HUMAN FERTILITY DATABASE DOCUMENTATION:
Chile

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WARNING: Female population exposures are based on HMD inter-censal and post-censal estimates, which differ from official population estimates. The current series will not be updated until the results of the 2024 census are published.

1 General information

This report documents data for Chile collected for the Human Fertility Database (HFD) project; namely, age- and birth order-specific data on live births, total live births by calendar month, and data on women by age and the number of live-born children. These data for Chile are based on the individual birth records, tabulations, and census records kindly provided for the HFD by *Ministerio de Salud* (MINSAL) and *Instituto Nacional de Estadísticas* (INE).

Time series of live births by single-year age groups of the mother and birth order covers the years 1990–2020. Since data on the age structure of the female population, which are taken from the Human Mortality Database (HMD; www.mortality.org), are currently available for the period 1992–2020, the current HFD data release for Chile provides fertility indicators limited to this period as well. However, the birth count data for 1990–1991 are accessible in the input file CHLbirths.txt (see section “Input Data” on the HFD country page of Chile). Data on female population by age and parity are available from the population censuses of 1992, 2002 and 2017.

According to the results of the 2017 census, the population of Chile amounted to 17.6 million, up from 13.3 million in the 1992 census. More details on the history of population statistics in Chile can be found in the country documentation of the Human Mortality Database (Canudas-Romo et al., 2022).

All the input data used for generating the HFD output data and indicators are specified in Appendix 1.

1.1 Territorial coverage

On February 12, 1818, Chile was proclaimed an independent republic. A long and narrow coastal Southern Cone country on the west side of the Andes Mountains, Chile stretches over 4,300 km north to south, but only 350 km at its widest point east to west. Chile has common borders with Peru, Bolivia, and Argentina. There were no territorial changes during the whole period under consideration.

Birth data refer to the resident population of Chile, irrespective of citizenship, and do not include births registered abroad.

1.2 Data collection and availability

Official data on vital statistics (births, deaths, and foetal deaths) are collected by *Ministerio de Salud*, and once a year transmitted to *Instituto Nacional de Estadísticas*, which is responsible for validating, statistic processing and dissemination of the vital statistics in the annual report of the *Estadísticas Vitales* (e.g. INE, 2021).

Births in the country must be registered within the Office of Civil Registry. While there is no specific deadline for registration, personal needs and legal requirements (especially for accessing the benefits of maternal health programs and children's admission to formal education) ensure that the majority of children are registered within one year after birth (see Section 4.4 for more details).

The statistical office also conducts regular population censuses. Three censuses that took place in 1992, 2002 and 2017 are relevant for the HFD, as they included a question on the number of children ever born to each woman aged 15+. The census held in 2012 was seriously flawed, and the results were officially cancelled (Canudas-Romo et al., 2022).

2 Birth count data

The birth count data used for the HFD calculations cover the period of 1992–2020. These are data on live births by age of the mother in completed years, distinguishing birth orders up to 8+. The data were tabulated from individual birth records for 1992–2011 and assembled from tabulations provided by the INE for 2012–2020.

For 1952–1989, data on births, tabulated by 5-year age groups and birth order, are available from historical demographic yearbooks. Quality of these data is limited, especially because of the large proportion of late registration births (up to 15%), which are not covered in the yearbooks. Due to their lower quality and the lack of reliable population exposure data, the data for the period 1952–1989 are not included in the HFD. Age-specific fertility rates based on these data are, however, published in the Human Fertility Collection (HFC), accessible at www.fertilitydata.org.

Totals of live births for the present-day territory of Chile are generally available since 1848. Live births by month of birth are available since 1947 (with a gap for 1967).

