The Impact of Access to Free Childcare on Women's Labor Market Outcomes:
Evidence from a Randomized Trial in Low-income Neighborhoods of Rio de Janeiro

by

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1. Introduction

Brazilian women entered the labor force at a rapid pace in the past decades. The female labor force participation (LFP) rate rose from 41.2 percent in 1990 to 64 percent in 2007, which is just below the OECD average of 65 percent. In comparison, only 44 percent of women in comparable upper-middle income countries in Latin America (Mexico and Chile) participated in the labor force. This increase in female LFP was driven mainly by married women (Soares 2002) and women with children, including small children (Brischini and Lombardi 2003). The trend has not been offset by a decline in the proportion of working fathers which indicates an increase in the need for child care.

Policy makers in Brazil have started to respond to the increased demand for child care associated not only with the rise in the female labor force participation, but also because access to child care for children ageing 0 to 5 has become a constitutional right (Article 7 of the Constitution). Municipal governments are responsible for ensuring access to day care and pre-school to all children under 6 years of age.

While the country is far from being able to provide services to guarantee those rights, political pressure, especially from low income families, is mounting. This is similar to what is happening in other parts of the world. In OECD countries interest is growing in more universal subsidies for early child care/education, as offered in many nations in Europe. In Canada, the province of Quebec introduced universal subsidies for child care over the 1997–2000 period, and a central debate of the 2005–6 federal election was a plan for a national child care program. In the United States, universal preschool initiatives have been passed by states such as Georgia, New York, and Oklahoma. The controversy over California's Proposition 82 reveals the conflict this issue provokes. Unfortunately, many of these debates continue without the benefit of evidence on the consequences of such policies.

Publicly financed and/or provided child care can be justified under grounds of redistribution or positive externalities. Governments may decide to subsidize child care and early childhood education if social gains surpass the private gains of families demanding services. On the other hand, governments may decide to subsidize child care costs to low income family to ensure equal opportunity to child

development and parent's careers. In either case, public subsidies may come at a cost of higher taxes and therefore reduced economic efficiency.

Moreover, if governments not only fund but also provide child care services, it is possible that such policies "crowd out" the private provision of care, with no net increase in child care use or labor supply to the market. This would imply in a higher fiscal cost since recovery of taxes from higher incomes generated by beneficiaries would be smaller.

Finally, and most importantly, the impacts on child development and family outcomes may be ambiguous depending on the implications of time spent in child care versus time spent with the parents. For instance, Baker, Gruber and Milligan (2008) find evidence of negative effects on a variety of child outcomes, parenting, and parent outcomes. Child outcomes are worse for a variety of parent reported measures, such as anxiety, aggressiveness, motor and social skills, child health status, and illness. Measures of parenting and family function are also negatively affected, and there is some evidence of deterioration in parental health and a reduction in parental relationship quality.

Our evaluation research of publicly provided child care in the municipality of Rio tries to answer the following three questions. First, how large is the increase in labor force participation of mothers due to the increased access to free child care? Second, what does the increase in labor force participation, if any, suggest about the net cost of the policy (subsidies offered minus new tax revenue collected)? Fourth, does public provision crowd out private provision? Finally, what effect does any change in child care (and associated increases in labor force participation) have on child and family outcomes?

This paper addresses the first four questions listed above.[1] In pursuing this goal, we use a special data set collected in 2008 to evaluate the impact of Rio de Janeiro's program that expands access to free publicly provided child care to families living in the city's low income neighborhoods. The empirical strategy relies on the fact that in November of 2007, the city government decided to carry a lottery to select 10,000 children out of a pool of approximately 24,000 applicants for the 2008 enrollment period.

[1] Field work to estimate the impact of access to child care services on child outcomes is currently being carried

Therefore, many eligible households who had applied were randomly excluded from the program by being placed in a waiting list. A sample of 4,348 applicant children was drawn, in which 2,174 (50%) of them were lottery winners and the remaining were from those placed in the waiting list. Between June and October of 2008, four to eight months after services had started, interviews were carried with the families of those children to measure their basic socio-economic indicators, to assess the validity of the randomization and to estimate the impact of access to child-care on mothers' labor market outcomes.

