



# Childcare effects on maternal employment: Evidence from Chile<sup>☆</sup>

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## ABSTRACT

Using a randomized experiment, this study examines whether offering afterschool care for children aged between 6 and 13 has an impact on labor market outcomes for women in Chile. The results show that program participation increases employment by 5% and labor force participation by 7%, while the intervention also generates substantial childcare substitution. The results also suggest that the provision of afterschool care for older children triggers the use of free daycare for young (ineligible) children.

## 1. Introduction

There are significant differences in labor market engagement and outcomes between males and females. Worldwide, female labor force participation (FLFP) reached 55.3%, whereas male labor force participation was 81.7% in 2014. Figures are similar in Latin America, where FLFP had increased steadily in the last decade, reaching 58.4% in 2014 (55.6% in Chile).<sup>1</sup> Women also work less, and earn less than males (World Bank, 2011).

Access to the labor market is one dimension of gender equality, which has a value by itself or as a tool for growth (Duflo, 2012). FLFP has been considered a high-return poverty alleviation strategy, as female-headed households are concentrated in the lowest income quintiles in Latin America (Araujo and López-Boo, 2015).

Women spend more time on housework and childcare, and consequently less time working (Berniell and Sánchez-Páramo, 2011). In Latin America, 51.6% of women report domestic and care-related activities as the main reasons for non-participation. For men, the corresponding figure is 3.2% (ILO, 2013).

In this context, providing free childcare could increase FLFP. In this paper, we test this hypothesis by investigating the effect of providing free childcare services for school-age children (aged 6–13 years) on childcare use, FLFP (employment and job searching) and other female employment outcomes using experimental variation in the assignment

of slots for a public afterschool program in Chile. We also investigate the extent to which the provision of free childcare substitutes other childcare arrangements. We stratified by working status at baseline and children's age, which allows us to investigate heterogeneities in these dimensions.

The program offers three hours of daily afterschool childcare at educational institutions throughout the school year. Oversubscription to the program allowed us to randomize applicants into a treatment (N=1,137) and a control (N=973) group. Randomization was conducted at the individual level among applicants in 25 schools where the program was introduced in 2012.

If childcare time and cost decreases female labor engagement, providing free or subsidized childcare should affect FLFP and potentially female employment. Testing this causal effect is complex because variations in childcare access and prices may not be exogenous to employment decisions. An extensive body of literature has investigated this relationship mostly for younger age groups (preschool) in highly developed countries with relatively high FLFP rates.<sup>2</sup> These studies use non-experimental methodologies, using childcare expansions, discontinuities in eligibility or other policy changes to address this causal effect.

Results for the US and Canada and European countries with similar FLFP are mostly positive (Gelbach, 2002; Baker et al., 2008; Lefebvre and Merrigan, 2008; Nollenberger and Rodríguez-Planas, 2015),

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<sup>1</sup> Source: World Bank Gender Statistics.

<sup>2</sup> Both Blau and Tekin (2007), and Blau and Currie (2006) summarize some of this vast literature.

generally finding that childcare use increases the probability of employment by ten percentage points. Other papers find stronger positive effects, but only for single mothers (Fitzpatrick, 2012; Cascio, 2009; Goux and Maurin, 2010).<sup>3</sup>

The literature for Latin American countries is scantier and it is focused on young children. Berlinski et al. (2011) and Berlinski and Galiani (2007) find positive effects of early school attendance and pre-primary availability in FLFP in Argentina, with effect sizes similar to Gelbach (2002). For Chile, several papers analyze whether the expansion of the public pre-school system had any effect on mothers' employment, finding no impact on participation and employment rates (Medrano, 2009; Encina and Martínez, 2009; Manely and Vasquez, 2013; Aguirre, 2013). Only Bentancor (2013) finds positive effects on employment rates of highly educated women.

As far as we know, there is no evidence on the impact of afterschool programs in mother's outcomes in developing countries, and only three studies in developed countries, all of them with non-experimental identification strategies.<sup>4</sup> Felfe et al. (2013) in Switzerland, Lundin et al. (2008) in Sweden, and Bettendorf et al. (2015) in the Netherlands, find inconclusive results, with effects ranging from zero in Sweden to increases in FLFP of 8 percentage points in Switzerland.

Our intention-to-treat (ITT) estimation shows a 3.4 percentage-point increase (almost 5% of the control group average) in the likelihood of a mother working at least one month during the 8-month window of observation. There is also a 4.3 percentage-point increase in the likelihood of a mother's participation in the labor market every month that the program is available (7% of the control group average). These effect sizes are on the low side of what has previously been found in the literature.

The program also increases household educational expenditure, which is consistent with an increase in income, either directly through the labor market effect or indirectly through decreased spending on childcare. We observe a high rate of substitution between free and paid care: offering childcare services increases the likelihood of non-maternal childcare during program hours (an increase of 6 percentage points, or 12% relative to the control group).

The labor market effects are stronger for mothers that had younger non-eligible children. Furthermore, our results imply that the program elicited the use of preschool care for young children not eligible for the program. This is consistent for women with both eligible and non-eligible children who must find care for all their children in order to enter the labor market. This highlights the importance of taking into consideration the existence of other institutional arrangements when designing a specific program.

In this context, our research offers four important contributions to the literature. First, to the best of our knowledge, this is the first randomized control trial of an afterschool program that measures the impact on caregiver outcomes. Moreover, it is conducted in a low-middle income country with an FLFP that is average for the Latin American and Caribbean region. Second, this study reveals the existence of an extensive substitution effect among the different types of childcare. Third, we provide evidence consistent with the relevance of the context; particularly, how widespread free preschool services affect the impact of an afterschool program. Finally, the program is implemented by the government and its scalability is therefore proven.

The remainder of this paper is organized as follows. Section 2 describes the background and the program details. In Section 3, we present the experimental design, and in Section 4, the data used in the

analysis. The empirical strategy is presented in Section 5, the results in Section 6, and Section 7 provides a discussion and conclusions.

## 2. Background and program details

### 2.1. Background

Despite the significant growth in FLFP in Chile in the last two decades of more than 20 percentage points, women represent only 40% of the total labor supply. Labor force participation (LFP) is particularly low among less educated women, women with both pre-school and school-age children, and women belonging to low-income households. The gap between male and female LFP in Chile is approximately 25 percentage points, and increases to 30–35 points when considering the lifecycle periods associated with birth and childcare.<sup>5</sup> The participation rate of women in the top income decile is more than double that of women with no education or those who have not completed primary school. A similar difference in FLFP rates occurs between the top and bottom deciles.<sup>6</sup>

Many women cite childcare as the main reason they do not seek employment. In the first two quintiles,<sup>7</sup> 20% of women with children aged between six and thirteen claim to forego job-seeking because they must take care of their children. Among women who also have younger children (zero to five years old), the figure is 30%.

Because 39% of all households and 51% of poor households in Chile have female heads, increasing FLFP has been considered a powerful poverty reduction strategy. Since 2006, the Chilean government has greatly expanded public childcare for children younger than five with the double objective of improving child human capital and FLFP rates.<sup>8</sup> Between 2006 and 2013, the availability of public childcare increased by over 450% for children up to the age of two and by 50% for children aged between three and five. Moreover, Aguirre (2013) reports that the attendance rate was low among infants and toddlers (around 9%) but higher for children who were aged three to five (48%). However, as previously mentioned, several studies have found that the FLFP has not been sensitive, on average, to this expansion.<sup>9</sup>

These facilities for children under 6 years old, are increasingly offering childcare until 7 p.m., and therefore are compatible with full-time work (typically from 9:00 a.m. to 6:00 p.m.).<sup>10</sup> Women face additional constraints if they have older children: the school day at public primary schools ends at 4:00 p.m. four days a week and around 1:00 p.m. on the fifth day.<sup>11</sup> For first and second graders, the schedule is even shorter; school ends at 1:00 p.m. every day. This half-day school schedule is not compatible with full-time work while the supply of part-time jobs is very limited (Rau, 2010). In this context, mothers who could place small children in full-time childcare facilities and work

<sup>5</sup> These figures are taken from the 2013 National Socioeconomic Characterization Survey (hereafter CASEN (2013)).

