The effect of the expansion of public pre-primary school places on maternal employment in Argentina: 2007-2013[1]

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March 2016

Abstract

The aim of this paper is to measure the effect of the expansion of public pre-primary school facilities for children aged 3 and 4 on maternal employment in Argentina over the period 2007-2013, when a series of large infrastructure programs was implemented. We exploit the differential intensity of the construction of facilities across pre-school levels, provinces and time to identify the effect of expanding pre-primary school facilities on maternal employment. Our estimates indicate that, under the assumption of full take-up, one place constructed per child in the 3-4 age group, increased the likelihood of maternal employment by 5 percentage points. Given that the average number of places constructed per child between 2007 and 2013 was 0.12, the construction of pre-primary school facilities explains a 0.6 percentage points increase in the employment of mothers of children aged 3 and 4, that is, around 10% of the increase in maternal employment over this period. This effect seems to come mainly from high-educated women and part-time jobs.

Key words: Pre-primary school; Public education; Female labor supply

Classification JEL: I28, J13

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1. Introduction

Although during the last decades Argentinean women have gained ground in the labor market, their labor market outcomes are still far from those of Argentinean men or women in other countries. In 2013, the employment rate of Argentinean women was 51 percent, just below Argentinean men employment rate of 75 percent and OCDE women average of 57 percent. In this framework, in 1998 the Argentinean Government approved a plan aimed at expanding women employment opportunities (Decreto Nacional 254/98, "Plan para la Igualdad de Oportunidades entre Varones y Mujeres en el Mundo Laboral", the "Plan"). Among other things, the Plan proposes taking actions that help women reconcile work and family life, such as increasing the supply of public childcare services.

Since 2004 a number of educational infrastructure programs aimed at constructing new schools and expanding school attendance followed one after the other.[3] The Federal Education Law of 2006 orders the State to expand the supply of pre-primary school facilities in order to make attendance to pre-primary school compulsory from the age of 4, which finally occurred in 2015. This implied that a significant part of the public school infrastructure programs focused on pre-primary school and particularly on facilities for children aged 4. Between 2007 and 2013, public construction programs created approximately 123,000 places for children between 3 and 4 (75% for children aged 4 and 25% for children aged 3). This represented a 32 percent increase over baseline places for children in this age group.

In this project, we analyze the causal effect of the expansion of public pre-school facilities for children aged 3 and 4 on maternal employment. Labor market participation decision involves comparing benefits and costs. In the case of mothers, who are typically the providers of childcare, childcare represents a cost of labor market participation and hence reduces the net benefit of employment.[4] We expect public (or free) pre-primary school facilities have an impact on maternal employment in Argentina for two reasons. First, the proportion of low-educated women is high (44% of female population has less than high school education) and childcare may represent a substantial proportion of their wages. Women with low wages may decide not to participate in the labor market if childcare costs are sufficiently large. Second, the availability of informal childcare (i.e., grandmothers) has decreased over time as female labor market participation has increased. Public pre-primary school reduces the costs of working for mothers and may trigger their incorporation into the labor market.

We exploit the differential intensity of pre-school facilities construction across pre-school levels, provinces and time to identify the effect of expanding these facilities on maternal employment. Our estimates indicate that access to free public school increases the employment probability of mothers whose youngest child is aged 3 or 4. In particular, under the assumption of full take-up, one place constructed per child in the 3-4 age group´s increased the likelihood of maternal employment by 5 percentage points. Then, given that the average number of places constructed per child between 2007 and 2013 was 0.12, the construction of pre-primary school facilities for children aged 3 and 4 explains a 0.6 percentage point's increase in the employment of mothers of children of that age over this period, that is, around 10% of the increase in the employment of their mothers. This effect seems to come mainly from highly educated women.

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[3] A large infrastructure program named "Programa Nacional 700 escuelas", launched in 2004, was followed by the programs "Más Escuelas", "Más Escuelas II" and "Más Escuelas III". For more information on these programs see http://www.700escuelas.gov.ar/web/2013/. The IADB financed between 60% to 90% of the 550 million dollars invested in those programs.

[4] Using the Survey on the Use of Time, Esquivel (2012) finds that, in city of Buenos Aires, 60% of childcare (children under 18) is provided by mothers, 16% by other women and 14% by men.

Once fully implemented, we expect universal attendance to kindergarten by 4- year old children to increase maternal employment by additional 0.3 percentage points.

As preschoolers attend school for three hours a day, the expansion of pre-school facilities targeted at children aged 3 and 4 particularly affected the probability that mothers are employed in part-time jobs. One place constructed per child aged 3 or 4, increases the likelihood that a mother that did not work starts working part-time by around 12 percentage points, increasing the average number of hours worked per week by around 1.5.

The remainder of this paper is organized as follows. In Section 2 we describe the literature on childcare and maternal employment. In Section 3 we describe the data used for the empirical analysis and present some descriptive statistics. In Section 4 we discuss the empirical methodology. In Section 5 we present the results and in Section 6 we present our conclusions.

2. Literature review

Many papers in the economic literature have studied the effects of childcare on maternal labor outcomes.[5] Most recent studies perform ex post analyses (e.g., using (quasi-) experiments) of the impact of childcare programs on maternal work decisions.[6]

A number of these studies exploits variation across geographical areas over time in the provision of preschool services and applies a difference-in-difference identification strategy as we will do. As for Argentina, Berlinski and Galiani (2007) study the impact of a program that expanded pre-school facilities between 1993-1999 on school attendance and maternal labor supply. They find that the construction program has a sizeable impact on pre-primary school enrollment among children aged 3–5. According to their results, the program explains about half of the increase in gross enrollment experienced in that period. They also find that the childcare subsidy induced by the program appears to increase maternal employment. Baker, Gruber & Milligan (2008) evaluate the effects of a program that provided universal and highly subsidized child care in Quebec in the late 1990s on married women labor supply. They find evidence of "crowd out" of informal childcare by this new subsidized childcare and a highly significant impact on labor supply. Lefebvre and Merrigan (2008) also evaluate the introduction of universal child care in Quebec and find similar results. Cascio (2009) applies a similar strategy to study the effects of public pre-school introduction throughout the 1960s and 1970s in the US on maternal labor supply. She finds significant labor supply effects on maternal employment for single mothers with a kindergarten eligible child and no younger children but no effects for married mothers. Cascio and Schanzenbach's (2013) analyze universal pre-kindergarten programs in Oklahoma and Georgia and find that the programs have increased the likelihood that mothers of lower-income families work. Havnes and Mogstad (2011) examine Norway's universal program and find little, if any, causal effect of child care on maternal employment. They find that, instead of increasing mothers' labor supply, the new subsidized child care mostly crowds out informal

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[5] Evidence on the relationship between child care and maternal employment also comes from studies of childcare prices (Anderson and Levine (2000) provide an in-depth review of this body of literature).

[6] More recently studies that perform ex ante analyses of the impact of childcare on maternal employment have started to emerge. For example, for Argentina, Katzkowicz and Egas (2014) use microsimulations to evaluate the potential impact of expanding the coverage of preschool on maternal labor market outcomes. Using alternative counterfactual scenarios, they find that preschool attendance by children under 3 years old positively affects mother´s probability of participation in the labor market. This effect is reduced when the analysis is limited to mothers belonging to low-income households.

child care arrangements. Schlosser (2011) use the gradual introduction of free public preschool for children aged 3 and 4 in Israel in 1999 as an experiment to estimate the effects of a reduction in child care costs on preschool enrollment and Arab mothers' labor supply and fertility. She finds that as a result of the intervention, mothers' labor supply increased sharply. The increase in labor supply occurred mainly among more educated mothers.

