Brazilian fertility regimes: profiles of women below and above replacement levels

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Abstract

In Brazil as in many other countries, education and income are negatively correlated with fertility levels and, despite the trend toward convergence among socioeconomic groups, fertility levels are still quite different from one group to another. Here we attempt to quantify, locate and qualify what groups showed below replacement fertility rates and which still showed high fertility rates during the last decade. We also discuss possible future trends. The results indicate that, by controlling the categories of years of schooling and average per-capita family income in 1991, 35% of Brazilian women were in below replacement fertility regimes. This percentage increased to 42% in 2000 and to 60% in 2003. In contrast, 11% of the women were still in a high fertility regime in 1991 (five or more children); this figure fell to 6% in 2000 and to 5% in 2003.

Introduction

The results of the Brazilian Demographic Census of 2000 make it possible to estimate fertility rates in the country as a whole, as well as in the various regions, considered individually. The contrast between these data of 2000 and those from 1991 enable researchers to study the trends that occurred between the censuses. It was seen that overall fertility in Brazil fell slightly and that the more developed regions maintained virtually stable levels. Consequently, the greatest fall in fertility took place in the regions where rates are still high (IBGE, 2002).

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Fertility rates have been cause for concern not only among scholars in the area but, especially, for formulators of public policies, due to the social implications involved. In particular, fertility below replacement level has been a constant concern in the more developed countries for many years, due to the implications of demographic aging and the inevitable reduction in the size of the population, and in view of the absence of measures to reverse this process (Demeny 1986 and 2003, Morgan 2003).

Depending on whether the transition in fertility rates in developing countries is present, just beginning, or in its final stages, special attention is focused on different fertility regimes, such as in Brazil, where overall national fertility is already close to replacement levels. (Rios Neto 2000, Camargo and Yazaki 2002).

This article has the objective of identifying, from the socio-economic and demographic points of view, segments of the female population living in different fertility regimes, especially emphasizing the two extremes: low, below replacement fertility, and high fertility, this latter being defined as having five or more children. As will be seen, the proportion of women in low fertility regimes is increasing, while the number of those in high-regimes indicates a downward trend, toward below replacement rates, for all those who have access to efficient contraceptive methods in all strata of the population.

Decline in fertility and its differentials

The Brazilian Demographic Census of 2000 reaffirmed the downward trend of fertility nationwide, but the reduction was much less intense than in the previous decade. Between 1991 and 2000 the reduction was approximately 11.9%, whereas the decline seen in the 1980 Census had been approximately 38.6%. The Census of 2000 indicated that women were having an average of 2.4 children (Graph 1) at the beginning of the 21st century, still above replacement level.

The reduction in fertility rates seen during the 1990s was not uniform across the different socio-demographic segments, but the Census of 2000 did indicate significant differentials. The fall was more accentuated in the socio-economic groups where fertility had been higher in 1991, that is, among poorer, less educated, and black women living in the rural areas, and in the northern and northeastern regions of the country.

Graph 1
Total fertility rates. Brazil, 1940 to 2000.
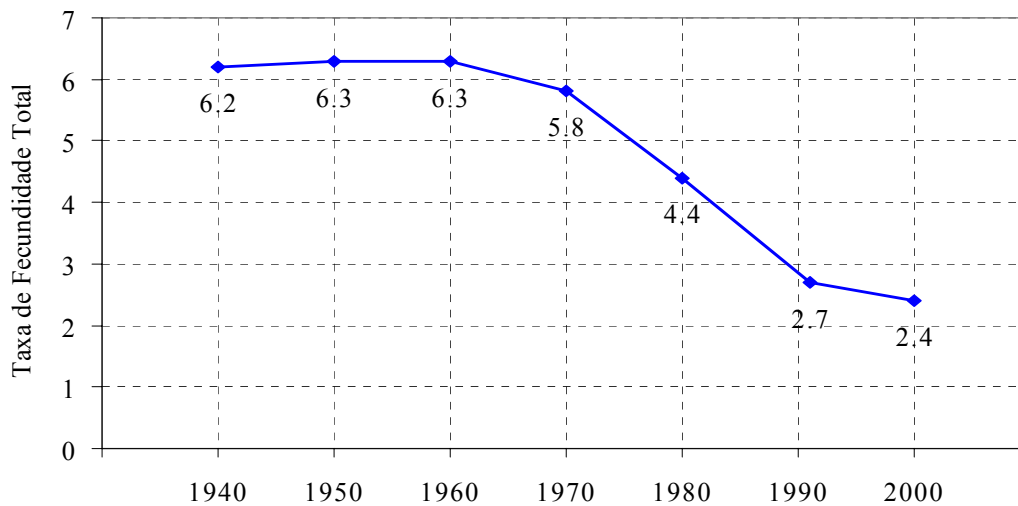
Source: IBGE, Demographic Censuses of 1940 to 2000.

