Chapter 2
Childlessness in Europe: Reconstructing Long-Term Trends Among Women Born in 1900–1972

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2.1 Introduction

In most parts of Europe, childlessness and non-marriage were common phenomena during the course of the demographic transition (Rowland 2007), and contributed to the fertility decline in the late nineteenth century and in the first four decades of the twentieth century. More recently, the decline in fertility among the cohorts of women born in the 1950s and 1960s has been accompanied by rising childlessness levels (e.g., Frejka and Sardon 2004). Most of the social, economic, and cultural trends of the last 45 years appear to steer women away from having children. Easy access to modern contraception—including to emergency post-coital contraception, which first became available in the late 1990s—has vastly expanded the ability of couples to decide whether and when to become parents, and has arguably made it more likely that they will choose to remain childless (van de Kaa 1997). While the educational attainment of women lagged behind that of men well into the 1980s, women are now more likely than their male counterparts to earn a tertiary degree in all countries of Europe except Switzerland (VID 2014). Moreover, women currently have relatively high rates of labour participation, even in the countries of southern Europe, where in the past the majority of women remained outside of the labour market (OECD 2011; Thévenon 2009). While young women now almost universally expect to be employed throughout their life (Goldin 2006), family policies and employers have only partly adjusted to women's new aspirations. Also their male partners have yet to fully adjust: although men are now more involved in parenting, cooking, and housework than in the past (Hook 2006), there is still a large gap in the

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amount of unpaid work done by men and women, and especially by fathers and mothers. This "incomplete gender revolution" (Esping-Andersen 2009) forces some women to make difficult choices between having a career and being a parent (Thévenon 2009). The nature of the labour market has also changed in recent decades: as the market has become more competitive, more demanding, and less secure, younger women and men are often working in temporary and poorly paid stop-gap jobs (McDonald 2002; Mills and Blossfeld 2005). This lack of secure employment had led many young adults to postpone marriage and parenthood.

In addition, the broad-based shift in values related to reproduction and marriage, and the related changes in partnership behaviour known as the "second demographic transition" (Lesthaeghe 2010), can also be expected to lead to higher rates of childlessness. In their analysis of European survey data, Merz and Liefbroer (2012) found that approval of voluntary childlessness was closely related to the progression of the second demographic transition, with respondents in Norway, Denmark, and the Netherlands expressing the most positive views on voluntary childlessness.

Some observers have suggested that childlessness has become the status most compatible with contemporary society. A single individual unhindered by family commitments is the winner in the race for the greatest career and material success in life (McDonald 2002). According to Beck (1992: 116), "the ultimate market society is a childless society." Such an alarmist perspective can, however, be countered by pointing to the low shares of survey respondents who declare that childlessness is their reproductive ideal (Miettinen and Szalma 2014; Sobotka and Beaujouan 2014; see also Kuhnt et al., Chap. 11, in this volume). In most countries, the share of younger men and women surveyed who express a firm intention to remain childless stays low. In their analysis of Eurobarometer data, Miettinen and Szalma (2014) reported that between 2008 and 2011 the share of female respondents aged 18–40 across the European Union who said they did not intend to have children was unchanged, at 5 % (see, however, Sobotka and Testa 2008 for some contrasting examples based on a different survey). Rather than being consistently planned from a young age, childlessness is often driven by a mix of adverse circumstances and adjustments to unforeseen events, such as infertility, poor health, not having a right partner, and partnership dissolution (Gray et al. 2013; Heaton et al. 1999). Many women and men of reproductive age therefore adopt a strategy of perpetually postponing childbearing (Berrington 2004), which increases the likelihood that they will gradually become adapted to their "childfree" lifestyle, and will eventually lose interest in having a child (Rindfuss et al. 1988; Veevers 1980). On the whole, it appears to be much more common for childless adults to express uncertainty about their reproductive plans than to claim they have chosen to be childless (Ní Bhrolcháin and Beaujouan 2011).

But are the theoretical expectations about rising childlessness in Europe actually supported by empirical trends? Is childlessness reaching unprecedented levels, as alarmist warnings that Europeans are no longer willing to reproduce appear to suggest? And is the prevalence of permanent childlessness becoming increasingly the same across Europe? Although a vast body of literature has examined period and cohort fertility trends across Europe, empirical research on childlessness among

women and men is typically limited to studies of individual countries. Several cross-country studies published in the past decade generated broad evidence that may be used to address these questions. These studies were based on census and register data (Rowland 2007), cohort data derived from reconstructed series of period fertility rates (Dorbritz and Ruckdeschel 2007; Frejka and Sardon 2004), or a mixture of different data sources (Miettinen et al. 2015). In this study, I take advantage of the rapid growth in recent years in the availability of data on cohort fertility and cohort parity distribution. By combining different datasets, I aim to provide the most detailed evidence to date on childlessness in Europe. I reconstruct the long-term development of childlessness in 30 European countries among women who were born between the beginning of the twentieth century and 1972. I discuss the trends in individual countries and broader European regions, the degree of historical continuity, and the main reversals in trends. I also analyse shifts in the geographic differentiation in childlessness, as until recently there was a clear east-west divide, with central and eastern Europe having unusually low childlessness levels. I focus on permanent childlessness among women, as the available data on men are much more limited, and are of uncertain quality (see below). In conclusion, I suggest that the childlessness levels among women born around 1970 are not unusually high when compared with those of their counterparts born in the early twentieth century.

2.2   Data and Methods

2.2.1   Reliability of Childlessness Estimates

Data on childlessness can be derived from different sources, including census and survey data that ask respondents about their number of children ever born, register data that include the childbearing or parenthood histories of the resident population, and vital statistics data on births by birth order that make it possible to reconstruct cohort fertility trends over long periods of time. Because each of these sources has potential advantages and drawbacks, there has been considerable uncertainty about childlessness estimates. Even very similar data sources (such as two consecutive censuses) can yield large differences in estimates of final childlessness in the same cohort of women. These discrepancies have been attributed to slight differences in the questions asked about the number of children, migration between censuses, differential mortality, and selective non-response.

Because the degree of uncertainty about the prevalence of final childlessness is particularly high among men, who can reproduce for a much longer period of their life than women, and for whom the relevant data are frequently missing, this study concentrates on childlessness among women. Even among women, a key issue is deciding at what point in their life course childlessness can be seen as permanent or almost final (Kreyenfeld and Konietzka 2007). Because of advances in assisted

reproduction, European women are now more often having their first child after age 40, and a few women have even given birth in their 50s or 60s. The Eurostat database (2015) recorded 334 cases of women having a child at age 50 or older in 2013; such cases were much rarer until the early 2000s. But the important question is at what age the number of first births becomes so small that it no longer makes a real difference in childlessness estimates. The same dataset shows that of the first births in the European Union in 2013, 15.4 % were to a mother over age 35, and 2.8 % were to a mother over age 40; this share falls to 1.1 % after age 42 and 0.1 % after age 46. Thus, it can be argued that childlessness among women is virtually permanent by age 46, and that, with a small degree of uncertainty, the final number can be established among women by age 42, when 99 % of first births have been realised.

As census data are available for some countries up to 2011, and vital statistics data are available up to 2013 or 2014, childlessness can be reliably estimated for women who were born around 1970 or earlier. Thus, the current analysis does not look at the experiences of the more recent cohorts, who have been in their peak reproductive years since around 2000. A number of previous studies attempted to make projections of final childlessness for the cohorts of women who, at the time, were in their late 30s or even younger, typically using the most recent period first birth rates to estimate the share of women who would have their first child in the future (e.g., Dorbritz and Ruckdeschel 2007; Frejka and Sardon 2004; Morgan and Chen 1992; Sobotka 2005). The accuracy of these predictions was mixed, with many studies overestimating the levels of final childlessness in recent cohorts. The biggest challenge researchers faced was in capturing the process of the recovery of postponed first birth rates at late childbearing ages, as the number of first births among women who were over age 35 was rising. The simplest projection method used—i.e., freezing the most recently observed period first birth rates—typically resulted in an underestimation of the first birth rates at these ages, and thus an overestimation of the levels and rates of increase of childlessness among the youngest cohorts. It can therefore be argued that predicting cohort childlessness is problematic, as the results are often misleading (Rindfuss et al. 1988). However, these studies often employed projection methods that were too simple, and relatively little effort has been put into determining which projection methods yield the most reliable estimates (the paper by Morgan and Chen 1992 is the main exception).

2.2.2 Data Sources on Permanent Childlessness: Drawbacks and Advantages

Before discussing the data used in this study, I outline the general advantages and disadvantages of different data sources on childlessness. These observations pertain to most of the historical data analysed here. In recent years, these distinctions between different data sources have been becoming more artificial, as register-based data are increasingly used to generate population census results (register-based censuses) as well as vital statistics records.

Population Census Data which include responses to the question on the number of children ever born, usually cover the entire female population of reproductive and post-reproductive ages (typically, ages 15+). These data also constitute the most accessible source of information on permanent childlessness. They typically cover the whole population (although some censuses, e.g., the Polish census of 2002, asked only a selected sample of women about family and reproduction), and thus allow detailed cohort-by-cohort comparisons of childlessness. As the censuses often collect information on a large number of socio-economic and demographic characteristics of the population, these data can also be used to conduct a detailed analysis of the main factors associated with childlessness (e.g., Burkimsher and Zeman, Chap. 6, in this volume), including educational attainment (Brzozowska et al. 2016).

Census data can, however, be affected by higher or lower mortality among child-less women, giving a distorted picture of permanent childlessness among older women, especially if they experienced higher mortality during their reproductive ages or lived through wars and major upheavals. Because census data (like survey and register data) provide only a snapshot of the "current population", they offer no information on women who left the country, while providing data on family size of women who recently moved into the country, including children they gave birth to before migrating. The influence of migration can be addressed with more detailed analyses that take into account women's migration status, but the data needed to conduct such analyses are often not published or available. Moreover, in a census a woman may misreport the total number of children she has (especially if one or more of her children died in infancy or childhood), or may fail respond to the question on the number of children she has ever had. The rate of non-response is often not proportionally distributed with respect to parity: especially in countries where childlessness is perceived as being undesirable, childless women often do not respond to the question on the number of children they have.[1] Whether there is a bias in reporting can be determined by checking the correlation between the share of women who are childless and the non-response rate in the data. When this cor-relation is strong, it is safe to assume most of the non-responses are due to childless women who failed to report their status. If it is assumed that all of the missing responses came from childless women, a simple adjustment can be made (El-Badry 1961). As this adjustment is likely to produce estimates of childlessness that are unrealistically high, more sophisticated imputation methods, including those based on regression techniques, are preferable. Such methods have, for example, been used to estimate childlessness in German micro-census surveys (e.g., Statistisches Bundesamt 2015). Finally, population censuses only rarely ask men about the num-ber of children they have.

