

Maternal Labor Supply and the extension of school day in Chile*

DANTE CONTRERAS

Department of Economics, Universidad de Chile

PAULINA SEPÚLVEDA

Inter-American development Bank

Abstract

In 1996, the Chilean government approved the extension of the school day from 30 to 38 hours per week. This paper exploits the quasi-experimental nature of the reform's implementation by time, municipality, and age targeting of the program in order to examine how the maternal labor supply is affected by the childcare subsidy implicit in the lengthening of the school day. Using data from the Chilean socio-economic household survey and administrative data from the Ministry of Education for 1990-2009, we estimate that, on average, there is a 5 percent increase in labor participation and employment rates of single mothers of 8 to 13 year-olds, with no younger children, who are the group potentially mainly affected by the policy. No significant labor supply responses are detected among others mothers with eligible children.

JEL Classification: J22; J13; O12; H42

Key words: Female labor supply; childcare; fertility; labor supply; Chile

*

The authors are grateful for the comments made by Francisco Gallegos, Norbert Shady and the participant of the workshops at Universidad de Chile, IADB, Chilean Economic Society and Universidad de Concepción They also acknowledge the funding provided by Center for Advanced Research on Education (Centro de Investigación Avanzada en Educación, CIAE) and the granted by Centro de Microdatos Project P07S-023-F. Any errors or omissions are the exclusive responsibility of the authors. e-mails: Dante Contreras (dcontrer@econ.uchile.cl); Paulina Sepúlveda (pasepulv@fen.uchile.cl).

1 Introduction

The lack of access to childcare institutions is one of the main reasons affecting the entry of women into the labor market. In most developed countries, the school day of public education is highly compatible with the workday of women.¹ These countries show high levels of female labor participation and employment rates (Adser, 2005). In contrast, in developing countries the school day is, in most cases, not compatible with the 9-to-6 workday. In fact, most of the school systems in developing countries work on a half-day basis, limiting the entry of women into the labor market in these countries.²

Female labor participation has experienced significant growth in Chile. The rate of female participation increased from 35% in 1990 to 48% in 2009 (in women 15-65 years old). However, the situation of women in the Chilean labor market is still poor, particularly for women with lower income levels. Women who belong to the poorest 20% of the country's population present a participation rate of 30%, while those from 20% of the wealthiest households achieve rates of 65%.³ Female labor entry in Chile has been relatively late and is one of the lowest in Latin America in spite of the comparatively high levels of education that Chilean women achieve.⁴

There are important reasons to study determinants of female labor supply in a developing country. First, the entry of women into the labor market should have positive effects for the most vulnerable families as it represents a new source of income for these households and thus could lead to a reduction in poverty (Ganuzza, et al. 2001). Second, despite the fact that greater opportunities have emerged for women, there are still significant gaps between the participation of men and women in all areas and discriminatory cultural patterns persist (Araújo and Scalon, 2005; Antecol, 2003; Contreras and Plaza, 2010).

Previous studies have found different significant variables that affect female participation, such as age and educational level, status as head of household, no labor income, and number and age of children (Jaumotte, F., 2005). The empirical evidence shows that the

¹ France and Sweden for example.

² However, there are various initiatives that promote the implementation of the full school day. In Latin America, Chile, Argentina, Uruguay and Venezuela has promoted different policies to expand the school day.

³ Source Chilean household survey, Encuesta de Caracterización Socioeconómica Chilena (CASEN) 1990-2009.

⁴ According to ECLAC statistics on gender, education and training for women (2007), economically active women (15 and over) in urban areas in Chile have an average of 11.6 years of schooling, placing them second in South America behind Argentina, which presents an average of 11.8 years. The average for women living in rural areas of Chile is 9.3 years of schooling, placing the country first in South America for education levels of rural women.

number and ages of children are the most important variables that influence the likelihood of women's labor force participation. Furthermore, evidence has identified additional, cultural, factors such as the level of machismo and conservativeness, labor market-related factors such as lower salaries for women and rigidity, as well as institutional factors such as a lack of childcare. This article focuses on the effects of the provision of childcare on female labor participation.

Most of the literature that studies the effect of the expansion of childcare availability on mothers' labor supply focuses on studying the effects on mothers with preschool-aged children. However, there is a lack of papers focusing on the effects of increasing the length of the school day on female labor supply.

There are two main topics in the literature of the effects of childcare on labor incentives. The first focuses on the relationships among the cost of childcare, female labor supply and government subsidies ([Wrohlich](#), 2011; Lundin, Mörk and Öckert (2008); Blau and Currie, 2007; Boca and Vuri, 2006; Del Boca, 2002). Most of these studies show a small effect on female participation and high impact on the likelihood of utilizing formal childcare.

The second stems from the study of natural experiments, which provides a better framework for analyzing how greater availability of childcare can affect employment decisions of women with preschoolers (Berlinki et al, 2011; Havnes, Mogstad, 2011; Goux and Maurin, 2010; Cascio, 2009; Lefebvre and Merrigan, 2008; Berlinki et al, 2007; Gelbach, 2002;). Most of these studies suggest a positive effect on participation rates given greater availability of childcare. We follow this second approach.

The increase in free time as a result of longer school day could have positive (collateral) effect on mothers' labor decisions. Thus, this article analyzes the effect of the extension of the school day, e.g. increased availability of childcare for younger school-aged children, on mother's labor participation, employment, and hours worked per week.⁵

In 1996, the Chilean government announced the implementation of the Full School Day (FSD) as part of a series of measures designed to improve the quality and equality of education in the country. This reform affected students in third through twelfth grades, e.g. children between 8 to 17 years of age. Previous to the reform, the school day was two shifts, students attending either in the morning or the afternoon. The implementation of the reform changed the

⁵ In Chile, Encina and Martinez (2009) and Medrano (2009) have studied the effect of childcare expansion on female labor supply. However, the authors do not find effect on female labor outcomes.

educational structure so the schools must work on basis of one “shift”. On average, FSD increased the amount of time that students spent in school from 32 to 39 hours per week.

But does this extension of the school day raise maternal labor supply? Which mothers respond? The work decision is ultimately about how to allocate time between labor and leisure. An increase in childcare may change mothers’ choices, as they may spend fewer hours caring for children. However, this will also depend on preferences regarding leisure and consumption. In other words, the effect of the extension of school day on labor supply is therefore neither a substitution elasticity nor an income elasticity, but rather a combination of the two (Gelbach, 2002). The size (and sign) of the effect relies on the relative magnitude of these elasticities and preexisting distribution of hours, which may differ across time and space.

Thus, following Card and Krueger 1992, and Dufflo (2001), our empirical strategy uses the variation across municipalities and time in the implementation of the full school day reform to predict labor supply among mothers of 8 through 13 year old children in a difference-in-difference (DD) framework. The reform affects children between of 8 to 17 years old. However, we consider a smaller, younger group, because older children are less likely to need childcare. On the other hand, following Casio (2009), and Havnes and Mogstad (2011), among others, in a second stage we use other mothers, who are treated but do not have children aged 8 to 13 years old to construct comparison groups. To minimize bias, we limit the comparison group to mothers with children slightly older or slightly younger than the group of interest. These triple-difference (DDD) models remove bias from municipality-specific shocks to labor supply share by mothers with children around the same age. These biases could include things like a change in the generosity of community welfare benefits.⁶ The source of exogenous variation is the level of implementation of the reform at the municipal level.⁷ The key assumption is that the implementation of the reform did not affect the demands

placed on the schools. In other words, it is assumed that the FSD implementation process did not provide an incentive for mothers to choose schools that implemented the reform earlier.⁸

⁶ It is important to note that the reform’s installation has not been homogenous. Section 5 (Specifications checks) presents a more complete analysis of how this phenomenon could impact our results.

⁷ Measured as share of schools with FSD and available places at the municipal level.

⁸ See Section XX for more details.