We find that access to free publicly provided child care services led to a very large increase in the use of care (from 51 to 94 percent), a considerable increase in mothers' employment (from 36 to 46 percent), and a almost doubling in the employment of mothers who were not working before the lottery took place (from 9 to 17 percent). We find no statistically significant impact on hours worked for mothers who were employed, however. This rise in mothers' employment is associated with a modest increase in household incomes of 16 percent (from an average of R$569 to R$661 per month). This difference of approximately R$91 is well below the monthly cost of service per child estimated at approximately R$250.

Finally, we also find robust evidence that the public provision of free child care crowds out private provision, even in low income neighborhoods. While none of the lottery winners enrolled their children in private day care centers, a third of the children left in the waiting list did so. Therefore, given that the estimated income impacts are smaller than the cost of public provision, direct transfers via vouchers for child care may be more cost effective than subsidized care via public provision.

The paper is organized as follows. In the next section we provide an overview of female labor force participation in Brazil. In Section 3, we review the literature on the impact of access to child care services on female labor market outcomes. In Section 4, we describe the city Rio de Janeiro's child care program being evaluated. Section 5 explains the empirical strategy. In Section 6 we discuss the estimation results and a brief conclusion is provided in Section 7.

2. Female labor force participation in Brazil

Brazilian women entered the labor force at a rapid pace in the past decades. The female labor force participation rate rose from 41.2 percent in 1990 to 64 percent in 2007 (fig 1). Studies have shown that the increase was driven mainly by married women (Soares 2002) and women with children, including small children (Brischini and Lombardi 2003). The trend has not been offset by a decline in the proportion of working fathers which indicates an increase in the need for formal or informal child care.
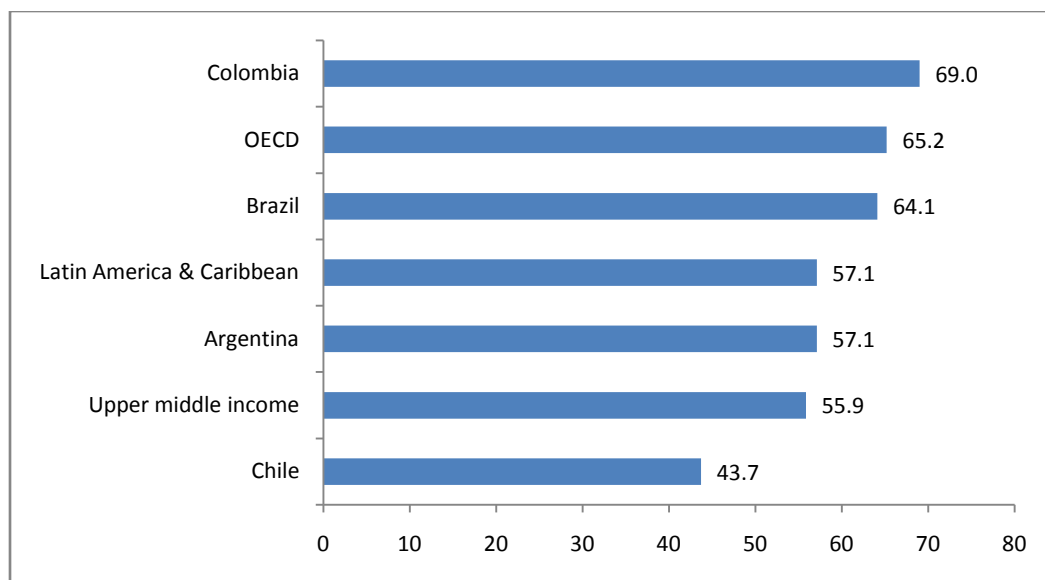
Fig. 1 Female Labor Force Participation, 1980-2005
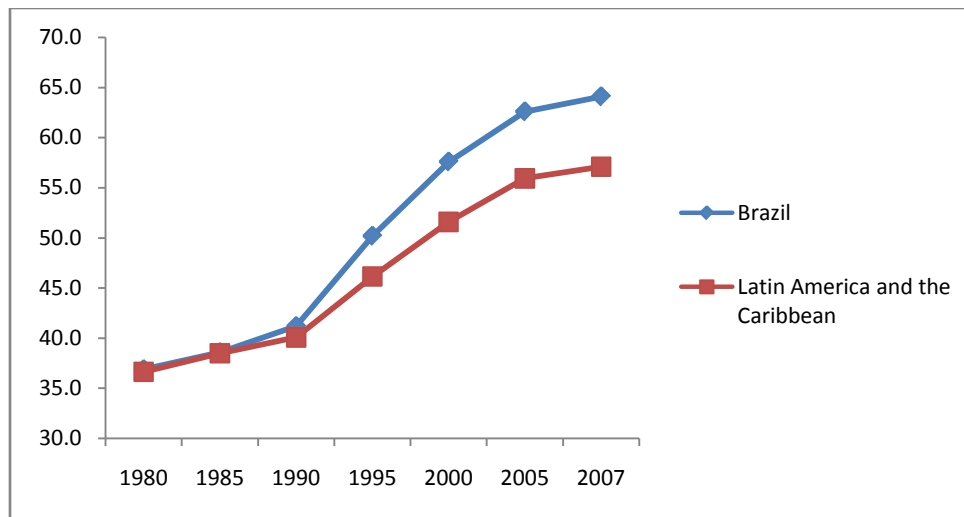
Source: World Development Indicators