3 Population count data

In the HMD, data on the annual age structure of women for Chile, based on the 1992, 2002, and 2017 population censuses, are available starting in 1992. According to the HMD country documentation (Canudas-Romo et al., 2022), the main reasons for restricting the HMD population and mortality series to the period since 1992 are as follows:

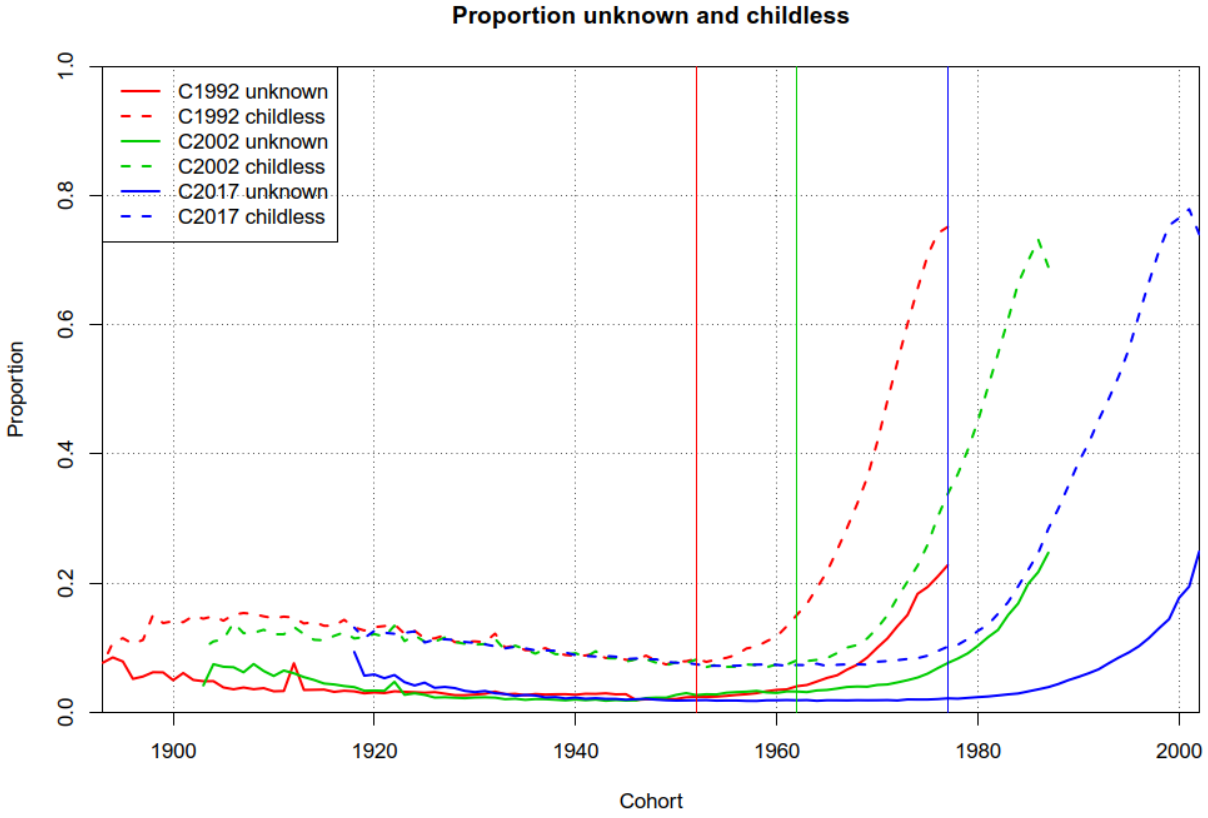
1) only the three most recent censuses of 1992, 2002, and 2017 show a low proportion of incorrect reporting of age (below 3%); the census counts prior to 1992 showed considerable age heaping at ages 30, 40,…, and up to 80. In the 1992 census, age heaping was considerably reduced;
2) it is only in the last decade of the twentieth century that the proportion of births that were registered late fell to the level of 5.4% or lower (see Section 4.4 and Table 1 for more details);
3) finally, during this period, at least 90% of deaths were certified by a physician.