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[1] This bias can be further strengthened by the questionnaire design. For instance, in the Czech Republic, childless women frequently leave the response on children ever born blank instead of writing "0" in the respective box (Zeman 2013).

Survey Data Generally, survey data have the same strengths as census data, but have additional weaknesses. As these data are often based on a small sample of the population (typically, several thousand respondents), cohort childlessness estimates made on the basis of these data are unstable and unsuitable for more detailed analyses. In addition, because many survey samples are not representative of the total female population with respect to family size, they may provide biased estimates of childlessness. In particular, survey non-response can produce distorted estimates of childlessness. The challenges of collecting survey data on childlessness are best illustrated by a discussion by Murphy (2009) and Ní Bhrolcháin et al. (2011). They attempted to explain a sudden rise in childlessness reported in some rounds of the UK General Household Surveys, and discussed a range of possible explanations, including differential response rates, changing non-response rates, changing sample designs, deliberate misreporting, and changes in survey procedures. Overall, it is preferable to use large-scale surveys with low non-response rates, as these surveys can eliminate the biases typical of surveys with smaller sample sizes.

Collecting data on childlessness among men is even more challenging, partly because men tend to underreport their children from previous marriages and partnerships (Rendall et al. 1999), and partly because they have a longer reproductive period. Thus, the only sources of data on childlessness among men are often smaller scale surveys, such as the Fertility and Family Surveys (FFS) conducted in the 1990s and the Generation and Gender Surveys (GGS) conducted since the early 2000s (e.g., Miettinen et al. 2015).

Population Register Data In Europe, a number of countries, including Nordic countries, Baltic countries, the Netherlands and Slovenia, have established population registers that contain records on demographic events for all of the residents in the country. These are in theory the most accurate and efficient sources of information on childlessness. Because they can be merged with other registers, they provide a broad scope for detailed analyses of the determinants of childlessness (for an excellent analysis of the educational gradient in childlessness and cohort fertility in the Nordic countries, see Andersson et al. 2009). However, using demographic register data for analysing childlessness has two main limitations. The first is that it is difficult to cover the reproductive histories of the entire population, especially those of migrant women, for whom the number of children they gave birth to before arriving in the country may not be known or reported. A partial solution to this problem is to measure fertility and childlessness only among women who were born in the country. The second limitation pertains to data access: to ensure the protection of data and confidentiality, many countries make accessing their register data difficult, and often also costly. Thus, obtaining register-based data on childlessness is not easy in countries that do not routinely publish these estimates.

Vital Statistics Data Statistical offices of almost all European countries now collect data on live births by age of the mother, year of birth of the mother, and birth order of the child. In combination with the official estimates of the female population by age and year of birth, these data can be used for estimating fertility rates by

the child's birth order and age of the mother. These data can then be cumulated over long periods of time and used to estimate cohort childlessness and parity distribution. This approach has often been used in the past, including by Frejka and colleagues (e.g., Frejka and Sardon 2004, 2006, 2007; Frejka et al. 2010), Heuser (1976), Sobotka (2005), and Dorbritz and Ruckdeschel (2007). The estimates of childlessness and parity distribution based on period vital statistics data are also featured in the Human Fertility Database.

However, approaches based on cumulating time series of period vital statistics to obtain childlessness data also have several drawbacks. The first one is obvious: to reconstruct the entire childbearing history of a single birth cohort, it is necessary to accumulate over 30 years of fertility data, starting from around age 15. Such long time series often are not available, either because birth order is not continually reported in birth records, or because in the past many countries collected birth order information only for women who gave birth within marriage. Several countries, including Germany and the United Kingdom, have only recently started collecting data on biological birth order. Childlessness estimates derived from the period data are also very sensitive to the quality of birth order statistics. Data quality problems, such as a high share of births with an unknown birth order, the publication of the birth order for 5-year age groups only (this practice was common in the past in some of the countries of the former Yugoslavia and the Soviet Union), and the incorrect or inconsistent reporting of biological birth order (this practice is common in France) make the resulting cohort childlessness estimates volatile and often useless. Furthermore, period data only contain the records on births that took place in the country: fertility for emigrants is included, but only before the date when they left the country, and the reproductive histories of immigrants are ignored up to the date when they arrived in the country. Thus, the cohort fertility histories created in this way are somewhat artificial, and may not reflect the actual childlessness of the residents in countries with high immigration or emigration, especially if the fertility behaviour of migrants differs from the behaviour of the "stayers". Finally, the estimates of the female population distribution by age might be strongly affected by incomplete reporting of migration. For instance, incomplete reporting of emigration can affect statistics on the entire female population of reproductive age (as is the case for some countries of central and eastern Europe (CEE) with high levels of emigration, including Poland) or of specific population groups, such as immigrant women (as is the case for Germany; Pötzsch 2016). This in turns inflates the registered number of women of reproductive age, which leads to an underestimation of period and cohort fertility rates, and, consequently, to an overestimation of childlessness. For these reasons, childlessness estimates based on period vital statistics should be used with caution. While such estimates may accurately reflect the average level of childlessness in the long run, they may be unstable or have implausibly low values for some cohorts. This is, for instance, the case in the estimated time series of lifetime childlessness in the Human Fertility Database for some CEE countries, including Bulgaria and Estonia (HFD 2015a).

Census or large sample survey data are often used in combination with the subsequent vital statistics. This approach, which is frequently used in this chapter, makes use of the comprehensive picture of childlessness among many different cohorts provided in the censuses, and then extends it using more recent data covering the period for which the census records are not available.

To illustrate the extent to which different data sources often yield different estimates of final childlessness, let us consider the data for Romania and Spain presented in Fig. 2.1, or the different estimates of childlessness for the United States discussed by Frejka (Chap. 8, in this volume). The data for Romania are mostly drawn from censuses taken between 1977 and 2011, although the data from the 2002 census are combined for the younger cohorts with the vital statistics data for 2002–2013. While the censuses of 1992 and 2002 closely overlap and give very similar estimates of final childlessness, the census of 1977 gives lower childlessness estimates for the women born in the 1920s, whereas the most recent census of 2011 gives much higher estimates of childlessness for the women born in the 1920s–1950s. For instance, women born in 1927 had a childlessness rate of 15 % in the 1977 census, of 18 % in the censuses of 1992 and 2002, and of 23 % in the most recent census of 2011. It is unlikely that selective emigration plays a role in this discrepancy (as it is implausible that women with children would have been leaving the country at a higher rate than childless women). Likewise, it is unlikely that women with children would have had a mortality rate that was so much higher than that of childless women that their share in the population of older woman would have declined so rapidly. Similar discrepancies can be found in the data for Spain: the more recent census data for 2011 show higher rates of childlessness than the 1991 census data, and the childlessness rates reconstructed from vital statistics records are much lower (and are also less stable) than they are in both census datasets. In this case, immigration might have played some role, as Spain experienced an unprecedented wave of immigration between the late 1990s and 2010 (Verdugo and Swanson 2011): the higher childlessness estimates in the more recent census likely reflect the fact that many female immigrants to Spain were childless when they arrived in the country.

2.2.3   Country Coverage, Data, and Assumptions Employed

This study presents childlessness estimates for European countries with populations over one million; in total I have assembled datasets for 30 countries. I could not find reliable data or longer time series for Albania, Bosnia and Herzegovina, Kosovo, Latvia, Macedonia, and Serbia; these countries are therefore not included in the analysis. For the United Kingdom, data are available for England and Wales only. Because eastern and western Germany were separate countries in 1949–1990, and continue to have distinct fertility patterns, I analyse the data for these two regions separately, alongside the dataset for Germany as a whole. To capture the main differences between major parts of Europe, I also study trends for six larger European
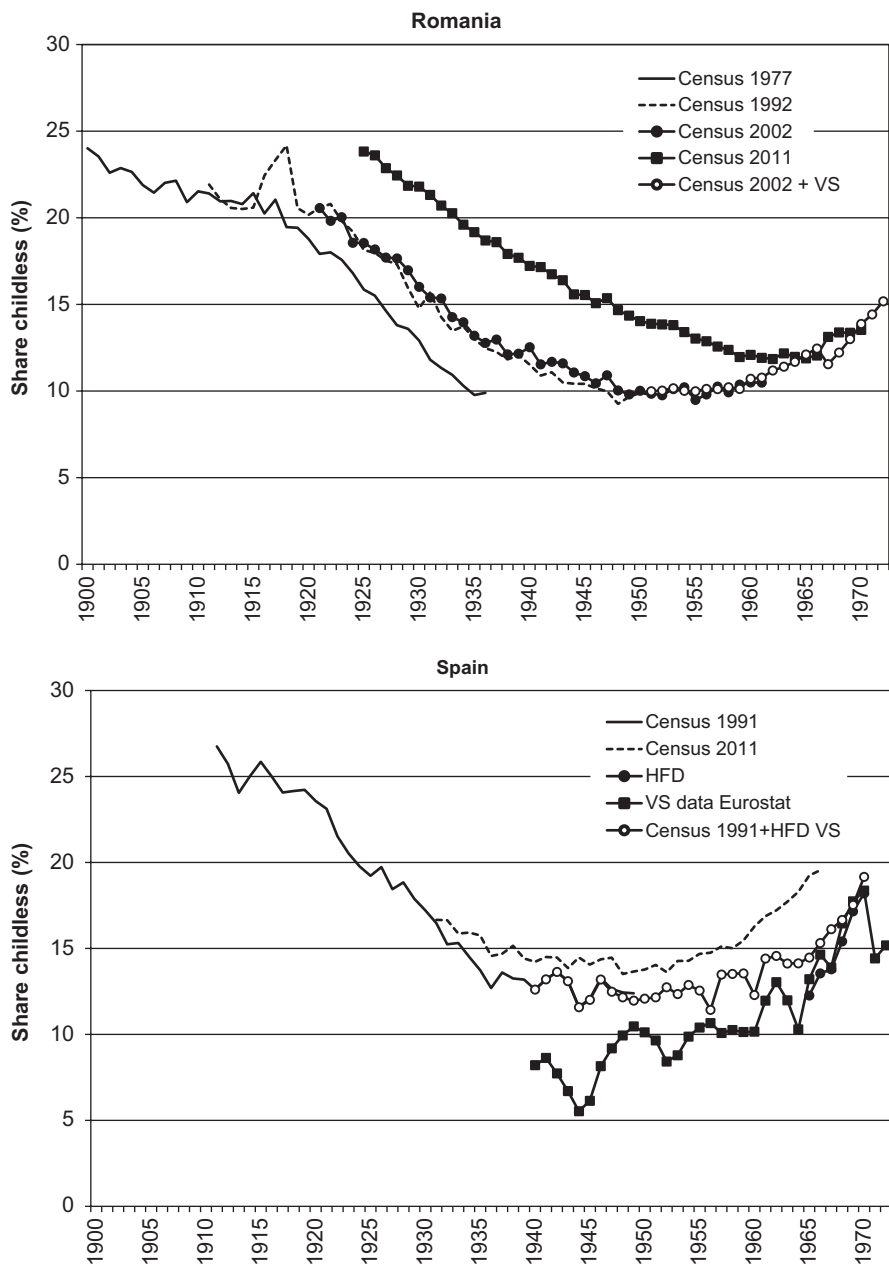
Fig. 2.1 Estimates of permanent childlessness in Romania and Spain among women born in 1900–1972; a comparison of different data sources. Notes: *HFD* Human Fertility Database (2015b), *VS* vital statistics (Sources: see Appendix 1)