Women in the category of without income or with incomes of up to ¼ of the minimum wage[1] (average per-capita household income) showed higher fertility, specifically, 5.5 children, in 1991. By 2000, this rate had fallen by 25.4%, to 4.1 children. It should be recalled that trends in fertility rates by income category have a composition effect due to changes in the economic conditions of the women during the decade.[2] What we wish to emphasize, however, is that women belonging to the segment with the lowest per-capita income in 2000 are in a much lower fertility regime than they were in 1991.

The segment of women without instruction (or with only adult literacy instruction) showed the greatest decline, from 15.5%, between 1991 and 2000, when one takes into account fertility in comparison with years of schooling. From an average of 4.8 children per woman in 1991, the fertility of this group fell to 4.1 in 2000. Likewise, the effect of composition, due to changes in the educational structure is also present in the analyses of trends in fertility rates, but with less intensity and complexity than changes in income, because years of schooling can only

[1] There were major changes made in the Census of 2000 in the form for collecting economic variables. One of the most important, that would affect the estimated fertility per income group, is related to the period of reference for work carried out. In 1991, work and, therefore, the income derived from it, referred to the 12 months preceding the date of the census. In 2000, this period was defined as the week preceding the study.
[2] In 1991 and 2000, respectively, approximately 7 million and 3.8 million women in Brazil were classified in this lowest income category.

increase with the passage of time. For the group with less education, the downward trend may be underestimated if we suppose that the probability that a woman will increase her level of education once she is in her reproductive phase is higher for younger women and for those with fewer children.[3]

In 1991 fertility was 4.3 children per woman in rural Brazil, in contrast to 2.3 in the urban areas. By 2000 this number had fallen 19.2%, to 3.4, whereas in the cities it fell only 5.2%, reaching 2.2. In other words, the decline in fertility in the last decade indicates a trend toward uniform fertility rates, as has been pointed out by other authors (Campanario and Morell, 1994). However, there are still considerable differences in fertility rates, especially for women in different categories of instruction and of average monthly income.

As expected, the north and northeast, with higher proportions of rural populations, lower instruction levels, and lower average income, also showed the highest fertility rates. In 1991 it was approximately 4.2 and 3.7 children per woman for the north and the northeast, respectively, and fell by 23.2% and 26.0% between 1991 and 2000, to 3.2 and 2.7 children per woman, respectively.

In relation to skin color, as already observed in previous studies by Bercovich (1989), black women show higher fertility rates than white women, but the rates fell farther among the black women, from 3.3 to 2.8 during the period, representing 16.3%. The white women, who already presented low fertility in 1991 (average of 2.2 children), showed a slight reduction, of 5.9%, to an average of 2.1 children in 2000.

Socio-demographic characteristics of fertility regimes in Brazil and their variations between 1991 and 2000

The rapid decline in fertility rates in Brazil, as well as in several other Latin-American countries, led to a major differential in the fertility of different social strata. At present there are important segments of the population living in high fertility regimes while others are below replacement level. As Chackiel and Schkolnik (2003) showed, in countries where fertility was already low in the mid-1960s, such as Chile, Argentina and Cuba, the differentials of fertility for women at the extremes of the educational scale are quite low. But in countries like Brazil,

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[3] Note that literacy instruction for adults was included in the category of no schooling. This was because it is supposed that women with adult literacy training had their children before they participated in any such course.