It is notable that the official population estimates are by up to 5% higher than the estimates from the HMD (Canudas-Romo et al., 2022). This results in differences between the official fertility indicators and those calculated in the HFD (see Section 4.5).

The distribution of women by age and the number of live-born children is available from the census data in 1992 (22.4.), 2002 (24.4.), and 2017 (19.4.), which were incorporated in the HFD. Women aged 15 and over were requested to report the number of all live-born children they had ever had.[1] The data included in the HFD are tabulated by age of woman and number of live-born children they ever had, up to birth order 10+.

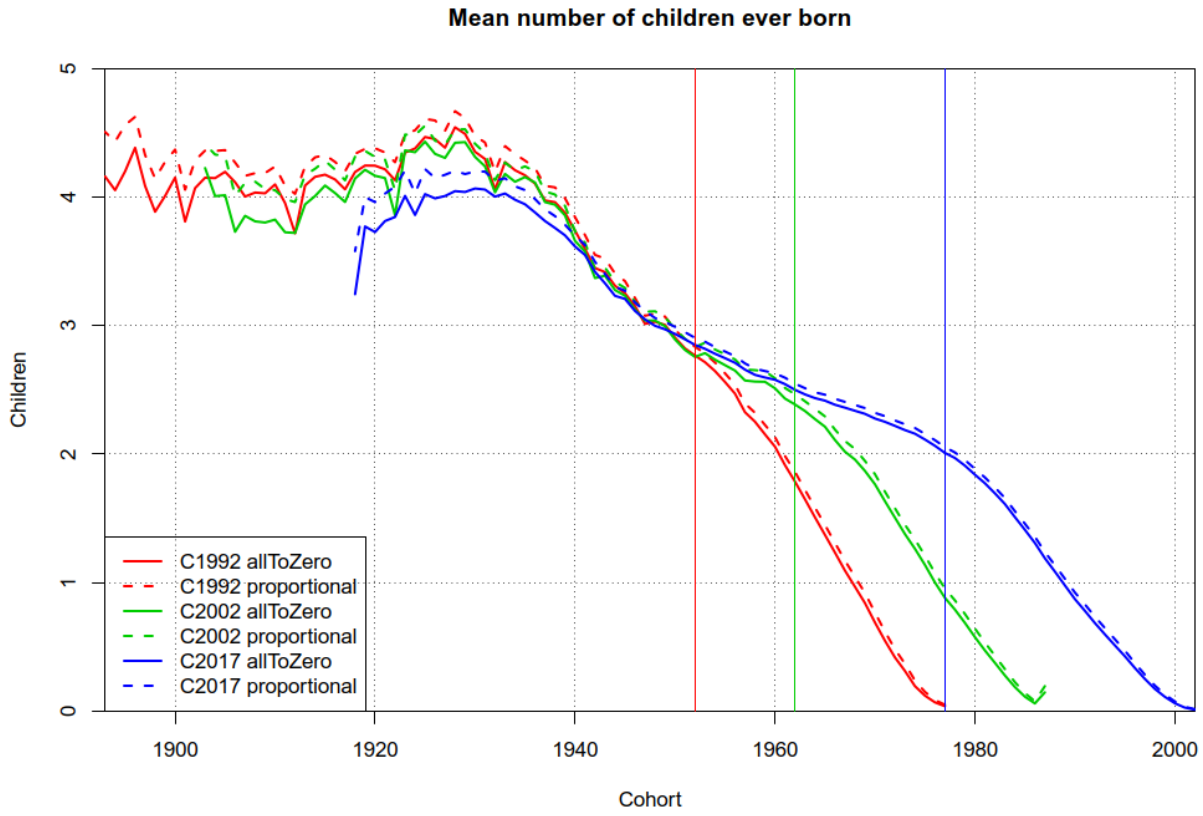
Figure 1 shows the proportion of women with an unknown number of children ever born in the censuses of 1992, 2002, and 2017. The proportion reaches over 10% among women aged 15–22 years, but declines to under 5% after age 30. A more in-depth analysis of the data and comparison of the data from the censuses with vital statistics, as well as experience from other countries (El-Badry, 1961 for France, USA, Egypt and Philippines; Potančoková and Šprocha, 2018 for Slovakia; Zeman, 2023 for the Czech Republic) suggest that the majority of women who did not respond to the question about the number of children were childless. Therefore, all women with unknown parity were classified as childless. The sensitivity analysis revealed that redistributing women with unknown parity proportionally across the known parities would not significantly affect the resulting estimates of parity distributions and cohort fertility levels (see Figure 2).

