age group in the numerator can be expected to exceed the fertility rate for the age group in the denominator after some time, consequently changing the country's type of fertility pattern. A precise determination of what type of fertility pattern a country may have in the future is not possible. It is also hardly possible to predict when the type of fertility pattern may change.

4. Results

4.1. Types of fertility patterns

The analysis of age-group-specific fertility rates for all births and first births in all selected countries, NUTS-1 units and years yielded 14 types of fertility patterns (see Table 1), which were numbered from 1 (the youngest type, with the highest fertility rate in the age group 20-24 years followed by age groups 25–29, 15–19, 30–34, 35–39, and 40–44 years) to 14 (the oldest type, with the highest fertility rates in the age groups 30–34 years and then 35–39, 25–29, 20–24, 40–44, and 15–29 years).

The types of fertility patterns obtained for all births and first births are presented by country and year in Table 2 (see also Table 5 in the Appendix and Figure 1). As can be seen, in 2000, 2005 and 2010, type 6 was predominant. The most common type in 2015 and 2017 was 13, which will also probably continue to predominate in the near future. The fact that almost all countries, excluding Bulgaria and Malta, either had the same type of fertility pattern or moved to a higher type seems to indicate a trend among women to postpone the age of childbearing.

In 2017, Bulgaria (type 3) and Belarus and Ukraine (both type 4) were characterised by the youngest types of fertility patterns for all births. The oldest type of fertility pattern (14) was determined for Spain and Ireland (see Table 2 and Figure 1b).

The most common type of fertility pattern for first births in 2017 was type 6, which characterised as many as 12 countries (see Table 2 and Figure 1c, and Table 5 in the Appendix).

It needs to be noticed that in 2017 the types of fertility pattern for first births in Greece, Ireland, Italy, Luxembourg, Portugal, Spain, and Switzerland were

Tab. 1. The types and age-group composition of fertility patterns in European countries in the years 2000, 2005, 2010, 2015, 2017 and 2025, and in NUTS-1 units in 2017

Type	Age groups ordered from the highest to the lowest fertility rate					
	I	II	III	IV	V	VI
1	20–24	25–29	15–19	30–34	35–39	40–44
2	20–24	25–29	30–34	15–19	35–39	40–44
3	25–29	20–24	30–34	15–19	35–39	40–44
4	25–29	20–24	30–34	35–39	15–19	40–44
5	25–29	30–34	20–24	15–19	35–39	40–44
6	25–29	30–34	20–24	35–39	15–19	40–44
7	25–29	30–34	20–24	35–39	40–44	15–19
8	25–29	30–34	35–39	20–24	15–19	40–44
9	25–29	30–34	35–39	20–24	40–44	15–19
10	30–34	25–29	20–24	35–39	15–19	40–44
11	30–34	25–29	20–24	35–39	40–44	15–19
12	30–34	25–29	35–39	20–24	15–19	40–44
13	30–34	25–29	35–39	20–24	40–44	15–19
14	30–34	35–39	25–29	20–24	40–44	15–19

Source: Eurostat data; created by the author.

[11] The approach was used in the paper only for countries for which Eurostat projections of fertility rates were not available.

Tab. 2. European countries by type of fertility pattern for all births in 2000, 2005, 2010, 2015, and 2017, projections for 2025, and type of fertility pattern for first births in 2017*