In these cases, the endogeneity of the child care measure is a source of potential concern in estimating the contribution of child care to employment. If public childcare expenditures rise in respond to demand, it may be difficult to determine the direction of causality between expenditures and employment. However, to the extent that funding for childcare is determined by the number of preschool-age children in the region, which is likely to be either uncorrelated or negatively correlated with female employment in the region, endogeneity is likely to be less of a concern. As a result, this endogeneity has often been neglected in studies on maternal employment.

Other papers use alternative identification strategies, such as birthday-or distance- based discontinuities in program exposure. For example, Gelbach (2002) uses children's quarter of birth in the 1980 Census as an instrument for public school enrollment of 5-year old children and finds significant effects on mother's labor supply.[7] Fitzpatrick (2010) applies a similar strategy using children's exact date of birth to compare the labor supply of mothers of 4-year-old children located within a narrow window around the cutoff birth date for prekindergarten enrollment in Georgia and Oklahoma. She finds that universal pre-kindergarten raised preschool enrollment but has no effect on mothers' labor supply.[8] As for Latin America, Attanasio and Vera-Hernandez (2004) evaluate the impact of a child care program - specifically a community nursery program- in Colombia. They use the distance between the child's home and the care center as an instrumental variable and find a positive impact of the program not only on the child height and school enrollment at age 13, but also on the mother's employment rate. For Brazil, Paes de Barros, R., P. Olinto, T. Lunde, and M. Carvalho (2011) studies 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 on the labor force participation of mothers. They find that free publicly provided child care led to a considerable increase of mother's employment but no effects on the hours worked.

In sum, so far the economic literature has found that, with some exceptions, child care program typically generate small employment effects that are applicable to specific sub-groups. In the next section we describe the data we use for our investigation.

3. Data

In the analysis, we use data from two sources. First, we use pre-primary facilities and attendance data from the Annual Reports published by the Federal Ministry of Education of Argentina from 2007 to 2013.

Even though the first construction program was launched in 2004, it takes a while for facilities to be operational. First, the Government issues a tender for the construction of the school. Second, the school is actually built. The whole process (bidding, awarding and complete construction) takes around two years. School years in Argentina run from March to December.

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[7] Fitzpatrick (2012) use children's quarter of-birth in 2000 Census.
[8] Unfortunately, the data in our investigation precludes the use of this identification strategy, as no information on the child's date of birth is available.

Thus, constructions that finalized in year t only are accessible in year t+1. Also, it was the Federal Education Law of 2006 which orders the State to expand the supply of pre-primary school facilities in order to make attendance to pre-primary school from the age of 4 compulsory. For these reasons, we decide to strike up in 2007. Last year for which data is available is 2013.

In Argentina, both free public schools and private institutions that charge fees to students supply education. Around 70% of students attend public schools. In general, public pre-primary schools operate in two shifts (morning and afternoon) with preschoolers attending school for three hours a day, five days a week. Pre-primary education is divided into two segments: (i) pre-kindergarten, which comprises children from 45 days to 2 years, and (ii) kindergartens, which comprises children of 3 (level 1), 4 (level 2), and 5 (level 3) years old. The information on facilities for pre-kindergarten is incomplete and unreliable for many years and provinces. We, then, decided to focus our analysis on kindergartens only.

Table 1 presents total (public and private) enrollment data by level of pre-primary education from the 2007 and 2013 Federal Ministry of Education Annual Reports. The enrollment rate increases with the age of children.

Attendance to level 3 of pre-primary education is compulsory by Federal Education Law since 1993. From 2010, non-compliers are penalized by losing the "Asignación Universal por Hijo", a conditional cash transfer granted to unemployed, informal, self-employed and domestic employees tied to children's school attendance and vaccination.[9] As seen in the table, attendance rate for children aged 5 is close to one in most provinces, presents little variability across provinces and has not increased from 2007 to 2013. As enrollment in level 3 of pre-primary school is universal, the effect on maternal employment of expanding public school facilities at this level is expected to be negligible.

During the period analyzed (2007-2013), attendance to level 2 of pre-primary education was still not mandatory. In 2007, the national enrollment rate for children aged 4 was 67 percent. This rate presents a lot of variability across provinces, with participation as high as 100 percent in the Autonomous City of Buenos Aires or Tierra del Fuego and as low as 19 percent in Misiones. The growth in enrollment of children at level 2 of pre-primary school during recent years is noticeable. Comparing 2007 and 2013, all provinces (except Neuquén) increased enrollment in level 2 of pre-primary education. Over this period, the average enrollment rate increased from 67% to 91% percent and the number of children attending pre-primary school increased by 127,482. This increase was possible due to the focus of public school construction programs on level 2 of pre-primary education in order to guarantee a place for each child at the time this level becomes compulsory, which finally occurred in 2015.

Pre-school attendance to level 1 of pre-primary education is not compulsory or expected to become compulsory in the near future. In 2007, the national average enrollment rate for children aged 3 was 33 percent. As for level 2, this rate presents a lot of variability across provinces, with participation as high as 77 percent in the Autonomous City of Buenos Aires and as low as 2 percent in Misiones or San Juan. The growth in enrollment of children at this level is lower, but also noticeable. Comparing 2007 and 2013, all provinces (except Neuquén) increased enrollment in level 1 of pre-primary education. The average enrollment rate increased from 33% to 46% representing a total of 52,750 new enrollments.

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[9] Eighty percent of the subsidy is paid out automatically; the remaining 20% is issued when parents present valid vaccine documentation for children aged four and under, or proof of school attendance starting at the age of five.