The data are drawn from the Chilean Socio-Economic Characterization Survey (CASEN) and administrative information from the Ministry of Education from 1990 and 2009. The results indicate that the introduction of FSD had a significant and positive impact on labor participation for single mothers without younger children. We estimate that 5 percent of single mothers without younger children entered the work force because of the implementation of FSD. The result is small, which could be explained because the extension of the school day only increased the school day by 30 percent. Thus, despite the increase of the school day, the new school day is not totally compatible with working hours. No significant labor supply responses are detected among other mothers with eligible children.

The implementation of the reform was gradual and heterogeneous in terms of timing and areas affected. Different regions and municipalities were integrated at different points in time and with varying levels of implementation intensity. Given that the resources assigned in the implementation of FSD mainly benefited at-risk municipalities and those with lower levels of female labor participation, our results may underestimate the true impact of FSD on female labor supply. On the other hand, the selection of school may be related to unobserved correlates of maternal labor supply-demand of childcare.⁹

Even though the reform was to be implemented based on educational considerations (exogenous to the job market), its introduction was not random. Following Kruger and Berthelon (2011), we estimate the determinants of the implementation of FSD.¹⁰ The results suggest a positive relationship between the vulnerability of the municipality and the installation of the reform. In other words, if our results are biased, they have a lower bound than the true value of the impact of FSD on the female labor supply.

⁹ However, Elacqua, Schneider and Buckley (2006) and Gallego and Hernando (2008) show that there is not any evidence to suggest a greater demand for schools with FSD.

¹⁰ The authors study the impact of full school days on adolescent pregnancy rates in Chile.

2 The Full School Day Program

The Chilean government has implemented two major reforms that affect the educational system's design. The first was introduced in 1981 and included decentralizing the educational system by transferring the administration of public schools from the Ministry of Education to Municipal Authorities. It also included a nationwide voucher system for both publicly and privately administered schools, introducing a uniform demand-side subsidy in which parents are free to choose among the schools in the market.

As a result, the educational system in Chile shifted to three kinds of administrative alternatives: public establishments funded by the student subsidy provided by the state and under municipal administration; private subsidized establishments funded by the student subsidy and administered by the private sector; and private fee-paying establishments funded and administered by the private sector. The creation of voucher schools led to a dynamic education sector that underwent fast growth in the supply of schools.

The second major reform took place in 1996 when the Chilean government announced a set of new initiatives designed to improve educational quality. The measure that had the greatest impact on the school system was the implementation of FSD. This program consisted of extending the number of classroom hours by 30% annually without lengthening the school year.¹¹ The change involved an average increase of 1.4 hours per school day. Prior to the reform, many schools had a double school day, that is two shifts of students, one in the morning and another in the afternoon.¹² The execution of the FSD program meant that those schools transitioned to a single school day format.¹³

The objectives of this program were to improve student learning and increase equality in education. They were described as follows: "To contribute to the improvement of the quality of education and provide equal learning opportunities to the boys, girls and adolescents throughout the country by significantly increasing teaching time in order to better develop the new curricular framework."¹⁴

¹¹ The school year is divided into semesters. The first semester runs from the end of February or early March to July. Following a two-week winter break school resumes and lasts until late November or early December, followed by summer vacations.

¹² Under the old system, some students attended school in the morning while others attended in the afternoon.

¹³ The reform led to a sharp redistribution of the educational system, benefitting the private subsidized sector. In fact, the percentage of students in private subsidized schools increased from 15% in 1981 to 47% in 2005.

¹⁴ The program was approved through Law No. 19,532.

More time at school could positively affect learning, the technical work of teachers, and the management of each school. In fact, Bellei (2009) analyzes the effects of the increase in the length of the school day on academic performance in Chile and finds a positive and significant effect on academic performance in both language and mathematics tests.

On the other hand, FSD allowed for services to be provided to high-risk populations by increasing opportunities for learning and significantly expanding the amount of time allotted for schoolwork for all students in government-subsidized schools. Kruger and Berthelon (2011) analyze the effect of the increased length of the school day on adolescent pregnancy rates in Chile and find that increasing the amount of time that students spend in school diminishes the likelihood of adolescent pregnancy by reducing risky sexual behavior.

2.1 Implementation

The FSD format has been incorporated gradually since 1997. According to official statistics from the Ministry of Education, 80% of primary schools, or some 7,322 institutions, had joined the system by 2009 (Figure 1).¹⁵

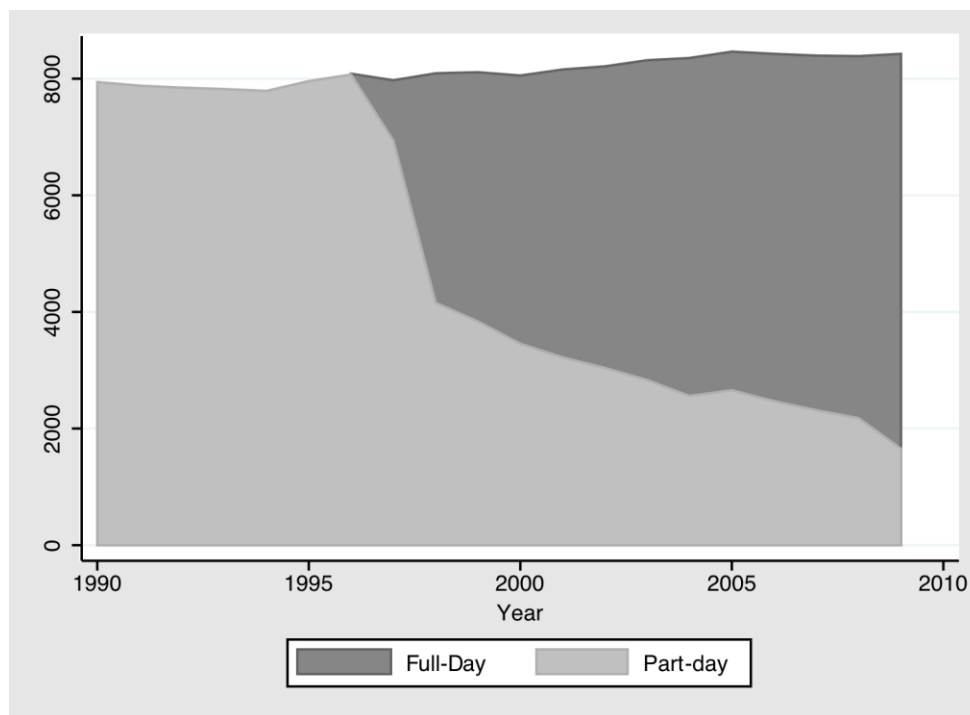
The increase in classroom time meant that third through sixth graders would increase their weekly classroom hours from 30 hours per week to 38 and that seventh and eighth graders from 33 to 38.¹⁶ For secondary students, the transition involved an increase from 33 to 38 hours for ninth and tenth graders, and from 38 to 42 hours for eleventh and twelfth graders.¹⁷ In short, the increase of the school day involved adding 232 hours per year for third to sixth graders, 144 hours annually for seventh to eighth graders, 261 for ninth and tenth graders, and 174 for students in their last two years of high school. However, the program's implementation was gradual. Restrictions linked to operational considerations and infrastructure meant that the incorporation of schools into the program was not instantaneous or homogenous.

¹⁵ The Ministry of Education projected that FSD would be universal in municipal schools by 2007 and in private subsidized schools by 2010. However, the process of incorporating municipal schools into the system did not end in 2007, which led to the extension of the period through 2010. The law requires that publicly funded schools created after 1997 begin operations with a full school day.

¹⁶ Primary education consists of eight years of education in Chile. Students who complete secondary school will have been in the school system for 12 years.

¹⁷ Additional time was provided before gym and lunch.

Figure 1: Number of half-day primary schools



Source: Authors' estimates based on administrative data from the Ministry of education

Operational costs are financed through a 30% increase in government subsidies¹⁸ while infrastructure-related costs are financed through the “capital contribution” subsidy, which I assigned to schools by the government through competition.¹⁹ Schools that did not have a full school day prior to 1998 can apply for support to acquire the infrastructure necessary to incorporate FSD. Schools created after 1998 can apply as long as there is a lack of schools in their region. Public schools can also receive subsidies from regional or municipal governments.

