Effects of full-day schooling on mothers' employment quality: Evidence from a school reform in Chile

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Abstract:

Women have lower labor force participation rates than men, and they typically have access to lower quality jobs. We investigate the effect of a reform that lengthened school schedules from half to full days in Chile on maternal labor force participation and on several measures of job quality. We use the gradual implementation of the policy across municipalities and over time to identify its effects. We find an overall positive effect on LFP, and heterogeneous effects on job quality measures by mother's cohort of birth. Longer school days allow younger mothers to work more hours and find more formal and secure jobs.

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1. Introduction

There is a long and established literature on the effects of child care policies and mothers' labor supply, which generally find a positive, causal relationship.[1] Less is known about whether access to child care also affects the type or quality of jobs that mothers look for or accept. If hours of supervised child care arrangements increase, mothers are able to devote more time to job search activities, improving their match to offered job positions, and thus accessing better jobs.[2]

Furthermore, a common job market obstacle for mothers of school-aged children is a mismatch between school hours and work hours. This mismatch can be particularly important in families where both parents work, or for single-parent households—mostly headed by women. For instance, in the U.S. about half of all 6 to 12 year old children with employed mothers participated in some form of supervised child care arrangement while their mothers were at work (Capizzano et al. 2000),[3] thus it is reasonable to expect that if children's daily school schedule changes, parental employment decisions may be affected.

In a context of labor market rigidities, such as where part-time jobs are not readily available, increasing the time that children spend under adult supervision closes the gap between school hours and working hours and might allow mothers to access full-time jobs that would not be available otherwise.[4] As full-time jobs are typically correlated with higher quality employment, extending school hours can not only affect the decision to participate in the labor market but also the quality of jobs that women accept.[5]

This paper studies the effect of an exogenous increase in the daily schedule of publicly funded schools in Chile on mothers' labor supply and on the quality of jobs they accepted. Changes in daily schedules were part of a nation-wide reform that extended the length of the

[1] See among others Gelbach 2002, Powell 2002, Lokshin 2004, Berlinski and Galiani 2007, Baker et al. 2008, Lefebvre and Merrigan 2008, Cascio 2009, Fitzpatrick 2010 and 2012, Graves (2013) and Berthelon, Kruger and Oyarzún (2015).

[2] A similar channel has been proposed when assessing the effect of unemployment insurance and job quality (Acemoglu & Shimer, 2000; Van Ours & Vodopivec, 2008).

[3] Supervised child care arrangements include before- and/or after-school programs, family child care centers, and care by an adult nanny, babysitter, or relative.

[4] Del Boca (2002) studies the effect of availability of child care and part time jobs over labor force participation and fertility decisions.

[5] On the quality trade-off between full-time and part-time jobs see Hirsch (2005), Manning and Petrongolo (2008) and Bardasi and Gornick (2008).

school day by about 35 percent without increasing the length of the yearly school calendar; throughout this paper we refer to this as the Full-Day School (FDS) reform.[6] The increase in the length of daily school schedules significantly reduced the gap between school and employed mothers' work hours, thus it is reasonable to expect that mothers responded by increasing their labor supply and by possibly accessing better, full-time jobs.[7]

In addition to estimating the effect of changes in access to full-day schools over labor force participation, we also analyze the impact of the policy on several measures of employment quality: wages (hourly), hours worked, and categorical variables for presence of a contract, whether the job is permanent, union participation, self-employment, business owner (employer), public sector employment, and size of firm where the mother works.[8] Our dataset is a large panel of about 8,300 women that were interviewed between 2002 and 2009 in Chile's *Social Protection Survey*, and our panel data model allows us to control for individuals' unobserved heterogeneity.

Identification of the policy effects comes from mothers' individual changes in labor supply and job quality as a response to changes in access to full-day schools at the municipal level. Due to data limitations, we are not able to identify the school that a child attends, thus the policy variable is access to full-day schools at the municipal level as a measure of exposure to the reform. Our key assumption is that trends in women's labor outcomes were independent from the implementation of the FDS reform at the municipal level. Although we cannot test this assumption directly, we present convincing evidence that it is met.

