Chapter 2
Demographic Change as a Challenge

Abstract This chapter defines the key terms *demographic ageing* and *declining population*. It refers to important indicators to give an overview of the demographic development in Germany and Poland over the last two decades. The main determinants of the demographic situation, i.e. fertility, mortality and migration, are analysed in depth. Both Germany and Poland show fertility rates below reproduction level. Due to a higher momentum of recent birth cohorts, the decline in natural reproduction is less accentuated in Poland than in Germany. Mortality trends are similar in both countries and are the main factors contributing to demographic ageing, albeit with a cohort-specific increase in the number of healthy years. Migration patterns in Germany are very volatile. Up until 2000, net immigration offset natural population decline. Changes in immigration policy in 1993 brought an end to the considerable migration surplus, thus leading to population decline in the 2000s. Germany's reopening of its doors to immigrants since 2011 constitutes a potential trigger for population decline in Poland since Poland has a long tradition of being an outmigration country with an underdeveloped immigration policy.

Since modernity restructures patterns of interaction in society, demography is not only a matter of fate for nation states but also a challenge to which they respond in different ways. Currently, demographic ageing and population decline are new challenges with which societies have to cope.

Demographic ageing describes a situation in which the age distribution within political units or organisations changes such that older age groups become more numerous whereas the percentage of younger people declines. There are different ways to operationalise the concept of demographic ageing. We define *demographic ageing* as a structural process in a political territorial unit or organisation that leads to an increase in the median age of a given population. We prefer this operationalisation because the median is a quite robust indicator, whereas the arithmetic mean is strongly influenced by shifts in infant mortality, which might distort the index. We deliberately do not work with predefined age intervals as used in "age-burden" indices, which conceptually (and unnecessarily) attribute resource dependence to certain age groups. In contrast to this prejudiced conceptualisation, changing the

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interpretations attached to certain age groups and fighting age discrimination are important elements of potential strategies for coping with demographic ageing.

Population decline characterises a situation in which political units witness a shrinking number of inhabitants. This can be the product of a lower number of births than deaths ('natural' population decline), a higher level of outmigration than immigration, or both. We define a *declining population* as a development in which the population of a political territorial unit or the membership of an organisation has decreased in absolute numbers during at least three 1-year periods over the past 5 years. Since migration in particular can have a strong short-term impact on population size and the direction of population development, using a 5-year interval allows correcting for such short-term volatility and focussing on structural trends.

Demographic ageing and shrinking populations are not the only challenges by which demographic developments put stress on society. During the last two centuries, rapid population growth (often in combination with an extraordinarily high percentage of persons below age 25) forced people to adapt in terms of education and the organisation of family systems, to name but two areas affected by this development. One of the first theories of demography, by Malthus (1789), pessimistically reflected on the effects of population growth on food supply. And 200 years later, the famous report "Limits of Growth" (Meadows et al. 1972) still focussed on the detrimental effects of population growth. Despite making use of various fields of knowledge, some of which were later cultivated in the social sciences, Malthus' theory was conceptualised in terms of the natural sciences and a search for universal laws. Malthus was convinced that his law showed that (exponential) population growth cyclically results in waves of famine because of (linearly increasing) food supply lagging behind. However, later developments showed that there is a sufficient increase in food supply in most societies marked by demographic growth. Even more importantly, there are no law-like regularities in the social sciences because human beings and their societies possess the means and faculties to react to the challenges they face. To name but one such response, Malthus triggered a social movement, the so-called Neo-Malthusians, who aimed to provide access to contraceptives to all strata of society in order to curb population growth and expand the options for families to make their own independent decisions on family size[1]. In contrast to the objects that preoccupy the natural sciences, social communication and change in human practices can alter developments in ways that contradict law-like regularities.