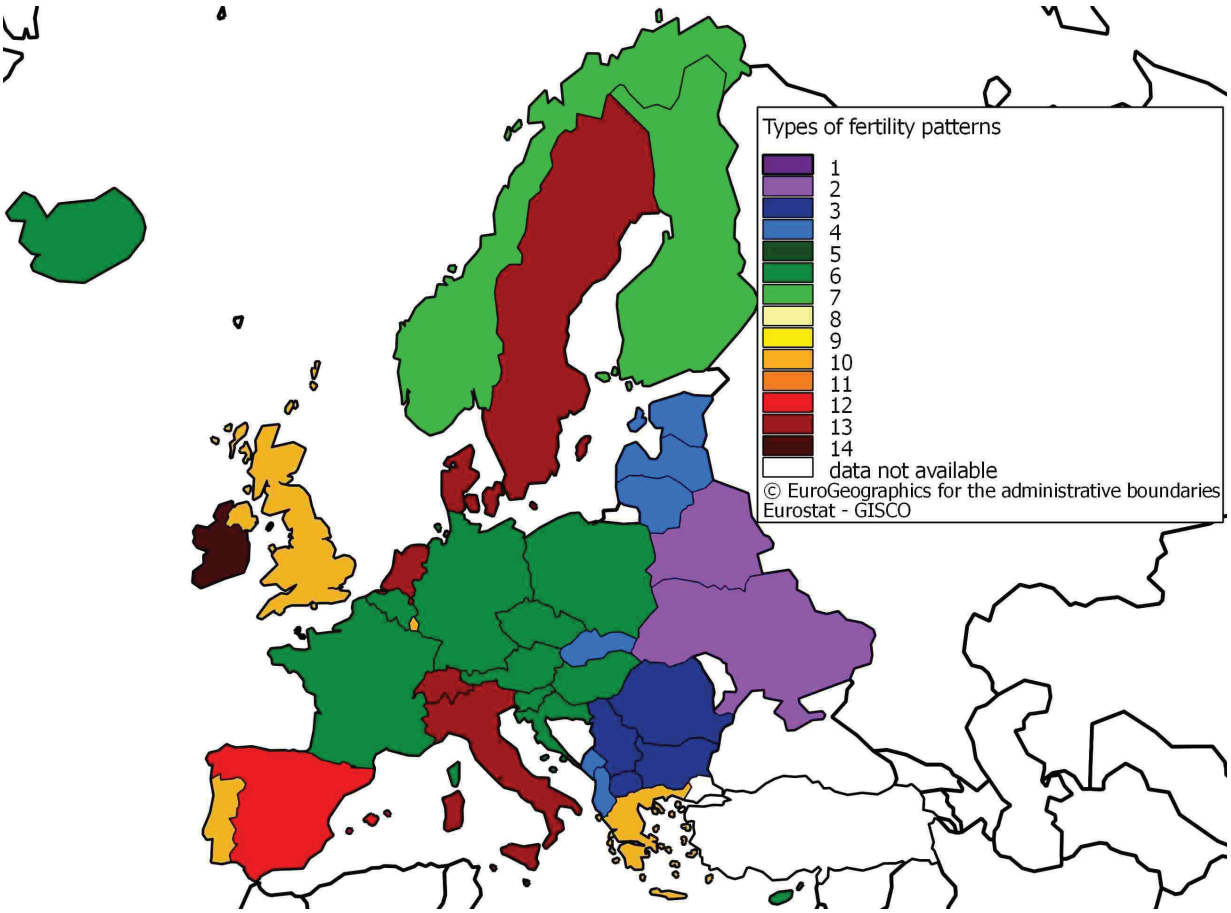
	All births						First births
	2000	2005	2010	2015	2017	2025	2017
Albania	:	4	4	4	6	:	3
Austria	6	6	10	13	13	13	6
Belarus	:	2	:	4	4	:	2
Belgium	6	6	6	9	13	13	6
Bulgaria	1	3	3	5	3	6	3
Croatia	4	6	6	6	12	13	6
Cyprus	6	6	13	13	13	13	6
Czechia	4	6	6	10	10	13	6
Denmark	6	13	13	13	13	13	7
Estonia	2	4	6	7	9	13	4
Finland	6	7	13	13	13	13	6
France	6	6	7	13	13	13	6
Germany	6	6	12	13	13	13	6
Greece	6	10	12	13	13	14	12
Hungary	3	6	10	12	12	12	5
Iceland	6	6	9	9	9	13	4
Ireland	12	14	14	14	14	14	12
Italy	13	13	13	13	13	14	13
Latvia	2	4	6	6	6	9	3
Lithuania	2	4	6	6	6	13	3
Luxembourg	6	10	13	13	13	14	13
Macedonia	3	3	4	6	6	:	3
Malta	6	5	8	12	12	13	6
Montenegro	:	4	6	6	7	:	:
Netherlands	12	13	13	13	13	13	7
Norway	6	7	11	13	13	13	7
Poland	4	6	6	6	6	7	3
Portugal	6	10	10	13	13	13	10
Romania	1	3	3	5	5	6	3
Serbia	2	3	6	6	6	:	4
Slovakia	3	4	6	6	6	10	5
Slovenia	6	6	7	9	9	13	6
Spain	12	12	14	14	14	14	13
Sweden	7	13	13	13	13	13	6
Switzerland	7	13	13	13	13	14	13
Ukraine	:	2	2	4	4	:	1
United Kingdom	6	10	10	12	13	13	6

Note: ":" stands for 'data not available'.

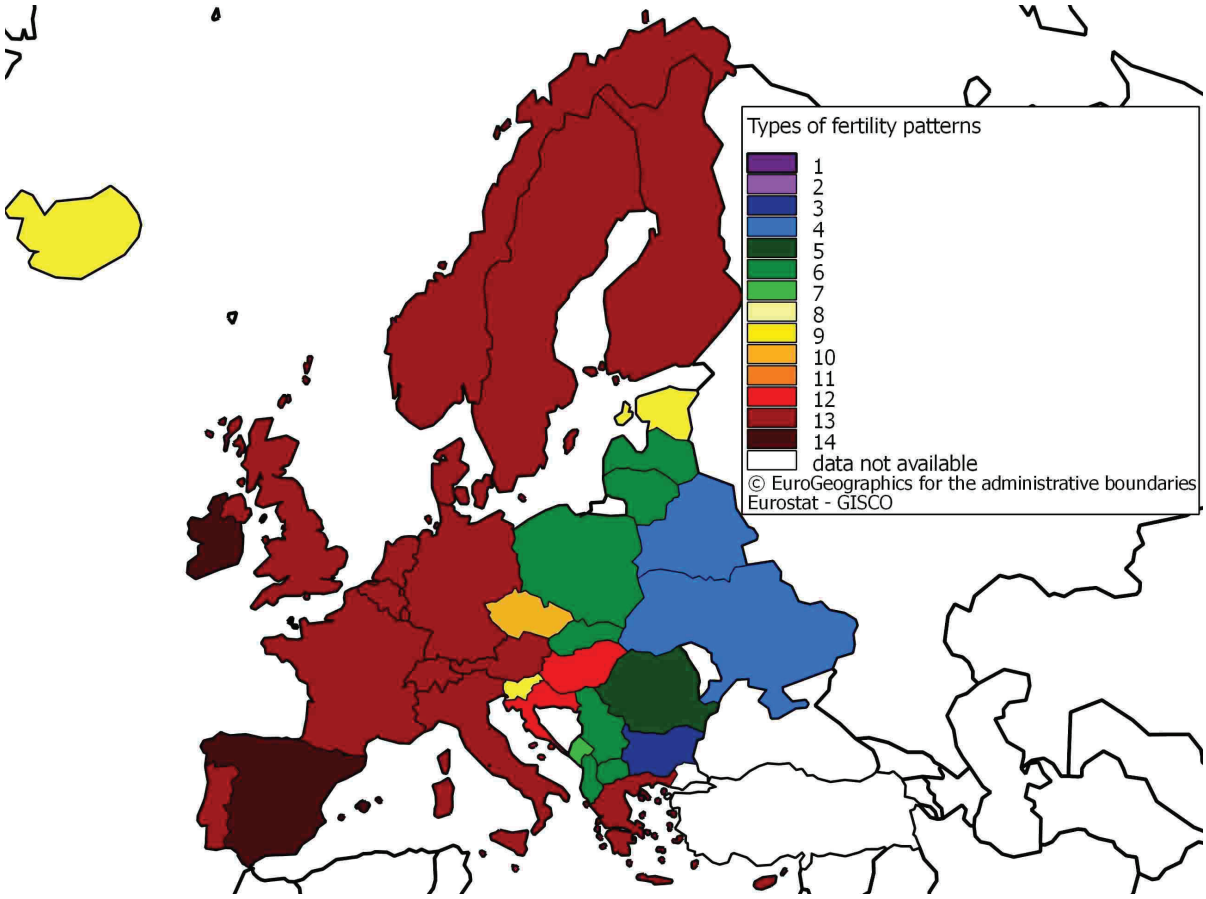
* Belarus – data from 2006, 2015 and 2016; Croatia – data from 2001, 2005, 2010, 2015, 2017 and 2025; Ukraine – data from 2006, 2011, 2014 and 2016.

