

Lessons learned with the use of demographic methods and multiple sources of data to evaluate the completeness and data quality from birth registration in Latin America

United Nations Expert Group Meeting on evaluation of vital statistics data from civil registration

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- ✓ **Objetive of this paper:** To analyze the main sources of data and methods, used to access quality, and to estimate fertility schedules in Latin America.

Structure of presentation

- ✓ Brief history of distinguished data sources;
- ✓ Indirect Demographic Methods;
- ✓ Brazil as case study – presenting different methods and sources to access fertility schedule in this country;
- ✓ Conclusion/Discussions/Guidelines

Background

- ✓ In Latin America the quality of vital statistics is questionable;
- ✓ Many countries are still present a considerable degree of data problems (under-registration of population and births, age-heaping, later birth registration, etc.)

Main data sources

- ✓ Population censuses;
- ✓ Household surveys;
- ✓ Demographic Health Survey;
- ✓ Civil Registration;
- ✓ Human Fertility Database (HFD) and Human Fertility Collection (HFC).

Population censuses

- ✓ The main data sources in Lat. American countries.
- ✓ Started in eighteenth and nineteenth centuries, and from the 1950s, most of the countries in the region started to introduce regular decennial census;
- ✓ The census under-reporting still exceeds 3% in many countries;
- ✓ Progress in quality is uneven, with signs of improvement and also deterioration (Chile as example).

Population censuses

- ✓ Reproductive questions: asked to all women of childbearing age (12, or 15 and older, sometimes with an upper age limit of 49);
- ✓ Two key questions provided by censuses are the number of “children ever born” and “the number of live births in the last twelve months” previous to the inquiry.

Household surveys

- ✓ Virtually all countries it have since the early 1960s;
- ✓ Initially, they only cover some socioeconomic groups and major metropolitan areas of the Latin American region;
- ✓ Over time, they expanded to more detailed information. Including detailed issues such as housing conditions, demographic trends.

Household surveys

- ✓ Brazilian National Household Survey (PNAD) – questions:
- ✓ Month and year of birth of the last child born alive; and the number of children ever born, within and outside the home.

Demographic Health Surveys

- ✓ Along with the national surveys, are the most important data sources for estimating fertility, infant mortality and nuptiality.
- ✓ Detailed information about the date of birth of each child for all women,
- ✓ Very useful information for studying fertility levels, trends and compare cohorts.

Table 1: List of World Value Surveys and Demographic Health Surveys conducted in the region of Latin America

| Country | WFS surveys | DHS surveys |
|---------------------|-------------|--|
| Bolivia | | 1989 1994 1998 2003 2008 |
| Brazil | | 1986 1991 1996 2006 |
| Colombia | 1976 | 1986 1990 1995 2000 2005 2010 |
| Costa Rica | 1976 | |
| Dominican Republic | 1975 1980 | 1986 1991 1996 1999 2002 2007 2013 |
| Ecuador | 1979-80 | 1987 |
| El Salvador | 1978 | 1985 |
| Guatemala | 1978 1983 | 1987 1995 1998-99 |
| Guyana | 1975 | 2004 2005 2009 |
| Honduras | | 2005-06 2011-12 |
| Haiti | 1977 | 1994-95 2000 2005 2006 2012 2013 |
| Mexico | 1976-77 | 1987 |
| Nicaragua | | 1997-98 2001 |
| Panama | 1975-76 | |
| Paraguay | 1979 | 1990 |
| Peru | 1977-78 | 1986 1992 1996 2000 2004-06 2007-08 2009 2010 2011 2012 2014 |
| Trinidad and Tobago | 1977 | 1987 |
| Venezuela | 1977 | |

Note: WFS: World Health Survey; DHS: Demographic and Health Surveys; Taken from Guzman et al. (2006) and adaptation from DHS (<http://dhsprogram.com/>).

Vital Registration

- ✓ Information collected as part of an ongoing vital registration system;
- ✓ The quality of these statistics covering recent decades is variable;
- ✓ The data collected are still very incomplete;
- ✓ Because parents often lack incentives to register births; or because babies who die shortly after birth may not be registered either as a birth or as a death; and late registration of births (for example, when the child attains school-going age) occur very often.

