

EXTENDED ABSTRACT

THE EFFECTS OF FERTILITY ON FEMALE LABOR SUPPLY IN BRAZIL FOR
DIFFERENT PARITIES

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Introduction

The relation between fertility and labor supply decision of parents, especially married women, is widely discussed in the literature in developed and developing nations (Souto-Maior, 1990; Goldin, 1997; Angrist & Evans, 1998; Maron & Meulders, 2007¹). The interest in the impacts of fertility on labor supply is motivated by the changes in the socioeconomic and cultural status of women in recent decades (Becker, 1981; Scorzafave, 2001). Also, in several countries, such as Brazil, female labor supply increased at the same time total fertility rate declined rapidly, increasing the debates on on the possible causal effects between the two variables (Rios-Neto, 1996; Goldin & Katz, 2002).

Economic theory suggests that labor supply and fertility decisions, for females, are not independent and are, perhaps, related to other household decisions. In some sense, one can expect that the decision whether or not to have children to be correlated to the participation and the status of the women in the labor market. This relation might have been strength by economic development and social and cultural changes that had a significant impact on the labor supply of females not only regarding entering the labor force but also in the intensity of work (hours worked per week).

Brazil is an interesting case to be studied. Total Fertility Rates (TFR) are declining rapidly. In less than four decades the total fertility rate dropped from 6 children per woman to about 2 children per women. Recent estimates from the 2006 Demographic and Health Surveys indicate a TFR of 1.8 children per women. During the same time, female labor supply went from less than 30% to over 60%. There is also huge socioeconomic differences in fertility and female labor supply, the more developed regions of the country have very high female labor force participation and low fertility, but in recent years it is been observed a convergence process (Costa, 1990; Wajnman, Queiroz & Liberato, 1998; Bruschini & Lombardi, 1996).

The objective of this paper is to estimate the impacts of fertility on female labor supply, especially mothers. The problems interpreting causality between fertility and labor supply arise from the fact that these decisions are jointly made by women (Angrist & Evans, 1998). So, since fertility variables are not exogenous in female labor supply models, estimations of the causal effects of children on work decisions are, in general, based on variables that work as a source of exogenous variability in family size.

¹ MARON, L.; MEULDERS, D. The child effect on parents employment in Europe. Versão preliminar. Mar. 2007.

This paper contributes to the literature by using different, some of them not used before according to our knowledge, quasi-natural experiments to estimate fertility effects. In addition to that, the paper speculates whether birth order plays an important role on the relation between fertility and labor supply.

The empirical evidence in Brazil and Latin America shows that fertility decisions have affected female status in the labor market, the labor intensity – hours worked per week (Pazello, 2006), and the decision to enter the labor market (Lérida, 2006). In common, all the previous studies do not consider different birth orders. But, there are reasons to believe, for example, that the first child is the one with the strongest effect on women's labor market decisions (Lérida, 2006).

This paper estimates the effect of fertility on labor supply decision for women of different parities using five different events related to early death of a child. We consider information on abortion (miscarriage), stillbirth and child mortality (early neonatal, neonatal and infant mortality) to estimate the effects of the first, second and third (or more) child on mother's labor supply decisions.

In the estimation of the first child, we compare women with no children but that had, at least, one abortion (treatment group) to those who have only one child and did not experienced similar event (control group). We repeat this exercise four more times, considering the different events describe before. This way, we obtain five estimations of the first child effect on women's work decisions. In the case of the second child (second birth order), we estimate similar models, but comparing mother with one child who have experienced, at least once, the death of one child (treatment group), to those with two children and who did not experienced similar event (control group). Thus, we have five more models, but this time considering the effects of second birth order. Lastly, when estimating the effects of the third child, we compared women with two children and previous child(ren) or fetal(s) mortality experience(s) to mothers of three children without experiencing this kind of event. So, in total, we estimate fifteen different models on the possible impacts of fertility on female labor supply.

In all models we assume that for both woman (control and treatment) pregnancy was a planned event, thus it could have impact their labor decisions. We also control for several variables that might be related to the occurrence of child mortality or interrupted pregnancy (Pazello & Fernandes, 2004; Eller et. al., 2006, among others). These

estimations allow us to test the effect of different birth orders on the fertility-labor relation, and besides, they work as robustness checks.

Data and Methods

We make use of the National Household Sample Survey (PNAD), carried out in 1984. The survey is performed annually by the Brazilian Institute of Geography and Statistics (IBGE) since 1971, except in Population Censuses years (1970, 1980, 1991 and 2000) and in 1994. PNAD collects information on education, labor, income and housing. Each year, a special supplement is also included in the survey.

In 1984, PNAD carried out a special supplement on birth history for all women aged 15 to 54. The questionnaire includes questions on number of births, child mortality, dates of birth and deaths, as well as information on miscarriage and stillbirth (including the date when it happened). Thus, it is possible to investigate whether different parities have different effects on women's labor supply.

We focus our analysis on the 'worked for pay' indicator variable and report estimates of the childbearing effects on women's labor supply using logistic regression models.

Based on the fact that abortion/stillbirth occurrence as well as child mortality are, in general, associated with socioeconomic conditions (França et. al., 2001; Schoeps et. al., 2007; Assis, Machado & Rodrigues, 2008), we control for variables related to these conditions, such as income (familiar mensal income ignoring the proper women earnings), schooling, residence area and household infrastructure.