We find that on average, an increase in access to full-day schools raises labor force participation of mothers that are potentially affected by the reform, without affecting job quality. We find that if FDS coverage increases by 25 percentage points—which is the change required to move to full coverage of the—mothers' labor force participation would increase

[6] The reform is referred to as JEC in Chile, due to the Spanish acronym of its official name, *Jornada Escolar Completa*, approved in law No.19,532. For most schools, this meant changing from a system of half-day shifts, to one continuous full-day schedule. A typical half-day schedule is from 8:00 a.m. until 1:30 p.m., while a typical full-day schedule runs from 8:00 a.m. until 3:30 p.m.

[7] In the nationwide household survey, CASEN 2009, Chilean mothers with children in primary school age that do not participate in the labor force and that are aged between 25 and 55 years old, cite lack of adequate child care as the second most important reason for not seeking employment (24%), after domestic household chores (54%). See Table 1.

[8] The literature on job quality is vast. See, among others, Land (1975), Jencks et al. (1988), Gittleman & Howell (1994), Anker, et al. (2003), Bescond, et al. (2003) and Clark (2005).

by 4.6 percentage points, equivalent to 6.5 percent, which is consistent with previous findings.[9]

One possible explanation for the lack of effects on job quality is the possibility that these effects are heterogeneous across different groups of mothers. We explore whether mothers may respond differently to the policy according to their age.[10] Previous studies find attachment to the labor force in Chile partly depends on women's year of birth and that younger cohorts are more attached to the labor market (Contreras, et al., 2005). It is therefore interesting to explore whether women respond differently to child care access according to their year of birth. We classified women in two groups, taking year of birth in 1969 as a cutoff point. Then we estimate a fully interacted model to explore whether effects differ for mothers born before or after 1969.

Results indicate that the effects of the FDS policy on labor force participation and on job differed according to mothers' birth cohort. As access to FDS increases, the group of mothers born before 1969—who are less attached to the labor force—had a stronger response in terms of participation, and they were also more likely to be self-employed or to be employers. In Chile, women that are self-employed tend to work fewer hours, and we find that women in this age group also reduced their working hours—although this reduction is relatively small.

In turn, women in the younger group (born on or after 1969) behaved differently in response to higher FDS access: their increase in labor force participation was smaller—about half of the one observed in the older cohort—yet they were more likely to work longer hours. Additionally, they were more likely to have jobs with higher degrees of formality—they were more likely to participate in workers' unions, to have jobs with contractual arrangements, and to work in larger firms. Our results indicate that in Chile at least younger mothers are benefiting by accessing better jobs.

Our results provide several contributions to the existing literature on the effects of child care policies on women's employment. First, we find evidence that polices focused on

[9] Previous studies on the effects of the FDS reform over LFP include Hernando (2009), Contreras et al. (2010), and Berthelon, et al. (2015).

[10] We also explore differences by the mother´s highest level of education completed (primary, secondary or tertiary), and we find no significant differences in any of the job quality measures.

older children—i.e., children in primary school—have significant effects on mothers' labor decisions. They also contribute to the growing literature and debate about on job quality and decent work (Findlay (2013) and ILO (1999)) by providing evidence that certain policies—although not aimed at improving or changing working conditions—may have significant effects of the quality of jobs that some groups are able to find, highlighting the importance of policies that allow a better match between schooling and working hours, both for mothers of small children but also of older children.[11]

This paper is organized as follows: in the next section we describe the Chilean education system and the FDS reform implemented since 1997. We discuss our identification strategy and the empirical model in Section 3. Data and variables are described in Section 4. Section 5 presents our results and Section 6 concludes.

2. Background: Chilean education system and the full-day school reform

Chile's education system is characterized by school choice. Three types of school exist, defined by their funding scheme. First, there are *public* schools—administered at the municipal level that are funded by a per-student subsidy from the central government and from resources allocated by the municipality. Second, there exist *private subsidized* or *voucher* schools, which are privately owned, for-profit organizations that receive the same per-student subsidy from the central government as public schools, but which can charge additional fees to their students.[12] Third, there are *private* schools that do not receive public funding and are allowed to freely set the fees they charge (Mizala & Romaguera, 2000). Private and private subsidized schools can select students but public (municipal) schools cannot.[13]

Within this context, and unlike public school systems in other countries, families in Chile are not restricted to a specific location or district because the per-student subsidy is

[11] Our results are also consistent with preliminary results fund by Calderon (2012) in Mexico. We also contribute to the literature that characterizes job quality in Chilean (Chacón, 1999; Sehnbruch, 2004; Cassar, 2010; Cáceres & Zúñiga, 2013).