Source: Eurostat data; created by the author.

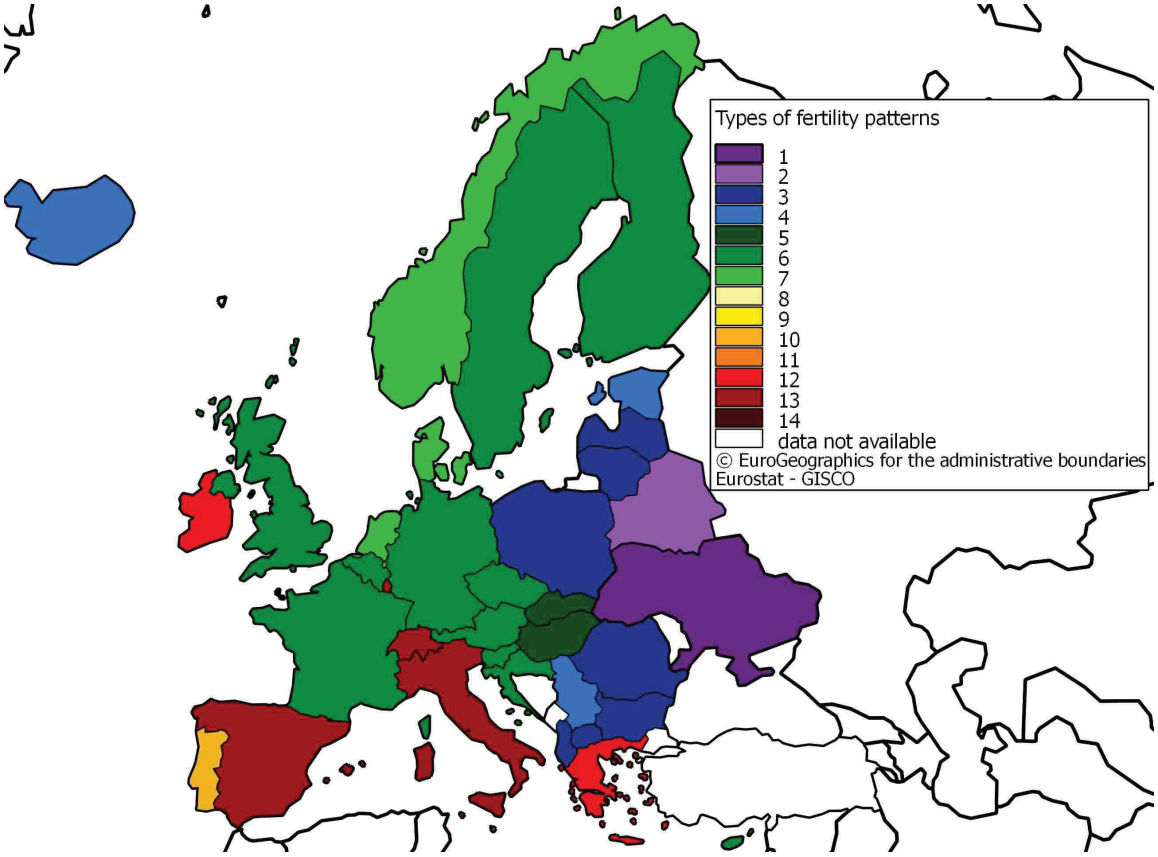
a) All births in 2005



b) All births in 2017



c) First births in 2017



d) All births in NUTS-1 units in 2017

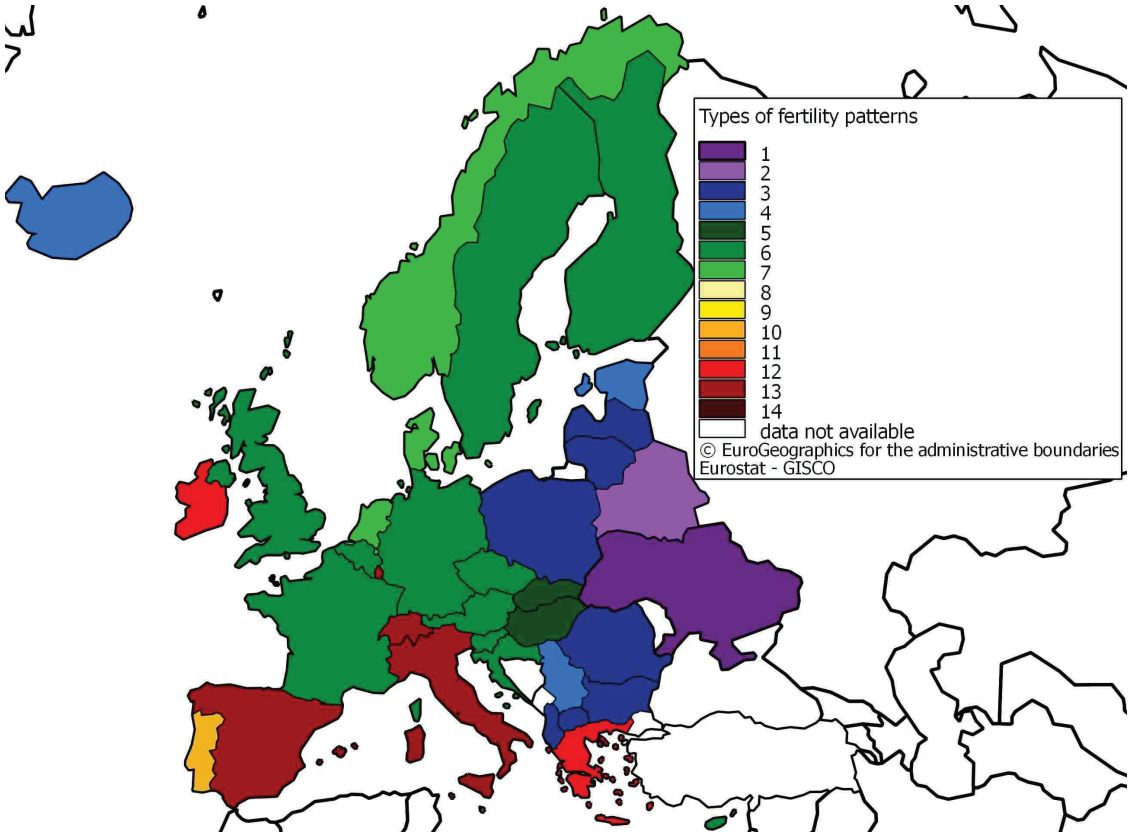


Fig. 1. The types of fertility patterns for all births in selected European countries in 2005 and 2017 and for first births in 2017, and the types of fertility patterns for all births in NUTS-1 units in 2017