<sup>6</sup> However, over the last 20 years, the participation gap among women from different socioeconomic strata has decreased because women with lower education and from lower-income households have led the increase in global participation rates. The FLFP rate in the bottom quintile increased by almost 70% compared to a 44% rise in the top quintile. The increase in FLFP among less-educated women (up to incomplete secondary education) was 35% vs. only 13% among women with higher levels of education.

<sup>7</sup> All these figures come from CASEN (2013).

<sup>8</sup> The main objective of this policy, introduced during the first presidential period of Michelle Bachelet, was to level children's access to pre-school; however, the next government led by Sebastián Piñera also focused on providing childcare but with the purpose of increasing female labor force participation. The program evaluated in this paper was included in this agenda.

<sup>9</sup> The most recent ones are Vasquez (2013), Aguirre (2013) and Bentancor (2013).

<sup>10</sup> Public childcare schedules generally run from 8:30 a.m. to 4:30 p.m.; however, some childcare centers offer longer schedules that end at 7:00 p.m.. From 2006 to 2011, the share of vacancies in this type of program grew from 20% to 65%.

<sup>11</sup> The regulation of school length applies to the numbers of hours per week. Schools decide how to complete these hours during the school week. In our sample, the most common schedule is from 8:00 a.m. to 3:30 p.m. from Monday to Thursday and from 8:00 a.m. to 1:00 p.m. on Fridays.

<sup>3</sup> For European countries with high FLFP, such as Sweden and Norway, the evidence is mixed but with mostly zero effects (Havnes and Magne 2011; Lundin et al., 2008).

<sup>4</sup> Previous randomized evaluations, as reported by Blau and Currie (2006), have focused on children's outcomes. Among them, LoSciuto et al. (1996, 1997) find positive effects on several indicators of school success (including graduation rates and attendance), positive attitudes at home, and teenage pregnancy rates among other outcomes, but the authors do not focus on mothers' labor market outcomes.

might not do so because they have no childcare provision for older children after school hours.

## 2.2. The afterschool program

Chile's 4–7 Program first started in 2011. The program offers three hours of afterschool care in an educational establishment for children aged six to thirteen years while their mothers or caregivers are working, seeking work, attending training courses, or attending formal educational programs. The 4–7 Program's main objective is to foster the insertion and labor attachment of mothers and/or women responsible for the care of children by providing afterschool educational and recreational activities (SERNAM, 2012).<sup>12</sup>

Initially, municipalities applied to participate in the program.<sup>13</sup> According to SERNAM, municipalities were selected based on whether there were other existing programs in the community, whether there were a large number of children in the eligible age range in municipal schools, and whether the municipality had a relatively high proportion of economically active women compared to the regional average. The selected municipalities identified the educational establishments in which the program would be implemented from among the municipal schools without existing childcare programs for working women.<sup>14</sup> Children from other schools could attend the program.

SERNAM determined the number of beneficiary children at each institution, which ranged from 50 to 100 depending on local needs, local conditions, expected demand, and other factors. The number of children in the program determined the assignment of personnel. In 2012, the program was run in 87 schools, and 6,750 vacancies were available.

Applicants completed an application form at the schools where the program was to be implemented in March. The application form asked the applicant whether she was working, seeking work, unemployed, involved in training courses, or completing an educational program. SERNAM's objective was to offer the program to those that “really needed it” and who intended to be active in the labor market. The eligibility requirements for beneficiaries were as follows: mothers and/or women responsible for at least one child between the ages of six and thirteen; mothers and/or women over the age of eighteen and working or living in the municipality of the educational institution where the program would be implemented or with at least one child studying at that institution; and mothers and/or women scoring below 14,236 on the Ficha de Protección Social (*Social Protection Score*).<sup>15</sup> This self-reported labor force participation requirement was not verified by SERNAM during the application process or the year of implementation.

The program was implemented after school hours, five days a week (Monday–Friday), starting in either March or April of 2012 and ending

in December 2012. The budget cycle of the implementing institution only allowed it to guarantee the program for the calendar year. The program's hours could be adjusted depending on the school's schedules, but childcare provision was mandatory for at least three hours a day.<sup>16</sup> The program offered sessions related to schoolwork and other extracurricular activities. Sessions related to schoolwork were intended to develop study skills (and allow children to complete some of their homework); extracurricular activities were designed to enhance children's abilities in areas such as arts and culture, sports, health, and information technology.

## 3. Experimental design

The experimentally designed evaluation was carried out in 25 schools (in 21 municipalities) that offered the program for the first time in 2012. Women had to fill-out an application form at the participating school. These applications were then sent to the research team's office, where the data was entered. Once the data was cleaned, spots were randomized among eligible applicants. Selected individuals were called by SERNAM to be offered a spot in the program.<sup>17</sup> Individuals in the control group were not called. Mothers had to sign a registration form to enroll their children. The application process and awareness-raising activities were carried out by SERNAM. The timeline of the study is available in Fig. 1.

Randomization was possible due to oversubscription in each school where the program was offered. The unit of randomization was the mother; if an applicant was assigned to the treatment group, positions were offered to all children under her care. This was done to respect the program's objective of helping women to find employment. The average oversubscription was 77% of the available slots.

Stratified randomization was performed within each school using two variables consistently reported in the literature as being strongly correlated with FLFP: labor history (measured by whether the applicant was working at the time of application), and the presence of young children (measured using a dummy variable equal to one if the applicant takes care of children younger than five years old). These variables were chosen because work attachment and the presence of young children are among the strongest predictors of female labor market outcomes.

To assess the quality of the intervention, a process evaluation<sup>18</sup> was carried out at the end of 2012 to gather quantitative and qualitative information on the program's implementation. The participating schools received visits during which details on session implementation, children's attitudes towards the program, staff qualifications, and other factors were collected.<sup>19</sup>

Although the selection process of the participating schools could affect the external validity of the results, we could not find observable differences in school size, vulnerability, mother's employment and labor force participation, and daycare availability with comparable schools. See Appendix 1 for details.

## 4. Data

We use the program application data as a baseline, and a one-year household follow-up survey (conducted between March and May 2013)

<sup>12</sup> SERNAM (Servicio Nacional de la Mujer) is the governmental agency that coordinates and finances the implementation of the program. Municipalities can execute the program directly or outsource it to non-profit entities. SERNAM transfers resources to the municipalities to support program implementation. In addition, the Ministry of Education collaborates with SERNAM to define the program's technical and pedagogical orientation.

<sup>13</sup> Applications included an expression of interest, identification of the municipality's participating institutions, the number of children who would attend at each school, and the specifics of the program that would be provided with session types and subjects. Additionally, applications had to specify the group of children who would be included in the program, the number of sessions, and those responsible for leading each session.

<sup>14</sup> Preference was given to institutions that taught up to eighth grade, provided a commitment letter from the principal, had the necessary infrastructure, and demonstrated a sustained increase in SIMCE outcomes (SIMCE stands for *Sistema de Medición de Calidad de la Educación*, or System of Measurement of the Quality of Education).

<sup>15</sup> In addition to these selection criteria, the program reserves a maximum of 10% of the vacancies for non-targeted special cases based on the authorization of SERNAM's Regional Director. The *Ficha de Protección Social* is a socioeconomic instrument used by the Chilean government. It aims to identify and prioritize sections of the population that are eligible for social benefits by measuring their vulnerability or “risk” of being in or falling into a state of poverty. A score below 14,236 points is equivalent to being in the most vulnerable three quintiles.

<sup>16</sup> One school implemented the program in the morning, because its schedule was in the afternoon. One school in our sample ran a schedule from 2:00p.m., starting immediately after lunch. In 70% of the schools in the sample, the program started at 3:30–4:00p.m. and ended around 6:30–7:00p.m.. In the 2012 program, the program was not offered during the winter break or on national holidays.

<sup>17</sup> This was also done personally if telephone contact was not possible.

<sup>18</sup> The process evaluation was done by an external company (Ekho, [www.ekho.cl](http://www.ekho.cl)).