Theoretical demographic thinking was greatly influenced in the twentieth century by a typology of stages of demographic transition. This typology identifies six stages of a secular demographic transition process, usually in reference to raw fertility and raw mortality rates (Birg 1996, p. 59). In the first phase, mortality and fertility rates are both high. In the second phase, a reduction in mortality rates triggers population growth, which continues to grow rapidly in the third phase despite lower fertility rates beginning to set in. In the fourth phase, a rapid decrease in fertility rates slows population growth. In the fifth phase, fertility and mortality rates converge at a lower level, and population growth stops. In the sixth phase, originally not envisioned and sometimes called the second demographic transition, the fertility rate falls below the mortality rate, which causes a shrinking population

[1] A drop in the total fertility rate, observable in Germany since 1900, is also an effect of this social movement (among many other factors).

(Lesthaeghe 2011). Currently, world society as a whole is in phase four (growing but with reduced momentum), whereas Germany and Poland, the two societies we want to analyse in depth, are both between phase five and six (population decline). Birg uses raw fertility and raw mortality rates, which are good indicators for predicting population growth in absolute numbers. For the purpose of analysis, age-standardised figures, such as the total fertility rate or projected life expectancy, are more useful key figures as they allow a more individualised reconstruction of the social processes behind the transition process (Büttner 2000).

The next chapters will give a general theoretical outline of the research question. The current chapter starts with a general overview of the demographic situation in Germany and Poland. The question guiding this chapter is, which processes are the determinants of population decline and demographic ageing? The developments in fertility, mortality and migration are described and explained accordingly.

2.1 Current Demographic Structure in Germany and Poland

Demographic ageing is a quasi-universal phenomenon in world society (United Nations 2011, p. 5), which is undergoing a transformation from a rapidly growing to a gradually growing society. As opposed to this overall trend, only a minority of countries throughout the world recently experienced a decline in population. Germany and Poland are in this group, among which many former communist countries in Central and Eastern Europe can also be counted as well as some southern European countries with low fertility rates, such as Italy and Spain, possibly in the near future. A shrinking population is not only a feature of European societies. We also find it in Japan and probably soon in other East Asian countries such as South Korea (Coulmas and Lützeler 2011; cf. Goldstein et al. 2009). Modern nation states with declining populations are a rather new phenomenon in world history that has only emerged since the 1990s. We still do not know how many nation states will experience this development. But with more and more nation states entering phase five of the demographic transition, in which fertility and mortality rates converge, the probability of more and more nation states witnessing at least some period of population decline is increasing.

Before we go into the details of the social processes that explain demographic change in Germany and Poland, a few characteristic numbers on fertility, mortality, migration, population growth and age composition will be provided to give an overview of the development in the last two decades.

Table 2.1 illustrates that in both Germany and Poland women currently have a fertility rate of 1.3–1.4 children, which is well below the replacement level of 2.1 children. The time pattern of the fertility rates differs insofar as the (West) German fertility rate has been nearly constant at around 1.4 since the middle of the 1970s, whereas the Polish fertility rate has dropped sharply in recent decades, starting from a high level of 2.3 in the early 1980s.

Table 2.1 Total fertility rate, life expectancy at birth, net migration balance, population growth and median age in Germany and Poland (1990, 1995, 2000, 2005–2012). (Sources: Eurostat, 2012, 2013; Statistisches Bundesamt, 2013, 2014; Gołata and Jonda, 2008; GUS, 2011, 2013b)

Year	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012
Germany: total fertility rate	1.4	1.2	1.4	1.3	1.3	1.4	1.4	1.4	1.4	1.4	1.4
Poland: total fertility rate	2.0	1.5	1.4	1.2	1.3	1.3	1.4	1.4	1.4	1.3	1.3
Germany: life expectancy at birth, male	72.1	73.4	75.2	76.2	77.2	77.4	77.6	77.8	78.0	77.9	77.9
Poland: life expectancy at birth, male	66.2	67.6	69.7	70.8	70.9	71.0	71.3	71.5	72.1	72.4	72.7
Germany: life expectancy at birth, female	78.4	79.7	81.0	81.4	82.4	82.7	82.7	82.8	83.0	82.6	82.6
Poland: life expectancy at birth, female	75.2	76.4	78.0	79.4	79.7	79.8	80.0	80.1	80.7	80.9	81.0
Germany: net migration balance (in thousands)	682	430	167	82	26	45	−54	−11	130	279	369
Poland: net migration balance (in thousands)	−16	−18	−20	−13	−36	−20	−15	−1	−2	−4	−7
Germany: population growth (in thousands)	521	279	96	−63	−123	−97	−215	−200	−51	92	196
Poland: population growth (in thousands)	85	19	−9	−17	−32	−10	20	31	33	9	−5
Germany: median age	37	38	40	42	42	43	43	44	44	45	46
Poland: median age	32	34	35	36	37	37	37	38	38	38	39