[12] The fee charged to students is regulated and the government per-student subsidy is reduced as private fees increase.

[13] Given that private schools—which represent 8% of the total enrollment—are not obligated to ascribe to the FDS program, we do not include them in our analysis.

independent of the family's municipality of residence. Families can enroll their children in the school of their choice, according to their preferences and financial capacity. Private and private subsidized schools can select students but public (municipal) schools cannot.[14]

Chile initiated a large-scale education reform in 1997 that included the increase of instructional time. This reform increased in the amount of time students spent in the classroom without lengthening the school year—in other words, increased the length of daily school schedules—and came to be known as the Full Day Schooling (FDS) reform. It mandated that all primary and secondary schools that receive public funds—public or private subsidized—must offer a full-day program by 2007 and 2010, respectively, and the change to full-day schedules could be implemented gradually within a school.[15] Additionally, the FDS law mandates that all publicly funded schools created after 1997 must initiate operations as full-day schools. Full-day 1st and 2nd grade is not mandatory.

The FDS reform stipulates that in primary schools—the focus of this paper—weekly academic hours have to increase from 30 to 38 hours in grades 3 to 6, and from 33 to 38 hours in grades 7th through 8th (García-Huidobro & Concha, 2009). In addition, there were also increases in time allocated for recesses and lunch, so that time spent at school increased by about 35 percent in primary schools without increasing the number of days in the academic calendar. This amounts to an additional 1.5 to 2 hours of daily classroom time.

The reform presented operational challenges that restructured how public schools function in Chile at both primary and secondary levels: some schools went from providing two half-day shifts to one full-day shift. As these challenges arose, the implementation of the reform was not immediate but gradual, due to infrastructure and financial constraints (in fact, its deadlines have been extended several times). The gradual implementation of the reform can be observed in Figure 1. It describes the evolution of primary school enrollment by FDS adscription. We can observe that it took 9 years for the enrollment in the FDS to surpass the

[14] In this context, place of residence in not bound to school choice, although there is evidence that for parents proximity to school is a significant determinant in choice of school (Chumacero, et al., 2011).
[15] Schools switching to the FDS regime did not have to change all grade levels to full-day schedules. For instance, it was possible for a primary school to offer FDS for 5th through 8th grades, and not for 3rd and 4th grade. However, if a grade level is full-day, all its classrooms within that grade level have to be offered as FDS. Full-day 1st and 2nd grade is not mandatory.

traditional school schedules, and that by 2009—13 years after the launching of the reform—FDS coverage had reached only 66 percent of total primary school enrollment.

The FDS program has operational and infrastructure costs. The operational component includes variable costs that increase as a result of lengthening the amount of time children spend in school; for example, teachers' salaries, administrative costs, and the provision of school lunches. To cover operational costs, the per-student subsidy regularly paid to all public and voucher schools increased by 40%. The most important expense (and constraint) associated with a full-day school is the expansion of schools' infrastructure to accommodate, in many cases, twice the number of students at any given time. Schools that wish to change their operations to FDS compete for public funds through an application process with the Ministry of Education, where they submit their academic plans and request the required funds to operate under the full day regime.[16]

In the funds application process, schools competed for limited capital infrastructure funds to finance their infrastructure requirements, and given the criteria for selection, the Ministry of Education does not allocate FDS funds randomly. Therefore the first schools that entered the program were schools with relatively low switch costs (i.e., rural schools with excess capacity) and priority schools with pre-existing deficits in infrastructure and located in areas of socio-economic vulnerability.[17]

Although child care was not an explicit goal of the policy, by increasing the time that children spend in school and the number of hours they receive adult care, the FDS policy was an implicit child care subsidy for school-aged children, which may impact the employment decisions of their mothers. Since mothers with children in primary school report lack of child care as an important determinant of inactivity (see Table 1), the FDS policy should lead to an increase in women's participation. Although the reform was implemented in both primary