<sup>19</sup> The process evaluation provided valuable information for this study. The average number of students observed in the sessions on the first visit was 17.6, and some children participating in the program were not listed on the sign-up sheet. Additionally, 65.2% of the visited institutions included students from other establishments in the program.

| Year | Month     | Event                                           |
|------|-----------|-------------------------------------------------|
| 2012 | March     | Enrollment/ Program starts                      |
|      | April     | Program starts                                  |
|      | May       |                                                 |
|      | June      |                                                 |
|      | July      |                                                 |
|      | August    |                                                 |
|      | September |                                                 |
|      | October   |                                                 |
|      | November  | Visits for process evaluation                   |
|      | December  | Visits for process evaluation/ Program finishes |
| 2013 | January   | Follow-up survey                                |
|      | February  | Follow-up survey                                |
|      | March     | Follow-up survey                                |

Fig. 1. Timeline.

to measure outcomes. In this survey women were asked to describe their 2012 labor history, childcare engagement, and program participation among others.

Because individuals were aware of the eligibility criteria and since the baseline is the administrative data collected in the application process, it is possible that these questions were answered strategically. The follow-up survey was conducted by an independent company after the program had finished. Therefore, these data are less likely to have strategic answers in the final survey.

For employment and labor force participation we use three measures: being active at least one month, every month, and number of months active in the period May–December 2012. For labor income and hours worked, we use the monthly income earned in the last (current) job held in the same period. We also measure expenditures in the last month. Finally, we use a stress index defined according to the Cohen-Kamarck-Mermelstein scale adapted for Chile by [Tapia et al. \(2007\)](#).

Take-up and labor market outcome variables are measured over the period May–December 2012.<sup>20</sup> We measure take-up according to the reported use of the program in the follow-up survey. If the child attended the program at least once a week in any given month, we code it as participating in the program.<sup>21</sup> We also report childcare use by younger (ineligible) children from the survey. We present a detailed description of these variables in [Online Appendix 2](#), while [Appendix 3](#) presents the original questions included in the follow-up survey for labor market outcomes.

We did not use administrative data to measure take-up and attendance because it is unreliable. During the process evaluation, it was observed that class rosters did not include all the children present in the room, and that many children in the roster were not attending. Furthermore, about two thirds of the visited schools could not produce a class roster when asked. For these reasons, we rely on the follow up survey to construct our measure of take up.

## 5. Summary statistics

[Table 1](#) presents the data on the outcome of the randomization process. There are 973 women in the control group and 1,137 in the treatment group. [Table 1](#) shows that 1,834 of the 2,110 participants in the evaluation (86.9%) were surveyed at end line.

Twenty-four percent of the women in the control group reported that their children attended the program; in the treatment group, this

**Table 1**  
Compliance rates.

|           | Base Line | Follow-up | Participating in the program | Participation Rate II |
|-----------|-----------|-----------|------------------------------|-----------------------|
|           | [1]       | [2]       | [3]                          | [4]=[3]/[2]           |
| Control   | 973       | 852       | 206                          | 0.24                  |
| Treatment | 1,137     | 982       | 549                          | 0.56                  |
| Total     | 2,110     | 1,834     | 755                          |                       |

Note: Columns [1] and [2] indicate the number of applicants who were surveyed at the baseline and follow-up, respectively. The proportion of baseline observations repeated at follow-up is 0.88 for both groups. Column [3] presents the number of applicants who report having participated in the program (take-up). Column [4] indicates the participation rate.

figure was 56%. The level of take-up is important when considering the analysis of the program's effects because imperfect compliance affects the statistical power of the evaluation.

Column [1] of [Table 2](#) presents the descriptive baseline statistics for the individuals studied. The average per capita household income is around USD120, the LFP rate is 90%, and the reported occupation rate (for all program applicants) is 85%. It is important to note that this FLFP level is higher than the national average.

The applicants' average monthly income is USD254. On average, the participants worked for seven months in 2011. Half of the sample had an employment contract at the time of the baseline survey.

Given that a high proportion of applicants reported at the outset that they were either working or looking for a job, this might reduce the likelihood of identifying an impact on labor market outcomes, particularly among mothers who reported that they were already working.

Among those working, 34% were in the private sector, 30% were self-employed, and 12% and 15% were public servants and domestic workers, respectively. Only 5% of applicants reported being students. Twenty-six percent of the applicants had children younger than five; that is, below the eligibility age for the program.

The average number of children per household chosen to participate in the program is 1.32. At the bottom of [Table 2](#), we present summary statistics for the stratification variables. The larger strata, with 62% of the sample corresponds to women employed and without children younger than five at baseline (N=1,141), followed by working mothers with small children (N=369), and non-working mothers without small children (N=215), and with small children (N=109).

Columns [4] and [5] in [Table 2](#) present descriptive statistics for the treatment and control groups. Column [6] shows *p*-values for means-comparison tests between the treatment and control groups for certain key variables, ensuring that the sample is balanced in all variables at a 5% significance level. This suggests that the randomization was successful in creating comparable groups; thus, comparing post-intervention outcome variables between the treatment and control groups yields an appropriate estimate of the program's impact.

Regarding attrition, [Table 1](#) reported a 13% attrition rate. In [Table 3](#), we show that attrition is balanced: regardless of the controls included, the treatment dummy does not predict being observed in the follow-up survey. Therefore, attrition should not affect the internal validity of the results.

## 6. Empirical strategy

Our empirical approach is based on the random assignment of vacancies to the 4–7 Program among eligible applicants. Based on this allocation, we carry out an ITT analysis, comparing labor outcomes between the offered and unoffered places in the program.<sup>22</sup> That is, for individual *i*, in Strata *k*, who applied to the program in school *j*, the impact of an offer being extended to that individual on the outcome

<sup>20</sup> The exact date at which the program began is unknown, and it varied across schools between March and May 2012. The program was active in all schools by May; this is why all our outcome variables are for the period May–December.

<sup>21</sup> The patterns are similar if we measure it March–December (as the labor market outcomes), and if we use more stringent versions of take-up (based on more attendance).

<sup>22</sup> To be precise, those selected to be offered a slot.



**Table 2**

Balance between treatment and control group at baseline.

| Variables                                            | Average<br>[1] | SD<br>[2] | N°<br>[3] | Treatment<br>[4] | Control<br>[5] | P-value T=C<br>[6] |
|------------------------------------------------------|----------------|-----------|-----------|------------------|----------------|--------------------|
| Applicant age                                        | 37.39          | 8.95      | 1833      | 37.40            | 37.38          | 0.968              |
| Household per capita income                          | 120.34         | 88.70     | 1820      | 118.56           | 122.39         | 0.359              |
| Applicant monthly income                             | 254.34         | 209.08    | 1517      | 257.86           | 250.18         | 0.476              |
| Labor force participation rate                       | 0.90           | 0.31      | 1786      | 0.90             | 0.90           | 0.854              |
| Unemployment Rate                                    | 0.05           | 0.22      | 1601      | 0.05             | 0.05           | 0.939              |
| Occupation Rate                                      | 0.85           | 0.36      | 1786      | 0.85             | 0.85           | 0.918              |
| Hours of work (daily)                                | 8.65           | 9.26      | 1617      | 8.90             | 8.35           | 0.233              |
| Months Worked in 2011                                | 6.99           | 4.91      | 1703      | 7.13             | 6.83           | 0.217              |
| Have employment contract                             | 0.49           | 0.50      | 1303      | 0.51             | 0.48           | 0.237              |
| Years of Education                                   | 9.32           | 3.25      | 1778      | 9.35             | 9.29           | 0.709              |
| Proportion without education                         | 0.02           | 0.12      | 1787      | 0.02             | 0.01           | 0.542              |
| Primary school proportion                            | 0.39           | 0.49      | 1787      | 0.38             | 0.41           | 0.184              |
| Secondary school proportion                          | 0.53           | 0.50      | 1787      | 0.54             | 0.51           | 0.274              |
| College (and/or further) education proportion        | 0.06           | 0.24      | 1787      | 0.06             | 0.06           | 0.905              |
| Attending an educational institution                 | 0.05           | 0.23      | 1811      | 0.05             | 0.05           | 0.975              |
| Stress Index                                         | 7.09           | 3.86      | 1698      | 6.95             | 7.26           | 0.099              |
| Applicants with children less than 5 years old       | 0.26           | 0.44      | 1834      | 0.27             | 0.26           | 0.590              |
| Children signed up to the program by applicants      | 1.32           | 0.57      | 1834      | 1.30             | 1.34           | 0.116              |
| Proportion that receives childcare support           | 0.61           | 0.49      | 1478      | 0.62             | 0.60           | 0.584              |
| Strata 1: works and has children < 5 (N=369)         | 0.20           | 0.40      | 1834      | 0.21             | 0.20           | 0.527              |
| Strata 2: does not work and has children < 5 (N=109) | 0.06           | 0.24      | 1834      | 0.06             | 0.06           | 0.943              |
| Strata 3: works and has children > 5 (N=1141)        | 0.62           | 0.49      | 1834      | 0.61             | 0.63           | 0.337              |
| Strata 4: does not work and has children > 5 (N=215) | 0.12           | 0.32      | 1834      | 0.12             | 0.11           | 0.478              |