Demographic ageing is also driven by a rise in life expectancy, which in both countries amounts to an increase of 5–6 years for both sexes over the last two decades. In Poland, life expectancy is still lower than in Germany; in particular the gender gap of 8 years is much larger in Poland (Rządowa Rada Ludnościowa 2011, p. 144).

The two countries differ in their net migration rate (Table 2.1). Poland has been and still is a country with high outmigration and low levels of immigration[2]. Whereas Poland has had consistently high levels of outmigration for some time, the numbers in Germany are highly volatile. There a high immigration surplus of more than half a million at the beginning of the 1990s neared zero in the 2000s but has gained momentum again since 2010.

The effect of these differences in fertility, mortality and migration is that the German population decreased between 2005 and 2010, whereas the Polish population shrank in the 5 years before 2007 but has returned to equilibrium since then. However, as this divergence has mainly been caused by the higher momentum of earlier population growth in Poland (an 'echo' of the baby boom of the 1980s), the probability of returning to decreasing population numbers is quite high there. This process has again set in since 2010.

While both countries are now demographically ageing societies, the speed and level of this development is faster and higher in Germany than in Poland. Demographic ageing is projected to proceed faster in Poland than in Germany in the coming decades (Lanzieri 2011).

In a world society that is still growing (and will continue to do so at a slower pace for most of this century), population decline will remain a regional feature. A pattern of national population decline persists only in countries where there are barriers to immigration or (less often) that are considered unattractive destinations. Within nation states, population decline also has a strong regional component. Some regions in Germany, such as most parts of East Germany and the Ruhr region, are shrinking faster, while other parts in southern Germany, especially the greater Munich or Stuttgart areas, are growing. Poland features similar regional patterns of decline: the eastern parts and Upper Silesia are shrinking, whereas the regions around Warsaw[3], Krakow, Poznań and the northern cities Gdańsk, Gdynia and Sopot are growing.

In summary, we can say that Germany experienced a period of a consistently declining population in the last decade and has been demographically ageing at a fast pace for several decades now. Poland, by contrast, witnessed a period of population decline during the middle of the first decade of the twenty-first century and is near equilibrium now. While Poland is also an ageing country, this trend is proceeding at a lower level and slower pace.

2.2 Determinants of Lower Fertility Rates

The following sub-chapters provide an analysis of the current determinants of population size and dynamics. We will proceed according to the three major determinants of population size: fertility, mortality and migration.

[2] Current statistics underestimate outmigration as many Poles register with their municipality despite the fact that they have left their country for an indefinite period of time (emigracja zawieszona = floating emigration) (Jończy 2009). The national statistics office estimates the number of Poles living outside of Poland in 2010 at 1.99 million people (GUS 2011).

[3] Birth data for Warsaw are systematically overestimated as all Polish children born outside of Poland by parents registered outside of Poland are counted as having been born in Warsaw.

Demographic analysis traditionally focuses on fertility. Why is the fertility level in Germany and Poland so low? The discussion usually revolves around the reasons for a decline in fertility. In the case of Germany, it would be more precise to ask about the factors that have stabilised a total fertility rate of around 1.4 children for nearly 40 years now and the mechanisms involved in reproducing this structure. To answer this question, we discuss in more detail major components, such as late births, a low number of high parities, motives for no children or only one child and motives for two and three children, as well as the effects of family policies.

