

Fertility Decline and Population Ageing in Europe: Current and Future Trends

RUTH MCMANUS

Department of Geography, St. Patrick's College, Drumcondra

Abstract: Concerns about increasing costs of pensions and competitiveness of the European economy are frequently discussed in the media. Much of this worry is related to an ageing population structure, with fewer children being born, higher numbers of people in older age groups, and an expected overall decline in the European population. This paper explores current population trends across Europe, drawing on some of the most recent research area to consider likely implications for the future.

Leaving Cert relevance: Core Unit 2 Regional Geography, Elective Unit 5 Patterns and Processes in the Human Environment.

POPULATION BASICS

At its simplest, there are only three factors which bring about population change: births (fertility), deaths (mortality) and movement (migration). The complex interaction between these three elements gives rise to all of the possible variations within a population, among them the popular concepts of 'baby boom', 'brain drain' and the rise of the 'grey consumer', where older people have disposable income to spend on goods and services particularly relating to health and leisure.

Typically, demographic variables are expressed as **rates**. A rate is a measure that reflects the frequency of an event (such as birth), relative to the population that may experience that event. Rates are useful because they allow us to make comparisons between different populations and because they can be compared across time to discover trends in a particular population. For example, Ireland and India have very different population sizes (4.4 million in Ireland compared to 1.132 million in India), but we can directly compare the birth rates for the two countries. Ireland's birth rate is 15 births per 1,000 people, while India's birth rate is considerably higher at 24 births per 1,000 people. We can also see how Ireland's birth rate has changed over time. In 1980, it was 21.8 births per 1,000, so it has dropped significantly over the last quarter of a century.

In exploring Europe's current population experience, the key basic measures to be used are the crude birth rate, crude death rate, net migration rate and total fertility rate, along with the percentage of the population falling within different age bands. These are explained further in Box 1.

Box 1: Population Measurements

The **crude birth rate** (often referred to simply as the birth rate) is the most commonly used index of **fertility**. This is the ratio of the number of live births each year to the total population (usually measured at the mid-point of the year). It is expressed as the number of births per 1,000 population. e.g. if 3,000 babies were born in a population of 150,000, then the crude birth rate would be 20 per 1,000.

The **crude death rate** is the number of deaths per 1,000 members of a given population. It may be calculated for the population at the mid-point of the year or at the beginning of the year.

Natural increase is a simple measure of population growth which examines the differences between **births (fertility)** and **deaths (mortality)** in a given group. It is usually determined by subtracting the crude death rate from the crude birth rate. Natural increase is generally expressed as a percentage figure. e.g. an annual natural increase of 0.8 means that a country is increasing its population by 0.8 per cent each year. For example, Croatia and Ireland have about the same population total, at 4.4 million, but in Croatia the death rate (12 per 1,000) is higher than the birth rate (10 per 1,000) whereas in Ireland the birth rate (15 per 1,000) is higher than the death rate (7 per 1,000), which means that we can say that Croatia's total population will fall, while Ireland's will rise, if we ignore the possible impact of migration.

Total Fertility Rate: The single most important factor in determining future population is the total fertility rate (TFR). The TFR is defined as the average number of babies born to women during their reproductive years. A TFR of 2.1 is considered the replacement rate; once the TFR of a population reaches 2.1 the population will remain stable assuming no immigration or emigration takes place. The TFR is one of the most useful indicators of fertility because it gives the best picture of how many children women are currently having.

Population Structure: In addition to the aspects outlined above, another factor that contributes to overall population change is the structure of a population. If we look at the profile of a country in terms of its population's age and sex structure, we will be able to determine whether a country has an expanding, declining or stable population. The **population pyramid** is a visually striking representation of the age and sex structure of a population. To make up a pyramid, a population is classified into age groups (cohorts) and by gender (male/female). The actual number of people, or sometimes the percentage of a population that falls into each of these age categories, is then graphed. The percentage of males in specific age groups is shown on the left and the percentage of females on the right. The general shape of the graph indicates the relative growth of the population (see Figure 2).