As a result of these impressive gains, women in Brazil participate in the labor market at almost equal rates as the OECD average, and at higher rates than most Latin American countries at comparable levels of income. In 2007, the female labor force participation rate in Brazil was 64 percent, just below the OECD average of 65 percent. In comparison, only 44 percent of women in comparable upper-middle income countries in the region (Mexico and Chile) participated in the labor force.

Fig. 2 Female Labor Force Participation, 2007

Colombia	69.0
OECD	65.2
Brazil	64.1
Latin America & Caribbean	57.1
Argentina	57.1
Upper middle income	55.9
Chile	43.7

Source: World Development Indicators

However the quality of Brazilian women's participation in the labor force is still an issue. A first indication of this is the fact that gender wage gaps remain high in Brazil when compared to regional standards (Salas and Leite 2007; Atal, Ñopo and Winder 2009). Furthermore, informal employment is significantly more common among women compared to men. 53.1% of women are engaged in informal work as opposed to 46.2% for men (CEDLAC 2007). Finally, unemployment rates are higher for women, in particular young women. While 22 percent of women aged 15-24 are unemployed, only 13 percent of young men are.

Fig. 3 Unemployment Rates, 2007
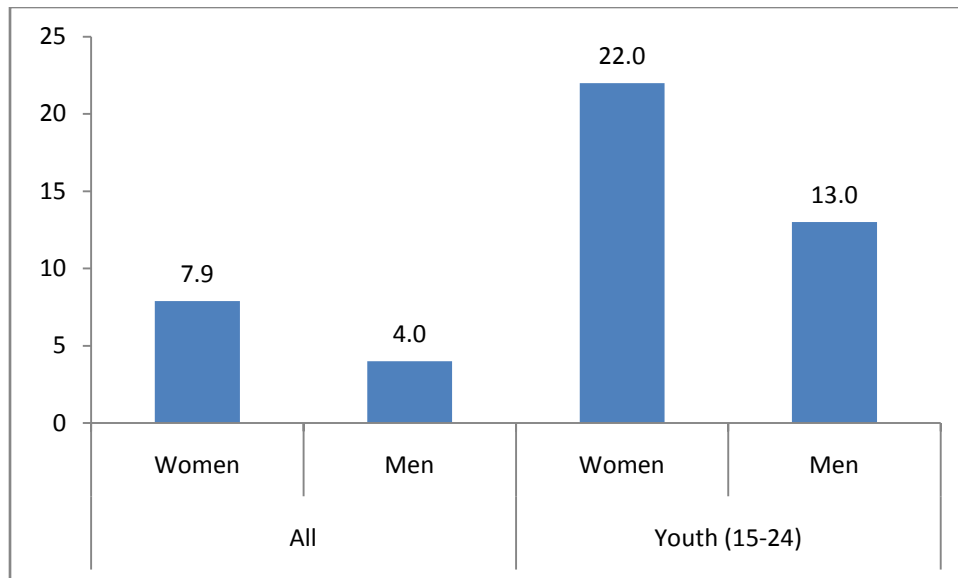
3. What we know about the impact of child care on maternal labor supply