Source: Eurostat data; created by the author.

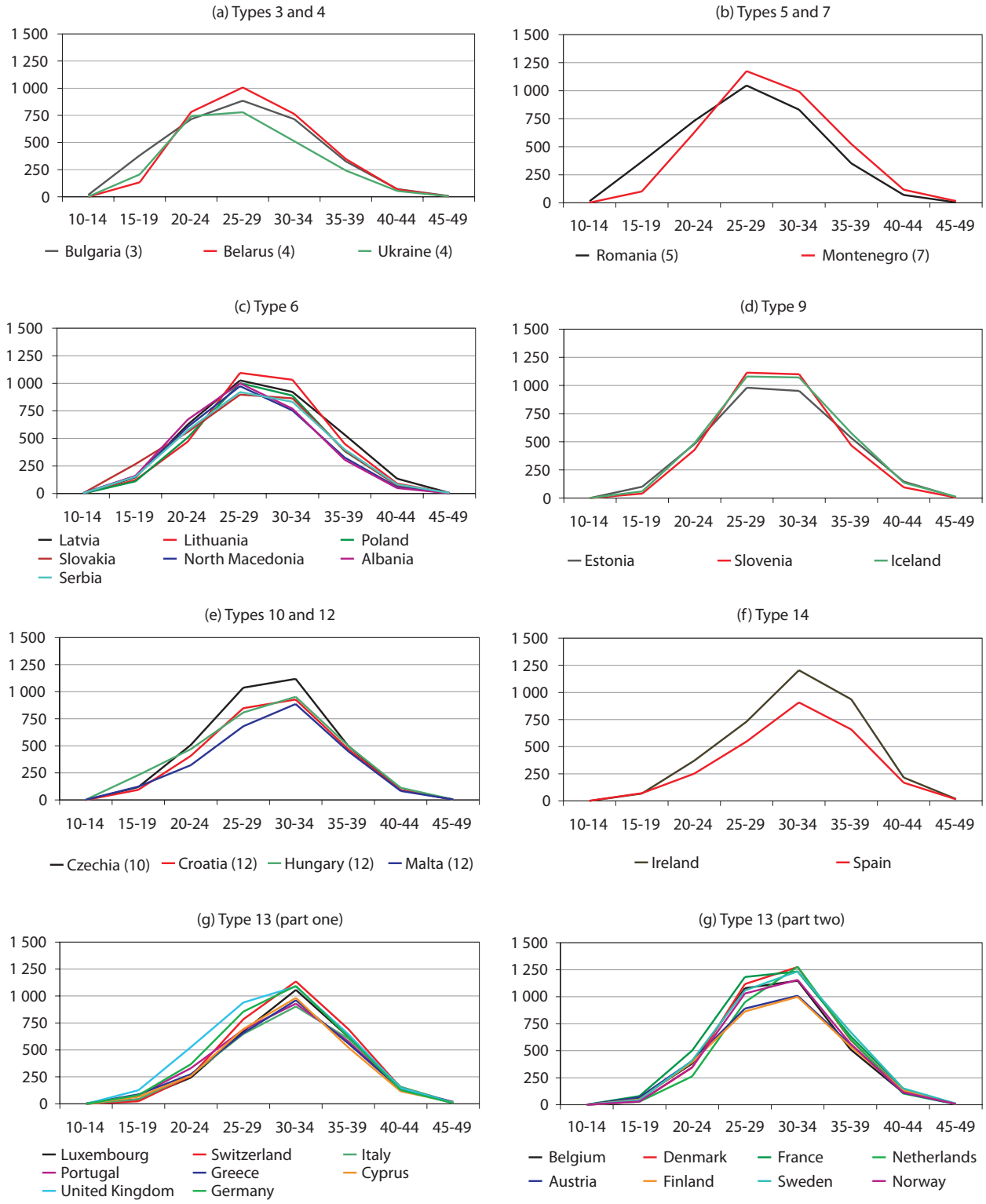


Fig. 2. European countries by type of total fertility patterns (all births) in 2017

Source: Eurostat data; created by the author.

identical or very similar to the types of fertility patterns for all births, confirming more advanced postponement transition in these countries (see Table 2 and Figures 1b and 1c).