In addition to these variables, all the fifteen estimated models include a variable that indicates the occurrence of a child or fetal mortality. This is our variable of interest, which means that, with a mathematical transformation, its coefficient provide us the marginal effect of having a kid (first, second or third – or more – kid, depending on the parity analyzed) on mother's labor supply decision.

For example, regarding the marginal effect interpretation, if we compare women with no children to women with one child, a positive effect (of the 'mortality event' indicator) means that women without children present a larger probability of being in the labor force than the one who experienced the event. In other words, it means that having a child (first) may reduce female labor force participation in Brazil.

Preliminary Results

Descriptive statistics

Table 1 shows descriptive statistics for one model, that compares woman who experience a stillbirth to those who have not. The results indicate the association between stillbirth occurrence and poverty characteristics, already suggested in the literature (Pazello, 2004; Eller et. al., 2006). Women in the control group (women that never had a stillbirth) are more educated, have higher income, are largely white compared to the treatment group (women that experienced, at least, one stillbirth). Moreover, there are more women in the control group living in developed areas and in more structured households.

In addition, the group that experienced a stillbirth has a larger proportion of women working for pay. In fact, this is a good sign, since we may expect that a woman that planned to have a child, but lost her/him soon, could have fewer restrictions to be back to the labor market.

It is also important mentioning that these descriptive statistics were also made for the other four variables related to the child or fetal mortality used on this paper. But, as the interpretation do not change significantly, we opted only to show the comparison between women with a stillbirth occurrence to those without experiencing this event.

TABLE 1

Selected characteristics distribution (%) and average - 15 to 49 years old women, by treatment (experienced, at least, a stillbirth) and control (never experienced) groups - Brazil - 1984

Characteristics	T ¹	C ²	Dif ³
<i>Sociodemographic</i>			
Average number of children	2.25	2.53	-0.29 ***
White (%)	45.81	53.46	-7.65 ***
Married (%)	92.51	90.97	1.54 ***
Household head (%)	7.98	9.10	-1.12 ***
Average age	29.15	27.40	1.75 ***
Average years of education	3.57	4.86	-1.29 ***
<i>Geographic</i>			
Residence region			
South	13.08	14.81	-1.73 ***
Southeast	39.96	43.10	-3.14 ***
North	3.41	3.17	0.24 ***
Northeast	36.15	31.74	4.40 ***
Center Weste	7.40	7.18	0.22 ***
Residence situation			
Urban	63.24	72.94	-9.70 ***
Residence area			
Metropolitan	23.83	31.24	-7.41 ***
<i>Household (in the household you live, there is...)</i>			
At least, one bathroom	70.47	79.25	-8.78 ***
General water system	48.77	62.31	-13.54 ***
Garbage collection service	39.44	50.59	-11.15 ***
Electricity	61.53	76.39	-14.86 ***
<i>Occupational</i>			
Working for pay	30.77	26.14	4.62 ***
Average familiar income ⁵	269336.30	382092.02	-112755.72 ***
Average non-working income ^{4 5}	225044.02	330867.20	-105823.18 ***
Works, at least, 40 hours by week (%) ⁵	16.60	15.06	1.54 ***
Observations	565	25,903	-

Source: IBGE/Pnad 1984.

Notes:¹T = Treatment (experienced, at least, a stillbirth); ²C = Control (never experienced); ³Difference test: T - C; Null hipotesis: T = C; *** significant a 1%; ⁴ Non working income = familiar income minus woman earnings; ⁵We considered null income and working hours to whom didn't work, that's why sample size is always the same, including these variables.

Estimated effects

Table 2 shows the estimated marginal effects of the first, second and third (or more) child on women's labor supply decision. The first point that stands out refers to the fact that having a child reduces the probability of a mother to be in the labor market. Moreover, by analyzing the results we observed an interesting tendency: the first and third children affect more negatively labor supply decisions in comparison to the second child. In another way, the children effect on female force participation by parity seems to have a 'U' shape curve.

We speculate that the first child as representing a new context to which the mother, and the household, needs to adapt. When a mother has a second kid the previous experience with the first one can make this adaptation easier (economies of scale). But, the negative effect of a third (or beyond) child increases again, meaning that having more than two children can represent a big burden to the time allocated to work in the family.

TABLE 2

First, second and third (or more) child marginal effect on women participation in the labor market (%) - 15 to 49 years old women - Brazil - 1984

Variable proxy to fertility	First child	Second child	Third (or more) child
Stillbirth	-9.2271 (0.1160)	-2.0111 (0.6400)	-11.7166 (0.0450)
Abortion (miscarriage)	-12.6882 (0.0000)	-3.4605 (0.0320)	-7.8329 (0.0000)
Early neonatal mortality (before 7 days)	0.1017 (0.9880)	-3.5942 (0.2740)	-7.1561 (0.0120)
Neonatal mortality (before 28 days)	-2.2288 (0.6340)	-6.1424 (0.0330)	-9.5059 (0.0010)
Infant mortality (before a year)	-6.1736 (0.1780)	-6.0339 (0.0020)	-7.0793 (0.0010)

Source: IBGE/Pnad 1984.

Note: P-value in parenthesis.

Finally, the coefficients estimate (for each parity) before allows us to simulate the female labor force participation and project the labor force considering the changes in fertility over time in Brazil. We use PNAD data from 1984 to 2007 to estimate labor force participation rates using the marginal effects estimated for 1984 and compared to the observed values for the same years.

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