The program was not introduced randomly. The first schools to change to the FSD format were rural and smaller institutions that already had a single schedule. As such, increased investment in infrastructure was not required. Furthermore, resources were focused on schools with populations of students who were at a greater socio-economic risk.

¹⁸ This contribution is received once the Ministry of Education approves the implementation of FSD in the school.

¹⁹ In order to apply for this subsidy, the school must participate in a capital contribution competition held by MINEDUC which normally takes place twice a year. Each school is evaluated on the basis of socio-economic vulnerability and the funds required for each student to join the program. Each component is assigned a score and the projects with the highest scores are funded.

Table 1 describes the FSD implementation process between 1998 and 2009 in the country's 13 administrative regions.²⁰ In 1998, the regions with the highest rates of incorporation were IX and XI, with a percentage of FSD schools of 73% and 79% respectively. This trend held until 2009, when these regions reached 91% and 93% enrollment respectively, which still represented the highest rates in the country.²¹

Table 1: Proportion of FSD schools (%) by administrative region, 1998-2009

Region	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
I	51	50	55	60	52	54	54	57	57	61	59	71
II	36	40	47	54	51	55	61	69	68	64	65	63
III	59	57	66	69	66	70	71	69	75	78	83	79
IV	53	56	59	63	59	64	62	69	72	74	76	88
V	32	39	42	46	53	57	60	62	64	67	68	73
VI	40	42	48	56	60	62	64	68	72	73	75	81
VII	49	55	57	59	65	68	70	72	72	75	76	83
VIII	41	46	49	51	56	61	62	62	64	66	67	78
IX	73	76	81	85	84	83	84	85	84	85	86	91
X	79	80	84	84	86	86	87	87	88	88	89	93
XI	63	64	70	76	71	79	81	79	83	88	87	78
XII	26	41	50	62	47	50	50	58	59	63	60	67
RM	17	22	28	34	37	45	45	48	54	57	61	67
Average	49	53	57	61	63	66	67	69	71	72	74	80

Authors' estimates using Ministry of Education FSD database. The table includes the proportions of primary schools in each of Chile's administrative regions that had implemented the FSD program in at least one of its grade levels. RM=Santiago metropolitan region

FSD schools in the Metropolitan Region were 17% in 1998, which was the lowest rate in the country. Only 7% of the schools in the Metropolitan Region are of the rural type, which was first addressed by the reform. In contrast, 68% and 38% of the schools in the IX and XI regions

²⁰ Chile was divided into 13 regions (in Spanish, regiones), which are the country's first-level administrative division. Each region is headed by an intendant (intendente), appointed by the President, and an indirectly-elected body known as regional board (consejo regional). Regions are divided into provinces (second-level administrative division), each headed by a governor (gobernador), appointed by the President. There are 54 provinces, in total. Provinces are further divided into municipalities (third and lowest level administrative division), which are governed by mayor (alcalde).

²¹ This percentage is based on total enrollment in the region.

are rural.²² Finally, only six municipalities had not incorporated FSD by 1998. The last to incorporate was the municipality of Rauco, which introduced FSD in 2004.²³ It is important to note that all municipalities were participating in FSD by 2006.

3 Data: Source sample and summary statistics

To estimate the relationship between full day school reform and maternal labor supply we use data from Chile's National Socio-Economic Characterization Survey (CASEN) for the period 1990-2009. We also use administrative data on enrollment and school compiled by the Ministry of Education for 1998-2009. CASEN is a representative survey at the national, regional, and urban-rural levels. It has been happened every two or three years since 1987 and provides important data on health, education, housing, income, labor market and demographic variables at the household level.

This study considers women between the ages of 20 and 50 since they present the greatest likelihood of being the mothers of 8-13 year olds. Following Gelbach (2002), we estimate separate models for a mother of an 8-13 year old with and without younger children. Mothers who have both an 8-13 year old and a younger child must find childcare for younger child (even if the older child is in FSD), so throughout the paper we split the samples according to whether the woman's 8-13 year-olds is her youngest child. We also split the sample by marital status, so we can differentiate the effects of the FSD on married and single mothers. Mothers were classified as single if listed as head of household or as the primary individual in a sub-family.²⁴

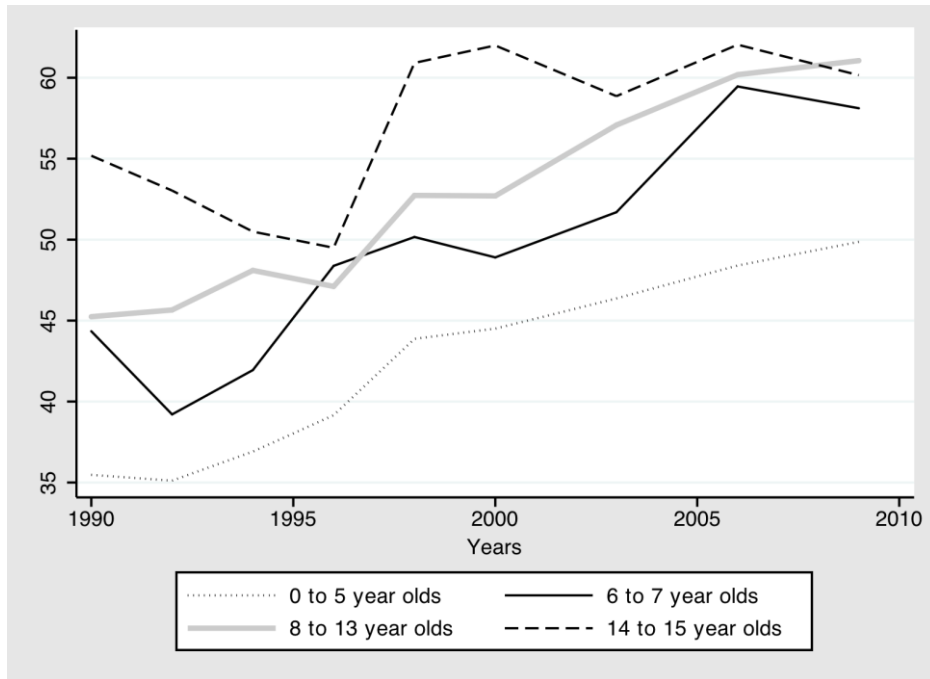
Figure 2 presents mothers' labor participation and employment rate by age of the youngest child. As was expected, the higher labor participation is for mothers whose youngest child is 14 to 15 years old (dash line). Meanwhile, the lowest labor participation is for the group of mothers whose youngest child is 0 to 5 years old (dot line). All the groups increased participation and employment. This can be explained by the increase in education levels of women in Chile, the increased in the access to childcare institutions for children in preschool age, among others.

²² Ministry of Education 1998-2009.

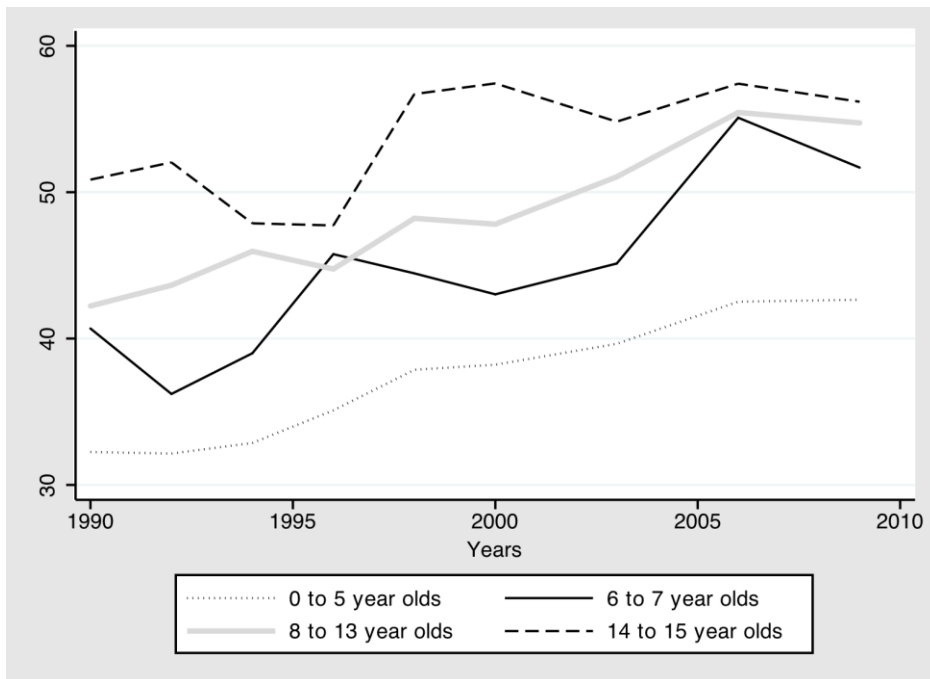
²³ The last municipalities to join the program were Sierra Gorda, Rinconada, Isla de Pascua, Olivar, Rauco and Penco. Source: Ministry of Education 1998-2006.