Additionally, correlations between the 2017 fertility patterns (total and for first births) in the analysed countries[12] and the mean age of women at childbirth (total and at first birth) were calculated. Pearson's coefficients of between 0.83–0.91 (p<0.05)

[12] Excluding Montenegro, for which data necessary to construct the type–of fertility pattern for first births were not available.

Tab. 3. Quotients between the fertility rates of the pairs of age groups (FRR) in European countries in 2017 (all births)

Country by type of fertility pattern	25–29 / 20–24	30–34 / 25–29	30–34 / 20–24	35–39 / 20–24	35–39 / 25–29	35–39 / 30–34	35–39 / 15–19	40–44 / 15–19
Bulgaria (3)	1.24	0.81	1.00	0.46	0.37	0.46	0.86	0.19
Belarus (4)	1.29	0.76	0.98	0.45	0.35	0.46	2.61	0.50
Ukraine (4)	1.05	0.66	0.69	0.33	0.31	0.47	1.18	0.26
Romania (5)	1.43	0.79	1.14	0.48	0.34	0.42	0.96	0.19
Albania (6)	1.49	0.77	1.15	0.46	0.31	0.40	1.91	0.31
Latvia (6)	1.64	0.90	1.47	0.85	0.52	0.58	3.63	0.92
Lithuania (6)	2.32	0.94	2.19	0.96	0.41	0.44	3.71	0.74
Macedonia (6)	1.61	0.77	1.25	0.54	0.34	0.43	2.06	0.37
Poland (6)	1.97	0.89	1.75	0.75	0.38	0.43	3.50	0.70
Serbia (6)	1.60	0.90	1.45	0.70	0.44	0.48	2.64	0.55
Slovakia (6)	1.61	0.96	1.55	0.70	0.44	0.45	1.46	0.28
Montenegro (7)	1.87	0.85	1.58	0.84	0.45	0.53	5.21	1.16
Estonia (9)	2.04	0.97	1.98	1.11	0.54	0.56	5.28	1.46
Iceland (9)	2.21	0.99	2.19	1.17	0.53	0.54	9.56	2.26
Slovenia (9)	2.61	0.99	2.57	1.09	0.42	0.42	11.60	2.36
Czechia (10)	2.04	1.08	2.20	0.98	0.48	0.45	4.22	0.77
Croatia (12)	2.08	1.09	2.28	1.15	0.55	0.51	5.07	0.99
Hungary (12)	1.72	1.18	2.03	1.06	0.62	0.52	2.17	0.49
Malta (12)	2.12	1.30	2.75	1.40	0.66	0.51	3.69	0.68
Austria (13)	2.20	1.13	2.49	1.38	0.63	0.55	8.21	1.63
Belgium (13)	2.83	1.06	3.02	1.35	0.48	0.45	8.71	1.92
Cyprus (13)	2.68	1.42	3.79	2.01	0.75	0.53	8.00	1.77
Denmark (13)	3.25	1.14	3.71	1.75	0.54	0.47	21.65	4.36
Finland (13)	2.19	1.16	2.53	1.37	0.63	0.54	11.08	2.74
France (13)	2.36	1.04	2.46	1.27	0.54	0.52	7.98	1.84
Germany (13)	2.33	1.28	2.98	1.69	0.73	0.57	7.74	1.58
Greece (13)	2.39	1.46	3.50	2.04	0.85	0.58	6.45	1.52
Italy (13)	2.44	1.39	3.40	2.28	0.93	0.67	13.95	3.62
Luxembourg (13)	2.76	1.57	4.35	2.55	0.92	0.59	14.74	3.67
Netherlands (13)	3.61	1.35	4.86	2.32	0.64	0.48	22.03	3.75
Norway (13)	2.97	1.12	3.33	1.63	0.55	0.49	18.90	3.89
Portugal (13)	2.08	1.35	2.81	1.75	0.84	0.62	7.39	1.72
Sweden (13)	2.58	1.17	3.01	1.64	0.64	0.55	15.58	3.48
Switzerland (13)	3.04	1.45	4.40	2.69	0.88	0.61	28.90	6.20
United Kingdom (13)	1.78	1.16	2.07	1.23	0.69	0.59	5.12	1.15
Ireland (14)	1.97	1.65	3.25	2.52	1.28	0.78	13.74	3.17
Spain (14)	2.18	1.66	3.61	2.62	1.20	0.72	9.36	2.39

Source: Eurostat data; created by the author.

showed that they were high, positive, and statistically significant.

In the next step, a typology of NUTS-1 units in 2017 according to the type of fertility pattern for all births was created[13] (see Fig. 1d). It was found that of the 14 types of total fertility patterns determined, ten were also present in NUTS-1 units (3, 5–10, 12–14), mostly types 13 (48 NUTS-1 units) and 6 (20 units). The youngest fertility patterns characterised NUTS-1 units in Bulgaria (type 3) and Romania (type 5), and the oldest ones almost all NUTS-1 units in Spain, one NUTS-1 unit in central Italy (Centro), one in Greece (Attiki), one in Ireland, as well as metropolises such as London, Hamburg, and Berlin.