[16] Law No. 19.532 of 1997 indicates that the Ministry of Education will grant schools authorization to operate under the full-day regime and also, through special competitive programs, will provide funds to schools that require additional resources to implement the FDS schedule. The Law also states that in granting both authorizations and funds the Ministry might use one or more of the following four selection criteria: a) Socio-economic or educational vulnerability of the school's students; b) Amount of resources requested on a per-student basis; c) Quality of the proposal with regard to technical, pedagogical, economic and social specifications; and d) Percentage of total requested funding that would be covered by the school's own administration.

[17] In section 3 we discuss how the non-random funds allocation rules may affect our empirical strategy.

and secondary schools, we focus only on the impact of primary full-day school availability on mothers' labor force participation decisions, because lack of child care is not a relevant concern to mothers with children in secondary school (Table 1).

Identification in our empirical estimations relies on the fact that the school system is highly decentralized, and therefore the FDS program was taken up at different rates across Chilean administrative regions and municipalities. Table 2 reports the average share of primary schools that were under a full-day regime in Chile's thirteen administrative Regions. Several features of the policy immediately stand out. First, there has been a sustained increase in full day school coverage in all regions. Second, there is also a large variability in reform take-up across regions, and third, there is an inverse relationship between enrollment and FDS implementation. The Metropolitan Region (XIII), where Santiago is located, was home to 36 percent of Chilean primary school students in 2009, yet there the reform was slowest—with 75 percent take-up—mainly because schools in this predominantly urban area face larger physical space constraints or higher costs of expansion of their infrastructure. The fastest implementation occurred in the sparsely populated XI, X and III Regions, comprised mostly of rural areas and small cities and where a total of 12 percent of primary school students reside. In each of these regions, more than 95 percent of primary schools were full day by 2009.

Given that there are more than 330 municipalities in Chile, in Table 3 we report the fraction of all 334 municipalities in the country which fall within different ranges of FDS implementation. As expected, we observe an increase over time in the share of municipalities reaching high levels of coverage, and a decrease in the number of municipalities with low coverage levels. More importantly, for our estimates, it also shows that there is a wide variation of FDS implementation levels at any given year, particularly for the years in which we compute our estimates. This feature can also be seen in Figure 2, which presents a map of the depth of FDS implementation across municipalities between 2002 and 2009. These descriptions reveal that the reform's phase-in had significant temporal and municipal variation. Our identification strategy is partly based on the quasi-experimental nature of its implementation.

3. Identification Strategy and estimation

Before discussing our identification strategy, we discuss properties of our data and of the FDS reform that play a crucial role in determining the estimation methodology. A first issue is related to our data set. Chile's Social Protection Survey (EPS), which is the source of our labor market outcomes, does not include information of the school that children attend, so it is not possible to estimate the direct effect of attending an FDS school on mothers' employment outcomes. Therefore, the policy variable we analyze is potential access, measured as availability to FDS schools at the municipal level.[18]

One concern could be that due to school choice in Chile, parents are not limited geographically in their choice of school so that FDS availability in the municipality of residence may not reflect parents' choice set; however, studies for Chile have found that proximity is an important determinant of school choice, and that most children attend primary school in the municipality they live (Chumacero, et al., 2011), so that access to full day schools in the municipality of residence is an appropriate proxy. One advantage of this measure is that FDS coverage at the municipal level is exogenous to each family—whereas actual school choice is not—provided that FDS access at the municipal level is not correlated with families' choice of residency, which is corroborated in Berthelon et al. (2015) who find that mothers' migration decisions were uncorrelated with municipal FDS coverage.