²⁴ We also estimate the results using the marital status reported by women. The results are quite similar and are available from the authors upon request.

Figure 2: Maternal labor participation and Employment rate by age of youngest child



(a) Maternal labor participation rates by age of youngest child



(b) Maternal employment rates by age of youngest child

Table 2a reports summary statistics for single and married mothers of 8-13 year olds without younger children. Along all the labor outcomes- labor participation, employment, and hours worked- the typical single mother consistently supplies more labor than her married counterpart. However, there were large increases in labor supply for married mothers over the sample period. The gain in employment was particularly large in 2000. The econometric models described below allow us to test whether any of this gain was response to FSD implementation.

Table 2b shows that married mothers of 8-13 year olds with younger children experienced similar gains in employment and hours over the same 20-year period, though their employment levels were lower in each year, arguably due to the presence of younger children. Generally, the ages and quantity of other children may affect labor supply decisions.

Table 2a, Table 2b, Table 3a, and Table 3b also show trends based on the number of children in different age groups and in other maternal demographic characteristics. Because these trends may underlie rising female labor supply (Blau 1998), our models control for maternal observables. Demographic characteristics of single mothers whose youngest child is 8-13 years old differ from similar married mothers. Single mothers show more years of schooling, lower levels of poverty, lower average age, and have a lower number of children. Additionally, they are more likely to live in urban areas and have an older woman in their households.

Table 2a Mothers' Characteristics of 8 to 13 year-olds without younger Children, by Marital Status: 1990–2009

A	Single mothers with no younger children								
	2009	2006	2003	2000	1998	1996	1994	1992	1990
Labor outcomes									
Labor participation	0.81 (0.39)	0.79 (0.40)	0.80 (0.40)	0.78 (0.41)	0.79 (0.41)	0.74 (0.44)	0.73 (0.45)	0.71 (0.46)	0.70 (0.46)
Worked last week	0.73 (0.44)	0.73 (0.44)	0.72 (0.45)	0.70 (0.46)	0.72 (0.45)	0.70 (0.46)	0.69 (0.46)	0.65 (0.48)	0.64 (0.48)
Hours last week	29.77 (22.23)	30.55 (22.99)	29.83 (24.17)	31.37 (24.96)	31.49 (24.30)	30.58 (24.46)	31.83 (24.94)	31.64 (25.82)	32.42 (27.91)
Background									
Schooling	11.10 (3.58)	10.83 (3.50)	10.57 (3.87)	10.65 (4.08)	10.22 (4.03)	10.08 (4.00)	8.85 (4.02)	8.97 (4.18)	8.71 (4.31)
Poor	0.21 (0.40)	0.20 (0.40)	0.23 (0.42)	0.22 (0.41)	0.26 (0.44)	0.25 (0.43)	0.35 (0.48)	0.38 (0.49)	0.48 (0.50)
Age	38.88 (6.65)	39.02 (6.55)	38.84 (6.31)	38.65 (6.06)	38.21 (6.03)	37.82 (6.19)	39.12 (6.27)	38.34 (6.19)	38.30 (6.51)
Number of Children 8 to 13	1.07 (0.51)	1.04 (0.51)	1.08 (0.51)	1.10 (0.55)	1.16 (0.57)	1.03 (0.56)	1.08 (0.58)	1.09 (0.58)	1.10 (0.51)
Number of Children 14 to 17	0.36 (0.56)	0.42 (0.63)	0.39 (0.60)	0.40 (0.64)	0.45 (0.67)	0.50 (0.69)	0.49 (0.68)	0.46 (0.66)	0.47 (0.70)
Urban	0.91 (0.29)	0.91 (0.29)	0.90 (0.30)	0.91 (0.29)	0.91 (0.29)	0.91 (0.29)	0.88 (0.32)	0.88 (0.33)	0.89 (0.32)
Other adult female in the household	0.56 (0.50)	0.59 (0.49)	0.59 (0.49)	0.62 (0.49)	0.60 (0.49)	0.64 (0.48)	0.65 (0.48)	0.62 (0.49)	0.58 (0.49)
B									
Married mothers with no younger children									
Labor outcomes									
Labor participation	0.50 (0.50)	0.51 (0.50)	0.48 (0.50)	0.51 (0.50)	0.43 (0.50)	0.48 (0.50)	0.40 (0.49)	0.37 (0.48)	0.33 (0.47)
Worked last week	0.44 (0.50)	0.47 (0.50)	0.43 (0.50)	0.47 (0.50)	0.39 (0.49)	0.43 (0.50)	0.38 (0.49)	0.35 (0.48)	0.31 (0.46)
Hours last week	17.34 (22.20)	19.01 (23.29)	16.63 (22.97)	19.01 (23.29)	15.28 (22.77)	16.63 (22.97)	16.83 (23.65)	16.10 (23.49)	14.56 (23.59)
Background									
Schooling	10.83 (3.47)	10.57 (3.49)	10.43 (3.65)	10.57 (3.49)	10.06 (3.81)	10.43 (3.65)	9.35 (4.17)	8.81 (4.14)	8.45 (4.15)
Poor	0.13 (0.33)	0.13 (0.33)	0.17 (0.38)	0.13 (0.33)	0.19 (0.39)	0.17 (0.38)	0.23 (0.42)	0.31 (0.46)	0.38 (0.48)
Age	40.99 (5.80)	40.29 (5.69)	40.19 (5.67)	40.29 (5.69)	39.92 (5.72)	40.19 (5.67)	40.19 (5.58)	39.85 (5.94)	39.46 (6.16)
Number of Children 8 to 13	1.09 (0.53)	1.11 (0.53)	1.12 (0.57)	1.11 (0.53)	1.18 (0.63)	1.12 (0.57)	1.18 (0.64)	1.22 (0.66)	1.25 (0.67)
Number of Children 14 to 17	0.49 (0.62)	0.55 (0.66)	0.56 (0.66)	0.55 (0.66)	0.60 (0.69)	0.56 (0.66)	0.65 (0.73)	0.65 (0.74)	0.71 (0.79)
Urban	0.86 (0.35)	0.86 (0.35)	0.86 (0.35)	0.86 (0.35)	0.87 (0.34)	0.86 (0.35)	0.85 (0.35)	0.84 (0.37)	0.85 (0.36)
Other adult female in the household	0.36 (0.48)	0.33 (0.47)	0.32 (0.47)	0.33 (0.47)	0.36 (0.48)	0.32 (0.47)	0.39 (0.49)	0.35 (0.48)	0.35 (0.48)

Underlying data are from the Chilean socio-economic household survey (CASEN) and administrative data from the Ministry of Education for 1990-2009

Table 2b Mothers' Characteristics of 8 to 13 year-olds with younger Children, by Marital Status: 1990–2009