It is hypothesized that differences in male and female employment outcomes, is in part explained by the conflicting demands on women's time as both primary caretakers and income earners, and a trade-off between reproductive and productive roles (Quisumbing et al. 2007).

How does access to childcare affect mothers' labor supply? The literature exploring the relationship between childcare and maternal labor force outcomes in developing countries is vast and strongly supports the hypothesis that the availability childcare is intimately linked to parental labor market participation and income, in particular that of mothers. In other words, most studies from developed countries find significant effects of childcare or pre-school programs on female employment.

In the US, research has focused on estimating the impact of child-care *costs* on the labor supply of women, viewing access to childcare as one of the determinants of female labor supply. Most studies that measure the elasticity of female labor force participation with respect to the cost of childcare show a negative relationship. In other words, when the price of child care falls,

maternal labor force participation increases. Anderson and Levine (2000) and Blau and Currie (2004) provide in-depth reviews of this body of literature. Blau and Currie (2004) show that while in all studies, lowering the price of childcare increases mother's labor force participation, estimates of this elasticity however vary greatly, with lower magnitudes registered in studies with a greater exogenous variation in child care costs. Results from other developed countries corroborate the evidence of a positive link between childcare and female labor force participation (see for instance Gustafsson and Stafford 1992, Lokshin 2000, Fong and Lokshin 2000, Baker et al. 2008)

A second strain of the literature investigates the impact on the labor supply *and* welfare dependence of single mothers (Garfinkel et al. 1990), Michalopoulos et al. 1992, Connelly 1990, Berger and Black 1992, Kimmel 1995). With few exceptions (notably Blau and Robins 1991, and Leibowitz et. al 1992), the vast majority of these studies indicate that lower child-care costs not only significantly increase women's labor supply and earnings, but also reduce welfare caseloads.

Evidence from the more restricted literature from developing and middle-income also shows a strong positive link between access to childcare and maternal labor force participation. In Latin America, there is a small but growing body of evidence on the impact of specific childcare and pre-school programs. Evaluations of policies and programs in Argentina (Berlinski and Galiani 2005), Colombia (Attanasio and Vera-Hernandez 2004, Peña-Parga and Glassman 2004, Ribero 2003), and Guatemala (Quisumbing 2005) all show a strong positive relationship between access to child care and female labor force participation. For instance, Berlinski and Galiani (2007, 2009) evaluate the expansion of pre-primary school facilities (targeted to children 3 to 5 years of age) in Argentina and find a positive impact on maternal employment. Similarly, Attanasio and Vera-Hernandez (2004) find large positive effects on female labor supply and child nutritional status in their evaluation of a community nursery program in Colombia.

A recent study of the considerable expansion of childcare facilities in Chile since 2007, however finds no positive impact on mothers' labor market participation. This may at first seem surprising given that Chile has one of the lowest female labor force participation rates in the region, especially for women in low-income households. One possible explanation is that the new child care facilities simply substitute for informal childcare arrangements. Another possible explanation is the impact of cultural and religious principles. Contreras and Plaza (2004) finds a strong negative relation between cultural values of the head of household and spouse, and their disposition with respect to female labor participation and child care arrangements.

In the case of Brazil, while there has been no evaluation of the impact of *actual* access to child-care on labor supply, earlier studies have looked at the negative effects on maternal labor force participation of the presence of children and how this interacts with the presence of alternative caregivers in the household (Sedlacek and Santos 1991, and Connelly et al. 1996). Presence of children has a negative impact on mother's labor force participation; presence of other adult females in the family mediates this impact. In addition, estimates of the relationship between childcare services, labor force participation and earnings in low-income areas in Rio de Janeiro suggests that expanded supply of low-cost childcare would increase mothers' labor force participation and earnings (Deutsch 1998).