In the majority of the analysed countries, NUTS-1 units had the same (or a similar) type of fertility pattern. The exception was Germany, the eastern part of which (the former GDR) had much younger fertility patterns (6 and 8) than the rest of the country (the capital city of Berlin, the Eastern part of which was formerly controlled by the GDR, was type 14). Diverse types of fertility patterns characterising NUTS-1 units were also found in France and the UK (see Figure 1d).

4.2. A comparison of age-specific fertility rates within and between countries

As already mentioned, although the sequence of age groups making up a type of fertility pattern is always the same, the age groups' fertility rates can differ between countries. However, in many cases, equivalent age groups differ in fertility rates (see Figure 2).

In the next step, the fertility rate ratios for all births were calculated for the following pairs of age groups 25–29/20–24, 30–34/25–29, 30–34/20–24, 35–39/20–24, 35–39/25–29, 35–39/30–34, 40–44/35–39, 40–44/15–19, and 35–39/15–19 for all analysed countries and years. Table 3 contains the FRR values in 2017. Some of the more interesting FFRs showing within- and between-country differences in the fertility of age groups that make up the same type of fertility pattern are interpreted below.

In Albania, which was type 6 in 2017 (see Table 3), the fertility rate for the age group 25–29 years was higher by 49% compared with the age group 20–24 years (in Lithuania the difference amounted to 132%); the difference between age groups 30–34 years and 20–24 years was 15% in favour of the older group (119% in Lithuania), but the age group 35–39 years had a lower birth rate than the age group 20–24 years by 54% (an FRR of 0.96 shows that in Lithuania, the two groups' fertility rates were almost identical). The data suggest that Albania became type 6 relatively recently, and that the type 6 fertility pattern that Lithuania now has will probably change soon (see also Tables 1 and 2). Interesting findings were also obtained when the countries with the type 13 fertility pattern were analysed. The Netherlands' fertility rate for the age group 30–34 years turned out to be 386% higher than for the age group 20–24 years; in Switzerland, the difference was 340%, but in the UK, it was only 107% (see Table 3). The same methodology can be applied to compare the fertility patterns for first births (see Table 6 in the Appendix).

The FFRs were also used to predict the types of total fertility patterns that countries without Eurostat population projections may have in 2025 (see Tables 2 and 3). A quotient of 0.77 calculated for the age groups 30–34 and 25–29 years in Albania indicates that the country's type 6 will probably be replaced by type 10, unless the other age-specific fertility rate ratios change significantly. The Belarus quotients for the age groups 30–34 and 20–24 years and for the age groups 30–34 and 25–29 years are 0.98 and 0.76, respectively, implying that the country is moving from the present type 4 to type 6, and then to type 10. North Macedonia and Serbia are also likely to become type 10, Montenegro type 11 or 13, and Ukraine type 4.

5. Discussion

The following short descriptions of the analysed countries are aimed at identifying factors which influence their current fertility patterns.

The youngest fertility patterns (determined by relatively early family formation) can be found today in some post-communist countries, such as Ukraine, Belarus, Bulgaria and Romania, Albania, North Macedonia, Montenegro and Lithuania, Latvia, Poland and Slovakia (see Table 2). In Ukraine and Belarus, the inflow of childbearing and nuptiality patterns and ideologies from the West is delayed by these countries' strong economic ties with Russia (BTI, 2018; Dobrinsky, 2016). In all the countries, the most frequent reasons why young, educated women decide to postpone having a child are the economic situation of families, labour market instability (which mostly affects young mothers), the hard-dying traditional division of family roles and a relatively ineffective family policy (see, for instance, Frejka, Gietel-Basten, 2016; Kotowska et al., 2008; Koytcheva, Philipov, 2008; Lerch, 2018; Mureşan et al., 2008; Perelli-Harris, 2008; Potančoková et al., 2008;

[13] The typology of NUTS-1 units was only created for countries for which Eurostat data on the number of births by mother's age and the age structure of women in the NUTS-1 units were available.

Stankuniene, Jasilioniene, 2008). All these countries are still strongly influenced by tradition. In Bulgaria, Romania and Slovakia, the family formation patterns are ethnically determined.

In Germany and Austria, women's procreation decisions are determined both by economic factors and their worldview. Women who attained higher levels of education and who are committed to professional careers usually postpone the birth of the first child, especially since the family policy in those countries lacks effective tools that support the motherhood-career balance (Dorbritz, 2008; Gordo, 2009; Köppen, Trappe, 2019; Prskawetz et al., 2008). The post-war division of Germany into the Federal Republic of Germany and the German Democratic Republic (see Klärner, 2015) resulted in the eastern part of the country still being less developed economically than the western part (although this does not apply to big cities, such as Berlin). It also delayed the course of the second demographic transition east of the river Elbe.

The family formation models in the UK vary ethnically, with both Caucasian British women and immigrant women showing a tendency to postpone procreation decisions (Dubuc, Haskey, 2010). It has been observed that immigrant women and low-educated native women are characterised by high fertility levels and are more inclined to have children and big families (Sigle-Rushton, 2008). In the UK and other Anglo-Saxon countries, procreation decisions are easier to make because those countries have a policy of supporting families, especially low-income families and single parents (Thévenon, 2011).

In France, women usually postpone procreation decisions, but most of them do ultimately have children. The main cause of high fertility in France, especially among women aged 30–40 years, is the government's "active multi-faceted family policy", which uses many instruments to help women reconcile childcare and career development (Toulemon et al., 2008; Thévenon, 2011). France has a large proportion of foreign-born residents, but the relatively high level of fertility among immigrant women only slightly increases the total level of fertility in the country (Toulemon et al., 2008).

