

HUMAN FERTILITY DATABASE DOCUMENTATION:

Chile

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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 and individual 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 mother and birth order, extracted from the database of individual birth records, cover the years 1990–2011. Since data on the age structure of the female population, which are taken from the Human Mortality Database (HMD; www.mortality.org), are presently available for the period 1992–2005, the current HFD data release for Chile provides fertility indicators calculated only for this period as well. However, those birth count data that were not used in the calculations (for 1990–1991 and 2006–2011) have been made accessible in the input file CHLbirths.txt (see section “Input Data” on the HFD website). Data on female population by age and parity are available from the population censuses of 1992 and 2002.

According to preliminary results of the 2012 census, the population of Chile amounted to 16.6 million, up from 13.3 million in the 1992 census. Only 2% of the enumerated population was of foreign nationality. The three major groups of foreign residents are citizens of the neighboring countries: Peru, Argentina and Bolivia.

More details on the history of population statistics in Chile are provided in the country documentation for the Human Mortality Database (Canudas-Romo, 2008).

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.

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

There were no territorial changes during the whole period under consideration.

1.2 Data collection and availability

Official data on vital statistics (births, deaths, and fetal deaths) are collected by *Ministerio de Salud*, and once a year passed on 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*.

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 seven years after birth. Late registered births (in following seven years) are subsequently added to the total number of births recorded for the year of their occurrence (see Section 4.4 for more details).

The statistical office also conducts regular population censuses. Three censuses that took place in 1992, 2002 and 2012 are relevant for the HFD, as they included a question on the number of children ever born to each woman aged 15+. However, the results of the most recent population census conducted in 2012 are not yet officially available.

2 Birth count data

Birth count data at present included in the HFD cover the period of 1992–2005 (the input data cover the years 1990–2011, but the exposure population from the HMD is available just for 1992–2005). These data on live births by age in completed years, distinguishing birth orders up to 10+, were tabulated from individual birth records provided by INE.

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 the lower quality of the data and the low detail of age structure, as well as to a lack of population exposure data in sufficient quality, 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 are generally available since 1848. Live births by month of birth are available since 1947.

3 Population count data

In the HMD, data on the annual age structure of women for Chile, based on the 1992 and 2002 population censuses, are available starting in 1992. According to the HMD country documentation for Chile (Canudas-Romo, 2008), the main reasons for restricting the HMD population series to the period since 1992 are as follows:

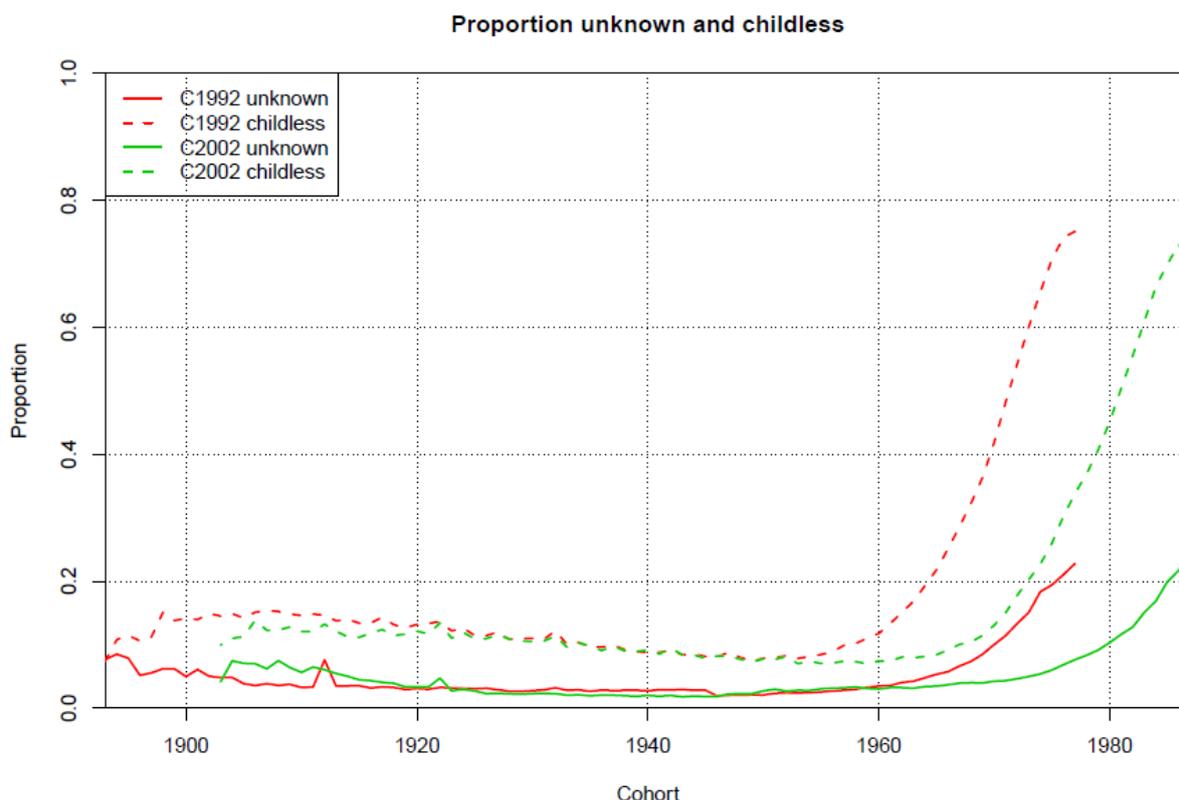
- 1) only the two most recent censuses of 1992 and 2002 show a low proportion of incorrect reporting of age (below 3%); the census counts prior to 1992 showed considerable age heaping at ages 30, 40, ..., and up to 80. By the 1992 census, age heaping was greatly attenuated;

