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THE EFFECTS OF LENGTHENING THE SCHOOL DAY ON FEMALE LABOR SUPPLY: EVIDENCE FROM A QUASI-EXPERIMENT IN CHILE

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The effects of lengthening the school day on female labor supply: Evidence from a quasi-experiment in Chile .*

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Abstract

In 1996, the Chilean government approved the extension of the school day, increasing the amount of time that students spend at school by 30%. Using data from the Chilean socio-economic household survey and administrative data from the Ministry of Education for 1990-2006, we exploit the quasi-experimental nature of the reform's implementation by time and region in order to identify the causal impact of the program on labor participation, employment and hours worked for women between 20 and 65 years old. The identification strategy relies on a fixed effect model of repeated cross-section. The results show a positive and significant effect on labor participation and female employment in all age groups and a negative and statistically significant effect on the number of hours worked. The main conclusion of this study is that the implicit childcare subsidy induced by the program had a positive and significant impact on the labor supply of women in Chile.

JEL Classification: J22; J13; O12; H42

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1 Introduction

In most developing countries, childcare and domestic duties continue to be one of the main responsibilities of female household members (Berlinski and Galiani, 2007). The greater the workload in the home, the fewer opportunities women have for labor insertion.

Female labor participation has experienced significant growth in Chile. The rate of female participation increased from 35% in 1990 to 48% in 2006 (age 15-65).¹ However, the situation of women in the Chilean labor market is as yet deficit-ridden, particularly for women with lower income levels. Women who belong to the poorest 20% of the country's population present a participation rate of 31%, while those from 20% of the wealthiest households achieve rates of 65%. Female labor insertion in Chile has been relatively late and is one of the lowest in Latin America in spite of the high levels of education that Chilean women have compared to their peers in the region.²

There are important reasons to study determinants of female labor supply in a developing country. First, women's insertion 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 should lead to a reduction in poverty (Ganuza, 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 (Arajo and Scalón, 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, non labor income, and number and age of children. The empirical evidence shows that the number and ages of children are the most important variables that influence the likelihood of women's labor force participation. Furthermore, the evidence has identified 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 .

¹Source Chilean household survey, Encuesta de Caracterización Socioeconómica Chilena (CASEN) 1990-2006

²According 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.

The work decision is ultimately about how to allocate time between labor and leisure. An increase in childcare may change women's choices, as they may begin to spend fewer hours caring for children. However, this will also depend on preferences regarding leisure and consumption. In other words, women may have a substitution effect and an income effect as a result of the liberation of time due to the extension of the school day. The decisions that they make will depend on which of the two effects dominates.

There are at least three cases that can be observed in this context. First, women who were not working prior to the policy. In this case, women should face a substitution effect thus the labor market is more attractive to them. Second, women who are working full time. They should face an income effect causing a reduction in the amount of hours offered in the labor market. Finally, women who are working part time face both income and substitution effects. It is not clear what the total effect on labor supply may be in this case. Based on these simple theoretical definitions, the total effect of greater availability of childcare on female labor supply is not evident. However, it can be expected that increased availability of time as a result of longer school days will generate positive (collateral) effects on women's decisions regarding participation and employment.

The empirical evidence is not conclusive either. There are two main themes 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 (Del Boca, 2002; Choné et al., 2004; Boca and Vuri, 2006; Blau and Currie, 2007). Most of these studies show a small effect on female participation and a high impact on the likelihood of utilizing formal childcare.

The second theme stems from the study of natural experiments which provide a better framework for analyzing how greater availability of childcare can affect employment decisions of women with preschoolers (Berlinski and Galiani, 2007; Gelbach, 2002; Cascio, 2006). Most of these studies suggest a positive effect on participation rates given greater availability of childcare.

This study follows the second theme. While literature in this area has focused on studying the effects of childcare for preschool-aged children, there is a lack of evidence regarding the effects of increasing the amount of time that school-aged children spend in school on female labor supply. Furthermore, while there is a wide field of literature on the relationship between childcare and female labor supply from developed countries, there is little research done on developing countries.

This article analyzes the effect of increasing the length of the school day, e.g. increased avail-

ability of child care for school-aged children, on women’s labor participation, employment and hours worked per week. In 1996, the Chilean government announced the implementation of the Full School Day (Jornada Escolar Completa or JEC in Spanish, henceforth FSD) as part of a series of measures designed to improve the quality and equality of education in the country.³ The implementation of the reform changed the educational structure so the schools must work on basis of one ”shift”.⁴ On average, FSD increased the amount of time that students spent in school from 32 to 39 hours per week.