These studies however do not provide robust measures of the impact of unmet child-care needs on women's decision to work and earnings. By estimating the impact of child-care indirectly through the composition of the household these open up for the usual causality identification problem. That is, because demographic composition is likely endogenous and determined by the same unobserved household (or women's) characteristics that determine employment, these studies are most likely overestimating the impact of unmet child-care needs on employment.

A key limitation of the existing evidence in Latin America – especially in light of the current push to expand child care coverage - is the lack of studies that jointly estimate the economic impacts and the impacts on children's development outcomes. Daycare programs can only be effective if they not only improve maternal labor market outcomes, but also do not negatively affect child health and development. Hence, relevant public policy conclusions can only be drawn when this full set of outcomes is evaluated. Finally, it is highly plausible that daycare programs have positive impacts on siblings and other household members as well. Freeing up the time these members normally spend caring for children may have positive impacts on their schooling and/or employment.

Studies from developed countries that have looked at the impact of childcare on child outcomes such as nutrition, health and development, generally find a positive impact of childcare. Zoritch et al. (2000) review eight randomized and quasi-randomized controlled trials (US only) and conclude that daycare had positive effects on child development, maternal employment and mothers' interaction with their children. At the same time, however, the authors emphasize the urgent need for higher quality studies in this area. More recently, however, an evaluation of subsidized, universally accessible childcare in Quebec finds not only significant increases in maternal labor supply but also evidence suggesting that children in childcare are worse off by a range of early childhood development measures (Baker et al. 2008).

Finally, it is highly plausible that daycare programs have positive impacts on siblings and other household members as well. Freeing up the time these members normally spend caring for children may have positive impacts on their schooling and/or employment.
The relative paucity of evidence in the literature on impacts of subsidized childcare in low-income households indicates the need for carefully designed evaluation studies.

4. The Child Care Program in Rio de Janeiro

The Rio de Janeiro's public day-care program is an integrated Early Childhood Development program for children ages 0-3 living in low-income neighborhoods. The program consists of a variety of center-based interventions, including full time daycare, health services, food, and provision of instructional toys and material for children. As of January 2008, there were 244 day-care centers providing these services spread around most low income neighborhoods of Rio. In addition, the program foresees involvement by parents as a way of improving knowledge about good parenting practices. In sum, it is expected that access to these well equipped and properly managed day-care centers, by providing a nurturing and stimulating environment for disadvantaged children, will: (i) boost human capital accumulation by the poor, and (ii) encourage mothers to seek employment and increase their earnings, thereby improving their own well-being and the well-being of their households.

5. Estimating the Impact of Access to Publicly Provided Day Care on Women's LFP

This study takes advantage of a lottery carried by the municipal government of Rio de Janeiro in 2007 to identify the causal relationship between access to day care and maternal labor market outcomes. Thus, the impact identification strategy is based on random assignment into treatment and control groups. Every year, the government of Rio offers approximately 10,000 new slots for center-based day care for children ages 0-3. In 2007, as in past years, demand for these slots far outstripped supply. More than 25,000 families applied for the 10,000 new slots. To ensure equality of opportunity, a lottery was carried to assign the slots among all eligible applicants (approximately 24,000 out of the 25,000). New beneficiary children started to receive services in February of 2008.

Between June and October of 2008, a survey was carried on a sample of 4348 households. The sample was evenly distributed between families of lottery winners and losers. In addition to a variety socio-economic indicators, the survey gathered information on current and past labor

market outcomes of mothers in the treatment and the control groups. While most treatment children were already receiving services when the survey went to the field, recall data were also collected on pre-program labor force participation to test the validity of the random assignment.

