

**Title:** Beyond the Desk: What's Driving the Change in Fertility Schedules for Brazilian Public Servants?

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## **1. Introduction**

Brazil has experienced a significant decline in its Total Fertility Rate (TFR), which dropped from 5.8 to 2.3 children per woman between 1970 and 2000 (Carvalho et al., 2005), further decreasing to 1.9 by 2010, thus falling below replacement level (Berquó & Cavenaghi, 2014). This fertility decline is strongly associated with women's increasing engagement in both education and the labor market (de Souza, 2009; Pardo et al., 2013). Specifically, higher educational attainment and formal employment have been shown to contribute to delayed motherhood (Miranda-Ribeiro, Garcia & Faria, 2019). Within this demographic context, public-sector employees represent a distinct group, often characterized by enhanced job stability and social rights (Conti & Sette, 2013), which in turn can favor promote a better conciliation between family and labor market. The present study aims to investigate recent developments of fertility among Brazilian public servants women and analyze how their fertility differs across various regions and socioeconomic groups.

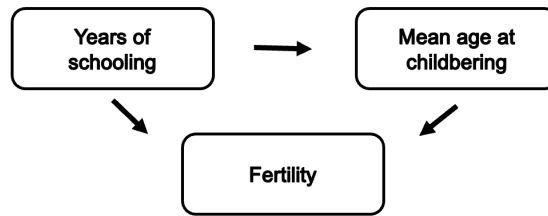
## **2. Data and Methods**

This study utilizes microdata from the 2000 and 2010 Brazilian Demographic Censuses, which were conducted by the Brazilian Institute of Geography and Statistics (IBGE). The analytical sample consists of female public servants in reproductive ages. Fertility was quantified using three primary demographic measures: the Age-Specific Fertility Rates (ASFRs), the Period Total Fertility Rates (PTFRs), the Parity Progression Ratios (PPRs) and Completed Cohort Fertility rates (CFRs). The ASFRs estimate fertility across distinct age cohorts. The TFR represents the hypothetical average number of children a woman would bear over her reproductive life based on current age-specific rates (Grupo de Foz, 2021). The PPRs measure the proportion of women who advance from a given parity (number of children) to the next, and CFR measured total number of children that women born in the same year have by the end of their childbearing years. These two last measures allow us to estimate cohort fertility and analyze progression patterns by parities (Hinde, 1998; Preston, Heuveline & Guillot, 2001).

Beyond these descriptive indicators, for 137 small areas of the country, we also estimate Structural Equation Models (SEMs) to ascertain how the chosen career path (public servant occupation) influences fertility outcomes. This modeling approach, the Structural Equation Model (SEM) is employed to disentangle the direct and indirect effects of public servants career on fertility (Byrne, 2010; Bollen, 1989; Kline, 2016), as visually represented in Figure 1. Specifically, the SEM framework is used to separate among public servants status the: 1) Direct effects on fertility: primarily through the age at starting reproduction, and 2) Indirect effects on fertility: mediated by investments in education. The direct effects of public servant status on fertility are measured by the mean age at childbearing (MACB). The underlying assumption here is that, due to their

time achieve this occupational status, these women postpone the onset of fertility. We also analyze the direct effects of education and other covariates on fertility of these women.

Figure 1: Causal path diagram example.



Source: Author's elaboration

### 3. Preliminary results

Descriptive analyses, detailed in Table 1, reveal significant shifts in the profile of Brazilian female public servants between 2000 and 2010. This group already concentrated in older age ranges, experienced further aging, evidenced by an increasing share of women aged 40 or over. The educational level of public servants has also increased sharply, mainly with 12 or more years of schooling. This increase reflects both greater educational selectivity in public employment and the overall expansion of women's education nationally.

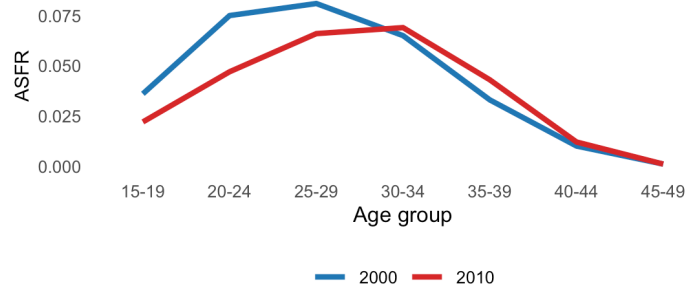
**Table 1:** Sociodemographic characteristics of female public servants aged 15-49, Brazil, 2000 and 2010.

<b>Age distribution (%)</b>	<b>2000</b>	<b>2010</b>
15–19 years	2.8	0.7
20–24 years	10.1	6.2
25–29 years	14.5	14.1
30–34 years	18.4	18.4
35–39 years	20.5	19.1
40–44 years	18.8	20.6
45–49 years	14.9	20.9
<b>Residence situation (%)</b>		
Urban	91.2	92.7
Rural	8.8	7.3
<b>Great region (%)</b>		
North	9.3	10.6
Northeast	25.3	23.9
Southeast	41.2	37.8
South	13.4	14.9
Center-West	10.8	12.8
<b>Years of schooling (%)</b>		
0–7 years	13.3	7.1
8–11 years	45.8	38.0
12 years or more	40.9	68.7
Period Fertility (PTFR)	1.51	1.30
Cohort Fertility (CTFR)	2.3	1.9

Source: Own estimates based Brazilian Censuses 2000 and 2010.