Note: Baseline survey data collected from March to May 2012. The sample size varies according to the amount of data without observations for each respective variable. Income is measured in US dollars. Columns [1]–[3] show the variable mean for the total of the sample, the standard deviation and the number of observations, respectively. Column [4] and [5] show the variable mean for the treatment and control group, respectively. Column [6] the p-value of the null hypothesis that Treatment=Control considering. \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.10.

**Table 3**

Attrition and base line characteristics.

|                                                      | Follow-up<br>[1]  | Follow-up<br>[2]    |
|------------------------------------------------------|-------------------|---------------------|
| Treatment                                            | –0.012<br>(0.015) | 0.011<br>(0.020)    |
| Household per capita income                          |                   | –0.000<br>(0.000)   |
| Applicant monthly income                             |                   | –0.000<br>(0.000)   |
| Unemployed                                           |                   | –0.100<br>(0.208)   |
| Hours worked                                         |                   | –0.001<br>(0.001)   |
| Months worked in 2011                                |                   | 0.002<br>(0.002)    |
| Have employment contract                             |                   | –0.009<br>(0.022)   |
| Attending an educational institution                 |                   | –0.008<br>(0.044)   |
| Self-confidence (adds score)                         |                   | 0.005***<br>(0.003) |
| Number of children enrolled to program by applicants |                   | 0.013<br>(0.018)    |
| Strata 1 works and has children < 5                  |                   | –0.093<br>(0.200)   |
| Strata 2 does not work and has children < 5          |                   | 0.127<br>(0.170)    |
| Strata 3 works and has children > 5                  |                   | –0.054<br>(0.199)   |
| Constant                                             | 0.876*<br>(0.011) | 0.911*<br>(0.207)   |
| R2                                                   | 0.000             | 0.013               |
| N°                                                   | 2,110             | 1,103               |

Note: Standard error in brackets. \*p < 0.1, \*\*p < 0.05, \*\*\*p < 0.01.

variable  $Y_{ijk}$  is estimated using Eq. (1):

$$Y_{ijk} = \alpha_{jk} + \beta T_{ijk} + \gamma X_{ijk} + v_{ijk} \quad (1)$$

where  $T_{ijk}$  is an indicator variable equal to one if the individual was assigned to the program, and  $v_{ijk}$  is an individual-specific error term.  $X_{ijk}$  represents a set of control variables (measured at the baseline): whether the applicant is the household head, her level of education, and the total number of children in the household.  $\hat{\beta}$  measures the ITT effect, that is, the impact of being offered a vacant slot in the 4–7 Program. If  $\hat{\beta}$  is significantly different to zero, the program has an impact on the interest variable  $Y_{ijk}$ .

All regressions include fixed effects by strata-school ( $\alpha_{jk}$ ). As we randomized within school-strata cells, we have to control for specific intercepts at this level. As the unit of analysis is the mother and we analyze labor market outcomes, we cluster at the municipality level to address the potential existence of local labor market shocks.<sup>23</sup>

The analysis focuses on the ITT; that is, we estimate the effect of *being offered* the program, not the effect of *using* the program. In our view, this is the appropriate focus because it considers the effect of the government offering the childcare option and letting every family decide the “treatment dose” of the program that they require. The intensity of the program requirements varies by family: some families might send children to the program every day, year-round, and others might limit their children's attendance to once a week only in the winter. Analyzing the effect of making the program available is also appropriate from a public policy perspective because all participants are offered but not obligated to use the vacancies. Additionally, defining “use” is complex in the case of this program. Given that it is an annual program, problems may arise when defining attendance, for example, is attending once a month in any given month sufficient or must it be year-round?

As a reference, given the imperfect compliance reported in Table 1, we estimate the LATE using an instrumental variable approach to the random assignment as the instrument for self-reported program participation. The IV results yield larger coefficients with no loss of

<sup>23</sup> In most cases we have one school per municipality, so clustering at the municipal level is very similar to clustering at the school level. We present results without clustering in Online Appendix 4.

**Table 4**  
Childcare use by children's age.

|                                                  | PARTICIPATION                              | Children 6–13 years old |                    | Children≤5 years old |                       |
|--------------------------------------------------|--------------------------------------------|-------------------------|--------------------|----------------------|-----------------------|
|                                                  |                                            | SUBSTITUTION            |                    | USE                  |                       |
|                                                  | Attend at least one day in any given month | Any Childcare           | Formal Childcare   | Formal Childcare     | Free Formal Childcare |
| Panel A: Whole Sample                            |                                            |                         |                    |                      |                       |
|                                                  | [1]                                        | [2]                     | [3]                | [4]                  | [5]                   |
| Treatment                                        | 0.290***<br>(0.039)                        | 0.059**<br>(0.028)      | 0.042**<br>(0.015) | 0.065*<br>(0.032)    | 0.055*<br>(0.030)     |
| Observations                                     | 1,778                                      | 1,684                   | 1,684              | 400                  | 400                   |
| R-squared                                        | 0.220                                      | 0.152                   | 0.160              | 0.131                | 0.149                 |
| Control group mean                               | 0.238                                      | 0.496                   | 0.074              | 0.078                | 0.067                 |
| Panel B: By strata                               |                                            |                         |                    |                      |                       |
|                                                  | [1]                                        | [3]                     | [4]                | [5]                  | [6]                   |
| T *Works at baseline and child≤5                 | 0.242***<br>(0.070)                        | 0.020<br>(0.057)        | 0.078**<br>(0.029) | 0.070*<br>(0.039)    | 0.048<br>(0.037)      |
| T*Does not Work at baseline and child≤5          | 0.318***<br>(0.072)                        | 0.041<br>(0.060)        | 0.023<br>(0.046)   | 0.047<br>(0.064)     | 0.081<br>(0.049)      |
| T*Works at baseline and child > 5                | 0.287***<br>(0.045)                        | 0.069**<br>(0.029)      | 0.027<br>(0.017)   |                      |                       |
| T*Does not Work at baseline and child > 5        | 0.385***<br>(0.079)                        | 0.081<br>(0.074)        | 0.074<br>(0.048)   |                      |                       |
| Observations                                     | 1,778                                      | 1,684                   | 1,684              | 400                  | 400                   |
| R-squared                                        | 0.221                                      | 0.152                   | 0.161              | 0.131                | 0.149                 |
| Control group mean                               |                                            |                         |                    |                      |                       |
| Works at baseline and child≤5                    | 0.235                                      | 0.500                   | 0.078              | 0.075                | 0.068                 |
| Does not Work at baseline and child≤5            | 0.229                                      | 0.319                   | 0.043              | 0.087                | 0.065                 |
| Works at baseline and child > 5                  | 0.249                                      | 0.543                   | 0.082              |                      |                       |
| Does not Work at baseline and child > 5          | 0.189                                      | 0.314                   | 0.035              |                      |                       |
| Test F (equal effects across strata) - p-value   | 0.469                                      | 0.795                   | 0.230              | 0.767                | 0.622                 |
| Test F (T*Children < 5=T*Children > 5) – p-value | 0.463                                      | 0.376                   | 0.228              |                      |                       |

Note: The follow-up survey data was collected from February to April 2013. The sample size varies according to the number of observations with missing responses for the respective variable. The table indicates the treatment impact (being offered the 4–7 Program) on the given outcome. Fixed effects at school-strata level are included in all regressions. The regressions also include additional controls for whether the applicant was the head of household, years of education, the number of children in the household, and the age of the applicant. Panel A presents the program's effects for the overall sample while panel B shows effects by strata. In the last two rows, we present p-values for two F tests. The first one tests the equality of coefficients across all the strata. The second one comes from a regression of the dependent variable on a treatment dummy, and this treatment dummy interacted with a dummy indicating if the mother had small children at baseline (same regressors and standard errors). Clustered standard errors at the municipality level are given in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \* p < 0.1.

statistical significance. These results are included in [Online Appendix 5](#).