regions that have had distinct fertility patterns in the past (Sobotka 2013): western Europe, the Nordic countries, southern Europe, the predominantly German-speaking countries of Europe (Austria, Germany, and Switzerland), central Europe, and a broad region of eastern and south-eastern Europe. The latter two regions are composed of the former state-socialist countries of central and eastern Europe (CEE).

For most of the countries, I have found multiple datasets on permanent childlessness (see the examples for Romania and Spain in Fig. 2.1). Combining them allowed me to reconstruct long-term series of cohort childlessness. However, having multiple datasets for identical cohorts also meant that I had to select some datasets over others, as I present only one figure for each of the analysed cohorts in each country.[2] In the selection procedure I followed a set of simple rules, which were based in part on the data issues and preferences outlined above. The selected datasets are listed in Appendix 1. The selection rules are as follows:

- Longer data series that show permanent childlessness for many cohorts are preferred.
- The time series that overlap closely with other available data (e.g., Romanian census data for 1992 and 2002 in Fig. 2.1) are preferred.
- The more stable datasets that show "plausible" ranges of childlessness are preferred (specifically, datasets that exclude data suggesting that childlessness levels are below 4 %, as these levels are implausible given that the permanent sterility is 2–3 %). This means giving preference to census data over vital statistics-based estimates. The drawback of this approach is that the availability of census data for the most recent round of censuses in 2011 is limited, as many countries either switched to conducting the census based entirely on population registers and other administrative registers, which often do not allow for the reconstruction of the parity structure of women (e.g., in Austria); or the organisers decided not to include the question on the number of children ever born in the census.
- Survey data are used only when the datasets are large, and only for countries where population-based datasets were unavailable (France and Germany).
- A hybrid approach of combining census data (mostly for the censuses around 1991 and 2001) and the time series based on vital statistics for the subsequent period is used to derive an estimate of childlessness for the most recent period (usually for 1 January 2014).

Age Ranges I present childlessness estimates as "final" when they pertain to women aged 42 or older; for some CEE countries, I have also included data for women aged 41, as these countries still have very low first birth rates among women at higher ages. In six countries (Austria, the Czech Republic, England and Wales, Italy, Spain, and Switzerland) I have used a simple trend projection based on the first birth probabilities by age to estimate permanent childlessness among women

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[2] I considered the option of presenting multiple datasets for the same cohort, but this would make cross-country and regional comparisons more difficult, and would also require much more space for data presentation, exceeding the scope of this study.

who were born prior to 1972, and for whom the data were available up to ages 40 or 41. At these ages the potential margin of error for such a projection is very small—well below the degree of uncertainty in estimates of childlessness levels based on different data sources. The census and survey data considered in the analysis were for women who were under age 80 at the time of the census, as above that age the selectivity due to differential mortality was assumed to be too large.

Redistributing Women with Unknown Parity When the number of women with unknown parity was available in the published datasets, they were usually assumed to have the same parity distribution as the women whose parity was recorded. Therefore, childlessness was computed only for the women for whom the parity distribution was reported. Usually, this assumption was not critical for estimating childlessness, as in most countries the share of women with unknown parity was typically below 1 %. However, in many of the available datasets the number of women with unknown parity distribution was not reported, and it is often unclear whether any specific assumptions for these women were applied by the national statistical offices that processed and published these data. Finally, some census data show that there is a close correlation between the share of childless women and the share of women with unknown or unreported birth order; in these cases, all of the women with unknown birth order are assumed to be childless (see Appendix 1).

Main Data Sources The data sources selected for each of the countries are detailed in Appendix 1. For some countries, the data came from census tabulations or other estimates published by national statistical offices or were provided by the researchers working with these datasets (see Appendix 1 and the acknowledgements). Here I outline the main sources, which were used for multiple countries. For the census data, there are two key sources: the census-based tabulations of the parity distribution of women provided in the input datasets in the Human Fertility Database (HFD 2015b), and the tabulations of the parity distribution of women aged 40–80 by cohort and education provided in the Cohort Fertility and Education database (CFE 2015; Zeman et al. 2014). The HFD census-based tabulations were available for 11 countries and territories: Belarus, Bulgaria, the Czech Republic, Estonia, eastern Germany, Lithuania, Portugal, Russia, Slovakia, Slovenia, and Ukraine.[3] The CFE data were available for Croatia, the Czech Republic, Hungary, Ireland, Poland, Romania, Russia, Slovakia, and Spain.

In addition to the census data, the HFD also contains annual register-based or official estimates of the parity composition of women by age for Finland, Hungary, the Netherlands, Norway, and Sweden. These estimates were used for selected years in this study (Appendix 1). The key sources of the childlessness estimates based on vital statistics are the Human Fertility Database (2015a) and the author's own

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[3] These data are not part of the main HFD "output" datasets, as their purpose is to provide estimates of the parity distribution of women of reproductive age, serving as an input for constructing fertility tables in the database.

computations based on the Eurostat online database (2015). In theory, the time series of period data on fertility by birth order from the Human Fertility Collection (HFC 2015) can also be used to generate estimates of lifetime childlessness, but for most European countries these estimates either cover relatively few cohorts or are too unstable to be used for that purpose.

2.3   Long-Term Developments in Childlessness in Europe: Evidence for 30 Countries

The presentation of long-term developments in childlessness in 30 European countries is nested within six broader regions that reflect the major geographic and cultural divisions of Europe, but also the geopolitical division of east and west that prevailed in Europe until 1989. These divisions are apparent in European fertility patterns, including childlessness (e.g., Sobotka 2011). In the next section, I summarise the major regional differences and discuss the between-country heterogeneity in childlessness in Europe.

In western Europe, childlessness trends have followed an asymmetric U-shaped pattern, starting from very high levels among women born in the first quarter of the twentieth century, reaching low levels among women born in the mid-1940s, and then rising again, especially among women born in the 1950s (Fig. 2.2). The level of childlessness reached around 25 % among French women born around 1900, Belgian woman born in 1910, and Irish women born in 1925 (earlier data are not available). Childlessness levels then declined substantially, to 10–14 % among the early- to mid-1940s cohorts, most of whom had their first child in the 1960s, i.e., during the later stages of western European baby boom. The subsequent increases in childlessness were steepest in the Netherlands and England and Wales, whereas in France the level of childlessness rose gradually; today France has the lowest childlessness rate in the region, of 14 % among women born in the second half of the 1960s. Among the 1960s cohorts there was a clear stabilisation in childlessness levels, with England and Wales even reporting a decline; among the late 1960s cohorts, 16–19 % of women in Belgium, Ireland, the Netherlands, and England and Wales remained childless (see also Berrington, Chap. 3, in this volume).

The childlessness patterns were similar in the Nordic countries, starting from high levels around 25 % among women born around 1910 (data available for Finland and Sweden only) and reaching much lower levels among those born in the 1940s. As in France, childlessness levels then increased gradually (see Köppen et al., Chap. 4, in this volume). Among women in Denmark, Norway, and Sweden who were born in 1970, the childlessness levels are 12–14 %. In Finland childlessness rates rose more sharply, with one out of five women born in 1968 remaining childless (see Rotkirch and Miettinen, Chap. 7, in this volume).