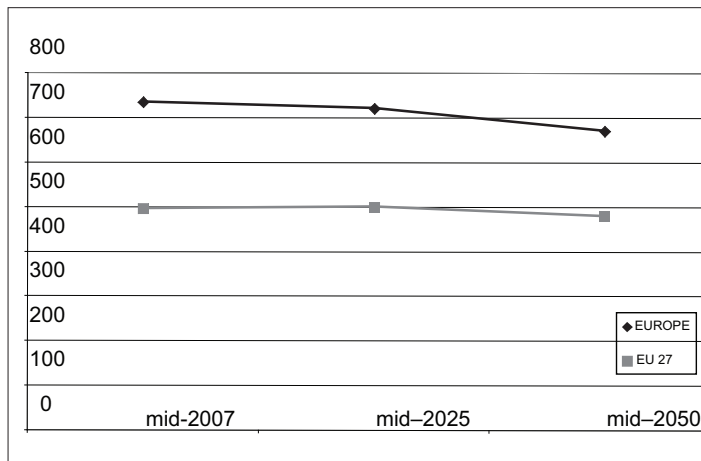


Figure 1: Projected European Population, 2007-2050

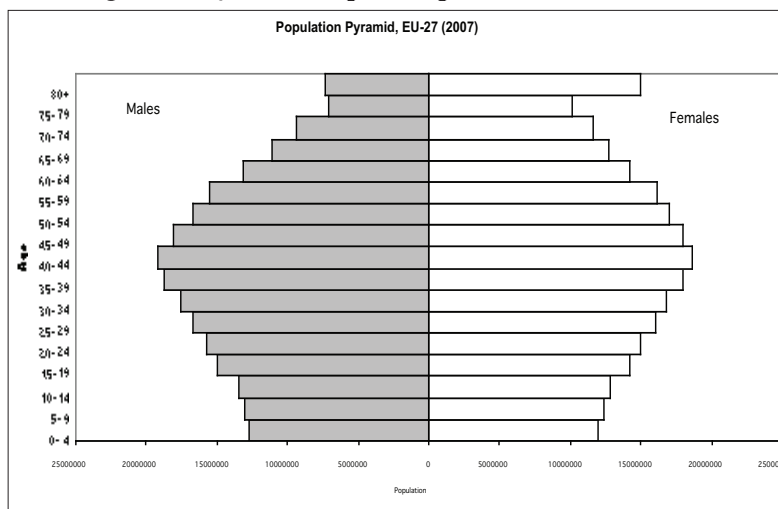


Figure 2: Current Population Structure of EU-27.

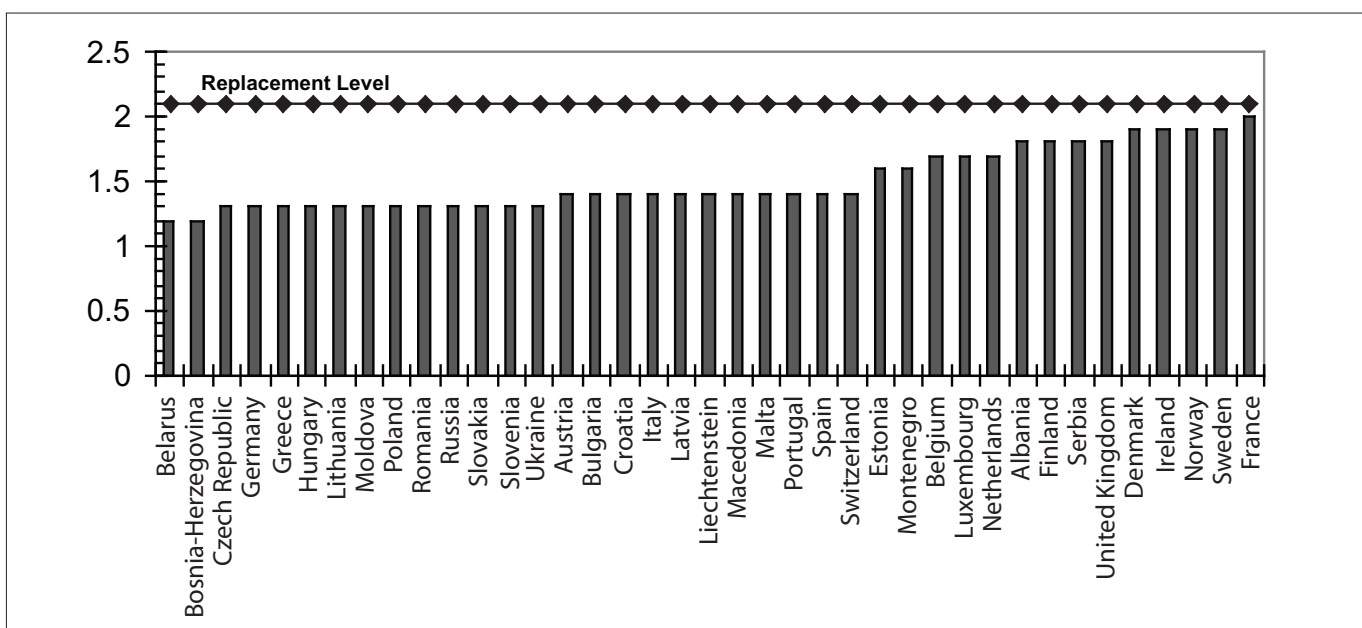


Figure 3: Total Fertility Rates in Selected European Countries, 2007

Source: compiled by R. McManus, based on data from the World Population Data Sheet 2007.