To assess the potential complementarity between preschool childcare and the 4–7 Program, we explore the potential existence of heterogeneous effects by stratum (i.e., defined by employment status and the existence of young children). The equation estimated in this case is:

$$Y_{ijk} = \alpha_{jk} + \sum_k \beta_k S_{ijk} T_{ijk} + \varepsilon_{ijk} \quad (2)$$

where  $k$  is the stratum indicator,  $S_{ijk}$  is a dummy that takes the value of 1 if the individual belongs to stratum  $k$ , and  $\beta_k$  is the estimator of the program's effect on that stratum. Again all the models include a fixed-effect at the school-strata level ( $\alpha_{jk}$ ), so the impact of the program is identified through the within school-strata variation.

## 7. Results

In this section, we examine the treatment effect. We first discuss take-up, the extent of childcare substitution, and childcare use for younger children ([Table 4](#)), followed by labor market outcomes and stress index ([Tables 5 and 6](#)), and finally [Table 7](#) presents the impact of the program on household expenditure. The average impact of being offered a place in the program is presented in Panel A, and the strata-specific effects in Panel B of each table.

### 7.1. Take-up, childcare substitution, and childcare use for younger children

Free childcare allows mothers who have been taking care of their children in the afternoons to send them to the program and use this time for other activities. Mothers who already had childcare arrangements for their children might consider the new alternative to be a better option and substitute their existing childcare for the 4–7 Program ([Havnes and Magne 2011](#)). The use of this free formal childcare is the reason the program could affect labor market engagement.

We first report the participation rate for the treatment and control groups. In column [1] of [Table 4](#), it can be seen that there is a 29 percentage point-higher likelihood of attendance to the program in the treatment group.<sup>24</sup>

To study the extent of childcare substitution, we estimate a model in which the dependent variable takes the value of 1 if the child generally received non-maternal care (column [2], [Table 4](#)) or if he/she is taken care of by any formal institution (column [3], [Table 4](#)) during the 4–7 Program hours and zero if otherwise. It is worth stressing that columns [1] and columns [2]–[3] correspond to different strictness levels regarding the definition of program use or participation. In column [1], if a child attended the program only one afternoon, it is coded as participating, whereas in columns [2]–[3] the mother has to

<sup>24</sup> This figure is different to [Table 1](#) because in [Table 4](#) we use school-strata fixed effects.

**Table 5**  
Labor force participation and employment.

|                                                    | Labor Force Participation                        |                       |                                | Employment                                |                    |                    |
|----------------------------------------------------|--------------------------------------------------|-----------------------|--------------------------------|-------------------------------------------|--------------------|--------------------|
|                                                    | Participates (at least one month during May–Dec) | Participates (always) | Months Participating (May–Dec) | Works (at least one month during May–Dec) | Works (always)     | Worked Months      |
| Panel A: Whole Sample                              |                                                  |                       |                                |                                           |                    |                    |
|                                                    | [1]                                              | [2]                   | [3]                            | [4]                                       | [5]                | [6]                |
| Treatment                                          | 0.028<br>(0.018)                                 | 0.043*<br>(0.025)     | 0.296*<br>(0.164)              | 0.034*<br>(0.018)                         | 0.033<br>(0.024)   | 0.310<br>(0.192)   |
| Observations                                       | 1,767                                            | 1,767                 | 1,767                          | 1,767                                     | 1,767              | 1,767              |
| R-squared                                          | 0.207                                            | 0.207                 | 0.237                          | 0.217                                     | 0.195              | 0.237              |
| Control group mean                                 | 0.754                                            | 0.605                 | 5.395                          | 0.716                                     | 0.526              | 6.162              |
| Panel B: Strata                                    |                                                  |                       |                                |                                           |                    |                    |
|                                                    | [1]                                              | [2]                   | [3]                            | [4]                                       | [5]                | [6]                |
| T *Works at baseline and child ≤ 5                 | 0.046<br>(0.029)                                 | 0.088*<br>(0.046)     | 0.586**<br>(0.257)             | 0.052<br>(0.046)                          | 0.067<br>(0.056)   | 0.584<br>(0.460)   |
| T*Does not Work at baseline and child ≤ 5          | 0.095<br>(0.083)                                 | 0.188***<br>(0.064)   | 1.210***<br>(0.480)            | 0.080<br>(0.087)                          | 0.123**<br>(0.055) | 1.077**<br>(0.501) |
| T*Works at baseline and child > 5                  | 0.019<br>(0.020)                                 | 0.027<br>(0.033)      | 0.171<br>(0.196)               | 0.027<br>(0.020)                          | 0.015<br>(0.037)   | 0.146<br>(0.248)   |
| T*Does not Work at baseline and child > 5          | 0.013<br>(0.068)                                 | −0.007<br>(0.068)     | 0.085<br>(0.474)               | 0.019<br>(0.054)                          | 0.029<br>(0.058)   | 0.402<br>(0.558)   |
| Observations                                       | 1,767                                            | 1,767                 | 1,767                          | 1,767                                     | 1,767              | 1,767              |
| R-squared                                          | 0.207                                            | 0.208                 | 0.239                          | 0.217                                     | 0.196              | 0.238              |
| Control Group Mean                                 |                                                  |                       |                                |                                           |                    |                    |
| Works at baseline and child ≤ 5                    | 0.733                                            | 0.553                 | 5.112                          | 0.696                                     | 0.497              | 5.963              |
| Does not Work at baseline and child ≤ 5            | 0.438                                            | 0.229                 | 2.438                          | 0.396                                     | 0.146              | 2.292              |
| Works at baseline and child > 5                    | 0.819                                            | 0.690                 | 6.053                          | 0.793                                     | 0.606              | 7.019              |
| Does not Work at baseline and child > 5            | 0.578                                            | 0.400                 | 3.633                          | 0.478                                     | 0.311              | 3.578              |
| Test F (equal effects across strata) - p-value     | 0.676                                            | 0.077                 | 0.142                          | 0.857                                     | 0.443              | 0.290              |
| Test F (T*Children < 5 = T*Children > 5) - p-value | 0.301                                            | 0.095                 | 0.066                          | 0.462                                     | 0.325              | 0.270              |

Note: The follow-up survey data was collected from February to April 2013. The table indicates the treatment impact (being offered the 4–7 Program) on the given outcome. Fixed effects at school-strata level are included in all regressions. The regressions also include additional controls for whether the applicant was the head of household, years of education, the number of children in the household, and the age of the applicant. Panel A presents the program's effects for the overall sample while panel B shows effects by strata. In the last two rows, we present p-values for two F tests. The first one tests the equality of coefficients across all the strata. The second one comes from a regression of the dependent variable on a treatment dummy, and this treatment dummy interacted with a dummy indicating if the mother had small children at baseline (same regressors and standard errors). Clustered standard errors at the municipality level are given in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.10.

state that she uses some childcare during a regular week.<sup>25</sup>

If the program had only replaced other forms of non-maternal care (e.g. care by grandparents, private childcare) then we would not expect to see an impact on the share of children not-taken care of by their mothers. Instead, we do not find evidence of a complete substitution: the offer of a slot in the program increases the likelihood that a child will be regularly taken care of by a third party by 5.9 percentage points. As forty-nine percent of women in the control group report having a third party to take care of their children, this represents a 12% increase. Column [3] shows that the increase is in formal childcare. Together, these results imply that offering a slot in the program increases the use of childcare.

On the other hand, the results indicate substantial substitution in childcare. If the 4–7 Program's care were provided to all children who would otherwise have been taken care of by their mothers, the expected coefficient would be 0.50.<sup>26</sup> The results in Table 4 show that there is substantial substitution in childcare because the increase in care by third parties (5.9 pp.) is significantly lower than the potential 50 percentage point increase.