Table 1 Pre-primary School Attendance by level, 2007 and 2013

Province	Pre-primary School Enrollment- Level 1				Pre-primary School Enrollment- Level 2				Pre-primary School Enrollment- Level 3			
	2007		2013		2007		2013		2007		2013	
	Level	Rate	Level	Rate	Level	Rate	Level	Rate	Level	Rate	Level	Rate
Buenos Aires	155,388	0.59	174,993	0.74	199,631	0.78	232,484	0.93	227,097	0.90	254,781	0.94
Catamarca	691	0.10	1,321	0.22	4,424	0.61	5,437	0.87	7,632	1.00	6,685	1.00
Chaco	1,862	0.09	3,879	0.25	9,524	0.44	15,355	0.86	23,407	1.00	20,725	1.00
Chubut	2,492	0.29	3,435	0.38	6,730	0.78	8,404	0.91	8,903	1.00	9,908	1.00
Ciudad de Buenos Aires	24,624	0.77	27,733	0.91	32,229	1.00	35,462	1.00	36,750	1.00	38,444	1.0
Corrientes	2,194	0.11	3,030	0.20	8,539	0.43	13,955	0.99	24,017	1.00	20,302	1.00
Córdoba	3,105	0.06	13,133	0.28	43,838	0.81	53,450	1.00	57,573	1.00	58,867	1.00
Entre Ríos	2,689	0.12	4,729	0.27	13,504	0.60	16,402	0.92	24,079	1.00	22,277	1.00
Formosa	645	0.06	1,273	0.15	5,218	0.47	7,039	0.88	11,852	1.00	10,997	1.00
Jujuy	1,656	0.13	2,763	0.25	6,056	0.48	9,358	0.88	13,588	1.00	13,097	1.00
La Pampa			345	0.07	1,733	0.31	3,267	0.63	5,341	1.00	5,483	1.00
La Rioja	1,388	0.22	2,160	0.41	5,397	0.87	6,001	1.00	6,993	1.00	6,392	1.00
Mendoza	847	0.03	1,426	0.05	14,429	0.53	26,985	0.81	29,011	1.00	33,113	0.92
Misiones	475	0.02	2,012	0.10	4,554	0.19	16,095	0.82	29,785	1.00	23,366	1.00
Neuquén	1,885	0.21	1,200	0.12	6,018	0.68	7,172	0.66	10,315	1.00	11,497	1.00
Río Negro	1,662	0.16	3,240	0.31	7,763	0.74	10,288	0.95	11,523	1.00	11,828	1.00
Salta	1,632	0.07	2,388	0.11	7,440	0.30	15,483	0.69	27,447	1.00	25,278	1.00
San Juan	295	0.02	755	0.06	4,323	0.34	8,850	0.65	15,380	1.00	14,760	0.99
San Luis	845	0.11	1,271	0.18	5,943	0.73	7,075	0.91	8,222	1.00	8,335	1.00
Santa Cruz	346	0.07	2,260	0.46	4,535	0.88	5,847	1.00	4,873	1.00	6,004	1.00
Santa Fe	15,180	0.30	14,111	0.32	38,948	0.76	41,304	0.94	51,438	1.00	51,071	1.00
Santiago del Estero	3,062	0.17	6,992	0.51	12,945	0.71	17,284	1.00	16,855	0.89	17,541	0.99
Tierra del Fuego	1,055	0.46	1,113	0.48	2,392	1.00	2,764	1.00	2,385	1.00	2,785	1.00
Tucumán	1,060	0.04	2,266	0.10	6,362	0.24	14,196	0.60	32,890	1.00	28,117	1.00
Total	**225,078**	**0.33**	**277,828**	**0.46**	**452,475**	**0.67**	**579,957**	**0.91**	**687,356**	**1.00**	**701,653**	**1.00**

Note: Some rates were above 1 because of data on students and population coming from different sources and were rounded to 1.
Source: Author´s calculations based on Annual Reports, Federal Ministry of Education and Population Census 2010.

As explained above, large public school construction programs supported the increase in enrollment at level 1 and level 2 of pre-primary school.[10] Table 2 presents the total number of places in pre-school age created over the 2007–2013 period in each province, the share of each province on total construction and the total number of places created per child by level of pre-primary education.[11]

Between 2007 and 2013, 4,907 new sections of level 1 and level 2 of pre-primary education were created.[12] If we consider an average class size of 25 students for each section, the construction program created 122,675 potential places at level 1 and level 2 of pre-primary education during 2007-2013. Most of these places (75%) were created at level 2 of pre-primary education, which became compulsory in 2015. The rest (25%) correspond to level 1 of pre-primary education. Note that the number of places at level 3 of pre-primary education has decreased between 2007 and 2013, as there was no need for additional places at this level.

In view of the above, our analysis will focus on the effect of the expansion of pre-school facilities for children aged 3 and 4 on the employment of mothers whose youngest child belong to that age group.

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[10] The Government of each province decides the number, location and design (including size and materials) of the rooms that are needed. The Federal Ministry of Education verifies this need, while the Federal Ministry of Planning finances and controls the construction of the rooms. Rooms in urban areas are prioritized due to the politics to access to credit established by the IADB.

[11] Information for level 1 is missing for La Pampa and San Juan in 2007 and has been omitted due to an outlier observation in Formosa in 2007 (i.e., 146 students per class) .

[12] A section is defined as the group of students that take classes at the same place, time and with the same teacher(s).

Table 2 Pre-primary School Construction.

Province	Pre-primary School Construction - Level 1			Pre-primary School Construction - Level 2			Pre-primary School Construction - Level 3		
	Places	Provincial Share	Places per child	Places	Provincial Share	Places per child	Places	Provincail Share	Places per child
Buenos Aires	4000	0.13	0.05	8625	0.09	0.04	8575	-0.98	0.00
Catamarca	675	0.02	0.12	975	0.01	0.23	-375	0.04	0.15
Chaco	1825	0.06	0.14	5100	0.06	0.36	-2550	0.29	0.02
Chubut	1300	0.04	0.14	1250	0.01	0.08	625	-0.07	-0.01
Ciudad de Buenos Aires	925	0.03	0.05	-375	0.00	-0.02	-775	0.09	-0.10
Corrientes	475	0.02	0.05	3950	0.04	0.39	-5125	0.59	-0.13
Córdoba	9800	0.32	0.21	5900	0.06	0.16	1450	-0.17	0.05
Entre Ríos	2150	0.07	0.14	3150	0.03	0.29	-1575	0.18	0.04
Formosa				1500	0.02	0.27	300	-0.03	0.20
Jujuy	475	0.02	0.06	2875	0.03	0.33	-975	0.11	-0.05
La Pampa				1925	0.02	0.39	-125	0.01	0.05
La Rioja	775	0.03	0.18	800	0.01	0.23	-50	0.01	-0.01
Mendoza	50	0.00	0.00	12750	0.14	0.30	650	-0.07	-0.23
Misiones	1150	0.04	0.06	10150	0.11	0.55	-6850	0.79	-0.11
Neuquén	-925	-0.03	-0.11	900	0.01	-0.04	1250	-0.14	-0.03
Río Negro	1625	0.05	0.16	2775	0.03	0.23	325	-0.04	0.03
Salta	1350	0.04	0.07	8925	0.10	0.41	-1175	0.13	0.01
San Juan				5575	0.06	0.40	300	-0.03	-0.10
San Luis	225	0.01	0.04	525	0.01	0.10	-475	0.05	0.04
Santa Cruz	2000	0.07	0.41	1325	0.01	0.19	1150	-0.13	0.04
Santa Fe	-500	-0.02	0.01	6700	0.07	0.23	5100	-0.58	0.18
Santiago del Estero	3350	0.11	0.29	2025	0.02	0.26	-350	0.04	0.03
Tierra del Fuego	-50	0.00	-0.02	300	0.00	0.22	425	-0.05	0.19
Tucumán	25	0.00	0.00	4350	0.05	0.20	-8475	0.97	-0.22
Total	**30,700**	**1.00**	**0.07**	**91,975**	**1.00**	**0.17**	**-8,725**	**1.00**	**-0.02**

Note: Places are calculated as the number of new sections multiplied by the average class size, which is 25.

Source: Author´s calculations based on Annual Reports, Federal Ministry of Education.

Second, we use data from the Argentine household survey Encuesta Permanente de Hogares (EPH) that is representative of the urban population of Argentina.

Table 3 shows the total employment rate of women with children under 5 by age of the youngest child in 2007 and 2013 and compares it with the employment rate of women with older or no children. Table 3 also shows the employment rate and the average hours worked per week of women who work less than 25 hours per week, that is, part time employment.

Women without children have higher employment rates than women with children and employment rates increase with the age of the youngest child. Between 2007 and 2013, the increase in the employment rate was larger for women with children aged 4 (8 percentage points), and women with children aged 3 (6 percentage points) than for women with children below 2 years old (4 percentage points), women with children above 5 or no children (2 percentage points) or women with children aged 5 (-3 percentage points). Hence, the employment rate appeared to have increased more for mothers of children in the age groups for which more places were built, that is, mothers whose youngest child is aged 3 or 4.