Figure 1: Proportion of women with unknown number of children ever born and childless women; 1992, 2002, and 2017 censuses



[1] The following question was asked: “How many live-born children have you given birth to?”

Figure 2: Mean number of children ever born, computed using two different methods of redistribution of unknown cases (all to zero parity vs. proportional redistribution); 1992, 2002, and 2017 censuses



4 Specific details

4.1 Definitions of live birth

Since 1992, the standard WHO definition of live birth has been used. It is formulated as follows: live birth refers to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of the pregnancy, which, after such separation, breathes or shows any other evidence of life.

4.2 Age

Files on individual birth records from 1990–2011 were used to tabulate live births by Lexis squares (age of the mother in completed years). Births for 2012–2020 are also tabulated by age of the mother in completed years. There was no information on birth cohort of the mother available in the original data sources.

4.3 Birth order

The birth order is defined as the total number of live births a woman has previously given plus the actual one, without counting stillbirths. In case of multiple deliveries, each child born is assigned a separate birth order.

4.4 Late registration births and unknown cases

Two different total numbers of births are published in Chile for any given year: reported births (*nacimientos ocurridos/observados*) and corrected number of births (*nacimientos corregidos*). *Nacimientos ocurridos/observados* are births born in a given year (*año de nacimiento*) and registered until March of the next year. *Nacimientos corregidos* estimate the true number of births that took place in a given year by combining the number of births reported in the aforementioned period and the number of births that are expected to be registered during the subsequent 7 years (*año de inscripción*) (i.e., an expected number of late registration births), estimated using the methodology of the INE (1988, 2021).

Table 1: Numbers of reported and corrected births, 1990–2020

Year	Reported	Corrected	Late registration
1990	292,146	309,220	5.8%
1991	284,483	300,740	5.7%
1992	279,098	294,218	5.4%
1993	275,916	289,419	4.9%
1994	273,766	285,228	4.2%
1995	265,932	275,760	3.7%
1996	264,793	272,163	2.8%
1997	259,959	265,493	2.1%
1998	257,105	261,802	1.8%
1999	250,674	254,096	1.4%
2000	248,893	252,155	1.3%
2001	246,116	248,651	1.0%
2002	238,981	241,027	0.9%
2003	234,486	236,223	0.7%
2004	230,352	232,588	1.0%
2005	230,831	232,092	0.5%
2006	231,383	233,104	0.7%
2007	240,569	242,054	0.6%
2008	246,581	248,366	0.7%
2009	252,240	253,574	0.5%
2010	250,643	251,199	0.2%
2011	247,358	248,879	0.6%
2012	243,635	243,858	0.1%
2013	242,005	242,862	0.4%
2014	250,997	252,194	0.5%
2015	244,670	245,406	0.3%
2016	231,749	232,616	0.4%
2017	219,186	219,494	0.1%
2018	221,731	222,088	0.2%
2019	210,188	210,413	0.1%
2020	194,978	195,231	0.1%

Source: Table1.2.2-01 in INE, 2021.

Late registration births, which constitute the difference between the reported and the corrected number of births, are included in the HFD as births of unknown age of the mother and birth order. This number of late registration births dropped from 17,075 (5.8%) in 1990 to (estimated) 253 (0.1%) in 2020 (Table 1). Most of the late-registration births are registered in the year following the year of birth. For instance, 98.8% of births registered in 2020 were actually born in 2020, while 1.0% of them were born in 2019 and only 0.2% in 2018 and earlier years (Table 1.2.2.1-02 in INE, 2021). In addition, a small number of live births (less than 100 births yearly) are recorded as births of unknown birth order. Births with unknown age and/or birth order were redistributed according to the standard HFD methodology.