Finally, we study if the offering of the program could trigger the use

<sup>25</sup> In column [2] and [3] the question was “In a regular week, who took care of the children in the afternoon, before 7:00p.m.?”

<sup>26</sup> Fifty percent of the control group members were using external childcare in the follow-up. If 100% of the treatment group members were using external childcare, the treatment effect would be 50%.

of daycare. Young children can attend public preschools or accompany their mothers to work. Offering care for older children could remove the greatest childcare barrier, allow them to participate in the labor market, and increase the use of childcare for small children. If this were the case, the program should change the childcare patterns for young (ineligible) children. We study this hypothesis in columns [4] and [5] of Table 4, where we estimate the Eq. (1) only for the sample of mothers that have a toddler (child younger than five and ineligible for the 4–7 Program). The dependent variable takes the value of 1 if the mother reports that the toddler is usually taken care of by a formal (column 4)/ formal and free (column 5) institution during the 4–7 Program hours and zero if otherwise.

Being offered the program increases the use of formal childcare of children with less than 6 years old by 6.5 percentage points (column [4]). This is a substantial increase considering that the mean use in the control group is 7.8%. Column [5] shows that this effect is driven by an increase in the use of free (presumably public) childcare institutions, in a context in which the supply of free public childcare facilities increased substantially in the last decade in Chile.

These results are consistent with the hypothesis that an offer to participate in the program increases the likelihood that a targeted woman's young child will be sent to formal childcare.

## 7.2. Labor market outcomes: employment and participation

If the lack of afterschool childcare were a constraint on women's

**Table 6**  
Hours of work, income and stress.

|                                                      | Working Hours     | Total Income        |                     | Hourly Income      |                     | Stress Index         |
|------------------------------------------------------|-------------------|---------------------|---------------------|--------------------|---------------------|----------------------|
|                                                      |                   | Coefficient         | CI treatment effect | Coefficient        | CI treatment effect |                      |
| <i>Panel A: Whole Sample</i>                         |                   |                     |                     |                    |                     |                      |
|                                                      | [1]               | [2]                 | [3]                 | [4]                | [5]                 | [6]                  |
| Treatment                                            | 0.512<br>(1.122)  | 12.217<br>(8.151)   | [-62.7, 51.1]       | 0.306**<br>(0.138) | [-0.62, 0.70]       | -0.164<br>(0.440)    |
| Observations                                         | 1,681             | 1,666               |                     | 1,618              |                     | 1,665                |
| R-squared                                            | 0.189             | 0.217               |                     | 0.132              |                     | 0.123                |
| Control group mean                                   | 27.655            | 263.426             |                     | 1.846              |                     | 25.330               |
| <i>Panel B: Strata</i>                               |                   |                     |                     |                    |                     |                      |
|                                                      | [1]               | [2]                 | [3]                 | [4]                | [5]                 | [6]                  |
| T *Works at baseline and child ≤ 5                   | 1.127<br>(1.991)  | 18.707<br>(20.988)  | [-87.1, 71.1]       | 0.358<br>(0.377)   | [-1.09, 0.94]       | -0.235<br>(0.954)    |
| T *Does not Work at baseline and child ≤ 5           | 4.212<br>(3.812)  | 54.271<br>(34.015)  | [-132.0, 255.7]     | 0.580*<br>(0.311)  | [-3.33, 3.65]       | 0.513<br>(2.044)     |
| T *Works at baseline and child > 5                   | 0.600<br>(1.450)  | 12.216<br>(12.510)  | [-69.8, 57.4]       | 0.162<br>(0.166)   | [-0.69, 0.52]       | 0.184<br>(0.561)     |
| T *Does not Work at baseline and child > 5           | -2.762<br>(1.765) | -16.868<br>(34.239) | [-123.2, 93.4]      | 0.893**<br>(0.416) | [-1.78, 4.21]       | -2.343***<br>(0.777) |
| Observations                                         | 1,681             | 1,666               |                     | 1,618              |                     | 1,665                |
| R-squared                                            | 0.189             | 0.217               |                     | 0.134              |                     | 0.125                |
| Control group mean                                   |                   |                     |                     |                    |                     |                      |
| Works at baseline and child ≤ 5                      | 26.417            | 240.876             |                     | 1.747              |                     | 26.000               |
| Does not Work at baseline and child ≤ 5              | 12.830            | 106.969             |                     | 0.987              |                     | 23.045               |
| Works at baseline and child > 5                      | 31.066            | 301.363             |                     | 2.070              |                     | 25.132               |
| Does not Work at baseline and child > 5              | 17.747            | 169.865             |                     | 1.205              |                     | 26.464               |
| Test F (equal effects across strata) - p-value       | 0.063             | 0.437               |                     | 0.226              |                     | 0.020                |
| Test F (T *Children < 5 = T *Children > 5) - p-value | 0.430             | 0.386               |                     | 0.708              |                     | 0.934                |

Note: The follow-up survey data was collected from February to April 2013. The sample size varies according to the number of observations with missing responses for the respective variable. The table indicates the treatment impact (being offered the 4–7 Program) on the given outcome. Fixed effects at school-strata level are included in all regressions. The regressions also include additional controls for whether the applicant was the head of household, years of education, the number of children in the household, and the age of the applicant. Panel A presents the program's effects for the overall sample while panel B shows effects by strata. Income variables include zeros when the individual is not working. In the last two rows, we present p-values for two F tests. The first one tests the equality of coefficients across all the strata. The second one comes from a regression of the dependent variable on a treatment dummy, and this treatment dummy interacted with a dummy indicating if the mother had small children at baseline (same regressors and standard errors). Clustered standard errors at the municipality level are given in parentheses. \*\*\*p < 0.01, \*\*p < 0.05, \*p < 0.10.

engagement in the labor market, the offer of participation in the program would increase LFP during the period when the program was available. Labor force engagement is defined using three different measures: the likelihood of participating in the labor market during at least one of the months when the program was offered, the likelihood of participating in the labor market during all the months that the program was offered, and the number of months of labor market participation.

LFP and employment, and employment average effects are reported in Panel A of Table 5. The coefficients of the program's impact are always positive in sign, indicating a positive impact on these labor market outcomes. However, they are not always statistically significant. The result in Column [1] shows that the program has a positive but insignificant effect on the likelihood of participating for at least one month. However, as 75.4% of the women in the control group participated in the labor market for at least one month; the outcome might be close to its ceiling and, therefore, difficult to modify.<sup>27</sup>

On the other hand, being offered a slot in the program increases the likelihood of a woman participating in the labor market throughout all

the months (Column [2], Panel A). The point estimate indicates a 4.3 percentage-point increase, and represents a 7% increase with respect to the control group mean (this result is statistically significant at 10%). This result is consistent with the coefficient of Column [3], which shows that being offered the program also increases the duration of women's labor market participation by 0.3 months. Thus, we conclude that an offer to participate in the program increases FLFP.

In columns [4]–[6], the treatment effect is estimated over employment outcomes. Considering that the program should affect labor supply (participation) but not necessarily labor demand, we expect to find weaker effects on employment outcomes. Although smaller than the figures reported at baseline, the proportion of women in the control group who work for at least one month per year is 71.6%. Column [4] shows that the program that is being offered has a positive effect on the likelihood of working for at least one month, increasing the likelihood by 3.4 percentage points. This effect is statistically significant at the 10% level, and represents a 5% increase with respect to the control mean. There is no significant impact on the likelihood of working throughout the entire period (Column [5]), nor on the number of months worked (Column [6]), although both coefficients are positive.

The results of the IV estimation are reported in Table A5.1 in Online Appendix 5. The corresponding coefficients are substantially larger: for example, the program increases the likelihood of always participating by 14.8 percentage points (Panel A, Column [2]) and the likelihood of working at least once in the period by 11.5 percentage points (Panel A, Column [4]).