EUROPEAN POPULATION OVERVIEW

According to the 2007 World Population Data Sheet, the forty-four countries of Europe have a total population of 733 million, which is projected to fall to 719 million by mid-2025 and to 669 million by mid-2050, representing a projected drop of 9% in total population to 2050 (Figure 1). The population of the 27 countries of the European Union (EU-27) is also projected to fall over the same period, although not quite as dramatically. This is largely due to a negative rate of natural increase, with deaths exceeding births for the region as a whole (also termed natural decrease). Meanwhile, the total fertility rate, at 1.5 children per woman, is well below the replacement level (2.1) (see Figure 3). Despite the expectation that there will be some movement of people into Europe, the net migration rate is not expected to make up for this imbalance.

Why is the population of Europe expected to decline?

Europe is experiencing a phenomenon known as **population ageing** (or **demographic ageing**). This is where the overall age structure of the entire population changes, with the older age groups increasing relative to the younger age groups. As a result, the average age of the population as a whole is increasing. There are two causes of demographic ageing, which can occur individually or simultaneously. The first of these is **fertility decline**, which is also sometimes termed **bottom-up ageing** (as it reflects a change to the bottom of the population pyramid). This is where declining birth rates result in fewer children being born. This means that the population aged over 60 years will comprise a greater proportion of the total population.

The second type of ageing occurs due to **declining mortality** in the older age groups, as life expectancy increases, leading to **'top-down' ageing** where there are more people at the apex of the population pyramid. These changes typically reflect improved living standards and health care (see Box 2). Current projections suggest that in 2030 the proportion of the population aged over 65 in the EU-25 (i.e. the EU countries excluding Romania and Bulgaria, which joined in 2007) could reach 24.7% (from 16.6% in 2005), with 7.2% aged over 80 (from 4.1% in 2005).

Both processes of demographic ageing have affected the European population, so that Europe already has 19 of the World's 20 oldest countries in terms of population age, a trend which is set to continue over the next 25 years (Lutz,

2006). Although Europe and Japan led the way in terms of population ageing, it is worth noting that this phenomenon is now occurring worldwide (PRB, 2007). Globally, some 7% of the population is now made up of people aged 65 and over. This proportion is projected to increase to 10% by 2025 and to 16% by 2050. While the industrialized countries are ahead, it is predicted that some 15% of the population in developing countries will be aged 65 or over by 2050, reaching 19% in Latin America and 18% in Asia.

Naturally, the different rates of fertility decline and life expectancy between various countries have resulted in an uneven distribution of the aged population. European countries with over 17% of their populations aged over 65 (i.e. an above average proportion) include Italy, Germany, Belgium, Greece and Sweden. By contrast, Ireland has had a very different demographic experience. In the period from the 1840s to the 1950s, there were low marriage rates, a late age of marriage, high rates of fertility within marriage and high rates of emigration from Ireland (Kennedy, 1973). This contrasts strongly with the post-World War II European experience, where there was a rapid recovery to historically high marriage rates, falling fertility rates within marriage and rising levels of births outside marriage, and the development of large-scale immigration in a number of European societies (MacEinri, 1997). It was not until the 1980s that fertility rates in Ireland began to fall towards European averages. Nevertheless, this delay in the fertility decline, combined with immigration during the 1990s, has left Ireland with an exceptionally young population, so it is the least affected by the ageing process and has the lowest proportion of elderly of all EU member states (Lutz, 2006).

Box 2: Life Expectancy and Mortality

Life Expectancy is a hypothetical measure which provides an estimate of the average number of additional years a person could expect to live if the age-specific death rates for a given year prevailed for the rest of his or her life. It is based on current death rates and, because actual death rates change over the course of a person's lifetime, each person's life expectancy changes over time.

As **infant mortality** declined significantly in the 20th century, life expectancy worldwide increased dramatically. The United Nations estimated that in the 1950s the world life expectancy rate at birth was 46.4 years, with the developed regions having a life expectancy of 66.0 years and less developed regions having a life expectancy of only 40.7 years.

By 2007, world life expectancy had increased to 68.0 years with more developed regions increasing to an average of 77.0 years and less developed regions increasing to 66.0 years. That represents an increase in life expectancy of close to 47% for the world, and a 62% increase for the less developed regions.

Despite these improvements, there are still stark contrasts evident. For example, Sweden's infant mortality rate is 2.8 (infant deaths per 1,000 live births) compared to 100 in Zambia. Not surprisingly, average life expectancy at birth in Sweden is 81 years, compared with just 38 years in Zambia.

In Ireland, life expectancy at birth was 80.52 years for females born in 2006, compared to just 57.9 for those born in 1926. Males born in 2006 could expect to live for 75.11 years, compared to 57.4 years for those born in 1926.

CHANGING FERTILITY PATTERNS

When the Treaty of Rome was signed in 1957, giving birth to the European Union, every one of the 27 countries that are now EU member states had total fertility rates above 2.1 (i.e. replacement level, the point at which population stabilises). Now, none does (Johnson, 2007). This is a startling statistic, but what does it mean?