As such, the identification strategy consists of utilizing the increase in the school day as a quasi-natural experiment that exogenously broadens the availability of childcare for children and adolescents between the ages of 8 and 17.⁵ Following Card and Krueger (1992) and Duflo (2001), among others, we exploit the variation in implementation and time increase of the treatment in different municipalities in order to identify the causal effect of the increase on female participation. A model of fixed effects at the municipal level is estimated for repeated cross sections of women between the ages of twenty and 65.⁶ The source of exogenous variation, which leads to the identification of the effect of increased free time on women’s participation in the labor market, 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 women to choose schools that implemented the reform earlier.⁸

This study utilizes data from the Chilean Socio-Economic Characterization Survey (CASEN) and administrative information from the Ministry of Education from 1990 and 2006. Additionally, we analyze the impact of the reform for different age groups. The results indicate that the introduction of FSD had a significant and positive impact on labor participation and female employment for all age groups. A negative and significant effect was found for hours worked for the whole sample, indicating a dominion of the income effect for this variable. Based on the results, it is possible to

³This reform affected students in third through twelfth grades. The children affected are 8 to 17 years of age.

⁴Previous to the reform, the school day was two shifts, students attending either in the morning or the afternoon.

⁵As we note above, the purpose of the reform was to improve the quality and equity of education in Chile. It was not intended to increase female labor participation.

⁶Women in this age range are considered to have the greatest likelihood of caring for children who would be affected by the reform.

⁷Measured as percentage of available places in schools with FSD at the municipal level.

⁸See Section 4 for more details.

conclude that the implementation of FSD has had positive effects on female labor supply in Chile.

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 intensity (see Section 3). 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. 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 (2009) we estimate the determinants of the implementation of FSD.⁹ 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.

This study is organized as follows: Section 2 presents a brief literary review. Section 3 outlines the empirical strategy and main sources of bias in the estimate. Section 4 presents the data used in the study and a brief summary of some of the stylized facts of the women's labor market in Chile. Finally, Sections 5 and 6 present the main results and conclusions.

2 Prior Evidence: Female Labor Supply and Childcare

There are two main themes in the literature that attempt to analyze the effects of childcare on female labor supply. The first considers the relationship among the cost of childcare, female labor supply and government subsidies. The second studies natural experiments that provide a framework for analyzing the effects of childcare on work decisions.

Following the first theme, Blau and Currie (2007) review studies that estimate the cost of childcare as a determinant of the female labor supply based on evidence in the US. The authors conclude that the relationship between the price of childcare and labor supply is weak. There are several studies of the same nature. Most of the evidence comes from Europe, including Choné et al. (2004) for France; Gustafsson and Stafford (1992) and Lundin et al. (2007) for Italy; Del Boca (2002) and Del Boca and Vuri (2006) for Germany. Most of these studies show a small impact of

⁹The authors study the impact of full school days on adolescent pregnancy rates in Chile.

prices on labor supply but greater one on the likelihood of using formal childcare.

In the second theme, Gelbach (2002) and Cascio (2006) analyze the effects of the provision of public and private childcare in the US particularly the impact of increased funding for public care between 1950 and 1990 on the employment rates of single mothers of children under 5. Both studies find a positive and significant effect on female labor supply for single mothers.

Berlinski and Galiani (2007) analyze the increase of preschools facilities in Argentina between 1991 and 2001. The authors estimate the causal effect of the program on maternal labor supply through a differences-in-differences strategy where they combine differences across region in the number of facilities built with differences in exposure across cohorts due to the timing of the program. They find a positive and significant effect of the program implementation on female labor supply. Lefebvre and Merrigan (2008), using difference in difference strategy, as well as Baker et al. (2005, 2008) find a strong positive impact of the universal childcare policy implemented in Québec, Canada on female labor supply for women with preschool-aged children.

Chilean studies also show a positive effect of childcare on female labor participation. Bordón(2007) characterizes the determinants of female labor participation using data from the CASEN survey and a sample of women between the ages of 25 and 30. She found that the availability of preschool education has a positive and significant impact.

Contreras, Bravo and Puentes (2008) utilize a survey especially designed to measure the effects of the availability of childcare in Chile by simulating the impact of extending the benefit of childcare to all employed individuals. The authors find that a subsidy of approximately US\$100 with a co-pay of US\$35 could increase female labor participation by 15 to 20 percentage points.

The results documented in the empirical literature show the importance of childcare on female labor participation. In other words, if women dedicate less time to childcare, their opportunities to participate in the workforce would increase. However, there is insufficient evidence regarding the impact of extending the school day on labor decisions. This study measures the impact of a longer school day on female labor participation by considering the impacts of the implementation of the Full School Day program.

3 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 (PU) funded by the student subsidy provided by the state and under municipal administration; private subsidized establishments (PS) funded by the student subsidy and administered by the private sector; and private fee-paying establishments (PP) funded and administered by the private sector.

The second major reform took place in 1996 when the Chilean government announced a set of new initiatives designed to improve the quality of education. 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. The change involved an average increase of 1.4 hours per school day. Prior to the reform, many schools had a double school day.¹⁰ The execution of the FSD program meant that those schools transitioned to a single school day format.

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."¹¹

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.

The first step involved recognizing that more time at school positively affects learning, the

¹⁰Under the old system, some students attended school in the morning while others attended in the afternoon.

¹¹The program was approved through Law No. 19,532.

technical work of teachers and the management of each school. Bellei (2009) analyzes the effects of the increase in the length of the school day on academic performance and finds a positive and significant effect on academic performance in language and mathematics tests.

Second, 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 (2009) analyze the effect of the increased length of the school day on adolescent pregnancy 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.