Another relevant aspect of the identification strategy is the non-random nature of FDS funds allocation. As indicated previously, each school was allowed to apply to the Ministry of Education for authorization and/or funding to become an FDS school, and after a sorting and selection process, funding was allocated.[19] Thus, one concern is that since FDS funds were targeted to more vulnerable schools, the estimates of its effect might be biased. For instance, schools in a municipality with a disproportionately large fraction of socio-economically vulnerable students might obtain funding for implementing the FDS reform. At the same time this municipality may also experience poor female labor market outcomes due to economic conditions, which in turn increases the vulnerability of its population. In

[18] The municipality is the smallest geographical level in our data.
[19] To our knowledge there is no available data that would allow us to model how schools decided to apply for authorization and funds, nor how funds allocation decisions were carried out at the Ministry level.

this case, we would observe a negative correlation between FDS access and female labor outcomes.

However, there are two relevant characteristics of the Chilean school system that make this spurious correlation unlikely. First, the school system in Chile is highly decentralized, with school districts defined at the municipality level. Each school district is operated in complete independence of other school districts. Second, within each school district principals operate with a high level of decentralization in both the public system (municipal schools) and private subsidized system. Within the public system, principals have gained increasing levels of autonomy (Núñez, et al., 2010) and within the private subsidized system, more than 70 percent of schools operate as single standing schools, i.e., they do not operate within a franchise, and therefore the school principal's decisions are not coordinated with other schools—either within the school district or with schools in other school districts (Elacqua, et al., 2011). The combination of these two characteristics introduce—once all school decisions are aggregated at the municipal level—a large variation in the take up rate across municipalities and time (see previous section); therefore we are confident that in this sense the FDS reform resembles a quasi-natural experiment.

Following Berthelon, Kruger and Oyarzún (2015) and Berthelon and Kruger (2011), we estimate a reduced-form panel data model of female labor force participation and jobs quality. Our identification relies, first, on the implementation of a panel data estimation. With the panel we are able to account for time-invariant individual unobservables, including those that jointly affect labor force participation, jobs quality, the choice of residency and the unobserved choice of school. Thus the effect of access to FDS schools over LFP and job quality is identified through within-individual changes in FDS access.

Second, we also rely on the quasi-experimental nature of the policy implementation. Given the dynamics of the Chilean school system—which are the results of the aggregation of highly independent school decisions—we believe that this assumption is reasonable. Additionally, given the criteria in the allocation of public FDS funds, it is unlikely that schools received them in response to changes in the local female labor market.

Even though we cannot test these assumptions explicitly, our estimates follow the approach in Duflo (2001) by controlling for pre-existing trends in labor force participation

across municipalities, as well as for other municipality characteristics that can affect labor outcomes and that are independent of FDS implementation. The model we estimate is the following:

$$Q_{imrt} = \theta \text{FDS}_{mrt} + X_{imrt}\beta + M_{mt}\mu + \alpha_i + \gamma_m + \tau_{rt} + \delta_t D_{mr} + \epsilon_{imrt} \quad (1)$$

where the dependent variable Q_{imt} represents an indicator of labor force participation or indicators of job quality (discussed below) for woman i living in municipality m and region r in year t. The policy variable of interest, FDS_{mrt}, measures the share of full-day primary schools in municipality m and region r in year t.[20] We also control for time-varying individual characteristics in vector X_{imrt}, and municipality-level characteristics in vector M_{mrt}.

As we are using a panel data set we include an individual-level fixed effect, α_i, which allows us to control for individual unobserved heterogeneity both in the labor participation and employment decisions. We also include a set of municipality fixed effects, γ_m, to control for time-invariant omitted factors that could affect a job's quality, such as local labor market conditions. At the same time they serve as controls for time-invariant factors that determine FDS access such as location of the municipality, geography, and infrastructure costs, among others. We also include region-time fixed effects, τ_t, to control for regional trends in labor force participation as well as quality of jobs.

We account for pre-existing trends in the labor market following Duflo's (2001) strategy, by interacting year fixed effects with a dummy variable that defines a municipality as "low" LFP if its LFP rate in 2000 was below the median. These interaction terms cleanse the estimated FDS effect of any differences in female labor force participation trends across municipalities that may have been in place prior to EPS survey. Finally, ϵ_{imrt} is an idiosyncratic error term.

4. Data and variables

[20] Our data also allows us to measure total enrollment under FDS: However, we believe that parents' choice is affected by the availability of schools under the FDS regime rather than the aggregated availability of FDS slots at the municipality level, as the former are observed by parents but the latter not.