Fertility, relating to the number of children born, involves both a biological and a social component. The biological aspect refers to the physical capacity to reproduce. However, it is the social environment which has had the greatest impact on the number of children being born. Significant changes have taken place in fertility patterns since World War II, which have been explained in a variety of ways (see Box 3), largely relating to societal changes, linked to the widespread availability of reliable methods of birth control from the mid-1960s. The overall decline in birth rates has been described as the **fertility transition**. The fertility transition, involving a shift from high to low fertility (associated with a move from 'natural' fertility to fertility limitation) is one aspect of the demographic transition model, which also involves a shift from high to low mortality (Weeks, 1999).

Box 3: Some factors affecting fertility patterns

- age structure
- income, wealth and prestige, value of family allowances
- religious observance
- education
- attitudes to family size and birth control
- concern with material possessions/consumerism
- changing status of women, and their changing role in society and economy

(see Hall, 1995, for further discussion)

Changing fertility patterns are related to different aspects of social and economic geography, and the interrelations between the various components and processes of social and demographic change are complex. Some factors which may have led to declining fertility include increasing urbanisation, the evolving status of women and a move from religious observance to increasing consumerism. In traditional rural societies, large families were prized because they could supply farm labour and security for parents in their old age. These influences, which continue to encourage large family size in the developing world, have largely disappeared in Europe, as agriculture has become mechanised and the population has become predominantly urban. Another key reason for the tendency to have large families was the high infant mortality rate, which led to parents having more children as an 'insurance policy', given the likelihood that many would die before reaching adulthood. This has also declined significantly since the second half of the twentieth century (see Box 2 above). In contemporary Europe, the perceived role of the family has changed for urban couples, who may make 'trade-offs' between quality of life and the expense of having children. Personal fulfilment is increasingly linked to material objectives in a consumer society, in contrast to the past, when strict adherence to religious traditions which prohibited artificial means of family limitation tended to encourage large families. As women have become increasingly well educated and are more likely to have a career outside the home, motherhood is just one of many possible roles. For example, Ireland's 2006 census showed that almost 53% of all women aged over 15 are in paid employment, compared to just 36% in 1980 (OECD, 1980).

The Council of Europe view is that 'the principal factors responsible for falling fertility are modernisation and individualisation as well as the desire to study, pursue a career and achieve a certain standard of living before starting a family. Life in large towns and cities and a decline in religious beliefs are further contributory factors to this fall in the number of children' (Höhn, 2005).

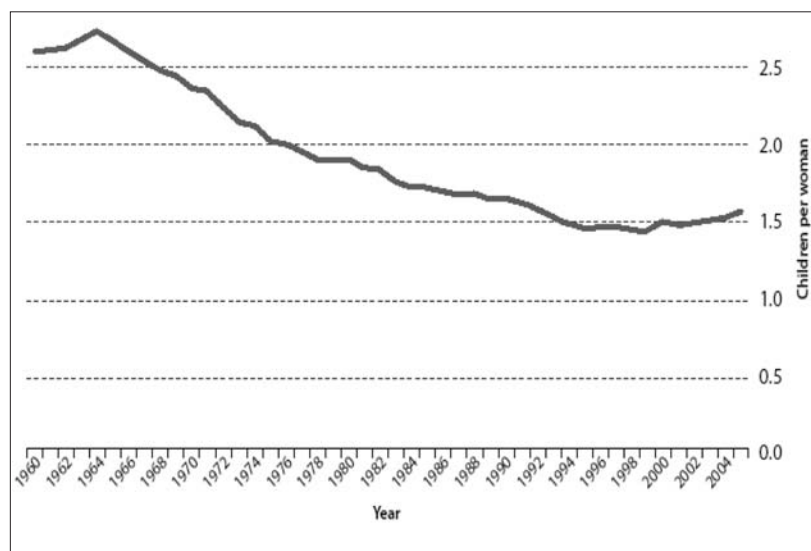


Figure 4: Total Fertility Rate in EU-25, 1960-2005

Source: Eurostat Regional Yearbook 2007: 17

EUROPE'S GEOGRAPHY OF NATURAL DECREASE

Many European populations are experiencing more deaths than births annually, a phenomenon that is not occurring in any other world region. Across Europe as a whole (as defined by the PRB, 2007), there are 10 births per 1,000 people, compared to 11 deaths. The situation is most stark in Eastern Europe, where the birth rate stands at 10 per 1,000, while the death rate has reached 14 per 1,000. This phenomenon of natural decrease, when combined with current levels of migration, suggests that the population of Eastern Europe will fall by more than one-fifth between 2007 and 2050, from 271 million to 229 million. The largest gaps between birth rates and death rates are currently being experienced in Ukraine, followed by Russia, Belarus and Bulgaria (see Table I, which shows those countries which are projected to lose 20% or more of their population by 2050). The greatest projected population change from 2007 to 2050 will be in EU-member state Bulgaria, which is expected to experience a drop of 35% in its population.