Colombia and Mexico, where the transition in fertility began at an average of over five children per woman in 1960, the educational extremes showed differences of over three children per woman at the turn of the millennium.

In this section we attempt to quantify and identify those women who are already in low fertility regimes and those who still have averages of over five children. That is, since the country's fertility level was quite low in 2000, and we know that there are considerable differences that depend on socioeconomic conditions, we want to know what percentage of women in the total population still show high fertility rates, and what proportion have below replacement fertility. We also intend to detect whether they are largely located in certain regions of the country, etc.

To answer these questions we used a procedure that considers hypothetical cohorts of women according to class of income and instruction, and calculated their total fertility rates using the Brass P/F Method (United Nations, 1983) for all groups. In this case, the segments identified are those that are in fertility regimes determined by their socio-economic condition and whose fertility would be estimated at the end of their reproductive period if they were subject to the specific fertility rates per age in their segment.

We used two variables to identify socioeconomic groups: one related to educational level and the other to income level. Educational level is defined as the woman's total number of years of schooling, divided into six categories that are known to demonstrate important differentials in fertility rates. Income categories are identified by average monthly per-capita household income, divided into seven categories related to numbers of minimum wages.

Charting the segments of women with high and low fertility

Observing the women's fertility rates according to years of schooling and average per-capita monthly household income, measured in minimum monthly wages, it was seen that, in 2000, there was a clear negative correlation in Brazil as a whole between fertility and instruction levels for the segment of women with income of up to one minimum wage. From that level on up, formal education exerts virtually no influence on fertility levels. In addition, women in families earning one minimum per-capita monthly wage and live in fertility regimes of 2.1 or fewer children per woman (Table 2). It is in the combination – without income or up to ¼ of the minimum wage and with a maximum of three years of instruction – where one finds the highest fertility rates. This was very similar to the situation seen in 1991 (Table 1).

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Table 1
TFT per years of schooling of women, according to average monthly per-capita household income in minimum wages, Brazil 1991.

Years of School	Average per capita monthly household income (minimal wage)							Brazil
	No Income Up to ¼	¼ to ½ MW	½ to 1 MW	1 to 2 MW	2 to 3 MW	3 to 5 MW	5 and + MW	
No Schooling	6.8	3.6	2.6	1.8	1.5	1.1	0.8	4.8
1 to 3 years	6.0	3.6	2.7	2.0	1.8	1.5	1.7	3.9
4 to 7 years	4.6	3.2	2.5	2.0	1.7	1.5	1.5	2.8
8 years	3.5	2.8	2.3	2.0	1.7	1.5	1.5	2.2
9 to 11 years	2.3	2.0	1.8	1.7	1.6	1.5	1.2	1.7
12 or +	1.1	1.2	1.3	1.3	1.2	1.6	1.4	1.3
Brazil	5.5	3.1	2.3	1.8	1.6	1.5	1.2	2.7

Source: IBGE, Demographic Census of 1991. Microdata from the sample.

Table 2
TFT per years of schooling of the women, according to average monthly per-capita household income in minimum wages, Brazil 2000.

Years of School	Average monthly per capita household income (minimal wage)							Brazil
	No Income Up to ¼	¼ to ½ MW	½ to 1 MW	1 to 2 MW	2 to 3 MW	3 to 5 MW	5 and + MW	
No Schooling	5.8	3.4	2.3	1.6	1.4	1.1	1.0	4.1
1 to 3 years	5.2	3.6	2.7	2.1	1.7	1.7	1.1	3.6
4 to 7 years	4.3	3.5	2.8	2.1	1.7	1.7	1.7	2.9
8 years	3.5	3.0	2.6	2.1	1.8	1.7	1.4	2.4
9 to 11 years	2.4	2.2	1.8	1.6	1.4	1.3	1.2	1.6
12 or +	2.2	2.0	1.6	1.4	1.4	1.1	1.1	1.1
Brazil	4.6	3.2	2.4	1.8	1.4	1.3	1.1	2.4

Source: IBGE, Demographic Census of 2000. Microdata from the sample.