Regionally, the more developed Southeast remained predominant in percentage of public servants, while the North and Center-West gained relative participation in 2010. This occupational group is overwhelmingly urban, with over 90% of public servants residing in urban areas. These changes in demographic and educational profiles set the context for the subsequent analysis of fertility determinants within this key occupational group.

**Figure 2:** ASFR for female public servants, Brazil, 2000 and 2010.

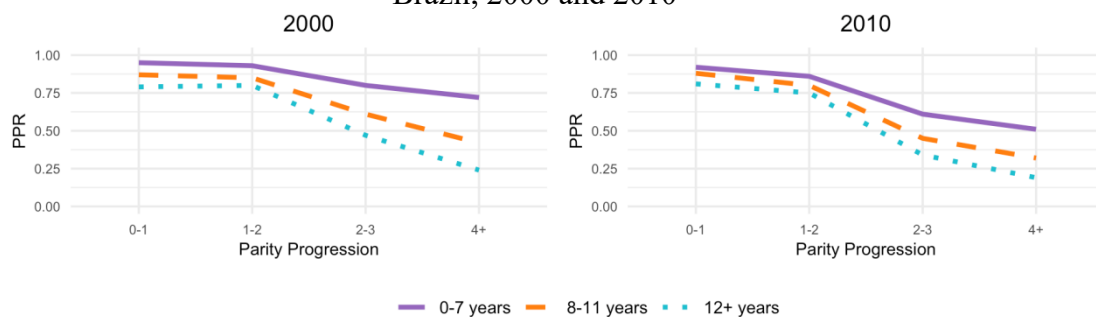


Source: Own estimates based Brazilian Censuses 2000 and 2010.

The fertility levels among female public servants remain low, with the period TFR declining slightly from 1.51 to 1.30 children per woman between 2000 and 2010, reaching lowest low levels in the last census. The cohort TFR estimated at 2.3 and 1.9 respectively, suggests that part of fertility is recovered later in life, indicating partial compensation at older ages. Moreover, the ASFRs reveal a clear shift toward delayed childbearing: while fertility peaked at ages 25-29 in 2000, by 2010 the peak had moved to 30-34 years. These patterns confirm that the decline in period fertility among public servants is primarily driven by the postponement of motherhood rather than a definitive reduction in completed family size.

The PPRs confirm the central role of education in shaping fertility patterns (Figure 3). In both years, an inverse relationship was observed: the higher the educational level, the lower the probability of progressing to subsequent birth orders. While differences between educational groups were evident in 2000, they became lesser pronounced by 2010, particularly in the transition from the second to the third and 3 to 4+ children in all educational groups.

**Figure 3:** PPRs for female public servants by years of schooling aged 45-49, Brazil, 2000 and 2010



Source: Own estimates based Brazilian Censuses 2000 and 2010.

Women with 12 or more years of schooling exhibited significantly lower progression probabilities to higher birth orders, whereas those with up to seven years of schooling maintained notably higher levels of parity progression. These findings indicate that higher educational attainment directly contributes to reduced family size, even for public servant women within a labor context that might otherwise offer greater job stability and support for conciliate motherhood and labor market participation.

The SEM results (Table 3) show that education is the main factor associated with fertility among public servants, exerting both direct (on fertility) and indirect (on MACB) effects that reduces fertility. In 2000, years of schooling had a significant negative direct effect on period fertility, while in 2010 the effect became mostly indirect, mediated by delayed childbearing via MACB. Furthermore, the education consistently reduced lifetime fertility, confirming its long-term influence on reproductive outcomes.

**Table 3:** SEM for PTFR and CTFR, women public servants, Brazil, 2000 and 2010.

Variables	PTFR 2000	PTFR 2010	CTFR 2000	CTFR 2010
Education indirect effect on MACB				
Average years of schooling	0.35***	0.38***	0.34***	0.35***
Direct effect of covariates on fertility				
MACB	-0.46***	-0.68***	-0.11*	-0.04
Average years of schooling	-0.27**	-0.04	-0.45***	-0.46***
% women aged 35+	-0.06	-0.15**	-0.36***	-0.39***
% women in adm. sector (ref.)	—	—	—	—
% women in health sector	-0.16**	-0.11	0.07	0.14**
% women in education sector	-0.16**	-0.17**	-0.01	0.09

Source: Author's elaboration. \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

The results underscore the central role of delayed fertility and its contribution to the observed low fertility levels. This is clearly highlighted by the increasing mean age at childbearing and the higher share of women aged 35 or above within the sample. In contrast, the effects of the area of actuation within the public sector were comparatively small. Specifically, the analysis showed slightly lower period fertility in the health and education sectors compared to the administration sector. However, when examining cohort fertility, the health sector exhibited a slightly higher effect.

#### 4. Conclusion

The findings indicate that fertility among Brazilian female public servants reflects both educational selectivity and the institutional context of time to achieve a public employment. Public servant lower and delayed fertility are closely linked to education and postponement. Hence, this postponement could be more than just a mere investment in years of schooling. It can also indicate the time spent to achieve such occupational status. The persistence of low fertility, even among women with job stability, suggests that public job institutional guarantees alone do not offset the opportunity costs of motherhood and the long time to obtain a public job. These findings illustrate how education and professional trajectories shape reproductive outcomes within Brazil's context of low fertility.