Table I: Population Change for selected European Countries, 2007-2050

	Population mid-2007 (millions)	Births per 1,000 Population	Deaths per 1,000 Population	Rate of Natural Increase (%)	Net Migration Rate per 1,000	Projected Population (millions) mid-2050	Projected Population Change 2007-2050 (%)
EUROPE	733	10	11	-0.1	2	669	-9
Bulgaria	7.7	10	15	-0.5	0	5	-35
Ukraine	46.5	10	16	-0.6	0	33.4	-28
Moldova	4	11	12	-0.2	1	3	-24
Estonia	1.3	11	13	-0.2	0	1	-23
Russia	141.7	10	15	-0.5	2	109.4	-23
Latvia	2.3	10	14	-0.5	-1	1.8	-22
Romania	21.6	10	12	-0.2	0	17.1	-21
Belarus	9.7	9	14	-0.5	0	7.8	-20
Poland	38.1	10	10	0	-1	30.5	-20
Bosnia-Herzegovina	3.8	9	9	0	0	3.1	-20
Malta	0.4	10	8	0.2	2	0.3	-20

Source: World Population Data Sheet 2007

Although the trends which have given rise to the fertility decline, as discussed above, have been broadly similar in all rich countries, this fertility transition occurred at different speeds in different parts of Europe. A gradual and consistent fertility decline was experienced in Scandinavia and north-west Europe, whereas in the European countries of the Mediterranean and central and eastern Europe, the pace and rate of change was more intermittent. Strong family traditions in the Mediterranean region, boosted by military dictatorships and the Catholic church, slowed down the transition after World War II, as marriage and children were encouraged, while women working outside the home and children being born out of wedlock were frowned upon. When the change in fertility happened, it occurred very rapidly. Meanwhile, in central and eastern Europe under Communism, women working outside the home, free child care and higher salaries for parents with larger families were the norm. Following the collapse of Communism, such policies disappeared, while economic uncertainty further contributed to a rapid fall in fertility rates (Johnson, 2007). The move to sub-replacement fertility in Russia, Ukraine and the Baltic States occurred rather suddenly in the late 1980s and 1990s. Population structure has been altered radically due to fertility decline and emigration. In Ireland we have seen the impacts of these population movements, with the 2006 Census recording 63,276 Poles, 24,628 Lithuanians and 13,319 Latvians living in Ireland (CSO, 2007). Whether such population decline will be reversed will depend on a range of social, economic and political factors.

Meanwhile, some recent research suggests that the traditionally low fertility areas of Europe may be starting to experience a recovery. This work points out that Europe should not be seen as a single demographic unit, but as two Europes, one experiencing low fertility and population decline, while the other is now seeing recovering fertility and rising population (Rychtarikova, 2005). The first cluster, the low fertility belt, runs from the Mediterranean to central and eastern Europe, while the second area of recovering fertility stretches from France to Scandinavia. One of the most surprising developments has been in the changing trends for France, where new projections suggest that the population will grow by 9 million to 2050. If Germany's population continues to fall, this would make France the most populous country in western Europe. This change is all the more significant given that France was the first country in the world which experienced long-term population decline, beginning in the late eighteenth century. It is worth noting that Turkey, which is a candidate country for EU membership, has a very different population structure to the rest of the EU (see O'Reilly in this issue). Based on current trends, if Turkey joined the EU it would

become the most populous member state with correspondingly influential voting rights.

A recent major study on attitudes to demographic change in Europe has found that, overall, the number of children being born across Europe does not reflect the number of children that people actually want. In fact, people would like to have more children. Reasons which the interviewees gave for their decision to limit the number of children included their age, limited financial resources, difficulty in juggling family and working life and fear of the future (RTDinfo, 2006). Unfortunately, Ireland was not one of the 14 countries included in the Dialog project.

Parenthood is a particularly difficult role to undertake in a climate of social insecurity, such as is found in many former communist countries of central and eastern Europe, which are experiencing the lowest birth rates in Europe. By contrast, we have seen that there appears to be some recovery in fertility in northern European countries. It seems likely that this is connected to a combination of positive measures which are in place to enable women to have the number of children that they would like to have. Such measures include equal opportunities in the labour market, family aid policy, tax measures and excellent childcare facilities. The Dialog project has suggested that a diverse range of measures to benefit families is needed, which must form part of a wider policy and which must meet the desires of the population. For example, in the post-communist countries, there is a greater need for direct financial aid to parents. If the correct mix of measures, including modified tax regimes, childcare facilities, flexible working hours, education and housing policies, is introduced, the researchers on the Dialog project believe that the birth rate across Europe could be boosted by between 7% and 15% (RTDinfo, 2006).

Is fertility decline just about timing?

It has been suggested that the decline in birth rates represents a temporary shift, as women postpone having children until later ages. This was thought to be linked to changes in the timing of marriages or to the fact that planning births had become easier through contraception. Certainly, the most recent data for Europe show that the average age of a European (EU-25) woman on the birth of her first child is increasing, from 26.1 in 1990 to 27.8 years in 2005. The average age is even higher in Switzerland (29.3 years), Germany (29.0 years) and the Netherlands (28.9 years), while countries such as Denmark, Greece, Ireland,

Italy, Luxembourg and Sweden are all above the European average. However, the question remains as to whether women who have their first child at a later age will 'catch up' or whether the decline in birth rates represents a more fundamental change in attitudes concerning what constitutes the 'right' family size.