In terms of the proportion of women in reproductive age in different fertility regimes, Table 3 shows that, from 1991 to 2000, the percentage of women in the lowest fertility regimes rose from 45% to 54% and the percentage of those in the highest fertility rates, that is, having five children or more, fell from 11% to 6%. In urban environments, in 2000, only 1% of the women at reproductive age are in high fertility regimes (Table 3). In the rural areas almost the same percentage of women, 21%, are classified as being in low and in high fertility regimes.
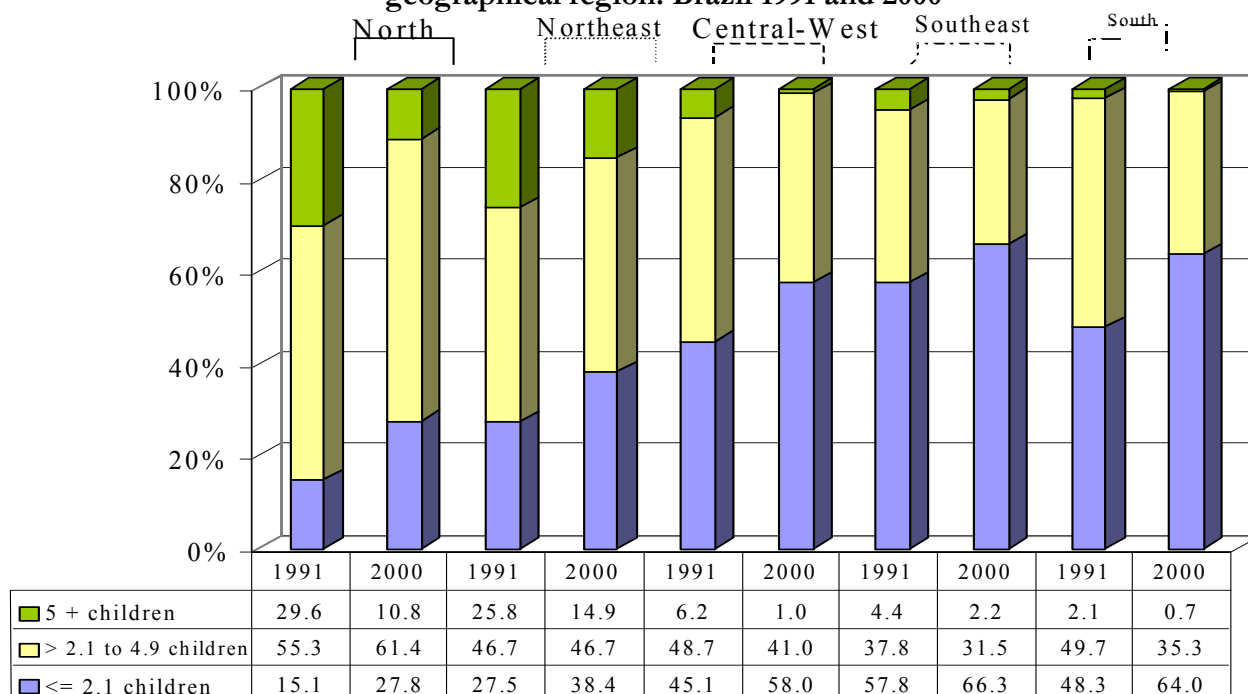
Table 3
Percentage of women between ages 15 and 49, according to fertility regime and household situation, Brazil, 1991 and 2000.

Fertility	Total		Urban		Rural	
Regime	1991	2000	1991	2000	1991	2000
≤ 2.1	45.2	54.1	57.5	62.8	11.4	22.3
> 2.1 to 4.9	43.7	39.6	37.5	35.9	56.2	56.9
≥ 5	11.1	6.3	5	1.3	32.4	20.8
All regimes	100.0	100.0	100.0	100.0	100.0	100.0

Source: Demographic Censuses of 1991 and 2000. Microdata from the sample.