Because compliance with the random assignments into treatment and control groups was not perfect, an Instrumental Variable (IV) approach is undertaken to estimate the Local Average Treatment Effect (LATE). Specifically, while 94 percent of the treatment children enrolled in day care centers which were either publicly or privately provided, but publicly funded, 51 percent of the control children enrolled as well.

The IV estimator of the LATE can be implemented as follows:

$$(1) \ LATE_{IV} = E[Y_i|d_i=1] - E[Y_i|d_i=0] \ / \ [\ P(z_i=1|d_i=1) - P(z_i=1|d_i=0) \ ],$$

where Y_i is the value of the outcome variable for woman i (e.g., if Y_i is labor force participation, $Y_i=1$ if woman i participates in the labor force, and is zero otherwise), d_i is a dummy variable indicating whether a woman is the mother of a child who won the lottery, ($d_i=1$ if woman i's child belongs to the treatment group, and is zero otherwise), and z_i is a dummy variable indicating whether a woman is the mother of a child enrolled in free day care, regardless of whether she won the lottery.

Thus, if $d_i=1$ and $z_i=1$, the child was selected into the treatment group by winning the lottery, and took up the program by enrolling into day care. If $d_i=1$ and $z_i=0$, the child was selected into the treatment group, but did not enroll into any of the publicly provided or funded day cares. If $d_i=0$ and $z_i=0$, the child was selected into the control group, and did not enroll as expected. Finally, if $d_i=0$ and $z_i=1$, the child was selected into the control group, but was able to enroll into a publicly funded day care center.

Hence, the denominator in (1) is the difference in the propensity of enrolling children in free day care centers between treatment and control children. That is, $P(z_i=1|d_i=1)$ is the

probability of a woman's child enrolling in a free day care, given that she won the lottery and was selected into the treatment group. On the other hand, $P(z_i=1|d_i=0)$ is the probability of a woman's child enrolling in a free day care, given that she lost the lottery and was selected into the control group. From our sample, we estimate that $P(z_i=1|d_i=1)$ is 94 percent and $P(z_i=1|d_i=0)$ is 51 percent. Therefore, we estimate that the denominator in (1) is equal to 41 percentage points.

The numerator in (1) is known as the intent to treat effect. That is, it is the difference in expected value of the outcome variable of interest between women in the treatment and control groups, regardless of the actual enrollment of their child in a publicly funded day care center. For example, in the case of labor force participation, $E[Y_i|d_i=1]$ is the probability of woman i participating in the labor force given that her child won the lottery and was selected into the treatment group. $E[Y_i|d_i=0]$ is therefore the probability of woman i participating in the labor force given that her child lost the lottery and was selected into the control group. Note that the intent to treat effect and the LATE would be identical if compliance was perfect. That is, if every child in the treatment group had enrolled in a free day care, and no child in the control had done the same, the intent to treat effect and LATE would be identical.

To measure the impacts of the program on most indicators of child development and women's labor force participation with enough statistical power, it was estimated that a sample of approximately 2,000 treatment and 2,000 control children and respective families would be sufficient. The final sample was of 4348 children, that is, 2174 treatment and 2174 control. Of these 4348 children, 3777 (87 percent) were found during the survey undertaken between June and October of 2008, seven to nine months after the lottery was carried and four to six months after services started. Of these, 49.4 percent were from the control group and 50.6 percent were from the treatment group. Therefore, attrition bias does not seem to be a problem in the sample.

6. Results

Table 1 below shows the results of the computation of the intent to treat effects (*ITTE*) and $LATE_{IV}$ estimators with the data in our sample. The first four columns of numbers show the computation of the intent to treat effect, without the IV correction. The last four columns show the estimation of the $LATE_{IV}$. First note that winning the lottery significantly induces families to enroll their children in free publicly funded or provided day-care centers. 94 percent of lottery winners enrolled their children in such centers, versus 51 percent for lottery losers.

In terms of labor market outcomes, both the *ITTE* and $LATE_{IV}$ estimates are statistically significant for maternal employment rates, labor force participation rates, albeit only at the 10 percent significance level, unemployment rates, but not for hours worked. Focusing on the $LATE_{IV}$ estimates, we see that enrollment in publicly provided or funded day care seems to increase maternal employment rates by 27 percent (from 36 to 46 percent), labor force participation rates by 8 percent (from 74 to 79 percent), and reduce maternal unemployment by 16 percent (from 50 to 42 percent).