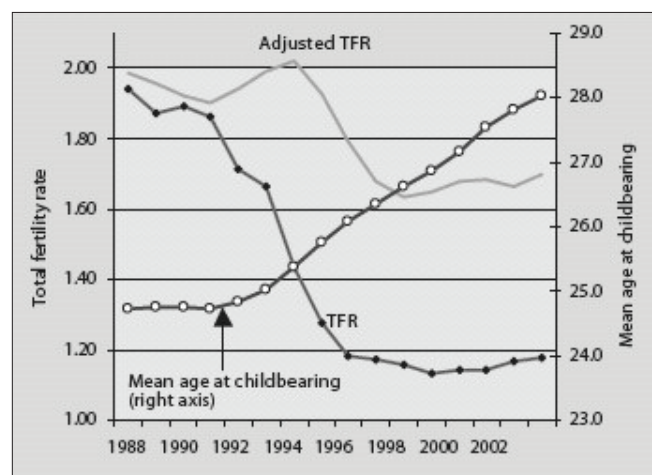
As women delay parenthood, a number of impacts can emerge. In some cases, having experienced a relatively independent lifestyle, the social and financial costs of starting a family become less attractive. As previously mentioned, improved educational and career opportunities for women have also provided alternative trajectories to the traditional role of wife and mother. In postponing childbirth, furthermore, some women have found that they have moved beyond their optimum years of fertility, and discover biological difficulties in becoming parents. The concept of the 'biological clock' is relevant here. These various factors have resulted in births not just being postponed, but cancelled.

Demographers have recently tried to allow for the timing factor in their population projections for Europe. The usual indicator of the level of fertility in a given calendar year is the Total Fertility Rate (period TFR). This reflects the interplay of two components: tempo (timing) and quantum (level) of fertility. The tempo component affects the TFR when the timing of childbearing over the life cycle changes. As we have seen, in Europe many countries are currently experiencing a postponement of births, which is also reflected in an increasing average (mean) age of childbearing. This results in a decline in the number of births in the current year and therefore depresses the period TFR, even if the number of children that women will have over their life course does not change. This timing effect can be thought of as being an expansion in the interval between generations during which fewer births fall into each calendar year. A new indicator has now been developed which attempts to measure the level (quantum) of fertility in a given calendar year, excluding the tempo effect. This is known as the 'tempo-adjusted TFR' (For a detailed description of methods and data see www.populationeurope.org).

Allowing for the timing factor, population projections using the Tempo-Adjusted TFR suggest that there may be some cause for optimism about future fertility patterns in Europe. As Lutz (2006) shows, in the Czech Republic the TFR fell sharply after 1992, in tandem with an increase in the mean age at childbearing. The TFR reached a low of 1.13 children per woman in 1999 (see Figure 5). However, if the TFR is adjusted to allow for the 'tempo effect', the graph suggests

that most of this drop was due to timing effects linked to fertility postponement. This means that it is quite likely that the fertility situation is less extreme than was previously suggested.

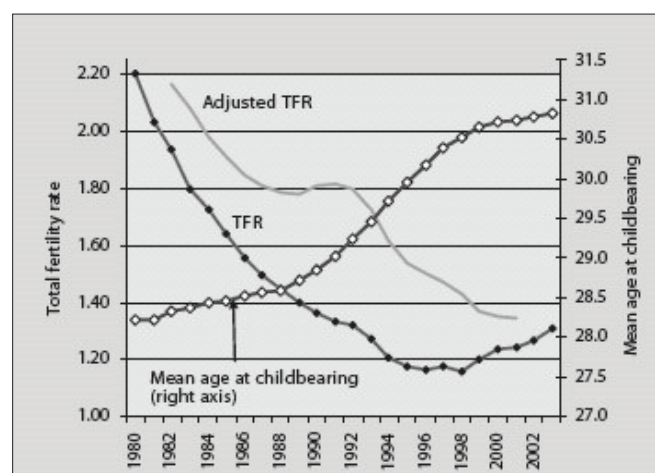
Figure 5: Czech Republic Adjusted TFR



Source: Lutz (2006)

However, in Spain (see Figure 6) the pattern has been quite different. The adjusted TFR follows the decline in the conventional TFR, suggesting that women are actually having fewer children overall, rather than simply delaying those births to a later age.