Significant differences were found in the comparison among the five large regions in Brazil between 1991 and 2000 (Graph 2). There was an increase in the percentage of women with low fertility rates in all these regions, as well as a fall in the percentage of those with higher levels. The southeastern and southern regions are in the lead, followed by the central-western region, with the highest proportions of women with low fertility rates and the smallest proportions with high levels. The largest proportions of women with high fertility regimes, 15%, and the lowest percentage of women with low fertility regimes are found in the north.

Graph 2
Distribution of women ages 15 to 49 according to fertility regime and large geographical region. Brazil 1991 and 2000

	North		Northeast		Central-West		Southeast		South	
	1991	2000	1991	2000	1991	2000	1991	2000	1991	2000
5 + children	29.6	10.8	25.8	14.9	6.2	1.0	4.4	2.2	2.1	0.7
> 2.1 to 4.9 children	55.3	61.4	46.7	46.7	48.7	41.0	37.8	31.5	49.7	35.3
<= 2.1 children	15.1	27.8	27.5	38.4	45.1	58.0	57.8	66.3	48.3	64.0

Source: Demographic Censuses of 1991 and 2000. Microdata from the Sample.

We then sought to identify the women with fertility regimes of five children or more. Of the 2,906,193 women in this situation in 2000, 73.9% are self-declared black, 70.7% live in the north or northeast, and 54.4% are rural. These characteristics did not vary greatly from the data gathered in 1991. Of the 4,062,370 women recorded in that year, 71.7% considered themselves black, 72.1% lived in the north or northeast, and 60.5% lived the rural areas.

In order to bring results as closer as possible to the present date, we have analyzed data for the 2003 National Household Survey (PNAD). The results points to the same tendency of decline from the last decade, the TFR decreased in the period of three years from 2.4 children per women in 2000 to 2.2 in 2003. Besides, Table 4, which shows TFR according to monthly household income per capita groups and years of schooling for 2003 data, present a pattern very close to that presented for 2000, as seen before.

Table 4
TFT per years of schooling of the women, according to average monthly per-capita household income in minimum wages, Brazil 2003.

| Years of School | Average monthly per capita household income (minimal wage) | | | | | | | Brazil |
	No Income Up to ¼	¼ to ½ MW	½ to 1 MW	1 to 2 MW	2 to 3 MW	3 to 5 MW	5 and + MW	
No Schooling	5.7	3.1	1.6	1.9	1.2	--	--	3.8
1 to 3 years	5.4	3.1	2.5	1.9	1.0	--	--	3.6
4 to 7 years	4.7	3.5	2.7	2.2	1.7	1.2	--	3.3
8 years	3.5	3.1	2.6	2.0	1.6	1.4	1.4	2.7
9 to 11 years	2.7	2.2	1.8	1.4	1.3	1.3	1.3	1.6
12 or +	--	--	1.3	1.2	2.4	2.1	1.4	1.3
Brazil	4.7	3.0	2.2	1.5	1.4	1.3	1.2	2.2

Source: IBGE, Household Survey of 2003. Microdata from the sample.
-- Data not reliable due to small sample.

Although comparisons among census data and household survey data must have to be taken with care[4], it is worth mentioning that trends indicate that during last years the percentage of

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[4] The sample for the Household Surveys is taken from the census tracks existing at the time of the census at the beginning of the decade, and households are chosen each year, until the next census, from the same sample. Since the sample of the census track is very small, only by chance the estimates of fertility rates might be above or below the real average values for the country as a whole during the entire decade.

women in below replacement regime continues to increase, 57.7% in 2003 compared to 54.1% in 2000 and 45.2% in 1991 (Table 5). By the same token, the percentage of women with very high regimes of fertility rates, above 5 children per women in average, continues to decrease, reaching only 4.7% of women aged 15-49 in 2003. This proportion encompasses around 2,2 millions women, compared to 3 millions found in 2000, in the same segment. This decrease together with the decrease of the percentage of women having between 2.1 and 4.9 children points to a decline of the TFR at the national level that will still bring fertility rates down in the next years, placing Brazil in the group of low (or even very low) fertility in the next decades.