Table 2: Classification of Latin American countries according to the degree of coverage of birth statistics

| Rating | Period | | | | | |
|---------------------------|---------|---------|---------|---------|---------|---------|
| | 1960-65 | 1975-80 | 1980-85 | 1985-90 | 1990-95 | 1995-00 |
| Good (> de 90%) | 45% | 55% | 55% | 57.9% | 54.5% | 55% |
| Satisfactory (80 and 89%) | 25% | 25% | 10% | 5.3% | 9.1% | 0% |
| Regular (70 and 79%) | 5% | 5% | 5% | 5.3% | 9.1% | 15% |
| Deficient (< 70%) | 5% | 10% | 5% | 10.5% | 9.1% | 5% |
| No information | 20% | 5% | 25% | 21.1% | 18.2% | 25% |
| Total | 20 | 20 | 20 | 19 | 22 | 20 |

Source: Bay, G. and Orellana, H. "La calidad de las estadísticas vitales en la América Latina". Taller de expertos em el uso de estadísticas vitales: alcances y limitaciones. LC/R. 2141. Santiago de Chile, diciembre 2007.

Other sources – Human Fertility Database and Human Fertility Collection

- ✓ Not a data source in strict senses, but a compilation of data with goal to gather and provide as much as possible fertility data to a broad public.
- ✓ HFD and HFC based on official vital statistics and aims to provide important fertility measures such as age-, cohort- and birth-order-specific fertility rates (whenever possible), as well as crude, cumulative and total fertility rates, and other many measures.

Methods to access completeness of births and estimate fertility – Brazil as example

Data/Methods

Sub-national population of the country (urban RN).

- ✓ Censuses 1970 to 2010;
- ✓ Reason: Region that has experienced rapid changes in mortality and fertility (IDEMA, 2002; Fossa e Bezerra, 2002), and also has historically shown lower quality of vital registration (IBGE, 2003; Paes, 2006; Lima and Queiroz, 2014).

Methods to access completeness of births and estimate fertility – Brazil as example

Data/Methods

The country as whole.

- ✓ Censuses 2000 to 2010;
- ✓ Birth registers;
- ✓ Demographic Health Survey.
- ✓ We compare the results of different data sources and methods combined in a scenario of fertility decline to below replacement level.

Methods to assess completeness of births and estimate fertility – Brazil as example

Methods used

- ✓ P/F of Brass (One census method);
- ✓ The Synthetic Relational Gompertz (SRG) model (Two censuses method);
- ✓ The Own-Children Method (OCM) and the reconstruction of fertility history;
- ✓ Other official estimates (Birth History – DHS).

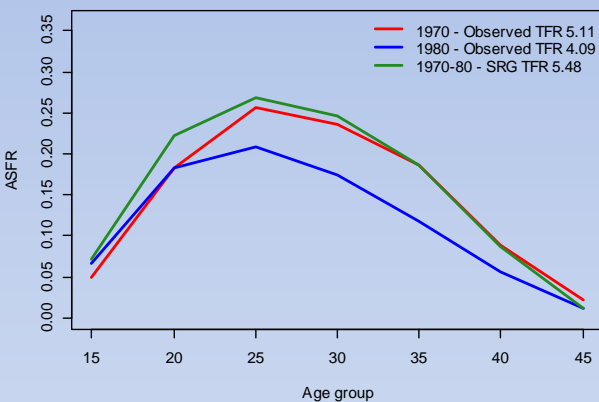
Sub-national – urban Rio Grande do Norte

Background:

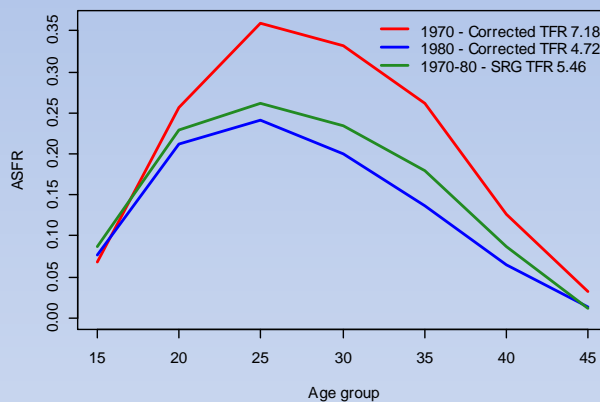
- ✓ Urban area of the with strong fertility decline over time, with change not only in level but also shape of fertility schedule;
- ✓ Two methods are applied P/F and Gompertz Relational Model (SRG)
- ✓ Two scenarios of analysis for the SRG:
 - 1) Observed data for each census
 - 2) Brass correction applied P2/F2

Results – Brazil, sub-national level. Evolution of TFR, fertility estimated by SRG and P/F ratio – 1970 to 2010. Census data.