- 2) it is only in the last decade of the 20th century that the percentage of delayed birth registration fell to the level of 5.4% or lower;
- 3) finally, during this period, at least 90% of deaths were certified by a physician.

The distribution of women by age and the number of live-born children is available from the census data in 1992 (April 22), and 2002 (April 24) 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+.

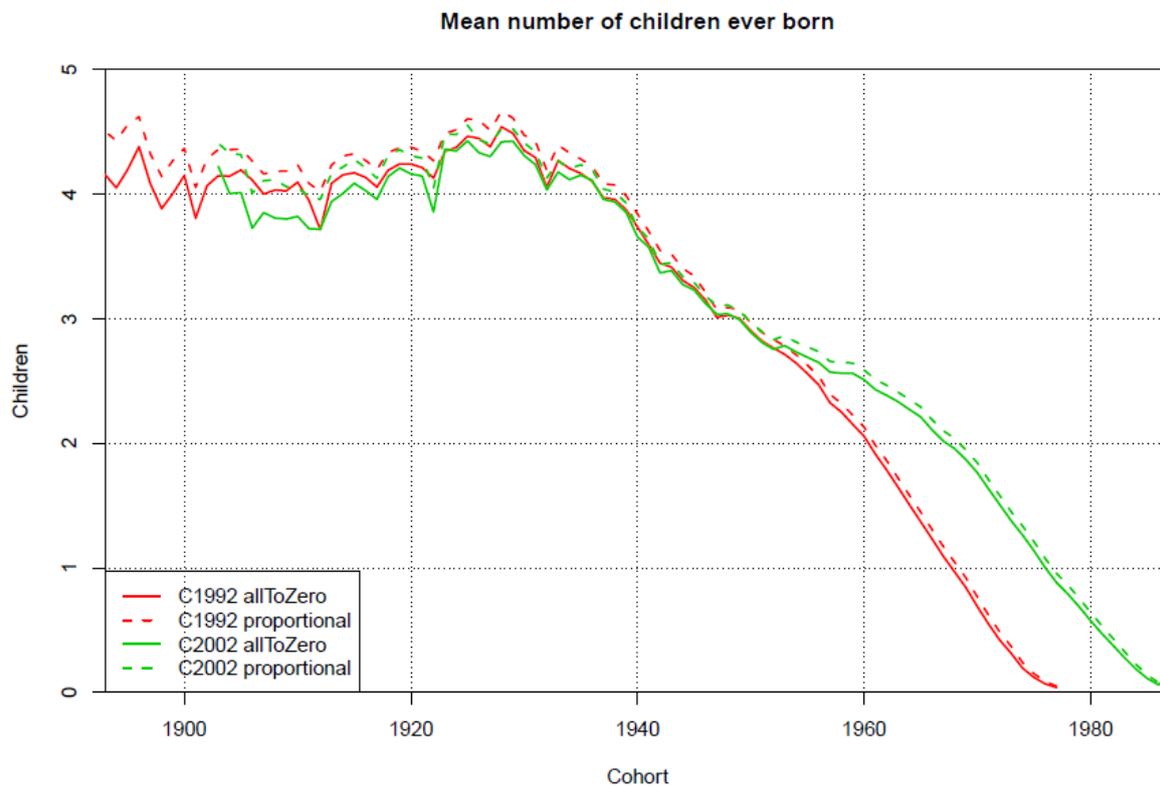
Figure 1 below shows the proportion of women with an unknown number of children ever born in the censuses of 1992 and 2002. The proportion reaches over 15 percent among teenage women, but declines under 5 percent after age 28. A more in-depth analysis of the data and comparison of the data from the 1992 and 2002 censuses with vital statistics, as well as experience from other countries (El-Badry, 1961 for France, USA, Egypt and Philippines; Potančoková, 2011 for Slovakia; Zeman, 2013 for the Czech Republic) suggest that the majority of women who did not respond to the question about children are in fact childless women. Therefore, all unknown cases were redistributed to zero parity. Standard HFD methodology is to redistribute unknown cases proportionally, and only in few countries the country-specific approach is used (so far the “all to zero parity” redistribution was used for censuses in the Czech Republic and in Slovakia). However, sensitivity analysis revealed that redistributing unknown cases proportionally would not lead to significantly different results (see Figure 2).