3.1 Implementation

The Full School Day format has been incorporated gradually since 1997. According to official statistics from the Ministry of Education, 80% of the country's schools, or some 7,322 institutions, had joined the system by 2007.¹²

The increase in classroom time meant that third through sixth graders would increase their weekly classroom hours to 38 from 30 hours in class per week to 38 and that seventh and eighth graders from 33 to 38.¹³ 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.¹⁴ In short, the increasing 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 would not be instantaneous or homogenous.

Operational costs were financed through a 30% increase in government subsidies¹⁵ while infrastructure-related costs were financed through the "capital contribution" subsidy, which is assigned to schools

¹²The 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 allowed for all schools through 2010. The law requires that publicly funded schools created after 1997 begin operations with a full school day.

¹³Primary education consists of eight years of education in Chile. Students who complete secondary school will have been in the school system for 12 years.

¹⁴Additional time was provided before gym and lunch.

¹⁵This contribution is received once the Ministry of Education approves the implementation of FSD in the school.

by the government through competition.¹⁶ 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 also can 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 (Table A1). 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.

Table A2 describes the FSD implementation process between 1998 and 2006 in the country's 13 administrative regions. In 1998, the regions with the highest rates of incorporation were IX and XI, with a percentage of FSD enrollments of 38%. This trend held until 2006, when the regions reached 60% and 63% enrollment, respectively, which still represented the highest rates in the country.¹⁷

FSD enrollment in the Metropolitan Region was 17% in 1998 which was the lowest rate in the country. Only 7% of the schools in the Metropolitan Region are the rural type which was first incorporated into the reform. In contrast, 68% and 38% of enrollment in the IX and XI regions is rural.¹⁸ However, when the percentage of FSD enrollment is obtained for each region compared on total national enrollment, the Metropolitan Region has a rate of 20%, which is the highest percentage in the country. This is a given because it has the larger population.

Only six municipalities had not incorporated FSD by 1998. The last to incorporate was the municipality of Rauco, which introduced it in 2004.¹⁹ It is important to note that all municipalities were participating in FSD by 2006. Finally, with respect to implementation by school type (Table A3), 75% of public schools and 46% of government subsidized private schools had FSD by 2006.

In summary, in order to estimate the effect of increasing the length of the school day on female labor participation, we exploit the quasi-experimental nature of the implementation of the full school day reform by region and over time.²⁰

¹⁶In 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.

¹⁷This percentage is based on total enrollment in the region.

¹⁸Ministry of Education 1998-2006.

¹⁹The last municipalities to join the program were Sierra Gorda, Rinconada, Isla de Pascua, Olivar, Rauco and Penco. Source: Ministry of Education 1998-2006.

²⁰It is important to note that the reform's installation has not been homogenous. Section 4.1 (Sources of Bias)

4 Empirical Strategy

The identification strategy consists of estimating a fixed effect model based on repeated cross sections. The manner in which women’s behavior is affected by exposure to the full school day in their municipality is examined. The relationship of interest can be represented as follow:

$$LFP_{ijt} = \alpha + \beta FDS_{jt} + \gamma X_{ijt} + \lambda Z_j + \theta Z_t + \mu_{ijt} \quad (1)$$

Where LFP_{ijt} is the indicator of the labor participation of woman i who lives in municipality j during the period t ; FDS_{jt} is the percentage of schools with FSD in municipality j at time t ; X_{ijt} is a vector of individual control variables for woman i ; Z_j is the vector of fixed effects of municipality j ; and Z_t is a vector of time with a fixed effect.

The key assumption behind this specification is that the reform’s implementation did not have an effect on the demand for schools. That is, women did not tend to choose schools that were to implement the reform earlier.²¹ Elacqua, Schneider and Buckley (2006) show that the main reason for choosing a school is its proximity to the home or parents’ place of work. On the other hand, Gallego and Hernando (2008) conclude that there is no evidence to suggest a greater demand for schools with FSD and that the supply of schools with FSD at the municipal level is exogenous to women’s decision to participate in the labor force.²² In this sense, parameter β represents the effect of women’s exposure to the full school day in their municipality on the decision to participate in the job market.

The model is designed to control for specific factors that affect female labor participation in a municipality LFP_{ijt} and that remain steady during the evaluation period. The decision to participate in the job market can be determined using various variables, particularly the existing relationship with the market salary and reserve salary. Vector X_{ijt} includes all of the individual variables affect women’s decisions about the job market. These include age, age squared, education, number and ages of children, status as head of household, income and whether there is another

presents a more complete analysis of how this phenomenon could impact our results.

²¹As was noted in Section 3, the Chilean education system allows parents to choose their children’s school

²²As we stated in the previous sections, FSD was installed in order to improve student learning and achieve greater educational equity, not to increase female labor participation.

adult woman in the household. All of these variables are related to the market salary and reserve salary.

In addition, we realize estimation for different age groups and child ages. Women with children who are not in the school system should be affected to a lesser degree than women with school aged children. The estimates are made for women between the ages of 20 and 29, 30 and 39, 40 and 49 and 50 to 65.