In the Nordic countries (Sweden, Norway, Denmark, Finland and Iceland), gender equality policies regulates both the labour market and domestic chores, and the family policy instruments emphasise balance between work and parental duties (Oláh, Bernhardt, 2008; Holland, Keizer, 2015; Thévenon, 2011).

Late family formation in Southern European countries is mainly caused by children not leaving their families until late into adulthood. Italy and Spain seem to be special in that respect because the home-leaving, transition-to-adulthood and parenthood patterns in these two countries are commonly called the "latest-late" (Billari et al., 2002; Billari, 2004). The attachment to "the family nest" largely derives from the widespread cultural norm (De Rose et al., 2008; Sobotka, Toulemon, 2008; Tanturri, 2016). The most frequent reasons why women in these countries postpone procreation decisions and, in many cases, never carry them out include economic factors, relatively ineffective family policies, as well as the women's worldviews (Bueno, Brinton, 2018; Delgado et al., 2008; Fiori et al., 2017; Kohler et al., 2002; Thévenon, 2011).

6. Conclusions

The analysis of European countries in the early 21st c. resulted in the creation of 14 different types of fertility patterns characterised by distinctive sequences of age groups ordered according to their fertility rates. Among the types of fertility patterns for all births, the most common one in the first decade of the 21st c. was type 6 (the highest birth rates characterised age groups 25–29, 30–34, 20–24, 35–39 and 15–19 years). By 2017, type 13 came to predominate (with the highest fertility rates for age groups 30–34, 25–29, 35–39, 20–24 and 40–44 years). As regards the types of fertility patterns for first births, type 6 was the most widespread in 2017.

The youngest fertility patterns occur today in some post-communist countries (especially in Belarus, Ukraine, Bulgaria and Romania) and the oldest ones in Spain, Italy, Luxemburg, Greece, Ireland and Switzerland.

In most European countries, the postponement transition will probably continue in the future. Its main drivers are economic circumstances (especially in the less developed, post-communist countries and in Southern European countries), social factors, and populations' worldviews.

Most European countries have low levels of fertility. In emigrant countries (but also in countries with positive but low net migration rates), they are the main cause of depopulation processes and the increasing demographic ageing of populations. A relatively more advantageous situation is observed in countries where the net migration rates are positive and comparatively high (e.g. Belgium, Denmark, Germany, Luxembourg, Netherlands, Austria, Sweden, Norway, Finland, Switzerland, and the United Kingdom), not only because immigrants (most of whom are of working age) enlarge their populations but

also due to the fact that immigrant women usually have more children compared with native women.

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Appendix

Tab. 4. Total fertility rates (TFR) in selected European countries in 2000, 2005, 2010, 2015, 2017 and 2025, the countries' total fertility rates for first births (TFR1) in 2017, and the percentages of first births and second births in relation to the total population in 2017

Country	TFR						TFR1 2017
	2000	2005	2010	2015	2017	2025	
Albania*	:	1.79	1.63	1.59	1.48	:	0.59
Austria	1.36	1.41	1.44	1.49	1.52	1.55	0.73
Belarus*	:	1.29	1.51	1.72	1.73	:	0.67
Belgium	1.67	1.76	1.86	1.70	1.65	1.65	0.72
Bulgaria	1.26	1.37	1.57	1.53	1.56	1.59	0.82
Croatia*	1.46	1.50	1.55	1.40	1.42	1.45	0.65
Cyprus	1.64	1.48	1.44	1.32	1.32	1.36	0.61
Czechia	1.15	1.29	1.51	1.57	1.69	1.72	0.86
Denmark	1.77	1.80	1.87	1.71	1.75	1.75	0.80
Estonia	1.36	1.52	1.72	1.58	1.59	1.66	0.67
Finland	1.73	1.80	1.87	1.65	1.49	1.50	0.61
France	1.89	1.94	2.03	1.96	1.90	1.89	0.82
Germany	1.38	1.34	1.39	1.50	1.57	1.59	0.75
Greece	1.25	1.34	1.48	1.33	1.35	1.39	0.66
Hungary	1.32	1.31	1.25	1.45	1.54	1.60	0.71
Iceland	2.08	2.05	2.20	1.80	1.71	1.71	0.70
Ireland	1.89	1.86	2.05	1.85	1.77	1.76	0.70
Italy	1.26	1.34	1.46	1.35	1.32	1.35	0.63
Latvia	1.25	1.39	1.36	1.70	1.69	1.72	0.71
Lithuania	1.39	1.29	1.50	1.70	1.63	1.63	0.76
Luxembourg	1.76	1.63	1.63	1.47	1.39	1.44	0.76
Malta	1.68	1.38	1.36	1.37	1.26	1.35	0.68
Moldova*	:	1.22	1.30	:	:	:	:
Montenegro*	:	1.69	1.70	1.74	1.78	:	:
Netherlands	1.72	1.71	1.79	1.66	1.62	1.62	0.73
North Macedonia	1.88	1.46	1.56	1.50	1.43	:	0.64
Norway	1.85	1.84	1.95	1.72	1.62	1.60	0.69
Poland	1.37	1.24	1.41	1.32	1.48	1.54	0.67
Portugal	1.55	1.41	1.39	1.31	1.38	1.42	0.74
Romania	1.31	1.40	1.59	1.62	1.71	1.76	0.93
Russia*	:	1.30	1.57	:	:	:	:
Serbia	1.48	1.45	1.40	1.46	1.49	:	0.71
Slovakia	1.30	1.27	1.43	1.40	1.52	1.55	0.73
Slovenia	1.26	1.26	1.57	1.57	1.62	1.66	0.77
Spain	1.22	1.33	1.37	1.33	1.31	1.34	0.67
Sweden	1.54	1.77	1.98	1.85	1.78	1.77	0.75
Switzerland	1.50	1.42	1.52	1.54	1.52	1.54	0.75
Ukraine*	:	1.30	1.43	1.46	1.35	:	0.64
United Kingdom	1.64	1.76	1.92	1.80	1.74	1.80	0.74

Note: ":" stands for 'data not available'.