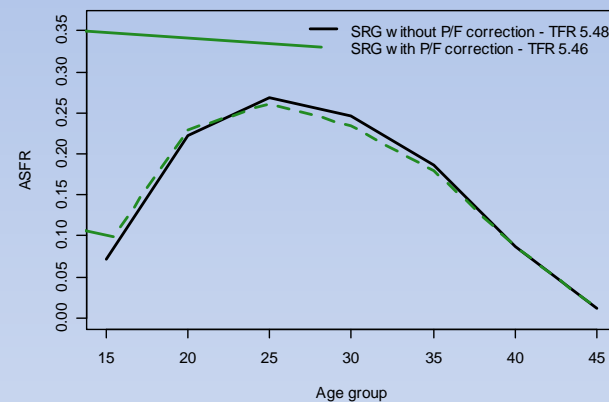
Observed Fertility Schedule and Estimated by Synthetic Relacional Gompertz, urban RN - Brazil, 1970 to 1980.



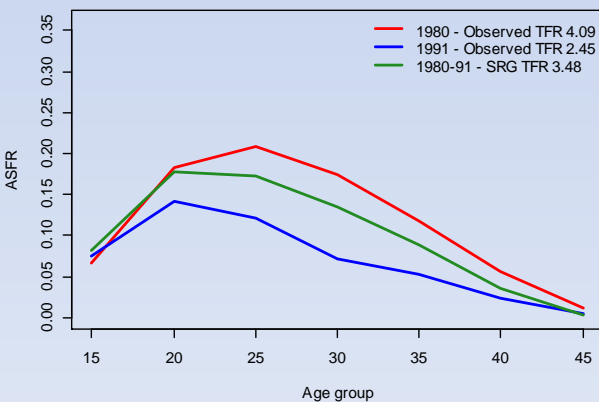
Fertility Schedule level corrected by P/F of Brass and Estimated by Synthetic Relacional Gompertz, urban RN - Brazil, 1970 to 1980.



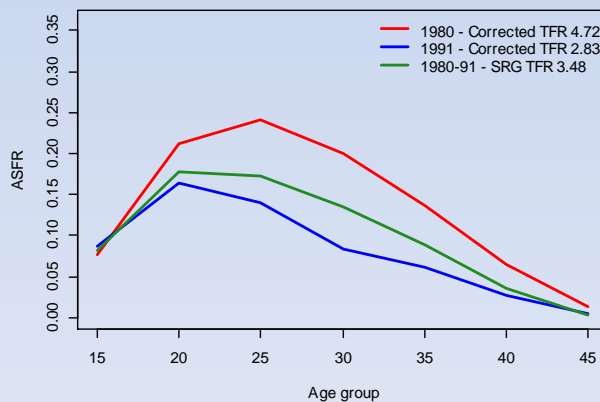
Fertility Schedule Estimated by Synthetic Relacional Gompertz, urban RN - Brazil, 1970 to 1980.



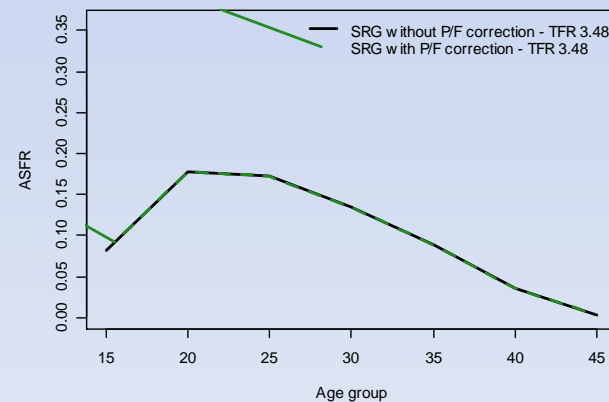
Observed Fertility Schedule and Estimated by Synthetic Relacional Gompertz, urban RN - Brazil, 1980 to 1991.



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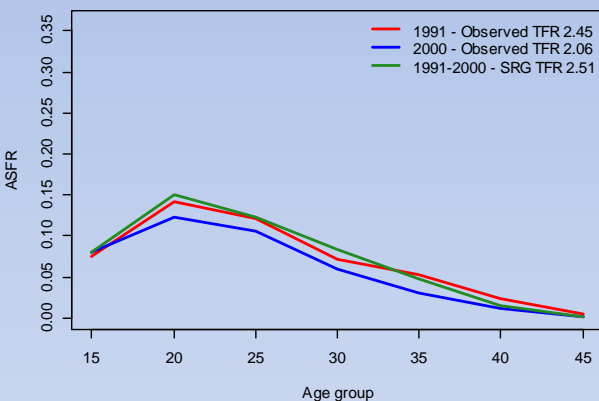


Fertility Schedule Estimated by Synthetic Relacional Gompertz, urban RN - Brazil, 1980 to 1991.