Figure 6: Spain Adjusted TFR



Source: Lutz (2006)

Implications of Europe's Fertility Decline: Changing Age Structures and Future Policies

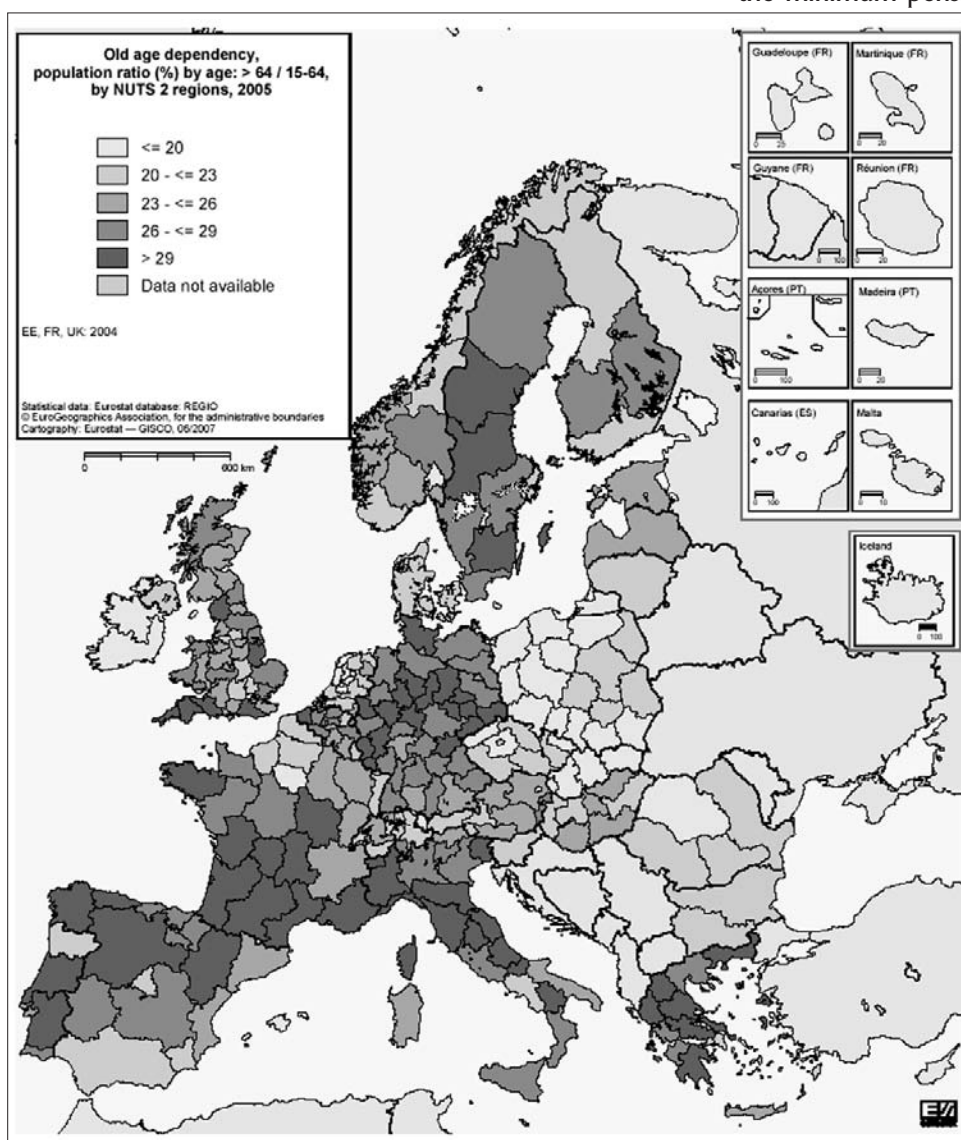
We have established that Europe has the oldest population structure in the world due to declines in both fertility and mortality. The age structure is the outcome of past population dynamics: past levels of fertility, mortality and migration. The **old-age dependency ratio** for the EU25 currently stands at 0.25 which means that there are four people in the age group 15-64 (considered as the potential working age) for each person age 65 or older. No matter whether fertility decline continues or not, this ratio is bound to increase significantly over the coming decades because most of this increase is already pre-programmed in today's age structure. There is an 80 percent chance that the ratio

will more than double by 2050, which implies fewer than 2 persons of working age per person above the age of 65. Concern has been expressed by academics and politicians alike that Europe's population trends, combining low fertility, longer life and mass immigration, will result in huge pressure on public health, pensions and other social services.

This major shift in the proportions of young and old in the population has very important implications for many different social, cultural and political aspects of everyday life. Recent media attention has focussed on changes to State pensions and the move towards greater individual responsibility for pensions. This is because, with more older people relative to the number of people of working age, there will be growing economic dependence on a relatively smaller 'economically active' population. For this reason, discussions have taken place about raising retirement ages. In Italy, for example, it is currently possible to retire early from 57 years, but this is now being reconsidered. In 2004, the minimum pension age in Ireland for public servants, including teachers, was increased to 65 and the compulsory retirement age was removed, so that in the future public servants will be able to work to more advanced ages. Certainly, there are important questions to be considered about economic performance in a future Europe with a smaller and older population.