As preschoolers attend school for three hours a day, we expect the expansion of public pre-school facilities to affect mainly part-time employment. Again, part-time employment rate and hours of work increase more for mothers of children aged 3 and 4, that is, part-time employment rate and hours of work increase more for mothers of children for which more places were constructed.

Table 3 Total and Part-time employment rates and Hours of work of women by age of her youngest child

	Employment rate			Part-time employment rate			Hours worked		
	2007	2013	Change	2007	2013	Change	2007	2013	Change
Youngest child 0-2	0.43	0.48	0.04	0.25	0.25	0.00	2.96	2.87	-0.09
Youngest child 3	0.47	0.53	0.06	0.25	0.31	0.05	3.55	5.16	1.61
Youngest child 4	0.54	0.62	0.08	0.35	0.40	0.05	4.71	6.26	1.55
Youngest child 5	0.56	0.52	-0.03	0.31	0.26	-0.05	4.62	3.62	-1.01
Other women	0.66	0.68	0.02	0.41	0.42	0.01	5.40	5.80	0.40

Note: Part-time employment rate excludes women who work 25 or more hours per week. Hours worked is the average hours worked in a week for this group of women.
Source: Author's calculations based on data from Household Survey, 2nd quarters.

This evidence may be understand as an indication of the causal effect of the program, under the assumption that in the absence of the program, the change in the employment rates and hours worked would not have been systematically different for mothers of children of different ages (or mothers and non-mothers).

To test this causal relationship, we pool repeated cross-sections of individual level data from the second quarters of the survey covering the period 2007-2013. We construct a sample of households with mothers aged 18–49 and whose youngest child is between 3 and 4 years old. The unit of observation is the mother.[13] [14]

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[13] The survey is conducted in the main urban agglomerates of each province of the country and the Autonomous City of Buenos Aires. We exclude agglomerate 38 as it covers two cities, in two different provinces. For each household, the survey collects information on the family relationship between the head of household and other household members. Our analysis focuses on children of the head of household. In such households, we identify the mother of a child as either the female head of the household or the head of the household's female spouse.

In Table 4 we define the variables used in the paper and their source.

Table 4 Definition and source of variables

Variable	Definition	Source
Mother's Employment	Binary variable. Equals 1 if woman is employed, 0 if she does not work - whether or not she is looking for employment.	Household Survey
Mother's Part-time Employment	Binary variable. Equals 1 if woman is employed less than 25 hours per week, 0 if she does not work - whether or not she is looking for employment. It is missing if woman works full-time (25 or more hours per week).	
Mother's Hours Worked	Weekly hours worked =0 if the woman is not working. Women working 25 or more hours per week are disregarded.	Household Survey
Number of places per child	Stock of preschool places per child in the 3 and 4 preschool cohort in each province. We multiply by 25 each preschool section to get the number of places created and we normalize by cohort size.	Annual Reports of the Ministry of Education and Census 2010
Child's Age	Binary variable. Equals 1 if the women's youngest child is 3 years old and 0 if she is 4 years old.	Household Survey
Mother's Age	We use 7 age group dummies in the regression analysis.	Household Survey
Mother's Skills	We use 3 age group dummies in the regression analysis (at most incomplete secondary education, at most incomplete tertiary education, and complete tertiary education).	Household Survey
Spouse at household	Binary variable.=1 when the spouse is residing in the household	Household Survey
Other Female Adult Household Member	Binary variable.=1 when the other female adult is residing in the household	Household Survey
Income of other Household Members	Household monthly income excluding the monthly wage from the women if employed.	Household Survey
AUH	Binary variable. Equals 1 from 2010 onwards for unemployed, informal, self-employed and domestic employees with no more than high-school, belonging to informal households in the first three deciles of the distribution of the household per capital income (see Gasparini and Garganta, 2012).	Household Survey
Unemployment rate (%)	Unemployment Rate. It varies by province and period.	Household Survey
Women participation rate (%)	Female participation Rate. It varies by province and period.	Household Survey

For the period 2007–2013, we have a sample of 6,518 mothers with information both on employment and school places for children of the age of their youngest children. In Table 5, we present descriptive statistics for this sample of mothers.[15]

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[14] Mothers who have both a 3- or 4- year-old and a younger child must find child care for the younger child even if the 3- or 4- year-old is enrolled, so throughout the paper we focus on women whose youngest child is 3- or 4- year-old.

[15] The EPH has a rotating panel structure, where household are surveyed during two quarters, not surveyed during the following two quarters and then surveyed again during the next two quarters. Then,

Table 5 Descriptive characteristics of households with youngest child between 3 and 4 years of age

Variable	Mean	Std. Dev.
Mother's Employment	0.52	0.50
Mother's Part-Time Employment	0.29	0.46
Mother's Hours Worked	4.20	7.59
Child aged 4	0.49	0.50
Mothers' Age:		
18-20	0.01	0.10
21-25	0.12	0.33
26-30	0.24	0.43
31-35	0.28	0.45
36-40	0.21	0.41
41-45	0.11	0.31
46-49	0.02	0.14
Mother's Education:		
Less than high school	0.42	0.49
High School	0.38	0.49
Tertiary	0.20	0.40
Spouse present	0.86	0.35
Income of Other Household Members (´000)	1.07	0.95
Other Female Adult Household Members	0.09	0.29
AUH	0.55	0.50
Observations	6,518	

Source: Authors based on data from Household Survey, 2nd quarters.

4. Empirical methodology

We seek to evaluate the causal effect of the construction of level 1 and level 2 pre-primary school facilities on maternal employment. As explained above, we will perform the analysis for mothers whose youngest children are between 3 and 4 years old.

We based our identification strategy on a variable that measures the exposure to treatment. We use the total number of preschool places (stock of preschool sections multiplied by mean number of children per section=25) for mother i whose youngest child is aged k residing in province j in period t. We normalize this stock dividing it by the size of the respective children age cohort in that province. Thus, for example, treatment exposure for mother i with a youngest child aged k in province j in year 2010 is given by the number of pre-school places available in the level corresponding to children aged k in that year and province divided by the total number of children aged k in that year and province.[16] We denote this variable *Places per child$_{kjt}$*.

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mothers whose youngest child was aged 3 in year t may also appear in year t+1, when their youngest child was aged 4. As explained in more detail in footnote 22, results are similar if we exclude one observation for mother appearing twice.