4.1 Source of Bias

The correct identification of the effect of FSD on female participation can be limited by various sources of bias. 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 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:

$$FDS_{jt} = \varphi + \rho L_{it} + \phi T_t + e_{jt} \quad (2)$$

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 A4 presents the results of equation (3). Column (1) shows the results of the transversal estimate within the characteristics at the municipal level and the percentage of students enrolled in schools with FSD. The results indicate that municipalities with greater poverty rates present a greater level of enrollment ascribed to FSD.

Column (2) of Table A4 presents the results of the estimate of equation (3) controlling for fixed effect by region. 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 the full school day on female labor participation.

5 Data on and Description of the Female Labor Market in Chile

This study uses data from CASEN for 1990-2006 and administrative data on enrollment compiled by the Ministry of Education for 1998-2006 in order to obtain the percentage of schools with FSD per municipality. The CASEN survey is a representative survey at the national, regional and urban-rural levels. It has been performed 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 65 since they present the greatest likelihood of being the mothers of school-aged children. Table A5 shows the percentage of women with children between eight and 17 years old by mother's age group. Tables A6 and A7 present the description and descriptive statistics of all variables for the estimation of the decision of women between 20 and 65 to participate in the labor market based on the CASEN survey. The total sample includes 412,876 individuals. The data suggest an increase in years of education, from 9.2 in 1990 to 10.6 in 2006. There is an increase in female heads of household to 19% by 2006.

Administrative data on enrollment provided by the Ministry of Education allows for the analysis of how the availability of schools with FSD affects the labor market behavior of women. Table A8 shows the increase in FSD enrollment between 1998 and 2006, from 20% to 50%.

5.1 The Female Labor Market in Chile

Over the past few decades, female labor participation increased notably in Chile. Table 1 shows that the rate of female participation was 35% in 1990. By 2006, it had increased to 48% for women

aged 15 to 65. However, this rate continues to be low compared to other OECD countries and when considered in the Latin American context.²³

Table 1 shows the rate of labor participation for men and for women with a child between the ages of 8 and 17. The results show that there is still a significant gap between the two sexes. Furthermore, even though women with children between the ages of 8 and 17 present higher rates of participation than women overall, they still participate less than men and the rates continue to be low.

Table 1: Labor participation by gender and for women with children aged 8-17

Year	Women	Men	Women children 8-17
1990	35%	78%	36%
1992	37%	80%	37%
1994	39%	80%	39%
1996	40%	79%	41%
1998	42%	79%	45%
2000	44%	78%	47%
2003	46%	78%	51%
2006	48%	78%	55%

Source: Authors' calculation based on the CASEN survey for 1990-2006.

Table 2 shows female participation by income quintile between 1990 and 2006. The results confirm an increase for all quintiles. However, despite the fact that there is a reduction in the percentage gap between the poorest and richest women, there is still an important difference between the two groups. Women in the poorest segment of the population have a participation rate of 31% while those in the wealthiest quintile presented rates of 65% in 2006, a level similar to that of women in Europe.

²³Chile joined the OECD in early 2010. The average rate of female labor market participation for OECD countries was 63.5% in 2008.

Table 2: Labor participation by income quintile (1990-2006)

Year	I	II	III	IV	V
1990	19%	27%	35%	43%	50%
1992	19%	28%	39%	46%	52%
1994	20%	30%	38%	49%	55%
1996	21%	31%	41%	49%	58%
1998	25%	34%	45%	50%	58%
2000	28%	36%	44%	53%	58%
2003	28%	40%	48%	55%	62%
2006	31%	40%	50%	57%	65%

Source: Authors' calculation based on the CASEN survey for 1990-2006.

6 Results

This section presents an analysis of impact of greater exposure to schools with FSD on female participation, employment and number of hours worked.²⁴ The estimates control for the fixed effect at the municipal level based on repeated transversal samples to model the woman's decision to participate in the labor market and are corrected by cluster and by municipality.²⁵

6.1 Participation

Table 3 presents the impact of the increased length of the school day on female labor participation. The results for the whole sample (women aged 20 to 65) suggest a positive and statistically significant effect, which shows that greater exposure positively affects female labor participation. In other words, using a fixed effect estimate, we find that the percentage of enrollment in FSD schools significantly and directly affects female labor participation with an associated estimator of 0.05. This means that a 1% increase in FSD generates a 5% increase in the likelihood that the woman would participate in the labor market in 2006.²⁶

Education is positively and significantly correlated with greater female labor participation. This

²⁴This is measured as a percentage of FSD enrollment in the woman's municipality of residence.

²⁵Estimates were made through a random effect and Hausman's test in order to confirm that fixed effect is the appropriate method. The authors can provide these results upon request.

²⁶The effect of the elasticity is derived as follows: $(\hat{\beta}/\bar{Y}) * \bar{X}$ where $\hat{\beta}$ is the coefficient estimated in Table 3 and \bar{Y} is the average of the dependent variable in 2006 (Table A5) and \bar{X} is the average enrollment for 2006 (Table A6).

is also true of age, but with decreasing rates. The number of preschool and school aged children negatively affects the likelihood of labor market participation. However, the coefficient that most significantly reduces the decision to participate in the labor market is that of having preschool aged children (under the age of five).