One structural component of lower fertility rates is a *rise in the age at which mothers give birth to their first child.* In Germany, the mean age rose from 24 years in 1970 to 27.5 years in 1995 and reached 30 in 2009. We can observe a similar trend in Poland. The mean age of Polish mothers at the birth of their first child increased from 22.8 years in 1970 to 23.8 years in 1995 and 26.6 years in 2010 (GUS 2011; OECD 2012). This rise is connected with the prolongation of women's participation in education, especially higher education. In Western countries there is an institutional tension and a role conflict between education and family formation (Blossfeld and Jaenichen 1993). This tendency is currently also present in Poland. The level of education of mothers has changed dramatically over the past 20 years. Whereas only 6% of all mothers had earned a graduate degree at the beginning of the 1990s, the percentage rose to 40 % in 2010, which is almost seven times the previous amount. The largest jump in this area occurred within the last 10 years; nevertheless, the percentage of mothers with a graduate degree was only 13 % in 2000.

In addition to education, the job entry phase is seen as another sensitive period in the life course—a time in which most potential parents try to avoid starting a family (Blossfeld et al. 2011). The current situation in the Polish labour market is an obstacle that many young people have to overcome when starting a family. This reinforces the tendency to postpone family formation. It is also becoming increasingly apparent that the difficulty of reconciling family and occupation in Poland prevents many women from having children early.

A life-course pattern of first births at a later age is not a universal feature of modern societies. Communist regimes tried to entice women, especially academics, into early birth in the early 20s with the intention of avoiding parental leave during the middle years of their working life. Another cause—unintended by the regime—was that allotment criteria for scarce housing also supported early family formation (Sackmann 2000). With the transition from a communist economic regime to a market society both in the former GDR and in Poland, mothers' age at first birth increased quickly but currently still lags behind the West. (The indicator "total fertility rate" is sensitive to changes in the timing of births (Blatchford et al. 2002); in the short term, it therefore misinterprets a rise in maternal mean age at childbirth as a drop in fertility rates. Extremely low total fertility rates, for example 0.77 in East Germany in 1993 and 1.22 in Poland in 2003, are also due to the aforementioned timing effects.)

However, changes in the timing of births are not only acts of rearranging events in the life course. They can also have a causal effect on the number of births because a higher mean age at the time of first birth influences the number of children afterwards: the biological fertility of women drops after age 35. Also in the case of divorce and remarriage, the time left to have children with a new partner might be too short in cases where having children has been postponed.

A second structural component of lower fertility rates lies in a *sharply decreasing number of high-parity children of four and more children* in a family. One cause for this development is a secular change in the value of children (Nauck and Trommsdorff 2010; Caldwell 1982), according to which the value of children in terms of their utility to the household economy, especially as farm helpers, disappearing as compulsory schooling is becoming universal. Even some immigrant groups in West Germany who originated from countries in which the economic value of children still plays a role have adapted quite rapidly, in the vast majority of cases, to the opportunities of the new host society and have accordingly adopted a view of children based on more 'modern' values. Within the indigenous population, those who strictly comply with religious dogma (e.g., conservative Catholics) and thus tend to give birth to a large number of children are also becoming fewer in number.

In contemporary advanced societies, the range of total fertility rates is therefore much smaller than its variance in traditional or modernising countries. The average number of births per woman is between 1.0 and 3.0 children in all of these societies. As a consequence of this development, research on the factors that explain fertility rates slightly above reproduction level, at reproduction level or at rates well below reproduction level has to concentrate on the causes of child parities of zero, one, two and three children. The mixture of these four groups is a decisive factor in shrinkage.

Motives for having one child are very strong in contemporary societies. Sociological research in the value-of-children tradition shows that the strongest current parental motive for having children is the emotional fulfilment derived from having children (Nauck 2007). This subjective utility can hardly be substituted by other goods or activities (Becker 1998). As biological causes for childlessness are responsible for around 10 % of potential parents who remain without children, higher rates of childlessness can usually be attributed to difficulties in partnership formation or strong incompatibilities between different life spheres. For instance, in the GDR under the communist regime, the *percentage of childless women* was below 10 %, which is an indicator of low incompatibilities between life spheres. By contrast, the percentage of childless women in younger cohorts in West Germany is around 20 %, which is an indicator of high incompatibilities. Research shows that in times of high female employment—encouraged by general values that support female labour force participation as a symbol of female liberation and independence—most countries that subscribed to a strong male breadwinner model in the twentieth century face a rising number of childless women today (Billari 2008; Brewster and Rindfuss 2000). West Germany, Italy and Spain are among this group of nations. The explanation for the seemingly paradoxical relation between aggregate low female labour force participation and aggregate low fertility rates lies in the effort of women in these countries to avoid or postpone family formation as long as possible as the price of having children is very high for women's careers in terms of their chances of advancement and higher wages. Social and educational policy schemes that provide childcare and schooling on a half-day basis only have a prohibitive impact, especially on the careers of highly educated women, who in Germany exhibit a higher rate of childlessness than lower-educated women.