[16] School years in Argentina run from March to December. Children who are 3 years old before 30th June can entry to level 1 of pre-school. Since we use the 2nd quarters of the survey, we minimized the cases of

To estimate the causal effect of the childcare subsidy induced by the construction of public pre-school facilities on maternal labor supply, we estimate equations of the following form:

$$Y_{ikjt} = \alpha_0 + \alpha_1 X_{ijt} + \alpha_2 Z_{jt} + \beta \, Places \; per \; child_{kjt} + \mu_j + \rho_t + \varepsilon_{ikjt} \qquad (1)$$

where Y_{ikjt} is a measure of maternal labor supply (employment, participation, part-time employment and/or hours or work) for mother i, whose youngest child is aged k, in province j, and period t; X_{ijt} is a vector of exogenous woman or woman's household characteristics, Z_{jt} is a vector of time-varying province variables, $Places \; per \; child_{kjt}$ is the variable of interest measuring pre-primary school facilities for children aged k in province j in period t, μ_j is a province fixed-effect, ρ_t is a year effect common to all provinces in period t, and ε_{ikjt} is the error term. The causal effect of pre-school facilities construction on female employment will be equal to β under the assumption of perfect take-up of preschool places.[17]

Identification of the parameter of interest relies on the differential intensity of the pre-school facilities construction across preschool levels, provinces (as observed in Table 2), and time. Some of the outcomes of interest in Eq. (1) are limited dependent variables. For such variables (employment, participation and part-time employment), we estimate a probit model and calculate the average impact of a marginal change in the explanatory variables (including the *Places per child)* on the expectation of the observed outcome of interest. For hours of work, we estimate Eq. (1) by Ordinary Least Squares (OLS). In all cases, we compute standard errors clustered at the province level.[18]

To the extent that mothers move across cities in response to the availability of public pre-primary school facilities our results could be biased. Working mothers moving towards cities where the availability of public pre-primary school facilities is higher, could cause a spurious positive correlation between maternal employment and public pre-primary school facilities, and therefore could bias upward the parameter of interest. However, this does not seem to be the case in our sample. Only 3% of mothers in our sample lived in a different province five years before they were surveyed (that, is before they had their youngest child) and only 1% lived in a different city of the same province.

Also, a possible difficulty with *Places per Child* arises because more places may be created where demand is higher. We first dealt with this issue by using the instrumental variable approach and found that the Wald test does not reject the null hypothesis of exogeneity, which would mean that there is no endogeneity problem.[19]

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children that at the time of the survey are 2 years old but turn 3 years old before the 30th June. The same occurs with children that are 3 years old at the time of the survey but turn 4 years old before the 30th June.

[17] The coefficient of the regression of child assistance to pre-primary school on the number of places per child is 0.99 and we cannot reject the null hypothesis that the effect is different from one, that is, we cannot reject the null hypothesis of full take-up of vacancies.

[18] Note that the clustered standard errors reported are estimated using STATA that adjusts its estimates to account for the finite number of clusters. In any case, in order to check that our estimates are robust, we also obtain OLS estimates with standard errors clustered by agglomerate and year (two-way clustering). None of the results of this paper change if we cluster standard errors this way.

[19] We use level 1 and 2 pre-school enrollment rates in 2004 and one lag of pre-school education expenditure as instruments for *Places per child*. The correlation between the total number of places created per child between 2007 and 2013 and the pre-primary school enrollment rate in 2004 is -0.28 for level 1 and -0.65 for level 2, which shows that more schools were built in regions where enrollment rates were low. The correlation between the number of places per child and one lag of pre-school education expenditure is 0.59 for level 1 and 0.77 for level 2. In the two-step estimator, in the second stage we include the residuals from the first-stage OLS regression as regressors. The Wald test is a test of significance on those residuals' coefficients. We do not reject the null hypothesis of exogeneity which means that the error terms in the structural equation (probit) and the reduced-form equation for the endogenous variable (instrumented regression) are not correlated.

Second, in order to definitely rule out an endogeneity problem in the construction of new pre-school places, we use a strategy similar to that in Alzúa et al. (2011) and López (2012) in order to estimate hazard models that test whether maternal employment affected the probability that a province constructs more pre-school places. We estimate models with different specifications of the dependent variable that depend on the percentage of pre-school places constructed for children aged 3- and 4- in each province from the beginning of the program in 2004 to a certain point in time over the total number of places constructed for those children along the entire period. If a province overcomes that threshold, then we consider the construction program was effectively implemented. We use three thresholds, 33% of the province total construction, 66% and 90%. The independent variables considered were: the maternal employment rate and other time varying provincial variables (GDP, inequality, unemployment total population, political party, which takes the value of 1 if the province is governed by the same party as the national government, and the log of the province pre-school education expenditure). In Table A1 in the Annex we present the results of estimating a logit model. We use two functional forms for the hazard function: (i) a time trend, and (ii) yearly dummies. Results indicate that, when we use the threshold of 66% and 90%, maternal employment is not statistically significant, which indicates that this variable did not influence the construction of pre-school places across provinces. As in Alzúa et al. (2011), the only variable that is significant in most specifications is the political party, which indicates that if a province was governed by the same party as the national government, it was more likely to construct new pre-school places. In light of this result, we include this variable as a control in our estimations.

Finally, as a robustness check, we have tried an alternative difference-in-difference approach in line with the strategy followed by Duflo (2001) and Alzúa et al. (2011). For this purpose, we extended the sample period to 2004-2013 to identify cohorts of children that were affected and not affected by the construction program and provinces with low and high exposure to the construction program. Formally, the model is given by:

$$Y_{ikjt} = \alpha_0 + \alpha_1 X_{ijt} + \alpha_2 Z_{jt} + \beta P_{kj} T_t + \gamma + \mu_j + \rho_t + \varepsilon_{ikjt} \ (2)$$

where Y_{ikjt} is a measure of maternal labor supply for mother i, whose youngest child is aged k, in province j, and period t; X_{ijt} is a vector of exogenous woman or woman's household characteristics, Z_{jt} is a vector of time-varying province variables, T_t is a dummy variable equal to 1 during the period of the infrastructure construction program (2007-2013), P_{kj} is a dummy that defines the intensity of the construction of new places for children aged k in province j[20], μ_j is a province fixed-effect, ρ_t is a year effect common to all provinces in period t, and ε_{ijt} is the error term.

5. Results

We now study how differences in exposure to the program, measured by the variable *Places per child*, affect maternal employment, participation, part-time employment and weekly hours of work. In other words, we study the causal effect on maternal labor market outcomes of increasing public school facilities of level 1 and 2 in their area of residence.

In Table 6, we analyze the impact of the expansion of level 1 and 2 pre-primary school facilities on maternal employment in households with a youngest child between 3 and 4 years old. For

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[20] As in Duflo (2001), high program provinces are defined as provinces where at least 70% of the residuals of a regression of the number of places on the number of children for that province are positive. Results are similar if we use a threshold of 50% or 60% of the residuals.

each control variable, we report marginal effects estimated for probit models and p-values in brackets. The standard errors are clustered at the province level.

In the first column, we only condition on year and province fixed effects. The point estimate of 0.05 indicates that, under the assumption of full take-up, one place constructed per child in level 1 or 2 of pre-primary school, increases the likelihood of maternal employment by 5 percentage points. Moreover, we reject the null hypothesis that the effect is zero at a 10% level of statistical significance. This point estimate suggests an effect of pre-primary school similar to the ones estimated by Galiani and Berlisnski (2007) for Argentina (7 percentage points) and by Gelbach (2002) for the US (5 percentage points).

Given that the average number of places constructed per child over the period was 0.12, the average increase in maternal employment as a consequence of the program is approximately 0.6 percentage points. Hence, the program explains around 10% of the increase in maternal employment from 2007 to 2013.

In Column (2), we add dummies for the age of the mother and her skill level and also condition on the structure of the household (i.e., age of the youngest child, presence of a spouse, number of children in the household, income of other household members, the presence of other female adult in the household and eligibility for the AUH). The estimate suggests that if we increase the stock of places per child by 1 and there is full take-up of these new places, the likelihood of maternal employment would increase by 6 percentage points. The education and age variables and most of the household structure variables have the expected signs and are statistically significant determinants of maternal employment. The probability of maternal employment force increases up to 40 years and decreases afterwards. It also increases with the level of education. In contrast, the presence of the spouse, the number of children, the family income and the eligibility for the AUH reduce the probability that the mother is employed.