The coefficient associated with no labor income is statistically significant and negative. This result is congruent with the theory that the greater the non-labor income the higher women's reserve salary, which provides a disincentive for female participation in the labor market. The urban component indicates that women who live in urban areas are more likely to participate in the labor market than those living in rural ones.

It is interesting to note that there is a positive correlation between the existence of another adult female in the household and female labor participation. While this parameter can be endogenous to women's decision to participate in the labor market, it suggests that the ability to delegate childcare duties to other members of the household can increase the likelihood of participation in the labor market.

The estimate for different age groups also indicates a positive and statistically significant effect of FSD on female labor participation across different age groups. The results suggest a positive and significant effect of FSD on female labor participation for the entire sample and for all age groups, although it has a greater impact on women between the ages of 40 and 65. This is due to the high concentration of the children of those women being of the age affected by the reform. The rest of the group has a greater range in their children's ages, with a larger percentage of children under the age of eight.

The estimates convincingly show that the reform has a strong, positive and statistically significant effect on female labor participation of mothers with at least one child between the ages of 8 and 17, especially when most of their children are in this age range.

Table 3: Effects of the school day on female labor participation (fixed effect municipality)

Variables	All	Women 20-29	Women 30-39	Women 40-49	Women 50-65
FSD	0.05 (0.01)**	0.04 (0.01)**	0.04 (0.01)**	0.05 (0.01)**	0.07 (0.01)**
Education	0.02 (0.00)**	0.02 (0.00)**	0.03 (0.00)**	0.03 (0.00)**	0.02 (0.00)**
Age	0.03 (0.00)**	0.17 (0.01)**	0.04 (0.01)**	0.02 -0.02	0.03 (0.01)**
Age2	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)	0.00 (0.00)**
Children under 5	-0.1 (0.00)**	-0.12 (0.00)**	-0.1 (0.00)**	-0.07 (0.00)**	0.00 (0.01)
Children 6-13	-0.04 (0.00)**	-0.06 (0.00)**	-0.04 (0.00)**	-0.02 (0.00)**	0.01 (0.00)*
Children 14-18	-0.02 (0.00)**	-0.03 (0.01)**	-0.01 (0.00)**	-0.02 (0.00)**	0.00 (0.00)
Non labor income	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)**
Female head of household	0.23 (0.00)**	0.27 (0.01)**	0.31 (0.00)**	0.27 (0.00)**	0.16 (0.00)**
Urban	0.08 (0.00)**	0.09 (0.00)**	0.09 (0.00)**	0.09 (0.00)**	0.06 (0.00)**
Other adult female in the household	0.08 (0.00)**	0.16 (0.00)**	0.14 (0.00)**	0.04 (0.00)**	0.00 (0.00)
Constant	-0.42 (0.01)**	-2.18 (0.11)**	-0.6 (0.22)**	-0.2 (0.41)	-0.4 (0.22)
Observations	412876	115980	109106	89167	98623
R-Squared	0.14	0.13	0.16	0.13	0.11
Control dummies year-region	Yes	Yes	Yes	Yes	Yes

Source: Authors' calculation based on the CASEN survey for 1990-2006.

Note: The estimates control for cluster by municipality.

6.2 Employment

Another indicator that is frequently discussed in the literature is the effect of increased availability of childcare on female employment. Table 4 shows the effects of FSD on employment. The results show a positive and significant effect for the whole sample with a related coefficient of 0.03. The estimates by age group also show a positive and significant effect. Again, these numbers are higher

for women in higher age ranges.

It is important to note that even if no effects on female labor participation has been detected, a positive effect on employment indicates that having children spend more time in school positively affects women's ability to accept a job. On the other hand, the coefficients and signs of the control variables are those that were expected and documented in the empirical literature.

6.3 Hours Worked

The third result documented in the literature is hours worked per week. Table 5 shows a negative and significant effect for the entire sample. There is a differentiated effect through the various age groups and a negative and statistically significant effect on women between the ages of 20 and 39. There is a negative but not statistically significant effect for women aged 40 to 49. Finally, there is a positive and statistically significant effect for women between 50 and 65.

The results indicate that there is a large income effect on female workers, particularly for the youngest cohorts. That is these women increase their consumption of leisure, offering fewer hours to the labor market. A possible explanation for these results is that the increased length of the school day decreases women's spending on alternative childcare, thus increasing their income and decreasing the amount of hours that they are required to dedicate to the labor market. The positive and statistically significant effect for female workers between the ages of 50 and 65 may be due to the fact that they do not need to spend money on alternative childcare for their children because they are older children. In their case, the labor market is more attractive and thus they tend to increase the number of hours worked outside of the home.