Motives for having two children are twofold. Firstly, according to opinion polls, the perceived ideal number of children in Germany is two. This is well-known and can be viewed as a weak social norm. (It is a weak norm insofar as it rests more on positive than on negative sanctions.) Secondly, a strong parental motive for a second child is that it is believed that two children of similar age provide a better setting for socialisation as the two siblings can guide and assist each other and are in a better position to acquire social skills (Buhr et al. 2011). This second motive is connected with the timing of child births, especially with the 'spacing' of the time interval between first and second child. In Germany, the optimal spacing is seen to be between 2 and 4 years (Kunze and Sackmann 2008). The strength of the socialisation motive decreases after this window so that the birth of a second child becomes more improbable the older the first one is. These motives play a huge part in Poland as well. Employed Polish women with a university degree are more likely to choose to have a single child than unemployed women. The choice to have a second child, on the other hand, is more common among unemployed mothers. The chances of women with two or more children to find employment are decreasing in Poland (Kotowska 2010).

Motives for having a third child are diverse. In contrast to other countries such as France, there is no cultural norm pushing for three children in Germany. However, as in most countries with a gender-egalitarian culture, there is a tendency for both parental sexes to prefer having children that 'mirror' their own gender. Therefore, the probability of a third child is higher in the case of the first two children being of identical sex (Yamaguchi and Ferguson 1995). As in other contemporary societies, the relationship between income and having a third child is curvilinear with a slightly higher probability of a third child for high-income fathers and a slightly higher transition rate for low-income parents.

Fertility patterns are often referred to in reforms of *family policies*. Family policies govern the rules of absence from the labour market as well as access to social benefits and services. By offering women conditions to better reconcile work and family, these policies define the intensity of the institutional incompatibilities between the two spheres of activity. Not surprisingly, the cross-country variation in family policies is often referred to in discussions on the interrelationship between fertility and the supply of female labour (Matysiak 2011).

In Germany, the effects of family policy are quite weak. Expenditure for family policy has more than doubled since the late 1990s, but it has not caused a rise in fertility rates (Blome et al. 2009; Seeleib-Kaiser and Toivonnen 2011). Despite the fact that public expenditure for families is now clearly above OECD levels, fertility levels have consistently remained below the OECD average. Family expenditure until 2008 concentrated on proportional tax relief for married couples and children on the one hand and direct income subsidies for parents on the other. Recent policies have experimented more with better childcare provision for preschool children and with parental leave. Up to now, no strong effects of these policies could be observed. Despite the fact that gender mainstreaming is an official EU policy, the reality in German companies, unlike the situation in Scandinavian countries, is more gendered, which creates a tension between life spheres that hinders fertility.

Family policy is one of the "strategic topics" in Poland and is also seen as one of the most important challenges there. Yet the public assistance for families provided by the Polish government is the lowest in all of Europe (Matysiak 2011).

In summary, the fertility patterns in Germany show a strong persistence of a low fertility equilibrium, which in West Germany is defined by a polarised constellation consisting of a large percentage of childless couples, on the one hand, and a large proportion of couples with two children, on the other. This is due to the implicit prevalence of gendered work relations both in companies and private households.

2.3 Determinants of Mortality Decline

The fall in the mortality rate, and the rise in life expectancy as the flip side of the coin, influences population dynamics in two ways. Firstly, it slows down population decline in terms of natural population dynamics. Secondly, and more importantly, it is an independent factor in demographic ageing.

Four developments in the field of mortality are important to understand changes in mortality in Germany and Poland in recent decades.