To summarize these results, an offer to participate in the program leads to a 7% increase in LFP when the outcome is defined as continuous participation throughout the observation period and a 5% increase in the likelihood of working at least one month. These effects,

<sup>27</sup> As most of the control group is in the same schools as the program was offered, they would probably have known that the program was running and that other families were selected to the program. This could generate a discouragement effect. We do not have a direct measure of discouragement in the survey, but we ask those that are not working or looking for a job for their reasons. Only 0.97% and 1.03% in the treatment and control group respectively responded that they are not looking for a job because “they are bored of looking” or “are not interested in working”. The most common reasons for both groups are “does not have anyone with whom to leave the children”, “household activities”, and “chronic illness or disability”, in the same order for both groups. These similar answers do not rule out the possibility of discouragement effects, but there is no evidence that supports it.



**Table 7**  
Expenses.

|                                                  | Educational Expenses  | Expenses          |                   |                 |                 |                   |
|--------------------------------------------------|-----------------------|-------------------|-------------------|-----------------|-----------------|-------------------|
|                                                  |                       | Food              | Child Clothing    | Female Clothing | Male Clothing   | Other Expenses    |
|                                                  | Panel A: Whole Sample |                   |                   |                 |                 |                   |
|                                                  | [1]                   | [2]               | [3]               | [4]             | [5]             | [6]               |
| Treatment                                        | 5.99**<br>(2.75)      | -4.89<br>(8.26)   | -19.28<br>(20.71) | 3.34*<br>(1.77) | 0.21<br>(1.12)  | 0.49<br>(7.10)    |
| Observations                                     | 1,639                 | 1,731             | 1,670             | 1,651           | 1,613           | 1,594             |
| R-squared                                        | 0.108                 | 0.159             | 0.019             | 0.098           | 0.107           | 0.176             |
| Control group mean                               | 48.27                 | 224.87            | 61.24             | 17.65           | 12.93           | 180.97            |
|                                                  | Panel B: Strata       |                   |                   |                 |                 |                   |
|                                                  | [1]                   | [2]               | [3]               | [4]             | [5]             | [6]               |
| T *Works at baseline and child≤5                 | 2.41<br>(5.42)        | 6.05<br>(11.59)   | 15.48<br>(9.98)   | 6.38*<br>(3.18) | 2.72<br>(3.03)  | 19.23<br>(11.46)  |
| T*Does not Work at baseline and child≤5          | 0.83<br>(14.26)       | -4.53<br>(21.88)  | -38.43<br>(32.52) | -3.57<br>(6.97) | 1.28<br>(3.05)  | -18.84<br>(23.90) |
| T*Works at baseline and child > 5                | 6.42<br>(4.63)        | -12.31<br>(10.34) | -34.55<br>(36.57) | 2.75<br>(1.99)  | -0.37<br>(1.32) | -7.81<br>(9.06)   |
| T*Does not Work at baseline and child > 5        | 12.39<br>(10.67)      | 17.79<br>(15.35)  | 13.19<br>(10.09)  | 3.96<br>(4.29)  | -1.75<br>(4.40) | 22.80*<br>(12.59) |
| Observations                                     | 1,639                 | 1,731             | 1,670             | 1,651           | 1,613           | 1,594             |
| R-squared                                        | 0.109                 | 0.160             | 0.019             | 0.099           | 0.108           | 0.178             |
| Control group mean                               |                       |                   |                   |                 |                 |                   |
| Works at baseline and child≤5                    | 52.33                 | 210.48            | 33.38             | 15.70           | 11.00           | 160.79            |
| Does not Work at baseline and child≤5            | 53.25                 | 220.43            | 59.08             | 19.72           | 13.12           | 196.34            |
| Works at baseline and child > 5                  | 47.38                 | 232.28            | 74.42             | 18.46           | 12.32           | 190.48            |
| Does not Work at baseline and child > 5          | 43.54                 | 209.94            | 34.86             | 15.45           | 20.22           | 152.96            |
| Test F (equal effects across strata) - p-value   | 0.80                  | 0.08              | 0.16              | 0.29            | 0.44            | 0.05              |
| Test F (T*Children < 5=T*Children > 5) - p value | 0.49                  | 0.42              | 0.40              | 0.66            | 0.21            | 0.21              |

Note: The follow-up survey data collected from February to April 2013. All columns correspond to monthly expenses. The sample size varies according to the number of observations with missing responses for the respective variable. The table indicates the treatment impact (being offered the 4–7 Program) on the given outcome. Fixed effects at school-strata level are included in all regressions. The regressions include additional controls for whether the applicant was the head of household, years of education, the number of children in the household, and the age of the applicant. Panel A presents the program's effects for the overall sample while panel B shows effects by strata. In the last two rows, we present p-values for two F tests. The first one tests the equality of coefficients across all the strata. The second one comes from a regression of the dependent variable on a treatment dummy, and this treatment dummy interacted with a dummy indicating if the mother had small children at baseline (same regressors and standard errors). Clustered standard errors at the municipality level are given in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

although lower than the effects reported in the literature on the impact of preschool childcare,<sup>28</sup> are substantial in our context because we must consider that the FLFP rates in Chile have grown in recent years by almost 20 percentage points.

### 7.3. Labor market effects: income and hours worked and stress measure

In Table 6, we present the same estimations for hours worked and income. The questions related to hours worked and incomes were posed with reference to the most recent job held by the respondent in 2012.

The number of hours worked could be affected by the program because the availability of extended childcare increases the number of hours that mothers are available to work and may render full-time work newly viable. However, Column [1] of Table 6 shows that an offer to participate in the program has a positive, but not statistically significant effect on the number of hours worked.

The program might increase available income in two ways. First, it might change LFP or employment, which in turn might have a positive effect on income. Second, the program might indirectly increase the

income of the mothers who had already chosen to work by decreasing the cost of childcare.

Columns [2] and [4] present the effect of an offer to participate in the program on both hourly and monthly income. As labor income is only observed for those working, we present the corresponding Lee bounds in columns [3] and [5]. Although positive, the coefficient on monthly income is not significant. For hourly wage, there is a significant and positive effect but it is not robust to the Lee bounds. Therefore, there is also no impact on this outcome. There is some heterogeneity in the impacts of the program on hourly wages by strata (Panel B), but these differences are not statistically significant.

Finally, this childcare program can relieve working women from the every-day stress of having to leave their children alone at home or with family and neighbors. The program can also help non-working mothers to cope with upbringing as they can devote more time to household chores or leisure now they have the kids on longer schedules.<sup>29</sup> The last column of Table 6 tests whether the program had any effect on stress levels. As explained above, the stress outcome is defined through self-reported questions about the individual's capacity to cope with changes, solve problems, etc. We do not find that on average the program has any significant impact on stress.

### 7.4. Effect on expenditure

Regarding expenditures, we find that an offer to participate in the program increases women's expenditures on themselves and their

<sup>28</sup> Our results are close to those of Berlinski and Galiani (2007) for Argentina, smaller than Gelbach (2002) for the US, and slightly higher than the results obtained by Bettendorf et al. (2015) and Felfe et al. (2013). Felfe et al. (2013) find that an increase in afterschool care of eight slots per 100 children leads to an increase in women's full-time employment of the same magnitude. Berlinski and Galiani (2007), using the expansion of preschool facilities in Argentina find that the likelihood of maternal employment increases by 7%, which (relative to their sample mean) is roughly 18% higher than our estimates.

<sup>29</sup> Although the program did not have mental health as an objective, it is a relevant outcome. According to Vicente et al. (2006), approximately one third of Chileans has had a lifetime psychiatric disorder, with a higher prevalence among females.

children's education. Column [1] of Panel A in Table 7 shows a 13% increase in school expenses and column [4] a 19% increase in spending on women's clothing. The increase in educational expenses is consistent with a reallocation of resources toward investment in children. The small increase in women's expenditure on clothing can be considered either an increase in conspicuous consumption or an investment to meet the fixed cost of entering the job market.<sup>30</sup>

### 7.5. Heterogeneous effects for mothers with young children

We now turn to the analysis of the heterogeneity by the randomization strata. Previous literature has shown that the childcare effects are greater for mothers whose children are all eligible for childcare.<sup>31</sup> We study if this heterogeneity is observed with the 4 to 7 Program by interacting the treatment assignment with the strata defined by whether the woman reported that she was employed when she applied to the program and whether she had children younger than five years of age.