Table 4: Effects of school day length on employment (fixed effect municipality)

Variables	All	Women 20-29	Women 30-39	Women 40-49	Women 50-65
FSD	0.03 (0.00)**	0.02 (0.01)*	0.02 (0.01)*	0.03 (0.01)**	0.06 (0.01)**
Education	0.02 (0.00)**	0.01 (0.00)**	0.03 (0.00)**	0.03 (0.00)**	0.02 (0.00)**
Age	0.04 (0.00)**	0.17 (0.01)**	0.05 (0.01)**	0.01 (0.02)	0.03 (0.01)**
Age2	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)	0.00 (0.00)**
Children under 5	-0.09 (0.00)**	-0.1 (0.00)**	-0.09 (0.00)**	-0.07 (0.00)**	-0.01 (0.01)
Children aged 6-13	-0.03 (0.00)**	-0.05 (0.00)**	-0.04 (0.00)**	-0.02 (0.00)**	-0.01 (0.00)**
Children aged 14-18	-0.02 (0.00)**	-0.03 (0.01)**	-0.01 (0.00)**	-0.02 (0.00)**	0.00 (0.00)
Non labor income	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)**	0.00 (0.00)**
Female head of household	0.21 (0.00)**	0.26 (0.01)**	0.28 (0.00)**	0.26 (0.00)**	0.15 (0.00)**
Urban	0.06 (0.00)**	0.06 (0.00)**	0.07 (0.00)**	0.07 (0.00)**	0.05 (0.00)**
Other adult female in the household	0.06 (0.00)**	0.12 (0.00)**	0.12 (0.00)**	0.03 (0.00)**	0.00 (0.00)
Constant	-0.55 (0.01)**	-2.21 (0.11)**	-0.82 (0.22)**	-0.02 (0.41)	-0.34 (0.22)
Observations	412876	115980	109106	89167	98623
R-Squared	0.12	0.1	0.14	0.12	0.11
Year-region dummies control	Yes	Yes	Yes	Yes	Yes

Source: Authors' calculation based on the CASEN survey for 1990-2006.

Note: The estimates control for cluster by municipality.

Table 5: Effects of FSD on hours worked per week (fixed effect municipality)

Variables	All	Women 20-29	Women 30-39	Women 40-49	Women 50-65
FSD	-0.6 (0.25)*	-1.39 (0.48)**	-1.14 (0.47)*	-0.74 -0.54	1.43 (0.49)**
Education	1.01 (0.01)**	0.48 (0.02)**	1.25 (0.02)**	1.23 (0.02)**	0.9 (0.02)**
Age	1.65 (0.02)**	7.76 (0.43)**	2.59 (0.62)**	0.00 (0.92)	1.27 (0.38)**
Age2	-0.02 (0.00)**	-0.13 (0.01)**	-0.04 (0.01)**	0.00 (0.01)	-0.02 (0.00)**
Children under 5	-4.07 (0.06)**	-4.93 (0.09)**	-4.27 (0.10)**	-3.04 (0.18)**	-0.08 (0.38)
Children aged 6-13	-1.89 (0.05)**	-2.82 (0.11)**	-2.28 (0.07)**	-1.56 (0.09)**	-0.66 (0.18)**
Children aged 14-18	-1.08 (0.06)**	-1.31 (0.42)**	-0.59 (0.10)**	-1.09 (0.10)**	-0.40 (0.14)**
Non labor income	-0.11 (0.01)**	-0.18 (0.05)**	-0.08 (0.01)**	-0.08 (0.02)**	-0.05 (0.01)**
Female head of household	9.26 (0.11)**	11.43 (0.38)**	12.17 (0.24)**	11.39 (0.22)**	6.52 (0.16)**
Urban	2.97 (0.09)**	3.09 (0.18)**	3.49 (0.18)**	3.53 (0.20)**	2.29 (0.17)**
Other adult female in the household	3.38 (0.07)**	6.07 (0.15)**	6.05 (0.15)**	1.99 (0.15)**	0.62 (0.13)**
Constant	-23.37 (0.43)**	-99.13 (5.25)**	-38.89 (10.64)**	11.73 (20.41)	-16.45 (11.00)
Observations	412876	115980	109106	89167	98623
R-Squared control for year-region dummies	0.10	0.09	0.12	0.10	0.08
	Yes	Yes	Yes	Yes	Yes

Source: Authors' calculation based on the CASEN survey for 1990-2006.

Note: The estimates control for cluster by municipality.

7 Conclusions

This article examines how a policy oriented towards a specific group within the population can have collateral effects on the economic decisions of other populations. In 1996, Chile began to introduce a 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 more hours spent in school impacts women's decision 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 fixed effect model based on repeated cross section is 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 women's access to the job market. In addition, a differentiated effect was detected for women by age groups who could potentially join the labor force. The greatest effects were found for women between the ages of 40 and 65. These individuals benefit the most (collaterally) from the educational reform because they are the group that has the largest concentration of children in the affected school years.

The results suggest increasing the amount of time that children spend in school provides women with more and greater opportunities to access the labor market because they dedicate less time to childcare. On the other hand, given that the effect of the reform is highest for older women, there is a need to implement similar policies focused on children under the age of eight.

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 schools located in municipalities with lower socio-economic levels. In Chile, these municipalities are those with the lowest levels of female 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 female labor participation.

In conclusion, in this paper we found a positive and significant effect of lengthening the school day on female labor supply. This result is of substantive interest, because the adequacy of this policy affects both the strength of women's labor supply attachments and 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 priority of increased availability of child care for younger children and the complementarity of FDS with these policies.