More impressive are the estimated impacts on employment rates for women who did not work at all during the six months preceding the start of services. For this sub-population, the provision of free day care seems to increase employment rates by 97 percent (from 9 to 17 percent). For the sub-population that did work some during the six months preceding the start of services, there was no significant impact on reducing the probability of them becoming unemployed after services started. These impacts on employment rates seem to be stable throughout the months as indicated by the results in each month. Note that the impacts on employment rates for each month are larger than the impact on current employment because the month by month variable measures whether a mother worked at least once during each month. In contrast, the current employment variable measures whether the mother is working at the time the question was asked.

Overall, access to free day care seems to significantly impact maternal labor market outcomes in the extensive margin. Mothers become significantly more likely to enter labor the labor force and find employment. Nevertheless, mothers already employed do not seem more likely to work more hours when gaining access to child care.

Another question of policy interest is whether the provision of free child care crowds out private supply of paid care. The last two rows in Table 1 suggest that it does. As it can be seen, winning the child care lottery seems to reduce the demand for privately paid centers by 100 percent. In the overall population, while 6 percent of the mothers who lost the lottery enrolled their children in private centers, none of the lottery winners did the same. For the sub-population of mothers who used to have their children enrolled in private centers before the lottery, the drop in demand is even more drastic. Of these, 33 percent still demanded private care if they lost the lottery. None of the lottery winners did so.

Finally, we look at the impact of access to free day care services on household income. As shown in the last row of Table 1, the $LATE_{IV}$ estimates indicate that there is a positive and statistically significant average impact of access to free day care of R$92 per month. However, this impact is considerably smaller than the monthly public cost of service per child estimated at approximately R$250. Figure 1 shows estimates of the conditional impact by age of the mother. As indicated, the impact on household income is highest for mothers ageing around 30 years. Nevertheless, even at age 30 the impact is considerably smaller than the estimated cost of service.

7. Conclusions

Despite the rapid pace in which Brazilian women have entered the labor force in the past decades, many are still constrained by the lack of access to proper child care, especially those living in low income areas of the country. The literature exploring the relationship between childcare and

maternal labor force outcomes in developed countries is vast and supports the hypothesis that the availability of child care is intimately linked to parental labor market participation and income, in particular that of mothers. Nevertheless, most of the studies present in the literature employ observational data which implies that robust estimation of a causal relationship is less likely.

In the case of Brazil, there has been no evaluation of the impact of *actual* access to child-care on labor supply. Earlier studies have looked at the negative effects on maternal labor force participation of the presence of children and how this interacts with the presence of alternative caregivers in the household, but no reliable estimates exists of the actual impact of access to child care services.

With this study we aim to contribute to enhancing the current state of knowledge in this field by analyzing the impact of access to free publicly or privately provided child care in low-income neighborhoods of Rio de Janeiro on women's labor market outcomes. Robust estimation of these impacts is possible because the government of Rio decided to randomize access to its public day-care program via a lottery. Of the approximately $25,000 families that applied to the city's day-care program in November of 2007, 10,000 children were randomly selected to receive services. We use this policy experiment to estimate the causal effect of access to child care on maternal labor market outcomes.

The results indicate that access to free child care significantly impact maternal labor outcomes in the extensive margin. Employment and labor force participation rates are substantially boosted, while unemployment rates are reduced. The impacts are particularly strong for new comers to the labor force. For mothers who were not working before being offered free child care, there was an almost 100 percent increase in employment rates.

Nevertheless, our results also indicate that subsidies to child care via public provision may crowd out private providers. None of the lottery winners who previously enrolled their children in

private centers did the same after services started. Further research should investigate these crowd-out effects more deeply so that a more thorough analysis of welfare gains of such programs can be conducted. Public provision should perhaps be compared to publicly funded/privately provided schemes in terms of their relative welfare impacts.