The three predominantly German-speaking countries, together with southern Europe, make up the group of countries with the highest levels of childlessness in
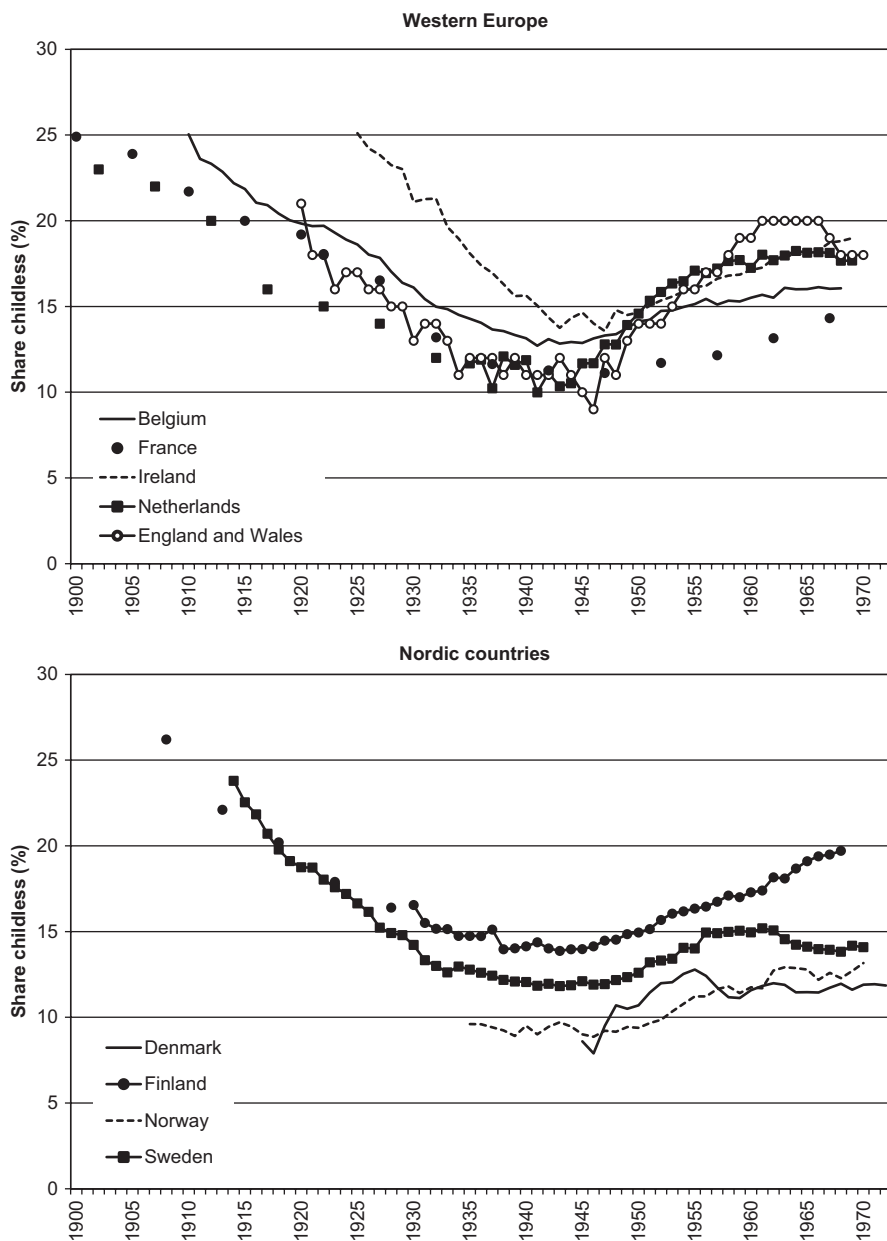
Fig. 2.2 Childlessness among women born in 1900–1972; western European and Nordic countries (in %). Notes: For each country and cohort only one data source was selected; the alternative datasets are not shown (see Sect. 2.2.3). For women who were born in the late 1960s and the early 1970s a small portion of their first birth rates (after age 42) is either estimated or disregarded (Sources: detailed sources by country are listed in Appendix 1)

Europe. In the German-speaking countries, childlessness increased sharply among women who were born in the 1950s and 1960s, and has been especially prevalent among women who have a tertiary education (Sobotka 2012). In Switzerland and Germany, the rates of childlessness exceeded 20 % in the late 1960s cohorts. In Germany, the fertility patterns in the eastern and in the western parts of the country have long been distinct, partly mirroring the broader differences between the former state-socialist countries and other regions of Europe (Goldstein and Kreyenfeld 2011; Kreyenfeld 2004; see also Bernardi and Keim-Klärner, Chap. 12, in this volume). Until recently, levels of childlessness were far lower in eastern than in western Germany: just 8–12 % of eastern German women born between the 1930s and the early 1960s were childless. While the results of the micro-census surveys of 2008 and 2012 indicate that this east-west gap had become much smaller among the 1960s cohorts (Fig. 2.3), western German women of the late 1960s cohorts had the highest childlessness levels in Europe; of around 25 % among those born in 1969. Over the past century, childlessness trends in western Germany have followed a U-shaped pattern: the level was around 26 % among the cohorts born in the early twentieth century, declined to less than 13 % among the mid-1940s cohorts, and then almost doubled among the women born over the next 25 years. But while recent estimates showing that 23–24 % of German women born in the late 1960s have remained childless seem high, these figures are actually lower than many estimates based on the smaller sample survey data analysed prior to the recent rounds of the micro-census surveys (e.g., Dorbritz and Ruckdeschel 2007). In Switzerland, it appears that childlessness levels peaked at around 22 %, and were lower among women born around 1970. However, these estimates are partly based on vital statistics, and are not fully in line with evidence from other data sources (for a more detailed analysis, see Burkimsher and Zeman, Chap. 6, in this volume).

In southern Europe, the long-term childlessness trends in the two largest countries, Italy and Spain, were similar: the childlessness levels were around 25 % among the cohorts born in the early twentieth century, declined gradually to around 11–12 % among the cohorts born in the early 1950s, and then increased sharply among the cohorts born in the 1960s and early 1970s, surpassing 20 %. This pattern reflects that the decline in fertility in southern Europe occurred later than the decreases observed in western and northern Europe, but also that the decline has been more severe in the south: among women born in 1972, the completed fertility rates in Italy and Spain are estimated to be the lowest in Europe, at 1.45 and 1.43 children per woman, respectively. Greece appears to be on a similar trajectory. By contrast, the level of childlessness in Portugal is considerably lower, estimated at around 12 % among women born in 1968. While the country currently has the lowest period total fertility rate in Europe, of 1.21 in 2013, this development is not yet reflected in the childlessness trends examined here. In addition, it appears that the cohort fertility decline in Portugal has mainly been characterised by a rapid spread of one-child families, with an estimated 36 % of women born in 1968 having only one child (computations based on Human Fertility Database).

In central, eastern, and south-eastern Europe, childlessness trends differed sharply from those in other parts of Europe among women born in the 1940s to
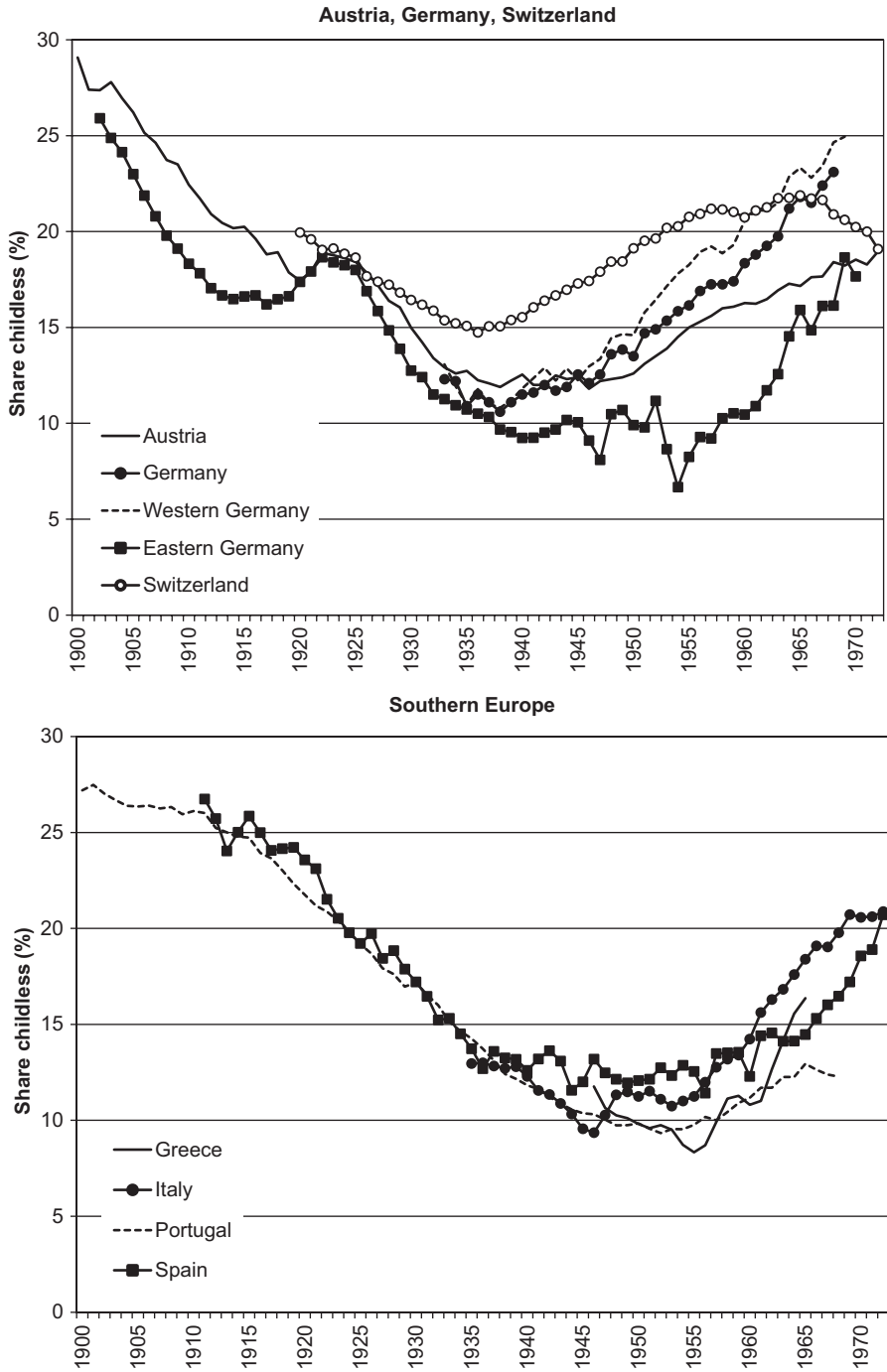
Fig. 2.3 Childlessness among women born in 1900–1972; Austria, Germany, Switzerland, and southern Europe (in %) (Notes and sources: see Fig. 2.2)

mid-1960s. Among these cohorts, childlessness levels were not only very low (estimated in most countries at 5–10 %); they were also much more stable than in the rest of Europe, where childlessness was rising. This pattern can be seen as one of the key features of reproduction under state socialism in the CEE region in the 1950–1980s. A wide range of social and economic factors contributed to this pattern of universal family formation: low average age at marriage and childbearing, negative attitudes towards childlessness, insufficient availability of modern contraception (which resulted in large numbers of unplanned pregnancies and "shotgun marriages"), the relative predictability of the life course, the lack of labour market competition, and the relatively consistent availability of institutional childcare (Sobotka 2011, 2015). With some exceptions (especially in Romania), childlessness was rare among women of all educational groups, suggesting that labour market participation did not pose a major barrier to family life in the region (Brzozowska et al. 2016).