A	Single mothers with younger children								
	2009	2006	2003	2000	1998	1996	1994	1992	1990
Labor outcomes									
Labor participation	0.76 (0.43)	0.75 (0.43)	0.75 (0.43)	0.74 (0.44)	0.76 (0.43)	0.73 (0.44)	0.71 (0.45)	0.69 (0.46)	0.71 (0.45)
Worked last week	0.68 (0.47)	0.68 (0.47)	0.66 (0.47)	0.66 (0.47)	0.68 (0.47)	0.69 (0.46)	0.66 (0.47)	0.64 (0.48)	0.66 (0.48)
Hours last week	27.14 (22.61)	27.83 (23.36)	26.78 (24.48)	28.94 (25.61)	29.17 (24.71)	30.29 (25.05)	30.33 (24.82)	30.52 (26.15)	31.52 (27.19)
Background									
Schooling	11.03 (3.46)	10.70 (3.44)	10.56 (3.70)	10.53 (3.86)	10.29 (3.81)	10.03 (3.93)	9.35 (3.93)	9.23 (3.99)	8.90 (4.20)
Poor	0.26 (0.44)	0.26 (0.44)	0.30 (0.46)	0.29 (0.46)	0.33 (0.47)	0.34 (0.47)	0.41 (0.49)	0.45 (0.50)	0.54 (0.50)
Age	37.21 (6.56)	37.45 (6.48)	37.28 (6.31)	37.14 (6.19)	36.70 (5.97)	36.72 (6.07)	37.30 (6.20)	36.63 (6.15)	36.66 (6.55)
Number of Children 0 to 7	0.24 (0.46)	0.24 (0.47)	0.25 (0.49)	0.28 (0.53)	0.32 (0.55)	0.35 (0.54)	0.33 (0.59)	0.28 (0.50)	0.27 (0.49)
Number of Children 8 to 13	1.12 (0.54)	1.10 (0.54)	1.15 (0.54)	1.18 (0.61)	1.26 (0.63)	1.16 (0.64)	1.20 (0.65)	1.17 (0.59)	1.19 (0.58)
Number of Children 14 to 17	0.34 (0.55)	0.39 (0.62)	0.37 (0.59)	0.37 (0.61)	0.42 (0.64)	0.46 (0.68)	0.45 (0.66)	0.41 (0.67)	0.41 (0.66)
Urban	0.91 (0.29)	0.91 (0.28)	0.91 (0.29)	0.91 (0.29)	0.93 (0.25)	0.94 (0.24)	0.90 (0.29)	0.92 (0.27)	0.95 (0.22)
Other adult female in the household	0.52 (0.50)	0.55 (0.50)	0.56 (0.50)	0.60 (0.49)	0.57 (0.49)	0.61 (0.49)	0.61 (0.49)	0.58 (0.49)	0.59 (0.49)
B									
Labor outcomes									
Labor participation	0.46 (0.50)	0.46 (0.50)	0.44 (0.50)	0.38 (0.49)	0.40 (0.49)	0.34 (0.48)	0.35 (0.48)	0.32 (0.47)	0.32 (0.47)
Worked last week	0.41 (0.49)	0.42 (0.49)	0.39 (0.49)	0.34 (0.47)	0.36 (0.48)	0.32 (0.47)	0.33 (0.47)	0.31 (0.46)	0.31 (0.46)
Hours last week	15.92 (21.80)	16.71 (22.46)	14.89 (22.16)	13.37 (21.96)	14.95 (22.73)	13.72 (22.64)	14.23 (22.33)	13.84 (22.43)	13.62 (22.91)
Background									
Schooling	10.94 (3.42)	10.71 (3.43)	10.57 (3.56)	10.25 (3.68)	10.14 (3.77)	9.99 (3.77)	9.49 (3.95)	9.42 (3.97)	9.31 (3.86)
Poor	0.16 (0.37)	0.17 (0.37)	0.22 (0.42)	0.26 (0.44)	0.25 (0.43)	0.26 (0.44)	0.33 (0.47)	0.39 (0.49)	0.44 (0.50)
Age	38.51 (6.26)	37.96 (6.02)	37.72 (5.97)	37.47 (5.91)	37.13 (5.93)	36.74 (5.77)	37.14 (6.04)	36.81 (6.10)	36.20 (6.32)
Number of Children 0 to 7	0.27 (0.50)	0.31 (0.52)	0.32 (0.53)	0.39 (0.58)	0.41 (0.59)	0.45 (0.61)	0.44 (0.63)	0.41 (0.59)	0.42 (0.58)
Number of Children 8 to 13	1.12 (0.53)	1.15 (0.57)	1.19 (0.60)	1.28 (0.67)	1.29 (0.66)	1.30 (0.68)	1.30 (0.71)	1.30 (0.68)	1.30 (0.66)
Number of Children 14 to 17	0.41 (0.59)	0.46 (0.63)	0.45 (0.63)	0.49 (0.66)	0.48 (0.68)	0.51 (0.71)	0.52 (0.70)	0.49 (0.69)	0.49 (0.71)
Urban	0.85 (0.36)	0.86 (0.35)	0.87 (0.34)	0.87 (0.34)	0.90 (0.30)	0.91 (0.29)	0.87 (0.34)	0.90 (0.30)	0.94 (0.24)
Other adult female in the household	0.29 (0.45)	0.28 (0.45)	0.25 (0.43)	0.33 (0.47)	0.34 (0.47)	0.33 (0.47)	0.37 (0.48)	0.29 (0.45)	0.29 (0.45)

Underlying data are from the Chilean socio-economic household survey (CASEN) and administrative data from the Ministry of Education for 1990-2009

4 Research Strategy and Findings

4.1 Research Strategy

To examine how mothers' behavior is affected by exposure to FSD, we first estimate a model that is similar to the conventional difference in difference (DD) specification:

$$y_{ijt} = \alpha + \theta FSD_{jt} + \beta X_{ijt} + \mu M_{jt} + \gamma_j + \tau_t + \varepsilon_{ijt} \quad (1)$$

Where y_{ijt} represents labor participation, employment or hours for mother i in municipality j in year t ; X_{ijt} is the vector of maternal characteristics described above; M_{jt} is the vector of time-varying municipal characteristics; γ_j represents municipality fixed effect and τ_t is the time fixed effect.

FSD_{jt} is the policy variable described above. We use two different but closely related measures of FSD. First, we include the proportion of primary schools in the municipality that offer FSD in a given year. The second measure we include is the share of primary schools that are FSD (addressing our given child age range).

The parameter of interest in Model 1 is θ and will be identified by ordinary least square (OLS) regression if the growth rate in maternal employment over FSD expansion period would have been the same in the municipalities with greater level of FSD (treatment areas) as in the comparison municipalities with lower level of FSD (comparison areas), in the absence of the FSD implementation.²⁵ Under this assumption, the parameter of interest θ gives the average causal effect on a mother who resides in the treatment area in the post-expansion period in the treatment municipalities compared to the comparison municipalities.

Our second approach is to estimate a triple difference (DDD) model on a sample that includes treated and non-treated mothers:

²⁵ Conditional on fixed effects and observables.

$$(2) \quad y_{ijt} = \alpha + \theta_1 FSD_{jt} * mother_i + \theta_2 FSD_{jt} + \theta_3 mother_i + \beta X_{ijt} + \mu M_{jt} + \gamma_j + \tau_t + \varepsilon$$

Where $mother_i$ is an indicator for whether mother i has an 8-13 year old child (enrolled in third to eighth grade of primary education). The coefficient $FSD_{jt} * mother_i$ is the difference in Model 1 coefficient on FSD_{jt} between the treatment and comparison group. We limit the comparison group to mothers with children slightly older or slightly younger, i.e. mothers whose youngest child is 6-7 years old, and mothers whose youngest child is 14-15 years old. In the next section, we show the results of the models presented above, by dividing the samples into single mothers, and mothers who are head of household. In addition, we correct for cluster by municipalities and maternal background.