Panel B in Tables 4–7 reports the ITT effects by strata. Regarding take-up, column [1] in Table 4 shows that the highest take-up is among the group of mothers that do not work at baseline without toddlers (38.5 percentage points) and with toddlers (31.8 percentage points). Columns [2] and [3] report the extent of childcare substitution. Although some point estimates are statistically significant, we cannot reject that all coefficients are equal ( $p=0.795$  or  $0.23$ ). Therefore, there is heterogeneity in the use across strata, and apparently substantial substitution in childcare for mothers not working at baseline.

Columns [4] and [5] in Table 4 Panel B, report the use of childcare for small ineligible children, only for the strata of women with small children. In this case, we only find a positive statistically significant effect for working mothers at baseline on formal childcare. All coefficients have the right sign, but the standard errors are too big. We are severely limited by sample size in order to detect differences between these two groups. In fact, we cannot reject the null that the effects across strata are equal ( $p$ -values are  $0.77$  and  $0.62$  for columns 4 and 5 respectively).

Regarding labor market impact, Panel B in Table 5 consistently shows that the LFP and employment effects are observed among mothers with small children. The strongest effect on participation is on continuous LFP (column [2]) where the point estimate for mothers of toddlers is 8.8 percentage points (18.8 percentage points) for those who were working (were not working) at baseline. For continuous participation, we can reject the null that the coefficients across strata are different at a 10% significance level. Furthermore, we reject the null of equal coefficients for women, with and without ineligible children.<sup>32</sup> For the outcome of *months participating*, we cannot reject the null that the program's effect is equal across strata but we do find evidence that mothers with young kids (regardless of their employment status) benefit the most.

For employment outcomes, only the coefficients for mothers of young children that do not work at baseline are significant. The magnitude is striking: a 12.3 percentage point increase in the probability of being always working with respect to the control group mean of 14.6%. However, for this specific outcome we cannot reject the null that the coefficients are equal across strata.

Regarding working hours and income, no point estimate is significant; and for hourly income, as for the average effect, some point

estimates are significant, but are not robust to the Lee bounds.

Therefore, there is heterogeneity on the impact on participation and labor market outcomes across strata, and across mothers with and without children under five. The labor market impact appears among mothers with small children: the availability of childcare increases the probability of employment by 12.3 percentage points for this group (84% with respect to the control group mean). Interestingly, this is not the group with the highest take-up. Indeed, non-working mothers without toddlers are those with the highest take-up, and it does not have any effect on the labor market outcomes. However, column [6] in Table 6 shows that there is a substantial decrease in the stress index of  $-2.34$  (0.26 SD) in this group.<sup>33</sup> Finally, there is no clear effect on expenditure by strata (Table 7). This can be due to multiple hypothesis testing and sample sizes.

## 8. Discussion and conclusions

The labor force participation and employability of mothers of school-age children is sensitive to the implementation of the after-school childcare program in Chile. We found effects on both participation and employment outcomes, which increased by 4.3 and 3.4 percentage points, respectively. Although we cannot find an effect on labor income, there is a significant increase in educational expenditures. We also find evidence of childcare substitution.

Both the effects on participation and employment, 7% and 5%, respectively are meaningful for the Chilean context where FLFP rates have increased by 18 points in the past 15 years while employment rates have increased by 16 points. The cost of the program is USD155 per child/year,<sup>34</sup> which is equivalent to approximately 20% of the total subsidy public schools received per child each year.

Our effects are on the low side of those found in the literature on pre-school children. Several factors should be considered in these results. First, not all beneficiaries had the intention to work: in the follow-up survey, 61% of the women surveyed reported that they would use their time to work if they had safe childcare available while 5.1% indicated they would rest, and 6.9% said that they would dedicate the time to household chores. Similarly, 5.7% of the beneficiaries indicated that the main benefit of the program was “working in peace,” the second benefit mentioned was “having more time for myself.” Second, although mothers use the program, it generates a significant (but not perfect) substitution with existing forms of childcare. Women whose children were all older than five years of age might use other forms of childcare. The older the children, the greater the likelihood that a mother will leave them home alone as a childcare strategy. We observe that in the group of working mothers with no young children at the baseline, 14% declared that their older children remain home alone after school hours.

We find some heterogeneity in the program's impacts. A positive effect on LFP is found for women who, in addition to having children who are eligible for the program, have young ineligible children. The effect is greater among women who were not participating in the labor force at the baseline. At the same time, the program increases the use of daycare for smaller children. These results are consistent with the existence of a vast supply of public childcare for children younger than five (i.e., those ineligible for the 4–7 Program) but an absence of free care for children older than five who are now eligible for the 4–7 Program. Women with more than one child must address the childcare needs of all their children to be able to join the labor market. In the Chilean context, women are more constrained by a lack of afterschool care for older children than by a lack of childcare for younger children, particularly considering a 600% increase in daycare centers and a

<sup>30</sup> To consider the presence of outliers, we run median regressions for the expenditure outcomes. The results are qualitatively similar, but some coefficients are much smaller in the median regressions. Results available by request.

<sup>31</sup> See Gelbach (2002), Fitzpatrick (2012), Cascio (2009), Baker et al. (2008), Berlinski et al. (2011), Berliniski and Galiani (2007) and Lefebvre and Merrigan (2008).

<sup>32</sup> This later result comes from a model in which the dependent variable is regressed on a treatment dummy, and this treatment dummy interacted with a dummy indicating if the mother had a small child at baseline.

<sup>33</sup> We reject the equality of the program's effects across strata.

<sup>34</sup> This figure includes only direct costs: wages and material. The cost of the school premises, utilities and indirect personnel are not included.

school day that is inconsistent with the schedule demands of full-time work. Considering this finding, coordinated efforts to provide childcare for all ages is required if the goal is to increase FLFP.

On the other hand, there is no impact on employment outcomes of mothers that do not work nor have a young child at baseline, which is at the same time the group with highest take-up. There is some evidence that women in this group (not working at baseline with older children) are not into participating actively in the labor market. First, FLFP in Chile increases with children's age; so, women with older children already not working at baseline might be a group with a low attachment to the labor force and without a labor market history. In our data, women with older kids are older themselves (38 vs. 36 years) and those that do not work at baseline also have lower educational levels (8.8 years vs. 9.4–9.5 in other groups). According to *Comunidad Mujer* (2013) older and less educated women in Chile are more likely to have a chauvinistic view of gender roles: they are likely to believe that women need a man to take care of them and to consider that home and children are women's responsibility.

Second, women in this group are less likely to be registered at local employment agencies (27% vs. 38–40% in the other groups),<sup>35</sup> and are more likely to answer that they are not interested in working (11.3–6% among working women at baseline).<sup>36</sup> Their labor history confirms their low attachment to the labor market: non-working women at baseline with older kids are more likely to answer that they have never worked (10% vs. 5.6% in the other group, even after controlling for age). In this group, there is a statistically significant decrease in stress. This result is consistent with *Devoto et al.* (2012), that finds that access to pipeline water in Morocco (which decreases housework time) had no impact on employment, but did decrease stress levels.

Overall, these results reveal a need to provide afterschool care to encourage FLFP. However, childcare provision is not a *magic bullet* to improve FLFP: childcare provision encourages labor attachment for some women, but for groups with no (or lower) experience in the labor market, additional policies might be needed.

## Appendix A. Supplementary material

Supplementary data associated with this article can be found in the online version at <http://dx.doi.org/10.1016/j.jdevvec.2017.01.001>.

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<sup>35</sup> In all municipalities, there is an employment agency where people seeking jobs can register in order to qualify for many active labor market programs.

<sup>36</sup> We asked participants the alternatives that would allow them to “work/study/ look for a job/participate in training” at the follow-up. The alternatives included having domestic help for housework, having childcare, knowing that your children are using their time on something useful, having help with care for the elderly or ill, having time to work/study/train, having time to look for a job, feeling supported in doing these activities, and “I am not interested in those activities”. Overall, 6% of the sample declared that they “are not interested”; if we focus on the control group, the figure is 6.7%. The lowest figure is found among those already working at baseline (with and without small children), at 6%. The group with the highest responses are those not working and with older kids at baseline (11.3%).