Some CEE countries stand out for their particularly low levels of childlessness: among women in Belarus, Bulgaria, Czech Republic, and Russia who were born in the 1950s (and thus had their first child mainly in the 1970s or the 1980s) the levels of childlessness were 5–6 %; or just a few percentage points above the estimated level of lifetime sterility (Leridon 2008). The highest childlessness levels in the CEE countries among these cohorts, of around 9–10 %, were recorded in Estonia, Romania, and Slovakia. These levels were, however, still well below those in most other parts of Europe. However, childlessness levels are higher among the youngest CEE women analysed, especially among those born at the turn of the 1960s and 1970s, who realised most of their reproduction in the post-communist transition era of the 1990s. While childlessness has been rising in all of the CEE countries, particularly sharp increases have been observed in Romania: according to a recent estimate, around 15 % of Romanian women born in the early 1970s are childless. This estimate is, however, tentative, as it is based on cohort fertility rates reconstructed from period vital statistics. These computations involve estimating the female population of reproductive age who are resident in the country in each year, which can be particularly challenging in countries with high rates of emigration, such as Poland and Romania (Sect. 2.2.2) (Fig. 2.4).

2.4 Diversity and Contrasts in Childlessness Trends: Countries and Broader European Regions

The analysis of childlessness trends for all countries presented above may not clearly illustrate the main differences between broader European regions. Figure 2.5 shows changes in childlessness in Europe, averaging data for all available countries, and also depicts regional averages of childlessness for the six broader regions analysed above. These regional averages are based on data for selected countries for which long-term series were available. This analysis is also accompanied by selected
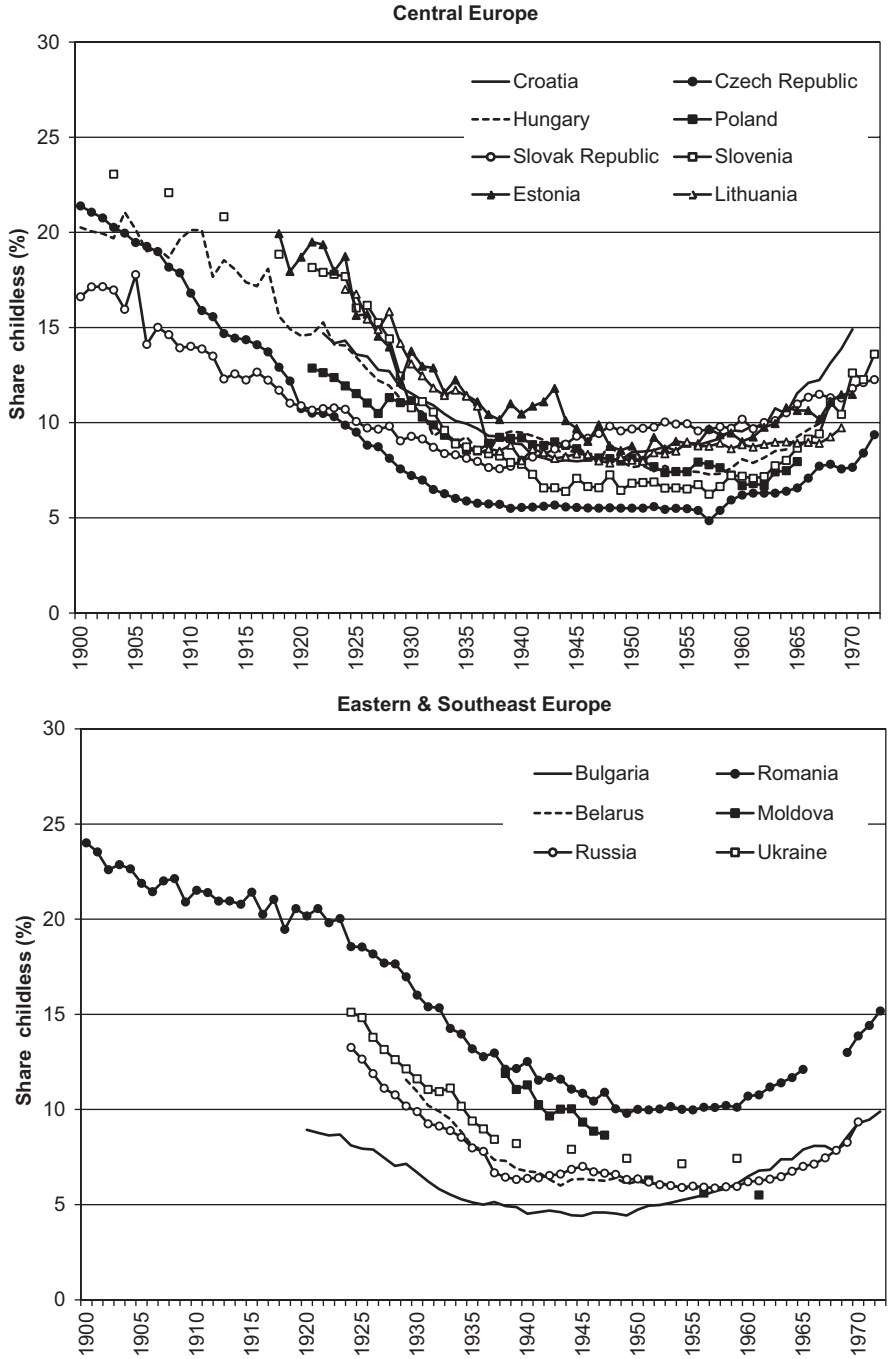
Fig. 2.4 Childlessness among women born in 1900–1972; central, eastern, and south-eastern Europe (in %) (Notes and sources: see Fig. 2.2)
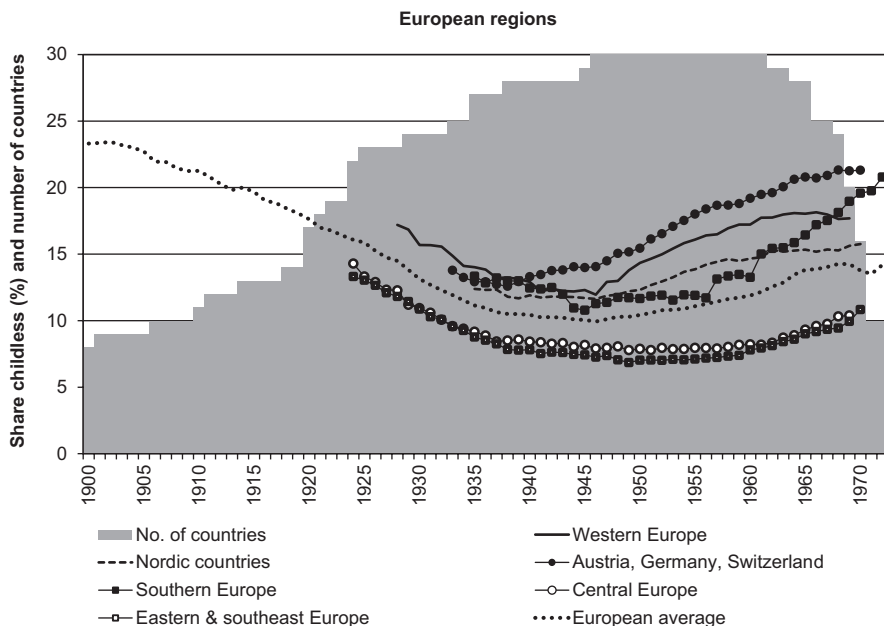
Fig. 2.5 Childlessness in Europe among women born in 1900–1972 (average for all countries with available data, in percent) and in six broader European regions (average for selected countries). Notes: European average is an average level of childlessness in all countries for which data were available in a given year. The regional data are unweighted averages based on selected countries for which longer time series of data were available. The selected countries are as follows: western Europe: Belgium, England and Wales, Ireland, and the Netherlands; Nordic countries: Finland, Norway, and Sweden; southern Europe: Italy and Spain; central Europe: Croatia, Czech Republic, Estonia, Hungary, Lithuania, Poland, Slovakia, and Slovenia; eastern and south-eastern Europe: Bulgaria, Romania, and Russia (Sources: detailed sources by country are listed in Appendix 1)

summary indicators of cross-country heterogeneity in childlessness in Europe in selected cohorts born between 1900 and 1968 (Fig. 2.6).

These data provide clear evidence that childlessness levels were high across Europe in the course of the demographic transition, in line with the findings of Rowland (2007). Women who were born in the early twentieth century had very high childlessness levels, as the family formation plans of many women were disrupted by the economic depression of the 1930s and by a lack of male partners after the First World War. Childlessness levels of women born between 1900 and 1911 approached or exceeded 20 % in all of the 13 countries with available data except Slovakia.