4.2 Findings

Table 4 reports the results using the first measure of FSD (share of primary schools in the municipalities that offer FSD). The second column of Table 4 shows the estimates of θ (DD model) for mothers whose youngest child was between 8 and 13 years old at the time of the survey. For single mothers (Panel A), the extension of the school day is associated with a significant effect in labor participation, employment, and hours worked in past week. Thus, it is found that the extension of the school day is associated with a 5 percentage point increase in labor participation, 6 percentage point increase in employment, and an increase of 2.56 hours worked, i.e., a 6 percentage increase in employment in labor participation ($0.05/0.77 \approx 0.06$), 8 percentage increase in employment ($0.06/0.73 \approx 0.08$), and hours worked ($2.56/31.67 \approx 0.08$), when we compare with pre- initiative means.²⁶

For married mothers (Column 2, Panel B), we do not find any significant effects. Similar findings emerge for married mothers of children between 8 and 13 years old who also have younger children, as shown in the same column of Table 5.

²⁶ We compare with pre-initiative means, in order examine the increase of means after the reform taking as a base the pre-initiative means.

We also do not find any effects for mothers who have both an 8-13 year old and a younger child. This may be because these mothers must find childcare for younger child, limiting the entry of these women to the labor market.

The conventional DD estimates can be biased to the true causal effect of the implementation of FDS, if there are economic fluctuations specific to the treatment group that are not fully accounted for. On the other hand, if the treated municipalities also initiated other policies affecting maternal labor supply, the DD estimator may also be biased. We address this concern by estimating equation (2) (DDD estimation) where we use mothers with slightly older or younger children as a control group. Thus, we can control for time-varying effects specific to the treatment areas, correcting for sources of bias mentioned above.

The third and fourth columns of Table 4 of Panel A, present the estimate comparing our treatment group with the control groups for single mothers whose children in the chosen age group. The results indicate that when we compare with mothers whose youngest children are just outside that age group, there is an increase of 4 percent points in labor participation and employment.²⁷ In others words, there is a 5 percent increase in labor participation and employment rate as a result of FSD implementation. We do not find significant effect on hours worked and, again, do not find an effect on married mothers and mothers with children younger than the treated group.

Table 5 reports the effects of FSD implementation using the second measure of FSD, the share of primary schools with FSD at municipal level (children between eight and thirteen year old). Using the second measure, we do not find any effects using DD strategy, but we do using DDD estimation. We find that when we compare with single mothers with children 6-7 years old, there is an increase in the labor participation and employment rate of single mothers of 4 percentage points (Table 5, Panel A, Column 3, Rows a and b), In addition, when we compare with the second control group (mothers whose youngest child is 14 to 15), on the effect on labor participation of the single mother group, reaches 5 percent of increase, i.e. 6 percent increase in labor participation of these mothers.

Thus, we find effects of the FSD implementation on single mothers whose youngest child is between 8 to 13 years old. These results are consistent with those of Havnes and Mogstad

²⁷ When we add interactions between the FSD and a large set of pre-reform municipality characteristics the results remains stable. The estimations are available from the authors upon request.

(2011), Ludin et al. (2008), and Casio (2009), in finding nearly no effects on the labor supply among married mothers as a result of the increased access to (or lower prices of) childcare.

Table 4 Effect of extension of school day in maternal labor supply, single and married mothers of eight to thirteen year olds, without and with younger children. (FSD proportion of school)

	No younger Children				With younger children			
	Pre-initiative mean (1996)	Coefficient on Share Model 1	Coefficient on Share (FSD)*Mother8-13 (Model 2) Comparison Group		Pre-initiative mean (1996)	Coefficient on Share Model 1	Coefficient on Share(FSD)*Mother8-13 (Model 2) Comparison Group	
			(Has) 6- or 7 Year old	(Has) 14- or 15 Year old			(Has) 6- or 7 Year old	(Has) 14- or 15 Year old
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
A. Single								
a. Labor Participation (=1)	0.73 (0.45)	0.05* (0.03)	0.04** (0.02)	0.04* (0.02)	0.72 (0.45)	0.05 (0.05)	-0.03 (0.02)	-0.01 (0.03)
b. Worked last week(=1)	0.69 (0.46)	0.06** (0.03)	0.04** (0.02)	0.04* (0.02)	0.69 (0.46)	0.03 (0.05)	-0.02 (0.02)	-0.01 (0.03)
c. Hours last week	31.83 (24.94)	2.56* (1.53)	0.27 (0.93)	0.38 (1.40)	30.30 (24.98)	-1.35 (2.55)	-1.78 (1.22)	-1.39 (1.50)
B. Married,								
a. Labor Participation (=1)	0.4 (0.49)	-0.01 (0.02)	-0.01 (0.01)	0.00 (0.01)	0.35 (0.48)	0.00 (0.02)	-0.01 (0.01)	-0.01 (0.02)
b. Worked last week (=1)	0.38 (0.49)	-0.01 (0.02)	-0.01 (0.01)	-0.01 (0.01)	0.33 (0.47)	0.01 (0.02)	0.01 (0.01)	-0.02 (0.02)
c. Hours last week	16.83 (23.65)	-0.21 (0.88)	-0.56 (0.47)	-0.61 (0.71)	23.24 (14.52)	0.25 (0.95)	0.3 (0.51)	-0.33 (0.77)
Controls								
Municipality Fixed effects		X	X	X		X	X	X
Time Fixed effect		X	X	X		X	X	X

Notes: Underlying data are from the Chilean socio-economic household survey (CASEN) and administrative data from the Ministry of Education for 1990-2009. Each entry in Panels A-B, Rows a-c, Columns 2-5 represents a coefficient from a different regression. All the regression include municipality fixed effects, year fixed effects, a vector of maternal background, and a vector

of municipality characteristics. All the regressions control for cluster by municipality, and standard error are consistent for heteroskedasticity and error correlation within municipalities over time. ***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively

Table 5: Effect of extension of school day in maternal labor supply, single and married mothers of eight to thirteen year olds, without and with younger children.(FSD proportion of enrollment)

	No younger Children				With younger children			
	Pre- initiative mean (1996)	Coefficient on Share Model 1	Coefficient on Share (FSD)*Mother8-13 (Model 2) Comparison Group		Pre- initiative mean (1996)	Coefficient on Share Model 1	Coefficient on Share(FSD)*M other8-13 (Model 2) Comparison Group	
			(Has) 6- or 7 Year old	(Has) 14- or 15 Year old			(Has) 6- or 7 Year old	(Has) 14- or 15 Year old
	1	2	3	4	5	6	7	8
A. Single								
a. Labor Participation (=1)	0.73 (0.45)	0.01 (0.03)	0.04** (0.02)	0.05* (0.03)	0.72 (0.45)	0.05 (0.06)	-0.02 (0.03)	-0.02 (0.03)
b. Worked last week(=1)	0.69 (0.46)	0.02 (0.03)	0.04* (0.02)	0.04 (0.03)	0.69 (0.46)	-0.01 (0.06)	-0.04 (0.03)	-0.03 (0.03)
c. Hours last week	31.83 (24.94)	1.08 (1.36)	0.64 (1.05)	1.22 (1.50)	30.3 (24.98)	-2.38 (3.07)	-2.5* (1.37)	-1.95 (1.64)
B. Married,								
a. Labor Participation (=1)	0.4 (0.49)	-0.02 (0.01)	-0.01 (0.01)	-0.01 (0.02)	0.35 (0.48)	0.01 (0.06)	-0.02 (0.01)	-0.02 (0.02)
b. Worked last week (=1)	0.38 (0.49)	-0.02 (0.01)	-0.01 (0.01)	-0.02 (0.02)	0.33 (0.47)	-0.05 (0.06)	-0.02 (0.01)	-0.02 (0.02)
c. Hours last week	16.83 (23.65)	-1.06 (0.70)	-0.77 (0.55)	-1.16 (0.77)	23.24 (14.52)	-3.12 (2.76)	-0.84 (0.59)	-1.09 (0.81)
Controls								
Municipality Fixed effects		X	X	X		X	X	X
Time Fixed effect		X	X	X		X	X	X

Notes: Underlying data are from the Chilean socio-economic household survey (CASEN) and administrative data from the Ministry of Education for 1990-2009. Each entry in Panels A-B, Rows a-c, Columns 2-5 represents a coefficient from a different regression. All the regression include municipality fixed effects, year fixed effects, a vector of maternal background, and a vector of municipality characteristics. All the regressions control for cluster by municipality, and standard error are consistent for heteroskedasticity and error correlation within municipalities over time. ***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively

5 Robustness: Specification checks

The correct identification of the effect of FSD on mothers' labor outcomes can be limited by various potential sources of bias. This section examines whether the FSD implementation was in fact exogenous and discusses the results of several additional robustness checks.