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



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

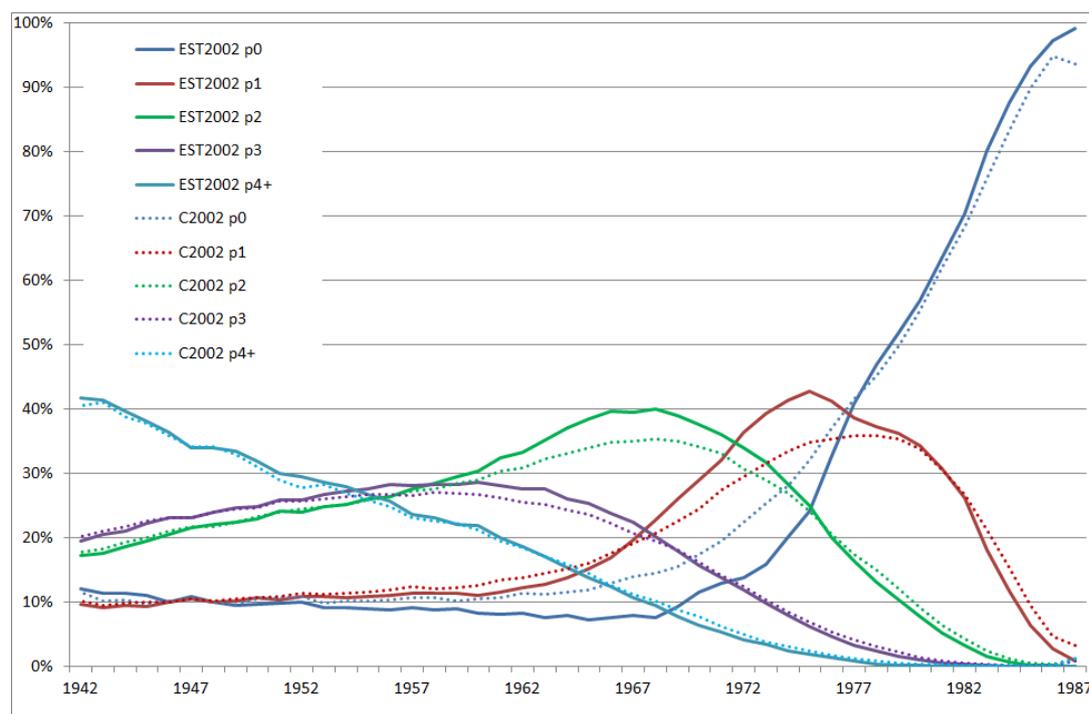
Figure 2: Mean number of children ever born computed using two concurrent methods of redistribution of unknown cases (all to zero parity vs. proportional); 1992 and 2002 censuses



The 2002 census shows an unnaturally high number of women at age 15 with parity 3 or higher. The reason is not known, but as the discrepancy does not cause any adverse effect to computations of summary indicators, HFD did not try to correct the numbers and publish them in original values.