There are many other social and economic implications of population ageing, including poverty, loneliness and changing consumption patterns (needs for hospitals and nursing homes rather than schools). Some strategies to ensure that older people are genuinely integrated into society have been proposed by the Council of Europe. These include the abolition of certain practices such as placing upper age limits on jobs and having a fixed retirement age. Instead, it is suggested that barriers between working life and non-working life could be removed by encouraging flexible, rather than fixed, retirement, and by making the most of human capital by encouraging pensioners to take on

Figure 7: Old Age Dependency, 2005



Source: Eurostat, 2007.

second careers. Already, the elderly make a huge, generally undervalued, contribution to society by caring for grandchildren and by working in the voluntary sector in community organisations, clubs and societies, as well as through low-paid part-time jobs such as school wardens. In this era of 'lifelong learning', further opportunities should open up for pensioners.

Given the certainty, built-in to the current population structure of Europe, that the age-dependency ratio is set to increase, a number of possible scenarios have emerged. It has been suggested that economic patterns within the active population will change. In theory, it is possible that unemployment could be reduced significantly and participation of women in the workforce could increase. Policies which encourage job sharing, flexi-time and reduced working hours, together with improved and reasonably-priced childcare provision, could be used to boost this possibility. More radical suggestions have been made that migration of workers and their families from outside Europe should be encouraged, as was the case in the 1960s when the region experienced a shortage of workers. For example, one study commissioned in 2007 on Europe's Demographic Future found that about 26 million immigrant workers could be needed by 2050 to compensate for this decline in the number of people of working age. However, this is a complex issue which requires further discussion. Indeed, a report on the demographic future of Europe by French PSE Member Françoise Castex will be discussed by MEPs in their February 2008 plenary session. It is likely to stress the positive role immigration can play.

Conclusion

It is certain that population ageing will continue, given the existing population structure. This is bound to put a strain on health care and pension systems, as discussed above. It should be noted however, that despite all of the calculations made by demographers, the future trends of all three forces (fertility, mortality and migration) shaping the pattern of population ageing in Europe are uncertain. Furthermore, policy decisions could go a long way towards alleviating many of the difficulties created by changing population structures and might, in some cases, contribute towards a change in population trends. For example, although demographic ageing is certainly underway, the actual ratio of workers to pensioners can also be influenced by policies affecting labour force participation rates and the retirement age, especially female participation, linked to provision of childcare. Other policies may help to encourage the upward trend in fertility which is being experienced in the northern

and western parts of Europe, perhaps causing it to be extended into southern and eastern Europe.

Acknowledgement

I would like to thank the two reviewers for their helpful comments and suggestions.

APPENDIX: INTERNET RESOURCES FOR POPULATION IN THE CLASSROOM

The dynamic nature of population can make it difficult to keep pace with changes. Fortunately, the advent of Internet resources enables us to access the most up-to-date data, thereby refreshing our teaching and keeping it relevant. One extremely useful resource is the **World Population Data Sheet (WPDS)**, which is published annually by the Population Reference Bureau, a Washington-based organisation which aims provide accurate, easy-to-understand and unbiased information about issues related to population, health, and the environment. The WPDS, which can be accessed online free of charge, provides a range of demographic data for the world as a whole, for more and less developed regions, for each continent, sub-region and country. For example, the data drawn upon in this article refer to Europe as a whole, to four sub-regions (Northern, Western, Eastern and Southern Europe) and to individual countries within Europe. The World Population Data Sheet can be downloaded from the Population Reference Bureau website at www.prb.org, along with many other useful articles and resources.

European Demographic Data Sheet 2006: available for download here: www.oeaw.ac.at/vid/popeurope/download.shtml or from www.populationeurope.org. The data sheet provides 26 indicators, which range from life expectancy at birth to average retirement ages and net migration totals, for 46 European countries.

Eurostat is the Statistical Office of the European Communities, established in 1953. It gathers and analyses figures from the different European statistics offices in order to provide comparable and harmonised data to the European Institutions so that they can define, implement and analyse Community policies. The data available cover the European Union, its Member States and its partners, and are published under a variety of Themes and Collections: <http://ec.europa.eu/eurostat>. Incidentally, it is worth

noting that the European Foundation for the Improvement of Living and Working Conditions is based in Loughlinstown, Dublin (<http://www.eurofound.europa.eu>).

US Census Bureau's International Data Base provides population pyramids for every country in the world: <http://www.census.gov/ipc/www/idb/>

Animated discussion of creation of population pyramid and its current structure for France, produced by l'Institut national d'études démographiques (INED), see http://www.ined.fr/en/everything_about_population/animations/age_pyramid/ (suitable for Junior Certificate level)

United Nations Programme on Ageing: <http://www.un.org/esa/socdev/ageing/popageing.html>

Learn more about the Dialog - Population Policy Acceptance Study (PPAS) project at: <http://www.bib-demographie.de/ppa/IndexDialogStart.htm>.

Create a population pyramid with Excel using the simple steps outlined on this website: <http://www.agecon.ag.ohio-state.edu/class/aede59701/gonzalez/pyramid/pyramid.html>

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