In various European countries and regions, the pattern of childlessness over the past century was U-shaped. In most countries, the lowest levels are observed among women born around 1940. These women were starting a family in the prosperous era of the early- to mid-1960s; a time when most women still fully embraced the "traditional" family model based on marriage and the strong division of gender roles. On average, only around 10 % of European women of these cohorts remained
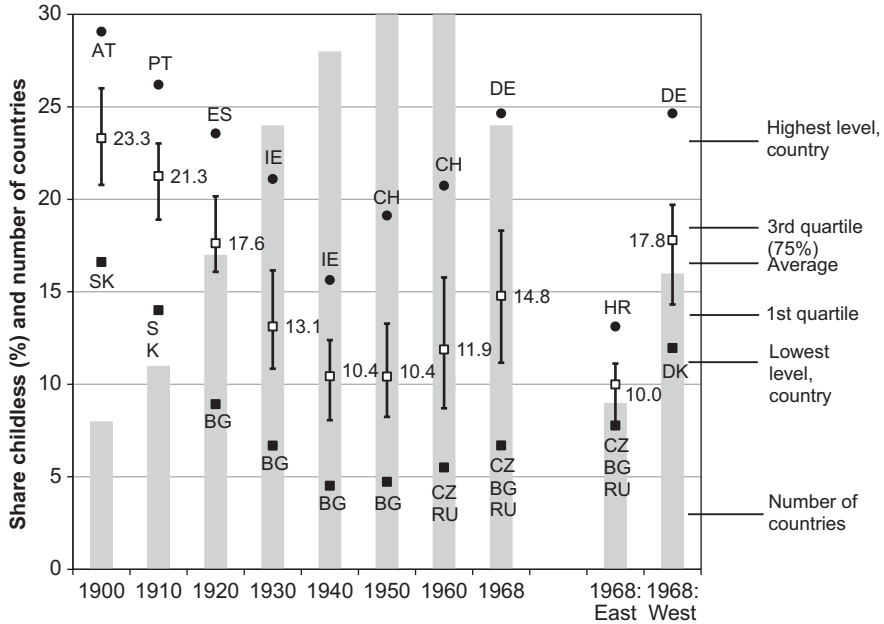
Fig. 2.6 Selected indicators of cross-country differences in childlessness in Europe (average, lowest and highest levels, 25 and 75 % of the childlessness distribution). Women born in 1900–1968, selected cohorts, in percent (Notes and sources: Indicators are computed for all European countries with populations over one million for which data were available for a given year; for the countries and the cohorts included, see also Figs. 2.2, 2.3, and 2.4 and Appendix 1). Country codes: *AT* Austria, *BG* Bulgaria, *CH* Switzerland, *CZ* Czech Republic, *DE* Germany, *DK* Denmark, *ES* Spain, *IE* Ireland, *PL* Poland, *PT* Portugal, *RU* Russia, *SK* Slovakia

childless (Fig. 2.6). A higher childlessness rate, of around 14 %, can be observed in only three countries: Ireland, Finland, and Switzerland. Paradoxically, the lowest levels of childlessness were reached at the same time among the cohorts who were experiencing the baby boom in western countries, and among the cohorts in eastern Europe whose fertility rates were declining to low levels (van Bavel et al. 2015).

The regional trajectories in Fig. 2.5 also suggest that some of the differences in childlessness between the eastern and the western parts of Europe preceded the geopolitical division of the continent that emerged after World War II. The CEE countries consistently had childlessness levels that were below European average, including among women who were born in the mid-1920s, many of whom had their first child before the new reproduction patterns of the state-socialist era were established during the 1950s.

While childlessness eventually increased in all of the regions, the timing of this rise differed considerably. In western Europe, including in Austria, western Germany, and Switzerland, the increase in childlessness began among women born in the 1940s. In the Nordic countries, the increase started among women born in the early 1950s, and then progressed much more slowly. In the south, the rise in childlessness started among women born in the 1960s. In the CEE countries, childlessness first

started to rise among the cohorts born in the late 1960s (Fig. 2.5). Because of these differences in the onset of the increase in childlessness, the east-west gap in child-lessness levels was most pronounced among women born between 1950 and 1965, although the differences between countries were large (Fig. 2.6). For an illustration, consider regional differences observed among women born in 1968: the average level of childlessness in the CEE countries (10 %) is below the lowest childlessness level in other parts of Europe (12 % in Denmark), and is well below the average level across non-CEE countries (18 %). These differences are also observed in the ranking of European countries with the lowest and the highest childlessness levels among women born in 1940 and 1968 (see Fig. 2.7): all of the countries with the lowest childlessness levels are located in the CEE, with Bulgaria, the Czech Republic and Russia having the lowest levels.

Finally, a distinction can be made between regions where childlessness seems to be levelling off or even declining slightly among the cohorts born in the late 1960s and early 1970s (western European countries, Nordic countries, Austria, Germany, and Switzerland), and regions where childlessness has been rising rapidly, and is likely to continue to increase (southern European and CEE countries).

How closely is childlessness correlated with completed fertility? Do countries with high childlessness rates also have low cohort fertility rates? Previous research has suggested that among women who were born in the early and mid-1960s, there is a weak correlation between low fertility rates and high levels of childlessness (Dorbritz and Ruckdeschel 2007: Figure 9, Miettinen et al. 2015: Figure 10c). In Fig. 2.8 we can see that among women who were born in 1968, the strength of this correlation varies by region: no correlation can be observed in the CEE countries (or if there is a correlation, it runs in the opposite direction), while in the rest of Europe the expected correlation is found, but it is not very strong. The main outlier is Ireland, which has both a high completed fertility rate (2.17) and a relatively high childlessness rate (19 %).

2.5   Discussion and Conclusions

This study has provided the most detailed reconstruction to date of long-term childlessness trends among women in Europe. But because the analysis is based on diverse datasets, the cross-country comparisons cannot be precise, and a degree of uncertainty about the exact levels of childlessness remains, especially in countries where different datasets provide contrasting estimates of childlessness, and in coun-tries that have been experiencing intensive migration. It is beyond the scope of this article to give a detailed account of all of the alternative datasets available, but these uncertainties should be taken into account when analysing the presented data.

This limitation notwithstanding, the main findings of the analysis are robust and clear. Europe has experienced a U-shaped pattern in permanent childlessness among women born between 1900 and 1972. Among the cohorts born in the early twentieth century, the childlessness rates were high (typically more than 20 %) in all of the countries for which data are available except Slovakia. Childlessness levels then

Women born 1940

Bulgaria	4.5
Czech Republic	5.5
Russia	6.4
Belarus	6.7
Slovenia	7.8
European avg	10.4
Spain	12.6
Belgium	13.1
Finland	14.1
Switzerland	15.5
Ireland	15.6

Lowest childlessness

Highest childlessness

Women born 1968

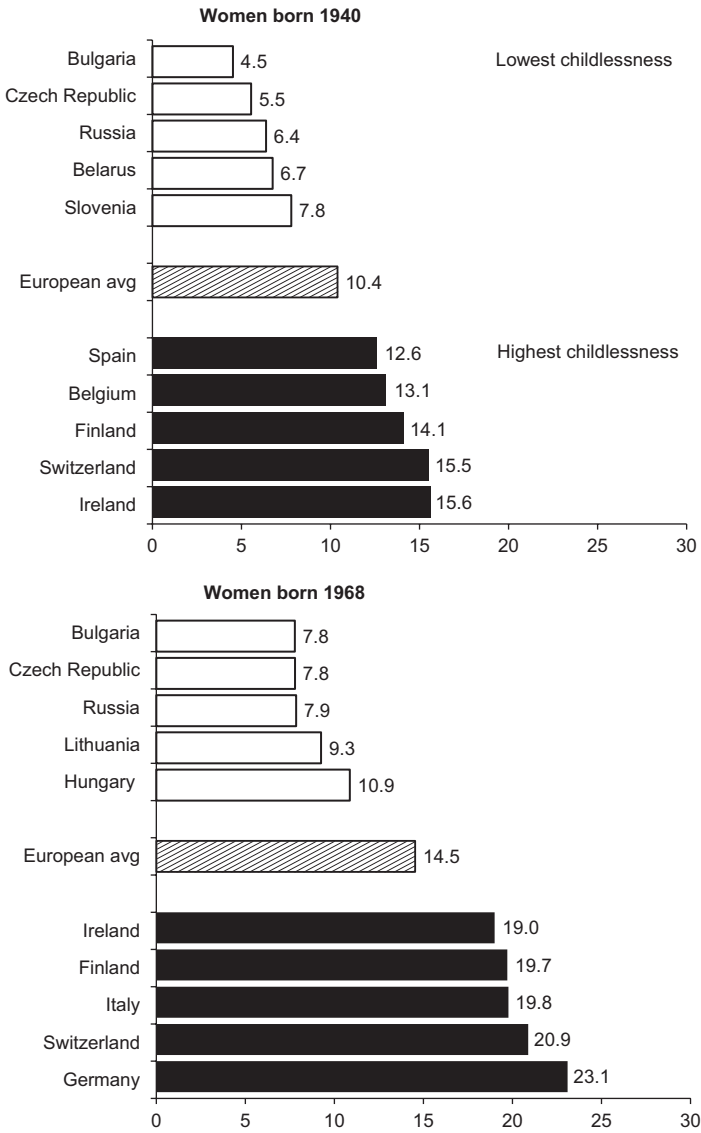|	
Bulgaria	7.8
Czech Republic	7.8
Russia	7.9
Lithuania	9.3
Hungary	10.9
European avg	14.5
Ireland	19.0
Finland	19.7
Italy	19.8
Switzerland	20.9
Germany	23.1

Fig. 2.7 European countries with the highest and the lowest childlessness levels among women born in 1940 and 1968 (Notes and sources: Ranking based on European countries with populations over one million for which data were available for a given year; for the data sources, the countries, and the cohorts included, see also Figs. 2.2, 2.3, and 2.4 and Appendix 1)
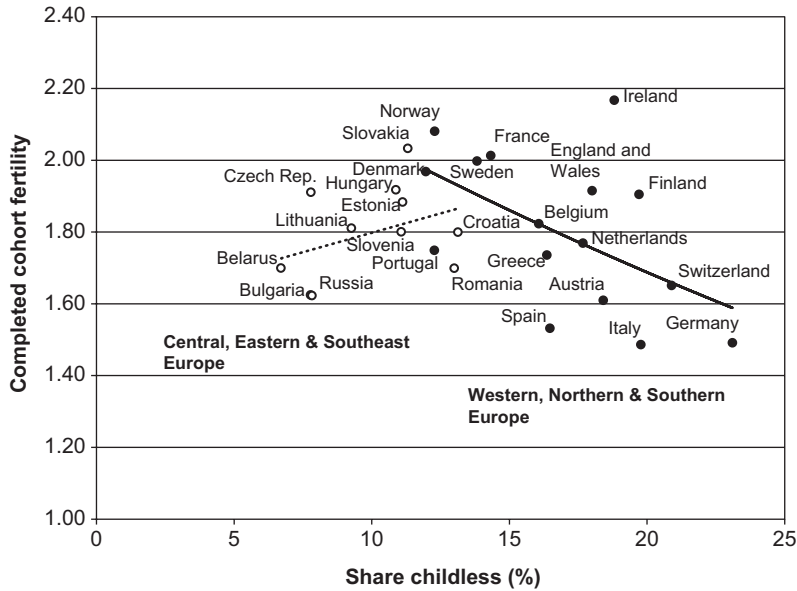
Fig. 2.8 Permanent childlessness and completed cohort fertility rates in Europe, women born in 1968. Notes: The data are for 28 European countries with populations over one million and available data on childlessness. The childlessness data for France are for the 1965–1969 cohorts, the data for Belarus and Greece are for the 1965 cohort, and the data for Romania are for the 1969 cohort (Sources: Childlessness: see Appendix 1; completed fertility: European Demographic Data Sheet 2010 (VID 2010) and own computations)