Finally, our results indicate that access to free child care does boost household incomes. However, the estimated magnitude of the income effects is much smaller than the cost of provision. If the main objective of providing access to free child care is to boost women's economic opportunities and incomes, governments should perhaps explore more cost effective alternatives. Nevertheless, further research is needed to assess the impact of access to child care on early childhood development. If impacts on child development are large, the current high costs of service provision may be justifiable.

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Table 1: Impact Estimation Results

Outcome Variables	Intent to Treat Impact Estimates				Instrumental Variables Estimates of LATE			
	Control	Treated	Impact(1)	Std. Errors(1)	Not Enrolled	Enrolled	Impact(1)	Std. Errors(1)
Observations	1865	1912			1865	1912		
% Children are enrolled in free day-care, public or private	50.7%	93.9%	43.2%	1.3% **	50.7%	93.9%		
% of mothers currently working	41.1%	45.2%	4.2%	1.6% **	36.2%	45.8%	9.6%	3.7% **
% of mothers working or looking for work	76.6%	79.0%	2.5%	1.4% *	73.7%	79.4%	5.7%	3.1% *
% of unemployed mothers	46.4%	42.8%	-3.6%	1.8% **	50.4%	42.1%	-8.3%	4.1% **
Average current hours worked per day if mother is working	8.22	8.18	-0.04	-0.04	8.27	8.17	-0.10	0.28
Average current hours worked per day if mother worked in 2nd semester 2007	8.33	8.37	0.04		8.28	8.37	0.09	0.31
Average current hours worked per day if mother was working just before lottery (October and November 2007)	8.35	8.40	0.05		8.29	8.40	0.12	0.32
% of mothers who worked at least once in 2008	38.6%	46.2%	7.7%	1.6% **	29.5%	47.3%	17.8%	3.7% **
Of mothers who did NOT work at least once before the lottery in 2007, % who worked at leat once in 2008	13.0%	16.5%	3.6%	1.5% **	8.7%	17.1%	8.4%	3.4% **
Of mothers who worked at least once before the lottery in 2007, % who also worked at leat once in 2008	86.8%	87.6%	0.8%	1.8%	86.0%	87.7%	1.7%	4.0%
% of mothers who worked in Jan 2008	31.3%	37.9%	6.6%	1.5% **	23.6%	38.8%	15.2%	3.6% **
% of mothers who worked in Feb 2008	31.7%	38.2%	6.5%	1.5% **	24.0%	39.2%	15.1%	3.6% **
% of mothers who worked in Mar 2008	32.6%	38.4%	5.8%	1.6% **	25.8%	39.3%	13.5%	3.6% **

Table 1: Impact Estimation Results

Outcome Variables	Intent to Treat Impact Estimates				Instrumental Variables Estimates of LATE			
	Control	Treated	Impact(1)	Std. Errors(1)	Not Enrolled	Enrolled	Impact(1)	Std. Errors(1)
% of mothers who worked in Apr 2008	33.4%	38.9%	5.5%	1.6% **	26.9%	39.7%	12.7%	3.6% **
% of mothers who worked in May 2008	33.8%	39.9%	6.1%	1.6% **	26.7%	40.8%	14.1%	3.6% **
% of mothers who worked in Jun 2008	34.4%	40.3%	5.9%	1.6% **	27.4%	41.1%	13.7%	3.7% **
% of mothers with children enrolled in privatly paid day-care centers	5.8%	0.0%	-5.8%	0.5% **				
% of mothers with children in private day-care before the lottery, who also used private day-care in 2008 (204 observations)	33.0%	0.0%	-33.0%	5.7% **				
Monthly Household Income	R$615.6	R$655.2	R$39.6	R$15.4 **	R$569.3	R$660.8	R$91.5	R$35.7 **

(1)   Percentage signs in this column represent percentage points

    ** Statistically different from zero at the 5% level. *Statistically different from zero at the 10% level

Figure 1: Estimated Impact on Household Income by Mother's Age

Impact of Child-Care on Household Income
by Age of Mother

Source: Authors' estimation