A. School Choice

The key assumption behind specification (2) is that the reform's implementation did not affect the demand for schools. That is, mothers did not tend to choose schools that implemented the reform earlier.²⁸ Elacqua, Schneider and Buckley (2006) show that the main reason for choosing a school is its proximity or parents' place of work or home. Additionally, Gallego and Hernando (2008) conclude that there is no evidence to suggest a greater demand for schools with FSD. Thus, we can conclude that the supply of schools with FSD at the municipal level is exogenous to mother's decision to participate in the labor force.²⁹ In this sense, parameter θ represents the effect of mother's exposure to the full school day in their municipality on the decision to participate in the job market.

B. Was the extension of school day exogenous?

The mechanism of assigning public resources for financing FSD and the characteristics of the municipality could bias the estimates. As has been discussed in previous sections, the implementation of the reform was not random. The Ministry of Education focused on the most vulnerable schools located in municipalities with relatively poor populations. In other words, if the schools located in municipalities with a low socio-economic level received priority in funding for installing FSD and presented low levels of female labor participation, the coefficient estimated by FSD underestimates the true effect.

Following Kruger and Berthelon (2009), we examine the presence of this potential bias. The percentage of FSD enrollment by municipality is modeled for a set of characteristics at the municipal level. The goal is to model the criteria utilized by the Ministry of Education to assign funding for FSD. Specifically:

²⁸ As was noted in Section XX, the Chilean education system allows parents to choose their children's school.

²⁹ As we stated in the previous sections, FSD was installed in order to improve student learning and achieve greater educational equity, not to increase mothers' labor participation.

$$FSD_{jt} = \varphi + \rho L_{it} + \phi T_t + e_{jt} \quad (3)$$

Where L_{it} is the vector that includes municipal level characteristics such as illiteracy, poverty, and unemployment. This estimate also includes dichotomous variables by year to control for the trend of the reform's implementation. Table 1A, in the Annex, presents the results of equation (3). Column (1) shows the results of the estimation of equation (3) controlling for year and fixed effect by municipality using the share of schools with FSD. The results indicate that municipalities with greater female labor participation present lower level of schools ascribed to FSD, i.e., there is a negative correlation between female labor participation and the implementation of FSD.

On the other hand, column 2 presents the results using FSD enrollment as a dependent variable. The results indicate that municipalities with greater poverty rates present a greater level of enrollment ascribed to FSD. The results show a positive correlation between the poverty rate and the implementation of the reform. The evidence based on equation (3) suggests that the administrative criterion of directing FSD funds to higher-risk municipalities has been effective. That is, these results indicate that our estimates probably understate the true impact of FSD on female labor participation, and that the results of the lineal estimate represent a level that is lower than the true effect of FSD on mother labor participation.

C. Time trend

In our DD approach we identify the childcare effects from the assumption of a common time trend in maternal employment between treatment and comparison municipalities, in the absence of the school day expansion. A concern is, therefore, that the estimated effects may reflect differential time trend. To investigate this, we estimate the effect of a placebo reform. This means that we fake that the full day school reform took place in the pre-reform period. Table A4 reports the placebo reform effect, from estimating Eq. (1) on the sample of head of family mothers and single mothers whose youngest child is between 8-13 years old in 1990. If there were differential secular time trends in the treatment and comparison municipalities in the pre-reform period, then the estimated effect of the placebo reform should be significantly different from zero. By contrast, the estimated placebo reform effect is insignificant.

D. Does the extension of school day predict labor supply in non-treated groups?

Another placebo reform to identify if there are time trends in maternal labor supply, is to estimate the effect of FSD on groups that should be not affected by the reform. To analyze this, we estimate the effect of a placebo reform on mothers whose youngest child is 6 to 7, and mother whose youngest child is 14 to 15 years old. Table A3, in the Annex, reports the placebo reform effect on the sample of single mothers with her youngest child being between 8 and 13 years old. Again, if there were differential secular time trends in mother labor supply, then the estimated effect of the placebo reform should be significantly different from zero. However, the results indicate that the FSD reform did not affect in neither of the groups.

6. Concluding remarks

This article examines how a policy oriented towards a specific group within the population can have collateral effects on the economic decisions of other groups. In 1996, Chile began to introduce the Full School Day system, significantly increasing the hours spent in school. The purpose of this study is to examine how greater availability of childcare via a longer school day impacts women's decisions to participate in the labor market.

The gradual implementation of the reform over time and in different regions of the country is exploited by this study. A DD and a DDD strategy are used to obtain the causal effect of exposure to the reform. The results show a positive and significant effect of the implementation of FSD on single mothers and head of family mothers' access to the job market. The results suggest that increasing the amount of time that children spend in school provides single mothers with more and greater opportunities to access the labor market because they need to dedicate less time to childcare. In fact, we estimate that 5 percent of single mothers without younger children entered the work force as a consequence of the implementation of FSD. The result is small, which could be explained because the extension of the school day provision only increased total school hours by 30%. Thus, to increase the labor force more, is necessary to increase the school day to be compatible with the working hours of mothers.

On the other hand, it is important to note that, while this educational reform is exogenous to individuals' decisions in the labor market, its implementation was not random. The Ministry of Education focused on the most vulnerable schools in municipalities with relatively poor populations. The reform's implementation was meant to give priority to these schools. In Chile,

these municipalities are those with the lowest levels of female labor participation. As a result of the design of the reform's implementation, our estimates probably underestimate the true impact of FSD on female labor participation. These results should thus be interpreted as understating the true effect of the Full School Day on mothers' labor participation.

In conclusion, in this paper we find that lengthening the school day has a positive and significant effect on single mothers' labor supply. This result is remarkably interesting because the adequacy of this policy both strengthens the benefits mother enjoy from their participation in the labor market and improve the economic well-being of families. In addition, these results are subject to a number of interpretations that highlight the importance of future work in this area: e.g., the need to give priority to greater availability of childcare for young children and the complementary of FDS with these policies.

References

Antecol, Heather. 2003. "Why is there Cross-Country Variation in Female Labor Force Participation Rates? The Role of Male Attitudes toward Family and Sex Roles." Claremont Colleges Working Papers, Department of Economics, Claremont McKenna College

Araújo, Clara and Celi Scalón. 2005. "Genero, familia e trabalho no Brasil" [Gender, family and work in Brasil], in Clara Araújo and Celi Scalón, eds. Editora da fundação o getulio vargas [Editors from Getulio Vargas Foundation], 1st ed., pp. 15–76. Rio de Janeiro: Getulio Vargas Foundation

Adser, A. (2005). Where Are the Babies? Labor Market Conditions and Fertility in Europe. IZA Discussion Papers (1576

Baker, M., Gruber, J. and Milligan, K. (2005). "Universal childcare, maternal labor supply and family well-being." Working Paper 11832. NBER. December.

Baker, M., Gruber, J., and Milligan, K. (2008). 'Universal Childcare, Maternal Labor Supply, and Family Well-being.' *Journal of Political Economy* 116: 709–745.

Berlinski, S. Galiani, S. and McEwan, P., 2011. "Preschool and Maternal Labor Market Outcomes: Evidence from a Regression Discontinuity Design," *Economic Development and Cultural Change*, University of Chicago Press, vol. 59(2), pages 313 - 344

Berlinski, S. and Galiani, S., 2007. The effect of a large expansion of pre-primary school facilities on preschool attendance and maternal employment. *Labour Economics* 14, 665–680.