Data on birth counts by age of the mother were adjusted to include late registration births, while data on monthly birth counts do not include late registered births. Therefore, the respective sums of births differ. For unknown reasons, there are small differences between the sum of monthly births and the given total in 1948, 1958, and 1974. The given total is higher by 30 births in 1948, by 2,000 births in 1958, and by 270 births in 1974. Finally, monthly births for 1967 are not available.

4.5 Summary fertility indicators – differences from the official estimates

The crude birth rates (CBR) in the HFD are by 0.5–0.9 higher than the official CBRs for the whole period 1992–2020. The total fertility rates (TFR) in the HFD are very similar (±0.05) to the official TFRs for 1992–2011. However, for 2012–2020, the differences became larger: the HFD indicators are by 0.08–0.16 higher than the official TFRs. For example, while the official TFR for Chile in 2019 is 1.44, the respective HFD value is 1.57. We believe the HFD provide more accurate estimates of fertility rates in the country. The differences from the official statistics are mainly due to the following two factors:

- The census-based population (used in the HMD and the HFD, based on the 1992, 2002 and 2017 censuses), is by up to 5% lower than the official population estimates produced by the INE: “the discrepancies between the (adjusted) population estimates and census counts in 2002 suggest a notable undercount at young ages. By 2017, there appears to be a consistent undercount at most ages below 70. … Altogether, these results suggest that the quality of the census may have improved over time. The problems at working ages may reflect the inability of the statistical system to accurately reflect processes related to internal and international migration.” (Canudas-Romo et al., 2022, p. 7, see also Figures 1–4 there).

- The HFD uses the corrected numbers of births and incorporates late-registration births, whereas the official fertility estimates are based on the reported numbers of births.

4.6 Revision history

Changes with the February 2025 revision:

Births data for 2006–2020 were added. Data on age-parity distribution of women from the 2017 census were added.

Due to changes in population exposures, there are considerable changes in fertility indicators, especially for 2002–2005. The most significant change was recorded for 2005, where the TFR changed from 1.838 to 1.883.

Data on births for 1992–2005 were revised using updated numbers of “corrected” births, as published in INE (2021). The differences are not big (162 births in 2000, 129 births in 2005, and less than 30 births in other years).

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APPENDIX 1
INPUT DATA USED FOR HFD CALCULATIONS

BIRTHS

Period	Type of data	Age range	Birth order	RefCode(s)
1990–2011	Annual number of live births by age of mother and birth order (Lexis squares)	12, …, 55, unknown	1–8+, unknown	1
2012–2020	Annual number of live births by age of mother and birth order (Lexis squares)	12, …, 55, unknown	1–8+, unknown	8
1947–2020	Annual number of live births by month	–	–	4, 5, 6,1, 7

FEMALE POPULATION: Distribution by age and parity

Period	Type of data	Age range	Year of birth, range	Parity	RefCode	Notes
22.04.1992	Women by age, year of birth and parity	15, …, 99+	–	0, 1, …, 10+, unknown	2	unknown parity redistributed to parity zero
24.04.2002	Women by age, year of birth and parity	15, …, 99+	–	0, 1, …, 10+, unknown	3	unknown parity redistributed to parity zero
19.04.2017	Women by age, year of birth and parity	15, …, 99+	–	0, 1, …, 10+, unknown	9	unknown parity redistributed to parity zero

FEMALE POPULATION: Exposure by age and year of birth

Female exposure population by calendar year, age, and year of birth (Lexis triangles) is estimated using data on population size and deaths from the Human Mortality Database, which is available at https://www.mortality.org or https://www.humanmortality.de