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A Appendix

Table A.1: Percentage of schools with FSD by year and type of area

Year	Schools with FSD	Rural	Urban
1998	47%	73%	26%
1999	50%	77%	29%
2000	55%	81%	35%
2001	56%	82%	36%
2002	58%	84%	39%
2003	60%	85%	42%
2004	60%	85%	43%
2005	61%	86%	45%
2006	62%	87%	46%

Source: authors' calculation based on administrative data from the Ministry of Education

Table A.2: Percentage of FSD enrollment by region and year

	1998	1999	2000	2001	2002	2003	2004	2005	2006
I	18%	19%	23%	27%	29%	26%	26%	33%	35%
II	24%	26%	30%	36%	38%	41%	36%	39%	39%
III	30%	29%	34%	34%	40%	41%	45%	44%	51%
IV	20%	22%	25%	31%	30%	36%	39%	46%	50%
V	15%	21%	25%	28%	38%	42%	45%	48%	49%
VI	16%	21%	26%	27%	35%	40%	44%	50%	51%
VII	22%	24%	27%	30%	37%	40%	42%	45%	47%
VIII	13%	16%	19%	25%	28%	37%	39%	42%	44%
IX	38%	42%	43%	52%	52%	57%	58%	60%	60%
X	38%	41%	47%	48%	54%	53%	56%	61%	63%
XI	37%	37%	41%	49%	49%	54%	56%	57%	58%
XII	30%	35%	41%	47%	30%	33%	34%	39%	40%
MR	17%	20%	25%	29%	35%	41%	43%	45%	50%
Total	20%	23%	28%	32%	37%	42%	44%	47%	50%

Source: authors' calculation based on administrative data from the Ministry of Education.

Table A.3: Percentage of schools with FSD by type

	Schools FSD	Public	Private Subsidized	Private
1998	47%	53%	37%	42%
1999	50%	57%	40%	45%
2000	55%	61%	45%	57%
2001	56%	63%	45%	52%
2002	58%	67%	46%	53%
2003	60%	70%	46%	53%
2004	60%	71%	47%	52%
2005	61%	73%	46%	55%
2006	62%	75%	47%	56%

Source: authors' calculation based on administrative data from the Ministry of Education.

Table A.4: Determinants of the implementation of the Full School Day

Variable	Transversal	Set effect by municipality
Poverty rate	0.14 (0.05)*	-0.04 (0.06)
Unemployment rate	-0.1292 (0.08)	-0.11 (0.10)
Percentage rural areas	-0.15 (0.02)**	-0.04 (0.02)
Illiteracy rate	0 0.15	-0.85 (0.19)**
1990	-0.66 (0.02)**	-0.56 (0.02)**
1992	-0.66 (0.02)**	-0.56 (0.02)**
1994	-0.66 (0.02)**	-0.56 (0.02)**
1996	-0.64 (0.02)**	-0.58 (0.02)**
1998	-0.19 (0.02)**	-0.14 (0.02)**
2000	-0.1 (0.02)**	-0.06 (0.02)**
2003	-0.03 (0.02)*	-0.01 (0.01)
Constant	0.77 (0.05)**	0.73 (0.06)**
Observations	1972	1757
R-squared	0.74	0.79

Note: Standard error in parentheses at 5% significance, at 10% significance. Dependent variable: Percentage of FSD enrollment in the municipality. Employment rate, illiteracy rate, poverty rate at the municipal level. 2006 is the omitted category.

Table A.5: Percentage of women with children between the ages of 8 and 18, by age

	Women 15-18	Women 19-24	Women 25-34	Women 35-44	Women 45-54	Women 55-65
1990	1%	3%	38%	73%	47%	15%
1992	2%	2%	36%	72%	47%	14%
1994	0.20%	2%	36%	71%	45%	12%
1996	0.20%	2%	41%	74%	46%	13%
1998	0.20%	2%	40%	74%	46%	13%
2000	0.00%	1%	39%	73%	47%	8%
2003	0.03%	1%	40%	73%	49%	8%
2006	0.02%	2%	37%	71%	44%	7%

Source: authors' calculation based on the CASEN survey for 1990-2006.

Table A.6: Description of variables

Variable	Description
Participation	Dichotomous variable that takes the value of 1 if the woman participates in the labor market and 0 otherwise
Age	Womans age
Children	Number of children that the woman has
Children under 5	Number of children that the woman has under the age of 5
Children aged 6-13	Number of children that the woman has between the ages of 6 and 13
Children aged 14-18	Number of children that the woman has between the ages of 14 and 18
Non labor income	Income from sources not related to the job market
Education	Number of years of education completed
Female head of household	Dichotomous variable that takes the value of 1 if the woman is head of household and 0 otherwise
Urban	Dichotomous variable that takes the value of 1 if the woman lives in an urban area and 0 otherwise
Region I- Region XIII	Dummy equal to 1 for each region of the country