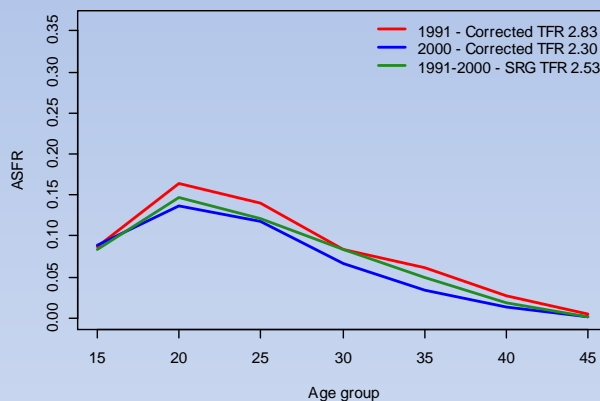


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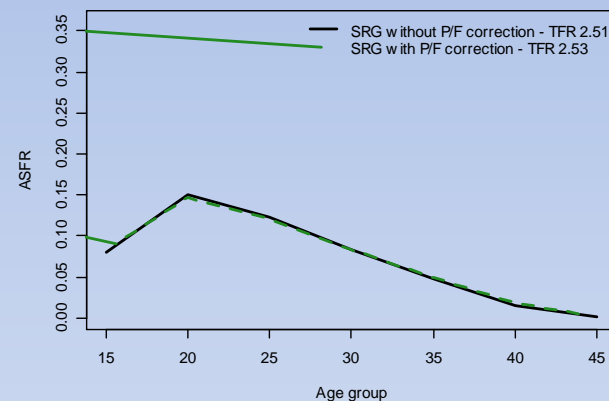
Observed Fertility Schedule and Estimated by Synthetic Relacional Gompertz, urban RN - Brazil, 1991 to 2000.



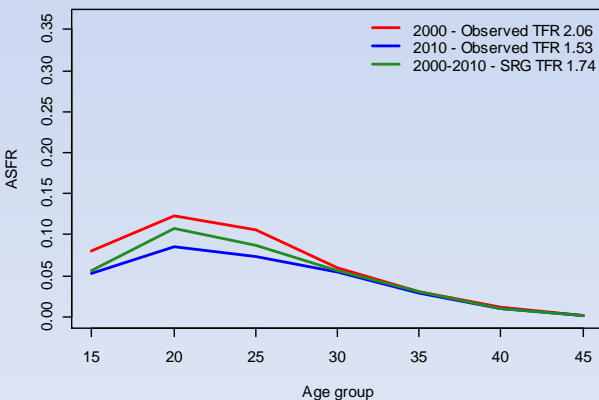
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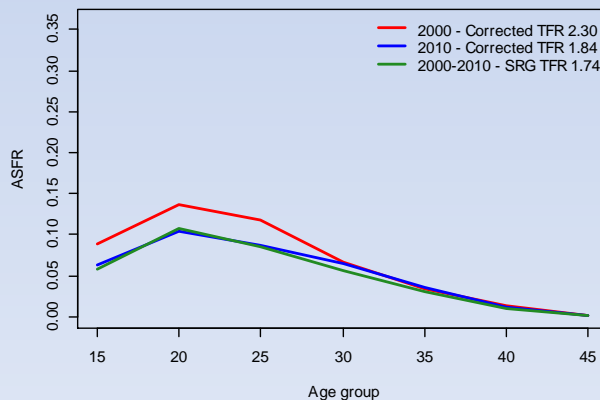
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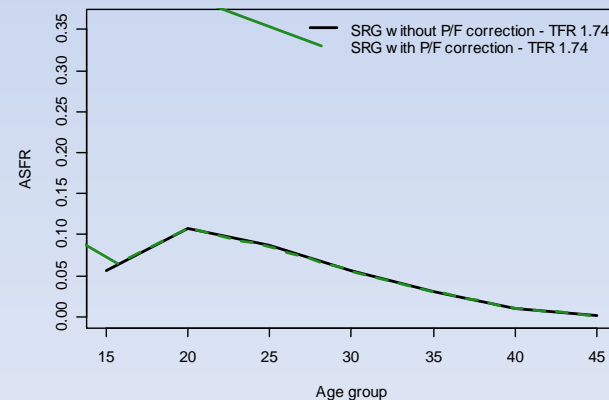
Observed Fertility Schedule and Estimated by Synthetic Relacional Gompertz, urban RN - Brazil, 2000 to 2010.



Fertility Schedule level corrected by P/F of Brass and Estimated by Synthetic Relacional Gompertz, urban RN - Brazil, 2000 to 2010.



Fertility Schedule Estimated by Synthetic Relacional Gompertz, urban RN - Brazil, 2000 to 2010.