Table 5
Percentage of women between ages 15 and 49, according to fertility regime, Brazil, 1991 and 2000.

Fertility	Year		
Regime	1991	2000	2003
≤ 2.1	45.2	54.1	57.7
> 2.1 to 4.9	43.7	39.6	37.5
≥ 5	11.1	6.3	4.7
All regimes	100.0	100.0	100.00

Source: Demographic Censuses of 1991 and 2000 and PNAD 2003.
Microdata from the sample.

Table 6 summarizes the main socio-economic and demographic characteristics of the women who were in different fertility regimes in 2000. All the women with fertility rates above five children were in the lower-income bracket and none of those with rates below replacement level were among the poorest. Additionally, all other characteristics show that women in high fertility regimes are defined as functionally illiterate (up to three years of schooling), are more likely to live in the northern or northeastern regions or in rural areas, are described as black, and are not on the labor market. The majority has already had four or more children, even though their average age is very close to the women in other fertility regimes.

Table 6
Characteristics of women according to fertility regime
Brazil 2000

Characteristics	High ≤ 5	Medium > 2.1 up to 4.9	Low ≤ 2.1
Per capita household income up to ¼ MW	100.0%	19.4%	0.0%
Functionally illiterate	100.0%	23.7%	6.3%
Live in the north/northeast	75.9%	44.8%	23.8%
Live in rural areas	51.3%	23.3%	5.8%
Have been in at least one union	83.9%	71.2%	64.2%
Black	69.6%	55.0%	31.6%
Do not have a job	88.4%	72.9%	47.2%
4 or + children	45.2%	18.4%	5.5%
Median age	30.0 years	28.0 years	32.0 years
% of total Women ages 15-49	6.3%	39.6%	54.1%

Source: Demographic census of 2000. Microdata from the sample.

Final Remarks

The transition in fertility in Brazil is completing its cycle of falling to low rates. For the country as a whole we are approximating a TFT close to the demographic replacement level. The Demographic Census of 2000 confirmed the continuous downward trend in fertility everywhere in the country and at all socioeconomic levels, but there are still very significant internal differences in fertility rates. These differentials of fertility between groups in better or worse socioeconomic conditions classify Brazil, together with other Latin-American countries such as Mexico and Colombia, in a demographic situation that is distinct from the other countries, where the transition from fertility began from lower levels, took place more slowly and showed much lower differentials in fertility from one socioeconomic group to another.

Even though the majority of the Brazilian population shows low fertility levels, there are still segments of the population where fertility is at the average levels seen in the country at the beginning of the transition, in the mid-1960s. This group represents an even smaller proportion of the population, but nevertheless consists of almost 2.2 million women at reproductive age under a regime of average fertility of five children or more in 2000. Although this group represents only 4.7% of the female population at reproductive age, it is concentrated among women living in the most adverse socioeconomic conditions.

The majority of the studies available indicate a low desired number of children, approximately 2 or 3. Despite all the criticisms in relation to measuring the average number of children desired, this preference may indicate deficient availability of contraceptive methods, and services related to the reproductive rights of the poorer sectors of the population. In fact, we know very little about this aspect and there is urgent need of studies to help answer this question, namely, whether women in the lower income categories and with fewer years of schooling have many more children than the average because they want them or because they do not have adequate access to information and lack the necessary means to regulate their fertility. In this latter case, programs and actions in the area of basic public health are needed.

In addition, a large proportion of women, about 60% in 2003, show fertility regimes below replacement level. The experience of other countries shows that fertility may oscillate at low levels, but that it is not likely to return to former higher levels. This phenomenon leads to changes in the population's age structure, with well-known demographic consequences. During the first stage it causes a reduction in the rate of demographic dependence, but on the medium and long terms it leads to aging of the population in general and increased rates of dependence. In view of this new demographic reality, which has social and economic consequences, factors in areas such as education, health, and social security, as well as others, should be taken into consideration when public policies are drawn up, while respecting both individual and collective rights.

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