steadily declined, and were lowest among the 1940s cohorts. Relative to the childlessness levels among both the older and the younger cohorts, the levels among these cohorts were low (Rowland 2007). The timing and the intensity of the subsequent increase in childlessness varied substantially by region. One clear and persistent regional difference was between the former state-socialist countries, where childlessness was rare, and the other regions of Europe, where childlessness was much more common. Although the CEE countries did not have high cohort fertility rates, motherhood was almost universal there, and voluntary childlessness was not normatively approved. However, the data for women born in the late 1960s and the early 1970s, who reached adulthood in the period when the state-socialist political systems in the CEE were collapsing, suggest this long-standing difference is now eroding. Some of the CEE countries, including Croatia, Hungary, and Romania, have experienced rapid increases in childlessness, matched only by the sharp upturns in childlessness in southern Europe. In contrast, the trend towards increasing levels of childlessness appears to be levelling off—and in some cases (e.g., in Switzerland and England and Wales) even reversing—in much of western Europe, the Nordic countries, and the three predominantly German-speaking countries of Europe.

I have not analysed the specific factors that have contributed to the between-country differences in childlessness levels, and to the increase in childlessness among women born in the 1950s and 1960s. Very generally, it appears that the factors that have contributed to declines in cohort fertility have also been driving trends in childlessness. Two broad sets of institutional influences can be highlighted. First, whenever women face difficulties in combining paid employment with parenthood because of limited childcare, inflexible work conditions, long work hours, and unhelpful partners, childlessness is likely to increase. Highly educated women, who have the strongest career prospects, and who thus face the steepest opportunity costs if they have children, are especially likely to remain childless under these conditions. Countries such as Germany and Spain—and to some extent the United Kingdom, where the cost of childcare is very high—fit this pattern. Second, childlessness is also on the rise in countries where labour market conditions are poor: i.e., unemployment is high, a large percentage of the working-age population are in temporary employment, a large share of young adults are neither in education nor working, and the rate of self-employment is high. Under these circumstances, many couples postpone and even forgo parenthood and they often cannot afford the type of housing they would need to start a family. Until recently, these conditions were mainly found in the countries of southern Europe (Adserà 2004). Now, however, these conditions are also prevalent in many ex-socialist countries of central and eastern Europe.

At the same time, however, childlessness trends appear to have a stronger normative underpinning than changes in cohort fertility: in countries where voluntary childlessness is not generally accepted, childlessness is still relatively infrequent, especially among women, who often face strong social pressure to have at least one child. This normative pressure was widespread in CEE countries until recently (see, e.g., Merz and Liefbroer 2012; Sobotka 2016), but it also helps to explain the low childlessness levels observed among some religious and ethnic minorities in countries where childlessness is otherwise relatively common and accepted. The broad acceptance and prevalence of voluntary childlessness is closely linked with low religiosity (e.g., Abma and Martinez 2006; Tanturri and Mencarini 2008; Burkimsher and Zeman, Chap. 6, in this volume). In addition, there is a high degree of historical and cultural continuity in childlessness levels over time (Morgan 1991), which suggests that countries where childlessness was widespread in the past are also likely to have high childlessness rates in the future, as younger women and men are socialised in conditions in which childlessness is common and generally accepted.

Will childlessness rates continue to increase; and, if so, by how much? It is important to note that recent childlessness levels are still well below the historical highs in most of the analysed countries, and that current childlessness levels are not as high as might be anticipated, considering the range of interconnected factors outlined in the introduction that may be expected to encourage women and men to remain childless. Among the women born in the 1970s and the early 1980s, childlessness is likely to increase especially in southern and central-eastern Europe, whereas it may stabilise in other regions. Childlessness levels are likely to be highest in the southern European countries, especially in Italy and in Spain; and possibly

in Greece, for which reliable recent data are unavailable. In these countries childlessness levels are over 20 % among the early 1970s cohorts, and may eventually reach 25 % if the increase in childbearing intensity at higher reproductive ages slows down or stops. Outside of Europe these high childlessness levels may be exceeded in some East Asian societies, especially in Japan, for which Frejka et al. (2010) have estimated that childlessness levels are close to 30 % in the late 1960s cohorts.

Future research should examine more rigorously the reliability of different data sources on childlessness, and the main sources of errors and distortions in these datasets. An important source of uncertainty about future childlessness lies in the interplay between fertility postponement and the ability of couples and individuals to realise their childbearing plans later in life. The mean age at first birth among women has exceeded 30 in Italy, Spain, and Switzerland; and is approaching this boundary in many other European countries. The share of women who are still childless at ages 35–40, when infertility becomes an important limiting factor (Menken et al. 1986), has risen rapidly in much of Europe. For instance, in Spain 35 % of women aged 35 were childless in 2011, up from 16 % in 1991 (computations are based on census data). Many of them are likely to experience infertility by the time they decide to start a family, and thus may need to use assisted reproduction, which is costly and rather ineffective at higher reproductive ages (e.g., Wang et al. 2008; see also Trappe as well as Präg and Mills, Chap. 14, in this volume). This trend is likely to contribute to an increase in involuntary childlessness. This pattern of "perpetual postponement" may also be associated with stronger fluctuations in childlessness levels in the future. Compared to past generations of women, most of whom had their first child at a relatively young age, and thus could postpone parenthood decision in difficult times, the current cohorts of women will have less "extra space" left for postponing motherhood if they encounter adverse circumstances. When times are tough, many women might be running a race against the biological clock that they are likely to lose.

Appendices

Appendix 1

Data sources by country

Country	Cohorts	Data	Reference period	Source	Note
Austria	1900–1940	C 1991	15 May 1991	CFE (2015)	Parity on 1 Jan. 2014 computed by Kryštof Zeman for Geburtenbarometer (2014); First births realised after 2013 projected (trend projection)
	1941–1964	C 2001	15 May 2001	CFE (2015)	
	1965–1972	& VS 2001–2013	up to 31 Dec. 2013	See note	
Belarus	1929–1957	C 1999	16 Feb. 1999	HFD (2015b)	Data available for 5-year cohorts only
	1959–1963, 1964–1968	C 2009	October 2009	HFD (2015b)	
Belgium	1910–1950	C 2001	31 Dec. 2000	See note	Computations by Karel Neels from individual data obtained by Statistics Belgium
	1951–1968	C 2001	31 Dec. 2000	See note	Computations by Karel Neels from individual data obtained by Statistics Belgium
		& VS 2001–1910	up to 31 Dec. 2010	Eurostat (2015)	Own computations; First births realised after 2013 projected (trend projection)
Bulgaria	1920–1972	C 2001	1 Mar. 2001	HFD (2015b)	No unknown birth order reported
		& VS for 2001–2013	Up to 31 Dec. 2013	Eurostat (2015)	

Country	Cohorts	Data	Reference period	Source	Note
Croatia	1922–1945	C 2001	31 Mar. 2001	CFE (2015)	Unknown birth order proportionally redistributed
	1946–1970	C 2011	22 Mar. 2011	CFE (2015)	Unknown birth order proportionally redistributed
Czech Republic	1900–1919	C 1961	1 Mar. 1961	HFD (2015b)	
	1920–1960	C 2001	3 Mar. 1991	HFD (2015b)	
	1961–1972	VS up to 2013	up to 31 Dec. 2013	HFD (2015b) & Eurostat (2015) for 2012, 2013	Own computations based on HFD + Eurostat data; First births realised after 2013 projected (trend projection)
Denmark	1945–1949	R 2013		Statistics Denmark (2014)	
	1950–1972	VS 1968–2013	Up to 31 Dec. 2012	Eurostat (2015) and older Eurostat data	Own computations
Estonia	1918–1936	C 1979	17 Jan. 1979	HFD (2015b)	
	1937–1943	C 1989	12 Jan. 1989	HFD (2015b)	
	1944–1970	C 2011	31 Dec. 2011	HFD (2015b)	Women with unknown birth order assumed to be childless
Finland	1930–1934	R 1986	Up to 31 Dec. 1986	HFD (2015b)	
	1935–1949	R 1999	Up to 31 Dec. 1999	HFD (2015b)	
	1950–1968	R 2009	Up to 31 Dec. 2009	HFD (2015b)	

	Cohorts	Source	Date	Reference	Note
France	1900,1905,10,15,20	INSEE surveys		Daguet (2000, T. 1)	
	1920–1924 to 1965–1969	Surveys 1982, 1990, 1999, 2011		See note	Data computed for 5-year cohorts by Éva Beaujouan from survey data obtained by INED and INSEE; Results based on combining several available surveys
Germany	1933–1968	Microcensus (MC) 2008,12		CFE (2015)	For most cohorts data computed by combining results from both MC surveys to obtain more robust results
Germany/	1902–1940	C 1981		HFD (2015b)	
Eastern Germany	1941–1958	Microcensus (MC) 2008		Statistisches Bundesamt (2015)	Data computed by Martin Bujard
	1959–1970	Microcensus (MC) 2012		Statistisches Bundesamt (2015)	Data computed by Martin Bujard
Germany/	1901–1905 to 1926–1930	Census 1970		Schwarz (2003: Table 8)	Data computed for 5-year cohorts
Western Germany	1933–1969	Microcensus (MC) 2008,12		CFE (2015)	For most cohorts data computed by combining results from both MC surveys to obtain more robust results
Greece	1946–1965	VS 1960–2008	up to 31 Dec. 2008	HFC (2015)	Computations by Kryštof Zeman
Hungary	1900–1919	C 1970	1 Jan. 1970	IPUMS/CFE (2015)	5 % sample of the census data available
	1920–1929	C 1970 + 90	1 Jan. 1990	IPUMS/CFE (2015)	5 % sample of the census data, average of two censuses used
	1930–1949	C 1990 + 2000	2 Feb. 2000	IPUMS/CFE (2015)	5 % sample of the census data, average of two censuses used
	1950–1968	R 2010	up to 1 Jan. 2010	HFD (2015)	
Ireland	1925–1948	C 2006	23 Apr. 2006	CFE (2015)	Unknown birth order proportionally redistributed
	1949–1969	C 2011	10 Apr. 2011	CFE (2015)	Unknown birth order proportionally redistributed