Bellei, C. (2009). Does Lengthening the School Day Increase Students' Academic Achievement? Results from a Natural Experiment in Chile. *Economics of Education Review*, 28.5: 629-640.

Berthelon, M. and Kruger, D. (2009). Delaying the bell: The effects of longer school days on adolescent motherhood in Chile, IZA Discussion Paper No. 4553.

Blau, D. and Currie, J. (2007). Who's minding the kids? Preschool, day care, and after school care. In: Welch, F., Hanushek, E. (Eds.), The Handbook of Education Economics. North Holland, Amsterdam, 1116–1278.

Bordón, P. (2007). “El efecto de los jardines infantiles en la oferta laboral femenina. Análisis del caso chileno.” Working Paper, CEA.

Bravo, D., Contreras, D. and Puentes, E. (2008), “Female labor supply and child care supply in Chile.” Working Paper, Department of Economics, University of Chile.

Card, D. and A. Krueger, 1992, “Does School Quality Matter? Returns to Education and the Characteristics of Public Schools in the United States”, *Journal of Political Economy*, 100, 1-40.

Cascio, E., 2009. Maternal labor supply and the introduction of kindergartens into American public schools. *Journal of Human Resources* 44, 140–170.

Contreras, D. and Plaza, G. (2010). “Female Labor Force Participation in Chile: How Important Are the Cultural Factors?” *Feminist Economics*, 16.2: 27-46

Choné, P., Le Blanc, D., Robert-Bobée, I. (2004). “Female labor supply and child care.” *Économie & Prévision* 162: 23–50.

Currie, J. (2001). “Early Childhood Education Programs.” *Journal of Economic Perspectives* 15.2: 213-238

Del Boca, D. (2002). "The effect of childcare and part-time opportunities on participation and fertility decisions in Italy." *Journal of Population Economics* 15: 549–573.

Del Boca, D. and Vuri, D. (2006). "The mismatch between employment and childcare in Italy: the impact of rationing." Working paper 983. Institute for the Study of Labor (www.iza.org).

Duflo, E., 2001. Schooling and labor market consequences of school construction in Indonesia: evidence from an unusual policy experiment. *The American Economic Review* 91 (4), 795–813.

Elacqua, G., Schneider, M., and Buckley, J. (2006). "School choice in Chile: Is it class or the classroom?" *Journal of Policy Analysis and Management* , 25.3: 577-601

Encina, J. and C. Martínez (2009). Efecto de una Mayor Cobertura de Salas Cuna en la Participación Laboral Feminina: Evidencia de Chile. Working Paper 303, University of Chile, Department of Economics, Santiago, Chile

Ganuzo, E., and Paes de Barros, R. (2001). "Liberalización, Desigualdad y Pobreza: América Latina y el Caribe en los 90." UNDP, ECLAC.

Gelbach, J. (2002). "Public education for young children and maternal labor supply." *The American Economic Review* 92: 307–322.

Goux, D. and Maurin, E., (2010). "Public school availability for two-year olds and mothers' labour supply," *Labour Economics*, Elsevier, vol. 17(6), pages 951-962, December.

Havnes, T., Mogstad, M., Money for nothing? Universal child care and maternal employment, *J. Public Econ.* (2011), Volume 95, Issues 11-12, December 2011, Pages 1455-146.

Jaumotte, F., 2005, Female labour force participation: past trends and main determinants in OECD countries, OECD, Paris.

Kruger, D. and Berthelon, M., (2011). "Risky behavior among youth: Incapacitation effects of school on adolescent motherhood and crime in Chile" in: *Journal of Public Economics*, 2011, 95 (1-2), 41-53

Lefebvre, P. and Merrigan, P. (2003). "Assessing family policy in Canada: a new deal for families and children." Montreal; Choices: Family Policy. Institute for Research on Public Policy, 1-99.

Lefebvre, P. and Merrigan, P. (2008). "Childcare policy and the labor supply of mothers with young children: a natural experiment from Canada." *Journal of Labor Economics* 23: 519–548.

Lundin, D., Mork, E., and Ockert, B. (2007). "Do Reduce child Care Prices Make Parents Work More?" Working Paper 2007-2, Institute for Labour Market Policy Evaluation, Sweden.

Medrano, P. (2009, December). Public Day Care and Female Labor Force Participation: Evidence from Chile. Working Paper 306, University of Chile, Department of Economics, Santiago, Chile

Pires, T. and Urzúa, S. (2010). "Longer School Days, Better Outcomes?" Manuscript, Northwestern University.

Wrohlich, Katharina, Labor Supply and Child Care Choices in a Rationed Child Care Market (November 1, 2011). DIW Berlin Discussion Paper No. 1169.

Annex

Table A1: Determinants of full day schooling reform implementation

Explanatory Variables	FSD Schools	FSD Enrr
Municipality Female labor participation rate	-0.27*** (0.07)	-0.1 (0.0)
Municipality poverty rate	0.03 (0.05)	0.17* (0.0)
Municipality literacy rate	-0.34** (0.14)	0.0 (0.1)
Urban	0.03 (0.03)	0.0 (0.0)
Constant	0.12*** (0.03)	-0.0 (0.0)
Observations	2,31	2,3
Number of comu	331	33
R-squared	0.86	0.78
Controls		
Municipality Fixed effects	Yes	Ye
Time Fixed effect	Yes	Ye

Notes: Underlying data are from the Chilean socio-economic household survey (CASEN) and administrative data from the

Ministry of Education for 1990-2009. ***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively

Table A2: Placebo reform

	Single Mother	
	Coefficient on Share	
	Model 1	
	FSD Schools	FSD Enrollment
No younger Children Labor Participation	0.07 (0.13)	0.08 (0.12)
Worked last week	0.08 (0.13)	0.07 (0.12)
Hours last week	9.91 (7.45)	5.11 (6.76)
No younger Children Labor Participation	0.11 (0.06)	0.09 (0.06)
Worked last week	0.08 (0.06)	0.05 (0.06)
Hours last week	3.41 (3.28)	3.11 (2.86)

Notes: Underlying data are from the Chilean socio-economic household survey (CASEN) and administrative data from the Ministry of Education for 1990-2009. ***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively

Table A3. Does the extension of school day predict labor supply in non-treated groups?
Single Mothers

	FSD Schools in Municipality		FSD Enrollment in Municipality	
	Coefficiente on Share Model 1		Coefficiente on Share Model 1	
	(Has) 6- or 7 Year old	(Has) 14- or 15 Year old	(Has) 6- or 7 Year old	(Has) 14- or 15 Year old
	(2)	(3)	(5)	(6)
A. Single, no younger Children				
a. Labor Participation	0.03 (0.04)	0.03 (0.08)	-0.02 (0.04)	-0.02 (0.06)
b. Worked last week	0.03 (0.05)	0.04 (0.08)	-0.01 (0.04)	-0.01 (0.07)
c. Hours last week	1.49 (2.40)	1.88 (4.46)	0.03 (2.11)	-2.02 (3.49)
B. Married, no younger Children				
a. Labor Participation	-0.03 (0.02)	-0.08** (0.04)	-0.01 (0.02)	-0.04 (0.04)
b. Worked last week	-0.01 (0.02)	-0.07* (0.04)	0.00 (0.02)	-0.04 (0.04)
c. Hours last week	-0.74 (1.20)	-2.09 (1.97)	-0.33 (1.07)	-0.49 (1.73)
Controls				
Municipality Characteristics	Yes	Yes	Yes	Yes
Municipality Fixed effects	Yes	Yes	Yes	Yes

Notes: Underlying data are from the Chilean socio-economic household survey (CASEN) and administrative data from the Ministry of Education for 1990-2009. Each entry in Panels A-B, Rows a-c, Columns 2-5 represents a coefficient from a different regression. All the regression include municipality fixed effects, year fixed effects, a vector of maternal background, and a vector of municipality characteristics. All the regressions control for cluster by municipality, and standard error are consistent for heteroskedasticity and error correlation within municipalities over time. ***, **, * Denote statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.