Results – Brazil sub-national level

Two choices each period (1) without P/F correction and (2) with correction:

| | | | | |
|-------------|---|-----------|---|------|
| 1970 | | App. 1975 | | 1980 |
| 1) TFR 5.11 | ⇒ | 5.48 | ⇒ | 4.09 |
| 2) TFR 7.18 | ⇒ | 5.46 | ⇒ | 4.72 |
| 1980 | | Jan 1986 | | 1991 |
| 1) TFR 4.09 | ⇒ | 3.48 | ⇒ | 2.45 |
| 2) TFR 4.72 | ⇒ | 3.48 | ⇒ | 2.83 |
| 1991 | | 1996 | | 2000 |
| 1) TFR 2.45 | ⇒ | 2.51 | ⇒ | 2.06 |
| 2) TFR 2.83 | ⇒ | 2.53 | ⇒ | 2.30 |
| 2000 | | 2005 | | 2010 |
| 1) TFR 2.06 | ⇒ | 1.74 | ⇒ | 1.53 |
| 2) TFR 2.30 | ⇒ | 1.74 | ⇒ | 1.84 |

Table 3: Comparison between TFR according to different data sources and estimates, Brazil, 2000 to 2010.

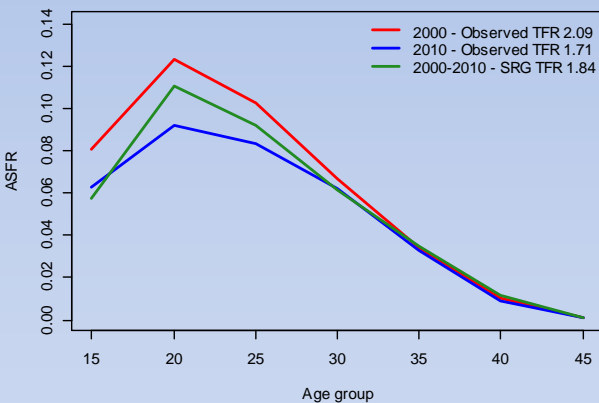
| Source of data | Year of the inquiry | | | Plausibility |
|--------------------|------------------------|----------------------|--------|----------------|
| | 2000 | 2005 (SRG estimates) | 2010 | |
| Vital Registration | Observed data | | | Plausible |
| | 2.09 ⇒ | 1.84 | ⇒ 1.71 | |
| Census | P/F adjustment applied | | | Plausible |
| | 2.17 ⇒ | 1.84 | ⇒ 1.75 | |
| Census | Observed data | | | Plausible |
| | 2.15 ⇒ | 1.85 | ⇒ 1.60 | |
| Census | P/F adjustment applied | | | Less plausible |
| | 2.37 ⇒ | 1.85 | ⇒ 1.91 | |

Sources: DATASUS 2000 and 2010 and Censuses – IBGE, 2000 and 2010.

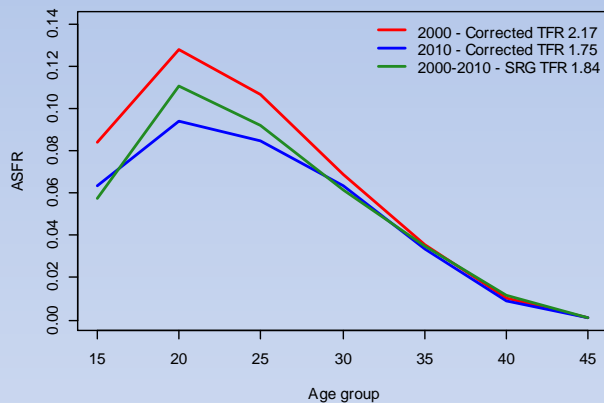
The official TFRs estimates were 2.37 in 2000 and 1.87 in 2010 (IBGE, 2013). TFR estimates of 1.80 according to PNDS (2006)

Results – Brazil as whole from 2000 to 2010. Comparing Brass vs. SRG and different data sources (census and vital registration).

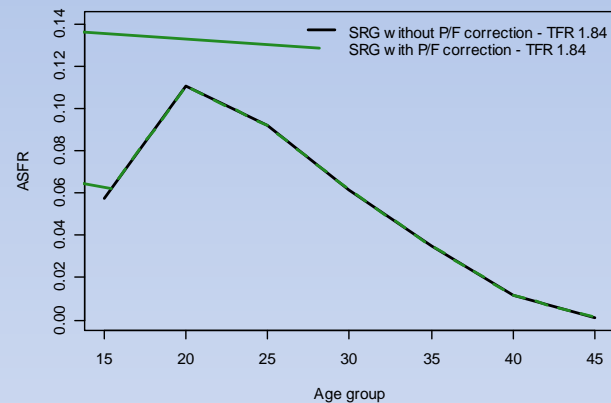
Observed Fertility Schedule and Estimated by Synthetic Relacional Gompertz, Brazil, 2000 to 2010 - Vital statistics data.