In Column (3), we include yearly measures of province unemployment, women participation in the labor market and political party. All these new conditioning variables have a statistically significant effect on maternal employment. However, the point estimate for the impact of school construction on maternal employment is slightly affected by their inclusion.

All in all, Columns (2) and (3) show that the benchmark fixed effects estimate in column (1) is robust to the controls we include in the regression and that the relation between school construction and maternal employment can be safely interpreted as causal.[21]

Column (4) examines heterogeneous effects of the expansion of pre-primary school facilities by estimating a modified version of the model that allows interactions of the exposure variable with women's education.[22] The results show that the expansion of public pre-primary school facilities for children aged 3 and 4 only affected the employment of the more educated mothers (those having at least tertiary education). Schlosser (2011) finds a similar result for Arab mothers in Israel. This could be a surprising finding given that, according to the basic labor supply theoretical model, the provision of child care subsidies is expected to increase the labor force participation of mothers at the margin, who are typically associated with low earnings potential and low educational levels. The employment rate for mothers with low education (at most

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[21] Due to the rotating panel structure of the EPH, 990 mothers (18%) appear twice in our sample. We test the robustness of the results by dropping one observation for those mothers appearing twice in our sample so that all appear only once. Results are shown in Table A.2 in the Annex. The estimated effect of an additional place per child on maternal employment is somewhat larger and more significant when excluding one observation for mothers appearing twice.

[22] We further explored whether the presence of a spouse in the household and the presence of any other female adult in the household generate differences on the impact of the expansion of pre-primary school facilities, and find no differences across these groups.

incomplete secondary education) in our sample is 38 percent. Therefore, it seems unlikely that solely the provision of preschool services will induce them to work.[23] For skilled mothers (complete tertiary education), the employment rate is 83 percent. Sixty-five percent of children of these mothers attend pre-primary school. Of this, 40% attend public pre-primary school.

Another possible explanation is that, in the case of low educated women, the new child care facilities substitute for informal childcare arrangements. Moreover, it is possible that publicly provided childcare simply "crowds out" the private provision of care (either formal or informal). Although information on informal childcare arrangements is not available, information on attendance rates from the Federal Ministry of Education indicates that during the period under analysis there was an increase in the percentage of 3- and 4- year old children attending public pre-primary school with the consequent decline in the percentage attending private pre-primary school.

Finally, Column (5) presents the results when exposure to the program is defined according to cohort and province, as in Duflo (2001) and Alzúa et al. (2011). Results are qualitatively similar to previous ones, although the estimated effect of the construction of new public pre-school places on maternal employment is slightly lower.

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[23] CEPAL data indicates that the labor force participation of women from poor households in Argentina decreased from 44% in 2004 to 36% in 2013 (see http://www.idesa.org/informes/1068). Also, Gasparini et al (2014) recognize a significant deceleration in the rate of increase of the female labor force participation in the 2000s in Latin American countries. They presume two possible causes of this slowdown: (i) participation levels are reaching a ceiling or a natural rate that is mainly determined by cultural factors, or (ii) the strong economic growth that experienced the region in the 2000s allowed a surge in earnings and social protection benefits that may have retarded the entry of women into the labor market.

Table 6 The impact of the new stock of preschool places per child on maternal employment

Dependent variable: Employment

VARIABLES	(1)	(2)	(3)	(4)	(5)
Exposure to program	0.050*	0.060*	0.058*	0.030	0.038**
	[0.052]	[0.068]	[0.059]	[0.299]	[0.041]
Places per child* Mother's Educ: High School				0.024	
				[0.635]	
Places per child* Mother's Educ: Tertiary				0.152*	
				[0.084]	
Youngest child aged 4		-0.022*	-0.021*	-0.022*	0.012
		[0.093]	[0.062]	[0.052]	[0.104]
Spouse present		-0.267***	-0.269***	-0.268***	-0.249***
		[0.000]	[0.000]	[0.000]	[0.000]
Number of Children<19		-0.042***	-0.042***	-0.042***	-0.032***
		[0.000]	[0.000]	[0.000]	[0.000]
Income of Other HH Members (´000)		-0.044***	-0.043***	-0.043***	-0.049***
		[0.000]	[0.000]	[0.000]	[0.000]
Other Female Adult HH Member		0.016	0.015	0.015	0.015
		[0.379]	[0.437]	[0.417]	[0.416]
Mother's Age: 21-25		0.087*	0.088*	0.089*	0.091*
		[0.071]	[0.065]	[0.061]	[0.081]
Mother's Age: 26-30		0.155***	0.156***	0.157***	0.151***
		[0.002]	[0.002]	[0.002]	[0.002]
Mother's Age: 31-35		0.222***	0.221***	0.223***	0.209***
		[0.000]	[0.000]	[0.000]	[0.000]
Mother's Age: 36-40		0.268***	0.268***	0.269***	0.248***
		[0.000]	[0.000]	[0.000]	[0.000]
Mother's Age: 41-45		0.238***	0.239***	0.240***	0.236***
		[0.000]	[0.000]	[0.000]	[0.000]
Mother's Age: 46-49		0.177***	0.181***	0.183***	0.190***
		[0.008]	[0.008]	[0.007]	[0.004]
Mother's Educ: High School		0.111***	0.111***	0.103***	0.107***
		[0.000]	[0.000]	[0.000]	[0.000]
Mother's Educ: Tertiary		0.401***	0.400***	0.363***	0.401***
		[0.000]	[0.000]	[0.000]	[0.000]
AUH		-0.127***	-0.128***	-0.127***	-0.136***
		[0.000]	[0.000]	[0.000]	[0.000]
Unemployment rate			-1.141**	-1.146**	-0.868*
			[0.026]	[0.025]	[0.056]
Female participation rate			0.730***	0.735***	0.733***
			[0.003]	[0.004]	[0.000]
Political party			-0.065**	-0.064**	-0.064**
			[0.026]	[0.029]	[0.022]
Year and province fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	6,518	6,518	6,518	6,518	8,774

*Notes: Exposure to program is measured by the variable Places per child in columns (1) to (4) and by the interaction between a dummy identifying treated cohorts and high program provinces. Marginal effects. Probit Estimations. P-values in brackets. Standard errors clustered at the province level . * significant at 10%; **significant at 5%;***significant at 1%.*
Source: Encuesta Permanente de Hogares, 2nd quarters, 2007-2013.

Women in Argentina spend, on average, 4 hours a day to unpaid work, including childcare, which could be dedicated to paid work if unpaid work were publicly provided. [24] Then, we consider the provision of pre-school education may mainly affect mother's probability of working part-time. Under this appreciation we also estimated the impact of the program on part-time employment and weekly hours worked using a similar strategy to that for total employment (see columns (1) and (2) of Table **7**). One third of the employed women in our sample work part-time (less than 25 hours per week). Assuming full take-up, one place constructed per child in level 1 or 2 of pre-primary school, increases the likelihood that a mother that did not work starts working part-time by 12 percentage points, being the effect estimated statistically significant at a 1% level.[25] Indeed, for this group, we estimate an average increase of around 1.5 hours of work per week for each additional place per child built.

Moreover, it may be the case that the increased availability of public pre-school places not only affected the employment of mothers but also had an effect on the number of mothers that look for a job. To test for this possibility, we estimated the impact of the program on mother's participation into the labor market. As shown in the last column of Table **7**, we found a positive but non-significant effect of the expansion of public pre-primary school facilities on the labor market participation of mothers.