Declining child mortality as well as fewer deaths caused by *infectious diseases* are two in the long line of social changes that have marked modern societies since the early twentieth century. More hygiene, better housing and improved medical services have induced this development.

Death rates in Germany were influenced by the late effects of the First and Second World Wars. This was also the case in Poland. Up to as recently as 2002, we find higher war-related effects on mortality and morbidity rates in Germany (Luy and Zielonke 2009). These long-term effects were caused by wounds, traumas and malnutrition in wartime and early post-wartime periods. They have been decreasing since the turn of the century. Due to the difficult living conditions in Poland, the life expectancy of people who were involved in the war was very low.

The mortality development follows a pattern influenced by the Iron Curtain. Until the early 1970s, life expectancy in East Germany was slightly higher than in West Germany. Between the 1970s and 1990, the communist countries lagged behind more and more in terms of mortality. In 1988/1990 both men and women lived 3 years longer in West Germany than in East Germany. By 1999 this difference had already shrunk to a 0.5-year longer life for West German women and a 1.6-year longer life for West German men (Luy 2004). Environmental differences, less strenuous physical work, lower risk behaviour (smoking, alcohol, high-fat food and obesity) and better medical care were responsible for the once growing and later shrinking gap between East and West Germany. Since the turn of the century, differences in risk behaviour are still more important for men than women. A decomposition analysis shows, for instance, that East German men lose 0.5 years compared to their West German counterparts because of a higher rate of cirrhosis of the liver and an extra 0.5 years as the result of a higher number of road accidents.

In 1990 gender differences in Polish life expectancy were even larger (9 years), and the gap had only dropped to 8.5 years by 2010. Decomposition analysis shows that approximately 50 % of the gender differences can be attributed to the higher level of alcohol and tobacco consumption among males (Mączyńska 2001). In general, Polish life expectancy has followed a similar pattern of historical development to the one observed in Germany. In the communist era between 1965 and 1990, the life expectancy of males above age 45 decreased in the range of 2 years, whereas between 1990 and 2010 it increased by an average 3.5 years (Rządowa Rada Ludnościowa 2011). The main causes of the post-transformation increase are less hazardous jobs, an improved environmental situation, better medical care and a healthier lifestyle (the consumption of fruit nearly doubled while cigarette consumption dropped by 35 %) (Rządowa Rada Ludnościowa 2011).

Generally speaking, there is an increasing *life expectancy after age 60*, especially since the 1970s (Oeppe and Vaupel 2002; Vaupel et al. 2003; Vaupel et al. 2007). Ischaemic, heart-related problems are losing ground to cancer as mortal illnesses (Lussier et al. 2008).

In Germany, higher life expectancy is connected with less sickness in all age groups between 40 and 81 (Tesch-Römer et al. 2006). This rise in the number of "healthy years" is not entirely due to diminishing post-war effects, as it has also been observed in countries that were not directly hit by the wars of the twentieth century, such as Switzerland (Höpflinger 2007).

Very high mortality rates have been observed in Poland among men of all age groups. At age 20–25, the mortality rate of Polish men is four times higher than that of Polish women. Only around 20 years ago, cardiovascular disease caused approximately 50 % of all deaths; this percentage has decreased substantially in recent years (GUS 2011).

In summary, changing mortality and morbidity patterns in both Germany and Poland have caused a trend towards increasing longevity. The impact of demographic ageing is alleviated insofar as reaching a higher age is associated with less frailty caused by morbidity compared to previous cohorts at the same age.

2.4 Determinants of Migration Patterns

Migration is the third component that is decisive for the explanation of population size in a given society. In terms of communication and interaction, world society is the only natural social unit, which since the end of the nineteenth century has encompassed all parts of the earth. Theorists such as Luhmann (2012; 2013), Stichweh (2007) or Meyer (2010) stress that world society is the adequate unit for analysing processes of structuration, reproduction and exchange. However, in the current world society, the nation state is the most powerful corporate actor. Therefore most actors view societies as nation states that exist alongside other societies with which they may exchange goods, harmful by-products, ideas and people. The differentiation between the level of world society and the nation state is especially relevant

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