* Belarus – data from 2006, 2011, 2015 and 2016; Croatia – data from 2001, 2005, 2010, 2015, 2017, 2025; Moldavia – 2006 and 2010; Russia – data from 2006 and 2010; Ukraine –2006, 2011, 2014 and 2016 data.

Source: Eurostat data; created by the author.

Tab. 5. The types of fertility patterns for all births (total) and first births in European countries in the years 2000, 2005, 2010, 2015, 2017 and 2025

Year	Types of fertility patterns														Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
All births															
2000	2	4	3	3	0	15	2	0	0	0	0	3	1	0	33*
2005	0	2	4	6	1	11	2	0	0	4	0	1	5	1	37
2010	0	1	2	2	0	10	2	1	1	4	1	2	8	2	36**
2015	0	0	0	3	2	8	1	0	3	1	0	3	14	2	37
2017	0	0	1	2	1	7	1	0	3	1	0	3	16	2	37
2025	0	0	0	0	0	2	1	0	1	1	0	1	19	6	31***
First births															
2017	1	1	7	3	2	12	3	0	0	1	0	2	4	0	36****

*Data for Albania, Belarus, Montenegro and Ukraine not available.
** Data for Belarus not available
*** Data for Albania, Belarus, Montenegro, North Macedonia, Serbia and Ukraine not available
**** Data for Montenegro not available
See also Notes in Table 4.
Source: Eurostat data; created by the author.

Tab. 6. Quotients (FRR) between the age-group-specific fertility rates in European countries, 2017 (first births)

Country by type of fertility pattern	25–29 / 20–24	30–34 / 25–29	30–34 / 20–24	35–39 / 20–24	35–39 / 25–29	35–39 / 30–34	35–39 / 15–19	40–44 / 15–19
Ukraine (1)	0.72	0.38	0.27	0.09	0.12	0.33	0.26	0.05
Belarus (2)	0.83	0.38	0.31	0.09	0.11	0.29	0.42	0.06
Albania (3)	1.00	0.45	0.46	0.14	0.14	0.30	0.42	0.09
Bulgaria (3)	1.21	0.57	0.69	0.24	0.20	0.34	0.36	0.08
Latvia (3)	1.29	0.50	0.64	0.22	0.17	0.35	0.69	0.13
Lithuania (3)	1.86	0.53	0.98	0.24	0.13	0.24	0.76	0.12
Macedonia (3)	1.24	0.53	0.66	0.21	0.17	0.31	0.64	0.14
Poland (3)	1.55	0.52	0.81	0.22	0.15	0.28	0.79	0.13
Romania (3)	1.35	0.62	0.84	0.27	0.20	0.32	0.44	0.08
Estonia (4)	1.52	0.56	0.85	0.30	0.20	0.35	1.12	0.26
Iceland (4)	1.57	0.51	0.80	0.29	0.19	0.37	1.80	0.39
Serbia (4)	1.34	0.69	0.92	0.37	0.27	0.40	1.12	0.25
Hungary (5)	1.72	0.87	1.49	0.56	0.32	0.37	0.82	0.16
Slovakia (5)	1.59	0.66	1.05	0.30	0.19	0.29	0.51	0.07
Austria (6)	1.76	0.90	1.58	0.68	0.39	0.43	3.18	0.59
Belgium (6)	2.37	0.69	1.63	0.54	0.23	0.33	2.64	0.58
Croatia (6)	1.76	0.77	1.35	0.47	0.27	0.35	1.70	0.33
Cyprus (6)	2.31	0.94	2.18	0.81	0.35	0.37	2.94	0.67
Czechia (6)	1.80	0.72	1.29	0.37	0.21	0.29	1.34	0.19
Finland (6)	1.64	0.85	1.40	0.56	0.34	0.40	3.16	0.74
France (6)	1.87	0.69	1.29	0.47	0.25	0.37	2.26	0.56
Germany (6)	2.07	0.99	2.06	0.84	0.40	0.41	2.90	0.53
Malta (6)	1.88	0.98	1.85	0.73	0.39	0.39	1.52	0.20
Slovenia (6)	1.98	0.66	1.30	0.42	0.21	0.32	3.97	0.94
Sweden (6)	1.99	0.81	1.62	0.61	0.30	0.37	4.49	0.90
United Kingdom (6)	1.41	0.97	1.36	0.61	0.44	0.45	1.74	0.37

Denmark (7)	2.59	0.73	1.88	0.61	0.23	0.32	6.12	1.29
Netherlands (7)	2.91	0.91	2.66	0.89	0.31	0.34	6.60	1.16
Norway (7)	2.24	0.76	1.70	0.59	0.26	0.35	5.10	1.02
Portugal (10)	1.80	1.07	1.93	0.82	0.45	0.42	2.85	0.60
Greece (12)	2.21	1.19	2.64	1.20	0.54	0.45	3.56	0.82
Ireland (12)	1.44	1.43	2.05	1.04	0.72	0.51	4.02	0.89
Italy (13)	2.41	1.20	2.87	1.48	0.62	0.52	9.13	2.43
Luxembourg (13)	2.25	1.29	2.89	1.32	0.59	0.46	6.25	1.72
Spain (13)	1.91	1.44	2.75	1.52	0.79	0.55	4.20	1.08
Switzerland (13)	2.37	1.16	2.76	1.31	0.55	0.47	11.29	2.31

Source: Eurostat data; created by the author.