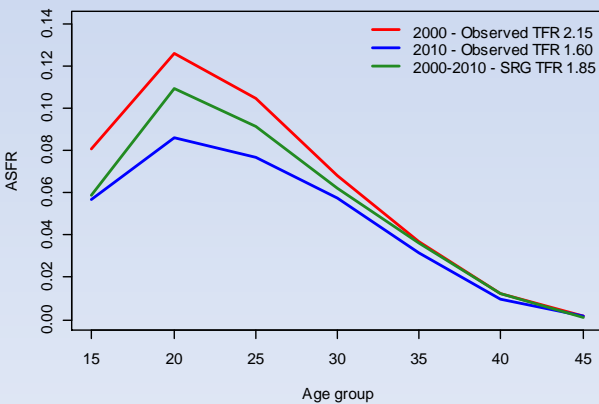
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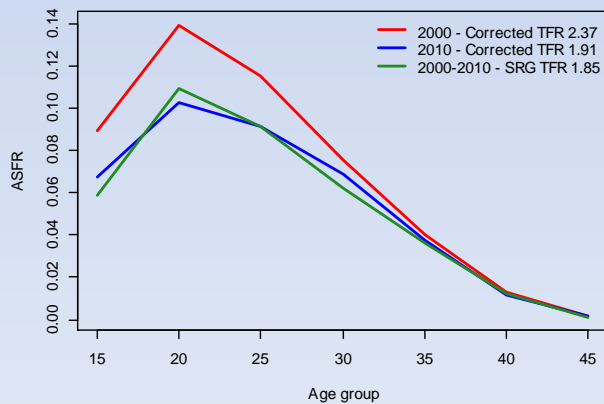
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Observed Fertility Schedule and Estimated by Synthetic Relacional Gompertz, Brazil, 2000 to 2010 - Census data.



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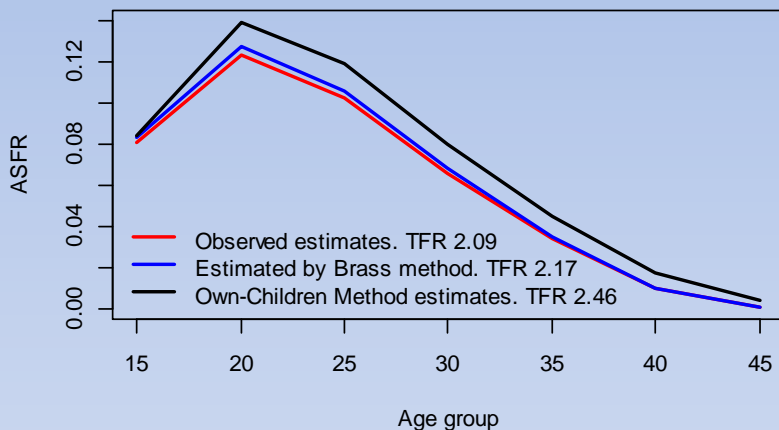


Fertility Schedule Estimated by Synthetic Relacional Gompertz, Brazil, 2000 to 2010 - Census data.

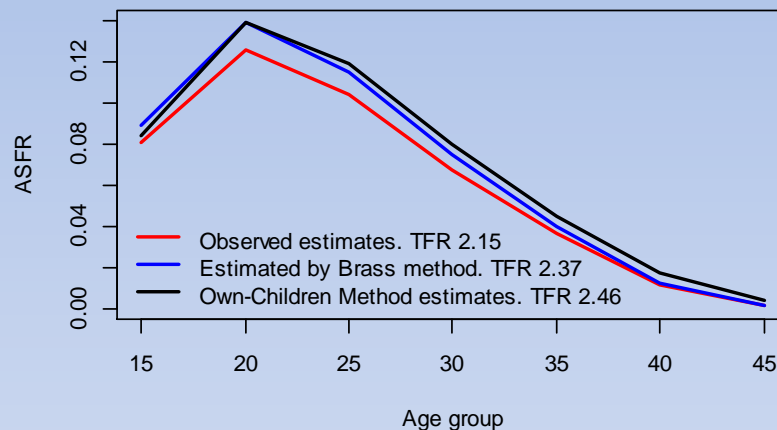


Results – Brazil as whole from 2000 to 2010. Comparing Brass vs. OCM and different data sources (census and vital registration).