Table A.7: Descriptive statistics, women aged 20 to 65

	1990		1992		1994		1996		1998		2000		2003		2006	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Participation	0.39	0.49	0.4	0.49	0.44	0.5	0.48	0.5	0.48	0.5	0.48	0.5	0.51	0.5	0.54	0.5
Employment	0.35	0.48	0.38	0.48	0.41	0.49	0.43	0.5	0.43	0.5	0.43	0.49	0.45	0.5	0.49	0.5
Hours worked per week	47.18	17.21	47.43	15.39	44.9	17.24	43.69	16.67	43.69	16.67	43.73	16.65	42.22	16.74	41.47	16.39
Education	9.12	4.35	9.15	4.27	9.7	4.27	10.14	4.24	10.14	4.24	10.2	4.19	10.55	4.15	10.58	4.1
Age	37.7	12.74	38.06	12.7	38.2	12.37	38.48	12.31	38.48	12.31	38.99	12.28	39.29	12.42	40.16	12.66
Number of children	1.49	1.38	1.45	1.36	1.52	1.42	1.47	1.39	1.47	1.39	1.38	1.25	1.32	1.21	1.18	1.15
Number of children under 5	0.39	0.66	0.38	0.66	0.37	0.63	0.34	0.6	0.34	0.6	0.31	0.57	0.28	0.54	0.23	0.49
Number of children 6-13	0.47	0.78	0.47	0.77	0.52	0.81	0.51	0.8	0.51	0.8	0.49	0.76	0.45	0.72	0.37	0.64
Number of children 14-18	0.29	0.62	0.27	0.59	0.29	0.6	0.29	0.59	0.29	0.59	0.27	0.55	0.27	0.55	0.26	0.54
Non labor income	125107	244401	184557	353562	334080	592240	395509	844035	395509	844035	380076	841457	409578	1032414	444104	849364
Female head of household	0.12	0.33	0.13	0.33	0.13	0.34	0.14	0.35	0.14	0.35	0.15	0.35	0.17	0.37	0.19	0.39
Urban	0.85	0.35	0.86	0.35	0.87	0.34	0.9	0.3	0.9	0.3	0.88	0.33	0.89	0.32	0.88	0.32
Other adult woman	0.54	0.5	0.52	0.5	0.55	0.5	0.56	0.5	0.56	0.5	0.51	0.5	0.53	0.5	0.52	0.5
Region 1	0.02	0.15	0.03	0.16	0.03	0.16	0.03	0.16	0.03	0.16	0.02	0.15	0.02	0.15	0.03	0.16
Region 2	0.03	0.17	0.03	0.17	0.03	0.17	0.03	0.18	0.03	0.18	0.03	0.17	0.03	0.18	0.03	0.18
Region 3	0.02	0.12	0.02	0.13	0.02	0.13	0.02	0.13	0.02	0.13	0.02	0.12	0.02	0.13	0.02	0.13
Region 4	0.04	0.19	0.04	0.19	0.04	0.19	0.04	0.2	0.04	0.2	0.04	0.19	0.04	0.2	0.04	0.2
Region 5	0.11	0.31	0.1	0.3	0.1	0.3	0.1	0.3	0.1	0.3	0.1	0.3	0.11	0.31	0.1	0.3
Region 6	0.05	0.22	0.05	0.22	0.05	0.22	0.01	0.12	0.01	0.12	0.05	0.22	0.02	0.13	0.05	0.22
Region 7	0.06	0.24	0.06	0.24	0.06	0.23	0.06	0.23	0.06	0.23	0.06	0.24	0.06	0.24	0.06	0.24
Region 8	0.13	0.33	0.13	0.33	0.13	0.33	0.12	0.33	0.12	0.33	0.12	0.33	0.13	0.34	0.11	0.31
Region 9	0.05	0.22	0.05	0.22	0.06	0.23	0.05	0.22	0.05	0.22	0.05	0.23	0.06	0.23	0.05	0.22
Region 10	0.07	0.25	0.07	0.25	0.07	0.25	0.06	0.24	0.06	0.24	0.07	0.25	0.07	0.25	0.07	0.25
Region 11	0.01	0.07	0.01	0.07	0.01	0.07	0.01	0.07	0.01	0.07	0.01	0.07	0.01	0.07	0.01	0.07
Region 12	0.01	0.1	0.01	0.1	0.01	0.1	0.01	0.09	0.01	0.09	0.01	0.1	0.01	0.09	0.01	0.1
Metropolitan Region	0.42	0.49	0.41	0.49	0.42	0.49	0.46	0.5	0.46	0.5	0.42	0.49	0.44	0.5	0.42	0.49
Observations	29916	29916	40521	40521	37763	37763	44817	44817	44817	44817	70578	70578	70896	70896	70993	70993

Source: authors' calculation based on the CASEN survey for 1990-2006.

Table A.8: Percentage of FSD enrollment by year and urban/rural area

Year	FSD Enrollment	FSD Enrollment	
		Urban	Rural
1998	20%	18%	43%
1999	23%	20%	49%
2000	28%	24%	53%
2001	32%	28%	62%
2002	37%	33%	65%
2003	42%	39%	67%
2004	44%	41%	68%
2005	47%	44%	68%
2006	50%	48%	69%

Source: authors' calculation based on the CASEN survey for 1990-2006.