Overall, estimations in Tables (6) and (7) indicate that the expansion of level 1 and level 2 pre-school facilities had a positive effect on mother's employment, particularly on the probability that mothers are employed in part-time jobs.

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[24] For a description of the time dedicated to unpaid work in Argentina, see Esquivel (2011).
[25] The results hold if we define part-time employment as less than 20 hours per week.

Table 7 The impact of the new stock of preschool places per child on maternal Part-time employment and Hours of work

	Part-time employment	Hours worked	Participation
Places per child	0.115***	1.452*	0.034
	[0.007]	[0.051]	[0.489]
Youngest child aged 4	-0.043***	-0.539*	-0.004
	[0.009]	[0.058]	[0.820]
Spouse present	-0.246***	-3.077***	-0.296***
	[0.000]	[0.000]	[0.000]
Number of Children<19	-0.020***	-0.216***	-0.041***
	[0.000]	[0.001]	[0.000]
Income of Other HH Members (´000)	-0.033***	-0.469**	-0.046***
	[0.009]	[0.015]	[0.000]
Other Female Adult HH Member	-0.010	0.051	0.020
	[0.751]	[0.909]	[0.368]
Mother's Age: 21-25	0.018	0.506	0.062
	[0.762]	[0.462]	[0.226]
Mother's Age: 26-30	0.052	0.979	0.120**
	[0.381]	[0.177]	[0.012]
Mother's Age: 31-35	0.077	1.266	0.162***
	[0.189]	[0.115]	[0.000]
Mother's Age: 36-40	0.113**	1.725**	0.198***
	[0.032]	[0.014]	[0.000]
Mother's Age: 41-45	0.103**	1.525**	0.179***
	[0.045]	[0.034]	[0.000]
Mother's Age: 46-49	-0.009	0.326	0.118*
	[0.881]	[0.767]	[0.099]
Mother's Educ: High School	0.016	0.394	0.108***
	[0.412]	[0.142]	[0.000]
Mother's Educ: Tertiary	0.429***	7.613***	0.381***
	[0.000]	[0.000]	[0.000]
AUH	-0.025	-0.233	-0.083***
	[0.192]	[0.458]	[0.001]
Unemployment rate	-1.183**	-16.439*	-0.067
	[0.011]	[0.060]	[0.883]
Female participation rate	0.812***	9.131**	0.843***
	[0.000]	[0.017]	[0.000]
Political party	-0.094	-1.584*	-0.051**
	[0.155]	[0.056]	[0.014]
Constant		3.375*	
		[0.088]	
Year and province fixed effects	Yes	Yes	Yes
Observations	4,389	4,373	6,518

*Notes: Probit estimation and marginal effects for part-time employment and participation. Part-time employment rate excludes women who work 25 or more hours per week. OLS estimation for Hours worked. Hours worked is the average hours worked in a week for this group of women. P-values in brackets. Standard errors clustered at the province level. * significant at 10%; **significant at 5%;***significant at 1%.*
Source: Encuesta Permanente de Hogares, 2nd quarters, 2007-2013.

Finally, to confirm our identification strategy, we perform a placebo experiment and estimate the impact of the expansion of pre-school facilities for children aged 3 and 4 on the employment of (i) mothers whose youngest children is below 3, (ii) mothers of children aged 5, (iii) mothers of children above 5 and (iv) women with no children. These women are similar to mothers whose youngest children are between 3 and 4 years old and therefore provide a good indication for the existence of differential trends in employment between treated and untreated women. Table A.3 in the Annex shows the results of this placebo experiment. We find no significant effect of the expansion of pre-school facilities for children aged 3 and 4 on the employment of women with no children or mothers of younger or older children. This finding reinforces our previous results.

6. Conclusions

The aim of this paper is to measure the effect of the expansion of public pre-primary school facilities for children aged 3 and 4 on maternal employment in Argentina over the period 2007-2013, when a series of large infrastructure programs was implemented. A significant part of these public school infrastructure programs focused on pre-primary school and particularly on facilities for children aged 4, whose attendance to school was intended to be made compulsory, which finally occurred in 2015.

Between 2007 and 2013, the construction programs created approximately 123,000 places for children between 3 and 4 years old (75% targeted at children aged 4 and 25% targeted at children aged 3). This represented a 32 percent increase over baseline places for children in this age group.

In this paper, we exploit the differential intensity of the facilities construction across pre-school levels, provinces and time to identify the effect of expanding pre-primary school facilities for children aged 3 and 4 on maternal employment. Our estimates indicate that access to free public school increases the employment probability of mothers whose youngest child is between 3 and 4 years old. In particular, under the assumption of full take-up, one place constructed per child in the 3-4 age group, increased the likelihood of maternal employment by 5 percentage points. Then, given that the average number of places constructed per child between 2007 and 2013 was 0.12, the construction of pre-primary school facilities would explain a 0.6 percentage points increase in the employment of mothers of children aged 3 and 4 over this period, that is, around 10% of the increase in maternal employment from 2007 to 2013. This effect seems to come mainly from high educated women.

As preschoolers attend school for three hours a day, the expansion of pre-school facilities targeted at children aged 3 and 4 particularly affected the probability that mothers are employed in part-time jobs. One place constructed per child aged 3 or 4, increases the likelihood that a mother that did not work starts working part-time by around 12 percentage points, increasing the number of hours worked per week by an average of around 1.5.

In sum, our findings confirm the results of previous investigations that suggest that the availability of implicit childcare subsidy generated by free kindergarten for 3- and 4-year-old children in public schools increases maternal employment. Once fully implemented, we expect universal attendance to kindergarten by 4- year old children to increase maternal employment by additional 3 percentage points.

Annex

Table A1. Hazard model

Dependent variables	33% constructed		66% constructed		90% constructed	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Maternal employment	45.724**	41.096*	7.308	5.957	2.582	3.519
	[0.043]	[0.057]	[0.141]	[0.215]	[0.489]	[0.364]
GDP (2004 million pesos)	-0.271***	-0.282**	-0.063***	-0.084***	-0.022	-0.025
	[0.007]	[0.015]	[0.009]	[0.006]	[0.319]	[0.271]
Gini	-102.198**	-94.446**	-32.814***	-28.114**	-12.736	-10.988
	[0.024]	[0.029]	[0.008]	[0.036]	[0.199]	[0.295]
Unemployment	-11.847	-5.724	-4.901	-4.079	-3.975	-4.360
	[0.598]	[0.810]	[0.574]	[0.669]	[0.608]	[0.589]
Political party	4.404**	3.908*	1.058**	1.010**	1.387***	1.543***
	[0.042]	[0.058]	[0.025]	[0.038]	[0.002]	[0.001]
Population ('0000 hab)	0.019***	0.019**	0.004*	0.005**	0.000	0.000
	[0.007]	[0.017]	[0.075]	[0.037]	[0.968]	[0.917]
Log(pre-school expenditure)	-1.134	-1.077	-0.031	-0.033	0.291	0.292
	[0.104]	[0.119]	[0.902]	[0.902]	[0.213]	[0.230]
d2007		-27.270		-3.919**		-0.866
		[0.992]		[0.042]		[0.319]
d2008		-24.940		-4.276**		-0.868
		[0.993]		[0.024]		[0.290]
d2009		-18.908		-4.341**		-1.295*
		[0.995]		[0.022]		[0.099]
d2010		-19.404		-3.601*		-1.142
		[0.994]		[0.055]		[0.126]
d2011		-21.077		-3.108*		-1.858**
		[0.994]		[0.097]		[0.012]
d2012		-20.777		0.146		-1.803
		[0.994]		[0.948]		[0.012]
Log(Time trend)	4.884***		1.149***		-0.082	
	[0.008]		[0.006]		[0.835]	
Constant	44.010*	68.859	10.314	13.699*	-2.007	-2.250
	[0.080]	[0.980]	[0.184]	[0.089]	[0.758]	[0.729]
Observations	145	145	145	145	145	145

*Notes: P-values in brackets. * significant at 10%; **significant at 5%;***significant at 1%. Model 1 includes a time trend. Model 2 includes yearly dummies.*
Source: Encuesta Permanente de Hogares, 2nd quarters, 2007-2013 and Annual Reports from the Federal Ministry of Education.