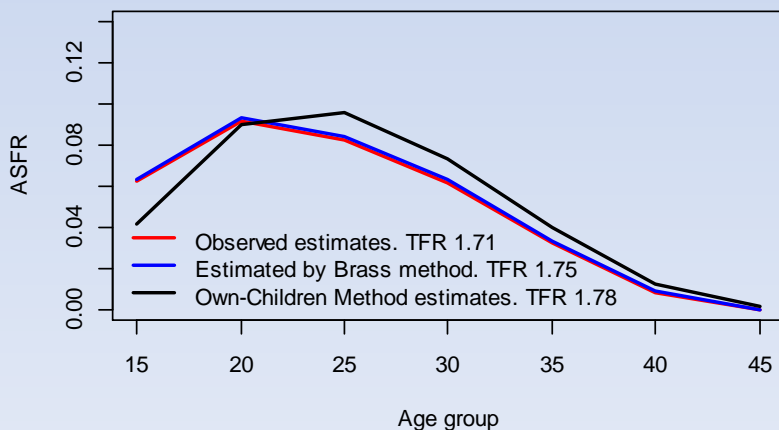
Fertility Schedule Observed, Estimated by P/F of Brass and Own-Children Method, Brazil, 2000 - Vital statistics data.



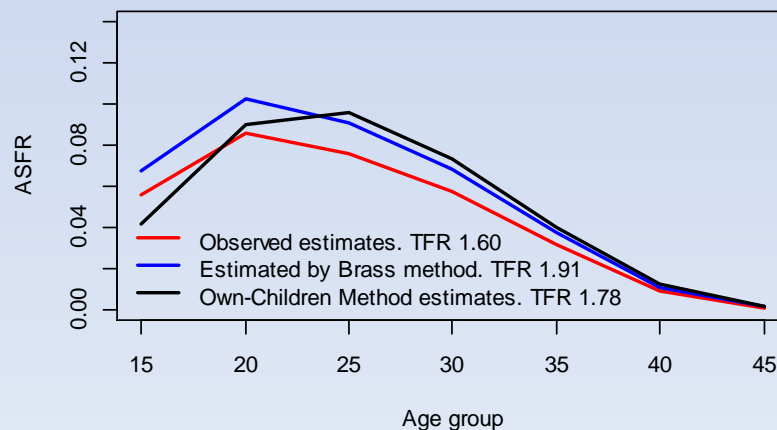
Fertility Schedule Observed, Estimated by P/F of Brass and Own-Children Method, Brazil, 2000 - Census data.



Fertility Schedule Observed, Estimated by P/F of Brass and Own-Children Method, Brazil, 2010 - Vital statistics data.

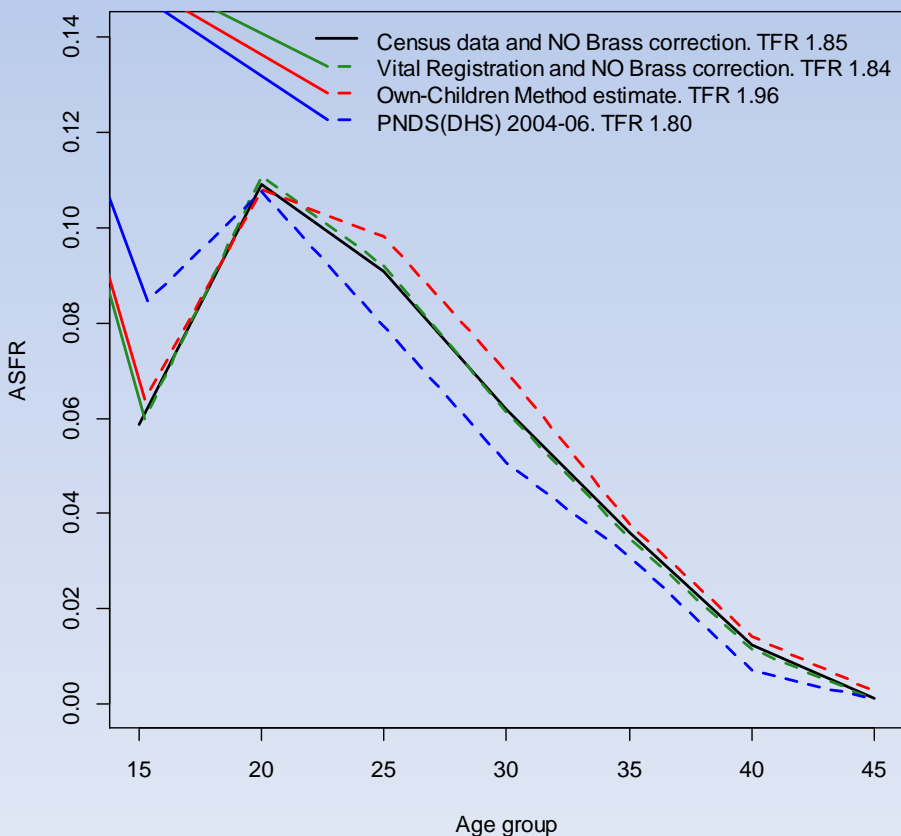


Fertility Schedule Observed, Estimated by P/F of Brass and Own-Children Method, Brazil, 2010 - Census data.