(continued)

Country	Cohorts	Data	Reference period	Source	Note
Italy	1935–1972	VS 1950–2013	up to 31 Dec. 2013	data provided by ISTAT for HFD	First births realised after 2013 projected (trend projection)
Lithuania	1924–1936	C 1979	17 Jan. 1979	HFD (2015b)	Unknown birth order proportionally redistributed
	1937–1969	C 2011	1 Mar. 2011	HFD (2015b)	Unknown birth order proportionally redistributed
Moldova	1938–1947	C 1989	12 Jan. 1989	Statistics Moldova	Tabulated data obtained from Statistics Moldova
	1949–1953 to 1959–1963	C 2004	October 2004	Statistics Moldova (2006)	Data available for 5-year cohorts only
Netherlands	1900–2004 to 1930–1934			Rowland (2007, T. 1)	Data computed for 5-year cohorts, assembled by Pearl Dykstra
	1935–1969	R 2013	Up to 31 Dec. 2012	CBS (2015)	Data for cohorts 1965–69 up to age 43, small adjustment (−0.15 %) added
Norway	1935–1939	R 1985	Up to 1 Jan. 1985	HFD (2015b)	
	1940–1944	R 1990	Up to 1 Jan. 1990	HFD (2015b)	
	1945–1949	R 1995	Up to 1 Jan. 1995	HFD (2015b)	
	1950–1954	R 2000	Up to 1 Jan. 2000	HFD (2015b)	
	1955–1959	R 2005	Up to 1 Jan. 2005	HFD (2015b)	
	1960–1970	R 2012	Up to 1 Jan. 2012	HFD (2015b)	

		C + VS	1 Jan. 1990	Boleslawski (1993)	
Poland	1921–1927				
	1927–1960	C/S 2002	June 2002	CFE (2015)/Brzozowska (2014)	Census survey (1.7 % of female pop.); results smoothed (3-years moving avg.)
	1961–1965	& VS 2002–2013	Up to 31 Dec. 2013	Eurostat (2015)	Figures for cohorts 1966–72 were implausibly low and are not shown
Portugal	1900–1929	C 1981	16 Mar. 1981	HFD (2015b)	
	1930–1948	C 1991	15 Apr. 1991	HFD (2015b)	
	1949–1968	& VS 1991–2013	Up to 31 Dec. 2013	Eurostat (2015)	
Romania	1900–1918	C 1977		IPUMS/CFE (2015)	10 % sample of the census data available
	1919–1920	C 1992		IPUMS/CFE (2015)	10 % sample of the census data available
	1921–1972	C 2002	17 Mar. 2002	INSSE (2003)	No unknown birth order reported
		& VS for 2002–2013		Eurostat (2015)	
Russian Federation	1924–1936	C 1979	17 Jan. 1979	HFD (2015b)	
	1937–1970	C 2010	October 2010	Data provided for CFE (2015)	Unknown birth order proportionally redistributed
Slovak Republic	1900–1914	C 1961	1 Mar. 1961	HFD (2015b)	Unknown birth order proportionally redistributed
	1915–1929	C 1991	3 Mar. 1991	HFD (2015b)	Unknown birth order proportionally redistributed
	1930–1972	C 2001	1 Mar. 2001	HFD (2015b)	Women with unknown birth order assumed to be childless
		& VS for 2001–2013	31 Dec. 2013	Eurostat (2015)	Own computations
Slovenia	1901–195 to 1916–1920	C 1971	31 Mar. 1971	HFD (2015b)	Data available for 5-year cohorts only
	1921–1927	C 1971	31 Mar. 1971	HFD (2015b)	
	1928–1972	C 2002	31 Mar. 2002	HFD (2015b)	
		& VS for 2002–2013	31 Dec. 2013	Eurostat (2015)	Own computations

(continued)

Country	Cohorts	Data	Reference period	Source	Note
Spain	1911–1930	C1991	1 Mar. 1991	CFE (2015)	
	1931–1964	C 2011	3 Nov. 2011	CFE (2015)	
	1965–1972	VS up to 2013	Up to 31 Dec. 2013	& VS 2011–13	Own computations based on Eurostat data; first births realised after 2013 projected (stable rates projection)
Sweden	1914–1923	R 1969	Up to 31 Dec. 1969	HFD (2015b)	
	1924–1933	R 1979	Up to 31 Dec. 1979	HFD (2015b)	
	1934–1943	R 1989	Up to 31 Dec. 1989	HFD (2015b)	
	1944–1953	R 1999	Up to 31 Dec. 1999	HFD (2015b)	
	1954–1970	R 2011	Up to 31 Dec. 2011	HFD (2015b)	
Switzerland	1920–1949	Census 2000	5 Dec. 2000	CFE (2015)	Data provided by Marion Burkimsher
	1950–1972	& VS 2001–2012	Up to 31 Dec. 2012	HFD (2015b) and Eurostat (2015)	Own computations; HFD data used for 2000–2011
UK/England and Wales	1920–1970	R + S	up to 2013	ONS (2014)	
Ukraine	1924–1937	C 1979	17 Jan. 1979	HFD (2015b)	
	1937–1941 to 1957–1961	C 2001	5 Dec. 2001	HFD (2015b)	Data available for 5-year cohorts only; Unknown birth order proportionally redistributed

Note: Types of data sources: *VS* vital statistics, *C* census, *R* population register, *S* survey

Appendix 2

Childlessness among women, selected cohorts (1900–1972), by country and region

Country	Cohort										
	1900	1910	1920	1930	1940	1950	1960	1965	1968	1970	1972
Western Europe											
Belgium	–	25.0	19.8	16.1	13.1	14.1	15.5	16.0	16.1	–	–
France	24.9	21.7	19.2	13.2 (1930–1934)	11.3 (1940–1944)	11.7 (1950–1954)	13.2 (1960–1964)	–	14.3 (1965–1969)	–	–
Ireland	–	–	–	21.1	15.6	14.7	17.1	18.0	18.8	–	–
Netherlands	23 (1900–1904)	20 (1910–1914)	15 (1920–1924)	12 (1930–1934)	11.9	14.6	17.3	18.1	17.7	–	–
England and Wales	–	–	21.0	13.0	11.0	14.0	19.0	20.0	18.0	18.0	–
Nordic countries											
Denmark	–	–	–	–	–	10.7	11.6	11.5	12.0	11.9	11.9
Finland	–	26.2 (1906–1910)	20.2 (1916–1920)	16.5	14.1	14.9	17.3	19.1	19.7	–	–
Norway	–	–	–	–	9.5	9.4	11.7	12.8	12.3	13.2	–
Sweden	–	23.8 (1914)	18.7	14.2	12.1	12.6	15.0	14.1	13.8	14.1	–
Austria, Germany, Switzerland											
Austria	29,1	22.4	17.4	15.0	12.5	12.6	16.3	17.2	18.4	18.5	19.0
Germany	–	–	–	–	11.5	13.5	18.4	21.8	23.1	–	–
Western Germany (FRG)		22 (1906–1910)	18 (1916–1920)	14 (1926–1930)	11.8	14.6	20.6	23.3	23.6 (1966–1970)	–	–

(continued)

Country	Cohort										
	1900	1910	1920	1930	1940	1950	1960	1965	1968	1970	1972
Eastern Germany (GDR)	25.9 (1902)	18.3	17.4	12.8	9.2	9.9	10.5	15.9	16.1	17.7	–
Switzerland	–	–	20.0	16.4	15.5	19.1	20.7	21.9	20.9	20.2	19.1
Southern Europe											
Greece	–	–	–	–	–	9.8	10.8	16.4	–	–	–
Italy	–	–	–	–	12.3	11.2	14.2	18.4	19.8	20.6	20.9
Portugal	27.2	26.1	21.8	17.2	11.8	9.8	11.2	12.9	12.3	11.8	–
Spain	–	26.7 (1911)	23.6	17.2	12.6	12.1	12.3	14.5	16.5	18.6	20.7
Central Europe											
Croatia	21.4	–	–	11.5	8.9	8.5	9.5	11.5	13.1	14.9	–
Czech Republic	21.4 (1901–1905)	16.8	10.7	7.2	5.5	5.5	6.2	6.6	7.8	7.7	9.4
Hungary	20.3	20.1	14.6	10.7	9.5	7.7	8.1	9.3	10.9	–	–
Poland	–	–	12.9 (1921)	11.2	9.2	8.1	6.7	8.0	–	–	–
Slovak Republic	16.6	14.0	10.9	9.3	8.0	9.7	10.2	11.0	11.3	11.8	12.3
Slovenia	23.1 (1901–1905)	22.1 (1906–1910)	18.2 (1921)	10.8	7.8	6.8	7.2	8.7	11.1	12.6	13.6
Estonia	–	–	18.7	13.8	10.5	8.8	9.0	10.6	11.1	11.5	–
Lithuania	–	–	–	13.1	8.0	8.0	8.8	8.9	9.3	–	–

Eastern & South-eastern Europe

Bulgaria	–		8.9	6.7	4.5	4.7	6.5	7.9	7.8	9.3	9.9
Romania	24.0	21.5	20.2	16.0	12.5	10.0	10.7	12.1	–	13.9	15.2
Belarus	–	–		10.9	6.7	6.2	5.8 (1959–1963)	6.7 (1964–1968)	–	–	–
Moldova	–	–		–	11.3	6.3 (1949–1953)	5.5 (1959–1963)	–	–	–	–
Russia	–	–		9.9	6.4	6.3	6.2	7.0	7.9	9.3	–
Ukraine	–	–		11.6	8.2 (1939)	7.4 (1947–1952)	7.4 (1957–1961)	–	–	–	–
Europe – average	23.3	20.7	17.5	13.1	10.5	10.6	12.4	14.1	14.8	14.3	15.2

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