Table A.2 The impact of the new stock of preschool places per child on maternal employment. Excluding one observation for mothers appearing twice

Dependent variable: Employment

VARIABLES	(1)	(2)	(3)
Places per child	0.093**	0.099**	0.091**
	[0.012]	[0.025]	[0.033]
Youngest child aged 4		-0.020	-0.017
		[0.244]	[0.265]
Spouse present		-0.257***	-0.258***
		[0.000]	[0.000]
Number of Children<19		-0.042***	-0.041***
		[0.000]	[0.000]
Income of Other HH Members (´000)		-0.047***	-0.046***
		[0.000]	[0.000]
Other Female Adult HH Member		0.014	0.012
		[0.401]	[0.483]
Mother's Age: 21-25		0.143**	0.145**
		[0.014]	[0.013]
Mother's Age: 26-30		0.195***	0.197***
		[0.001]	[0.001]
Mother's Age: 31-35		0.263***	0.263***
		[0.000]	[0.000]
Mother's Age: 36-40		0.306***	0.307***
		[0.000]	[0.000]
Mother's Age: 41-45		0.270***	0.272***
		[0.000]	[0.000]
Mother's Age: 46-49		0.214***	0.219***
		[0.000]	[0.000]
Mother's Educ: High School		0.110***	0.111***
		[0.000]	[0.000]
Mother's Educ: Tertiary		0.407***	0.406***
		[0.000]	[0.000]
AUH		-0.131***	-0.131***
		[0.000]	[0.000]
Unemployment rate			-1.494**
			[0.024]
Female participation rate			0.859**
			[0.017]
Political party			-0.068**
			[0.044]
Year and province fixed effects	Yes	Yes	Yes
Observations	5,528	5,528	5,528

*Notes: Probit estimations. P-values in brackets. * significant at 10%; **significant at 5%;***significant at 1%.*
Source: Encuesta Permanente de Hogares, 2nd quarters, 2007-2013.

Table A.3 Placebo experiment. The impact of the new stock of preschool places per child on employment of other women

Dependent variable: Employment VARIABLES	Mothers youngest child <3	Mothers youngest child aged 5	Mothers youngest child above 5	No mothers	Mothers youngest child <3	Mothers youngest child aged 5	Mothers youngest child above 5	No mothers
Places per child aged 3	-0.105 [0.450]	0.229 [0.326]	0.032 [0.795]	-0.115 [0.102]				
Places per child aged 4					-0.071 [0.499]	-0.132 [0.425]	0.058 [0.311]	-0.077 [0.236]
Spouse present	-0.261*** [0.000]	-0.254*** [0.000]	-0.233*** [0.000]	-0.057*** [0.000]	-0.265*** [0.000]	-0.253*** [0.000]	-0.235*** [0.000]	-0.058*** [0.000]
Number of Children<19	-0.040*** [0.000]	-0.024*** [0.008]	-0.030*** [0.000]		-0.041*** [0.000]	-0.025*** [0.003]	-0.029*** [0.000]	
Income of Other HH Members (´000)	-0.030*** [0.000]	-0.023** [0.047]	-0.038*** [0.000]	-0.052*** [0.000]	-0.031*** [0.000]	-0.026** [0.016]	-0.040*** [0.000]	-0.054*** [0.000]
Other Female Adult HH Member	0.036 [0.148]	0.047** [0.014]	0.010 [0.158]	-0.047*** [0.001]	0.038 [0.108]	0.058*** [0.003]	0.013* [0.088]	-0.046*** [0.001]
Mother's Age: 21-25	0.149*** [0.000]	0.155 [0.403]	-0.029 [0.857]	0.228*** [0.000]	0.131*** [0.000]	0.152 [0.406]	-0.028 [0.861]	0.224*** [0.000]
Mother's Age: 26-30	0.231*** [0.000]	0.168 [0.360]	0.083 [0.548]	0.331*** [0.000]	0.221*** [0.000]	0.174 [0.338]	0.088 [0.523]	0.330*** [0.000]
Mother's Age: 31-35	0.339*** [0.000]	0.213 [0.214]	0.116 [0.398]	0.321*** [0.000]	0.327*** [0.000]	0.214 [0.209]	0.118 [0.392]	0.322*** [0.000]
Mother's Age: 36-40	0.362*** [0.000]	0.226 [0.215]	0.144 [0.285]	0.302*** [0.000]	0.354*** [0.000]	0.236 [0.185]	0.144 [0.289]	0.303*** [0.000]
Mother's Age: 41-45	0.381*** [0.000]	0.238 [0.141]	0.128 [0.369]	0.315*** [0.000]	0.375*** [0.000]	0.237 [0.141]	0.129 [0.369]	0.315*** [0.000]
Mother's Age: 46-49	0.326*** [0.000]	0.129 [0.476]	0.116 [0.415]	0.336*** [0.000]	0.322*** [0.000]	0.132 [0.458]	0.112 [0.434]	0.339*** [0.000]
Mother's Educ: High School	0.115*** [0.000]	0.110*** [0.000]	0.074*** [0.000]	0.032** [0.016]	0.121*** [0.000]	0.105*** [0.000]	0.073*** [0.000]	0.029** [0.030]
Mother's Educ: Tertiary	0.431*** [0.000]	0.381*** [0.000]	0.326*** [0.000]	0.278*** [0.000]	0.440*** [0.000]	0.378*** [0.000]	0.331*** [0.000]	0.281*** [0.000]
AUH	-0.137*** [0.000]	-0.134*** [0.000]	-0.121*** [0.000]	-0.130*** [0.000]	-0.136*** [0.000]	-0.134*** [0.000]	-0.131*** [0.000]	-0.130*** [0.000]
Unemployment rate	-1.034** [0.047]	0.657 [0.432]	-0.502** [0.027]	-0.450 [0.116]	-1.103** [0.036]	0.637 [0.420]	-0.505** [0.020]	-0.528* [0.095]
Female participation rate	1.141*** [0.000]	0.652** [0.048]	0.905*** [0.000]	0.489*** [0.000]	1.166*** [0.000]	0.705** [0.023]	0.948*** [0.000]	0.548*** [0.000]
Political party	-0.024 [0.253]	-0.022 [0.146]	-0.045** [0.042]	0.017 [0.129]	-0.024 [0.325]	-0.016 [0.344]	-0.042* [0.070]	0.018* [0.092]
Year and province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,517	3,048	23,735	14,058	13,378	3,296	25,596	15,030

Notes: Marginal effects. Probit estimations. P-values in brackets. Standard errors clustered at the province level . *
significant at 10%; **significant at 5%;***significant at 1%.
Source: Encuesta Permanente de Hogares, 2nd quarters, 2007-2013.

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