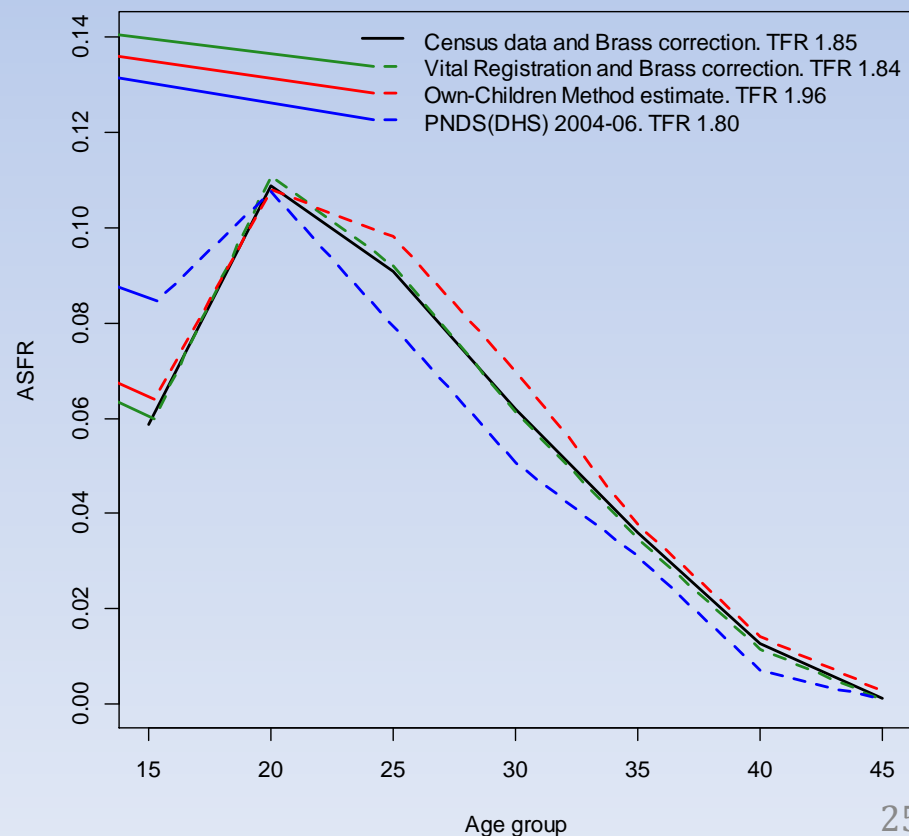


Results – Brazil as whole app. in 2005. Comparing Brass, SRG and OCM and different data sources

Fertility estimated by SRG model applied approximately to 2005 with different data sources and OCM estimates in 2005, Brazil.



Fertility estimated by SRG model applied approximately to 2005 with different data sources and OCM estimates in 2005, Brazil.



Conclusion/Discussion/Guideline

- ✓ What are the most appropriate methods available to evaluate the completeness and quality of births records?
- ✓ What are the strengths and limitations of the various methods?
- ✓ What are the lessons learned from recent experiences with the application of these methods to different settings, including at the sub-national level or for subpopulations disaggregated by various characteristics?

Conclusion/Discussion/Guideline

- ✓ What recommendations can be provided to national authorities in low middle income countries to best evaluate the completeness and quality of their vital statistics, both at the national and at the local level?
- ✓ What further methodological research would be desirable to address any pending needs?

Conclusion/Discussion/Guideline

- 1) To invest and to promote more accurate information about: age of mother, place of residence of the mother and births information (Tacla, 2009). This will be the first desirable stage. Second, once the first is achieved, to invest in socioeconomic characteristics of the father or mother in civil registration.
- 2) Concerning the methods, we judge the combination of SRG model and Brass P/F ratio as good tool to evaluate completeness of births and to estimate “right” the fertility shape, especially in a scenario of fertility change;
- 3) To promote other alternative data sources, providers of fertility information. Hereby, we highlight the (future) project of Latin American Fertility Database in HFC and the Latin American census data in CFE database <http://www.cfe-database.org/database/>

Thank you

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