Period fertility tables are not calculated for Chile because the quality of census data (both from the 1992 and from the 2002 census) does not quite meet the “golden census” requirements and the birth data series are too short to apply the “cumulative” approach (for methodological details, see Section 8.1 of the HFD Methods Protocol, Jasilioniene et al. 2012). Only census-based parity estimates for 1992 and 2002 and the corresponding period fertility tables for these two years are published. The reason for excluding annual series of fertility tables is that, because of the high number of unknown parity in both census and vital statistic data, the golden census 1992-based parity estimates for 2002 would be significantly different from 2002 census-based parity estimates (see Figure 3), suggesting they might be biased.

Figure 3: Proportion of women by number of children ever born in 2002, computed by two concurrent methods: extrapolation using 1992 census data with vital statistics for 1992–2002 (solid lines) versus 2002 census data (dotted lines)



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 since 1990 were used to tabulate live births by Lexis squares (age in completed years). No information on birth cohort of mother was available in the data files.

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

Two different total numbers of births are published in Chile for any given year: observed or registered births (*nacimientos ocurridos/observados*) and corrected number of births (*nacimientos corregidos*). The corrected number gives total births that took place in a given year (*año de nacimiento*), including births registered in the following seven years (*año de*

inscripción). Most of these “late registrations” (77 to 95 percent) were, however, registered in the year following the child’s birth.

Table 1: Published numbers of observed and corrected births

Year	Observed	Corrected	Late registration
1990	292146	309220	5.5%
1991	284483	300740	5.4%
1992	279098	294218	5.1%
1993	275916	289419	4.7%
1994	273766	285228	4.0%
1995	265932	275756	3.6%
1996	264793	272161	2.7%
1997	259959	265493	2.1%
1998	257105	261803	1.8%
1999	250674	254096	1.3%
2000	248893	251993	1.2%
2001	246116	248653	1.0%
2002	238981	241006	0.8%
2003	234486	236198	0.7%
2004	230352	232577	1.0%
2005	230831	231963	*
2006	231383	233047	*
2007	240569	241063	*
2008	246581	247261	*
2009	252240	252701	*
2010	250643	251337	*
2011	247358	248879	*

Source: INE, 2012

Note: * late registration period (7 years) not yet finished

The difference between observed and corrected number of births (i.e. late registration births) is included in the HFD and reported as births of unknown age of mother and birth order. The number of this “late registration” births dropped from 17,075 in 1990 to 2,225 in 2004, representing only about 1% of all live births in 2000–2004 (see Table 1). For 2005–2011 the corrected number is not final yet, because some late-registration births may still be added. However, the overwhelming majority of births is registered in the year of birth or the following one. For instance, 99.8 percent of births born in 2004 were registered in the years 2004–2005. The difference between observed and corrected births is also included in the HFD monthly births file as births of unknown month of birth. In addition, a small number of live births (less than 100 births yearly) are marked as unknown birth order. Births with unknown age and/or birth order were redistributed according to the standard HFD methodology.

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Data sources

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**APPENDIX 1
DESCRIPTION OF DATA USED FOR LEXIS DATABASE**

BIRTHS

Period	Type of data	Age range	Birth order	RefCode(s)
1992–2005	Annual number of live births by age of mother and birth order (Lexis squares)	12, ..., 55, unknown	1-10+, unknown	1
1947–1989	Annual number of live births by month	–	–	4, 5, 6
1990–2011*	Annual number of live births by month	–	–	1

* Includes also unknown month of birth

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 to be redistributed all to parity zero
24.04.2002	Women by age, year of birth and parity	15, ..., 99+	–	0, 1, ..., 10+, unknown	3	unknown parity to be redistributed all 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 <http://www.mortality.org> or <http://www.humanmortality.de>.