Our main source of information comes from Chile's Social Protection Survey, which we denominate as EPS for its Spanish acronym.[21] The EPS has several rounds available (2002, 2004, 2006, and 2009) and collects detailed information of respondent's current labor status and labor history, as well as other socio-economic characteristics. From this data source we obtain individual information for our dependent variables (Q_{imt})—i.e., labor force participation and job quality—and mothers' socio-economic characteristics (X_{imrt}).

Given that mothers of primary school children report lack of child care is one of their main constraints in accessing the labor market (see Table 1), our sample is restricted to women that were potentially affected by the FDS policy, i.e., women with primary school-aged children. In addition, we only include in our sample women aged 25 to 55, to avoiding the possible correlation between women's education and retirement decisions. Our final sample is composed by an unbalanced panel of more than 8,300 women for the labor force participation estimates and between 4,000 and 5,600 women for the job quality estimates.[22]

We construct several dependent variables; the first is a measure of labor force participation that equals one if the mother worked or looked for work at any time during the year of the survey. We also construct all the measures of job quality discussed in the existing literature that the EPS includes: hourly wages (in logs), weekly hours worked, categorical variables for presence of contract, whether the job is permanent, and whether she participated in a worker's union. We also create a series of categorical variables that capture some characteristics related to the type of job: whether she is self-employed, whether she employs others (i.e., business owner), whether the job is in the public sector, whether the firm where the woman works is small (less than 10 employees), whether it is medium (between 10 and 199 employees), and whether she works in a large firm of 200 or more employees.[23] The EPS also allows us to construct measures of women's years of education, whether she is the head of the household, and her age.

FDS availability at the municipal level is obtained from administrative school data that contains detailed yearly information on full day enrollment within a school. The FDS program does not require schools to implement full days for all their grade-levels, instead

[21] The survey's name is *Encuesta de Protección Social*.
[22] Our job quality estimates are conditional on holding a job, thus samples are smaller than for LFP estimates.
[23] See Appendix 1 for a complete description of each of all variables.

schools seeking to participate in the program were only required to offer FDS to all classrooms of the same grades.[24] We defined a school as full-day if at least 50 percent of its grade levels were functioning under the FDS scheme, and estimated the share of FDS schools in a municipality for all years of the EPS survey. Chile's CASEN Household Surveys provided time-varying municipal-level variables (vectors M_{mrt} and D_{mr}), including average adult educational attainment, male and female labor force participation rates, municipal poverty, municipal unemployment rates, and average income per capita in each municipality.

Table 4 reports summary statistics of all variables in our sample of mothers aged 25 to 55 years (yearly and the period's average). On average, approximately 71 percent of women participated in the labor force during the period,[25] while the hourly wage during the period was US$2.50. Mothers worked an average of 43 weekly hours, and it is interesting to point out that hours worked decreased consistently over time, which is due to a 2005 law that reduced a legal work week from 48 to 44 hours. About 81 percent of women report having a formal contractual arrangement and 78 percent have a permanent job (either with or without contract). We also observe that 14 percent of women belong to a union, 16 percent work on the public sector and 18 percent work either as self-employed or as employer. Lastly, over the whole period 43 percent of women declare having worked in a small firm, 39 percent in medium-size firms and 28 percent in large firms.[26]

Table 5 reports cross tabulations for some of the job quality measures, revealing that mothers that have jobs with formal contracts have significantly higher wages, work more hours and are more likely to have a permanent job. These correlations are consistent, since the presence of signed contract indicates a higher degree of formality as well as more employment stability, which is also correlated to higher productivity and thus higher wages. Also, women that belong to a union have higher wages and are more likely to have jobs that are permanent and that have a formal contract. Women working in the public sector report

[24] For instance, a school that had two classes per grade could choose to enter only grades 3rd to 8th, provided that both classes in each grade were offered as full-day.

[25] The observed difference (decrease) between 2002 and 2004 is due to the fact that in 2002, the population contributing to the country's pension system (working women) was over-sampled. Later rounds of the survey are representative of the whole population.

[26] Given that EPS survey collects monthly information regarding labor history it is possible for a worker to work in more than one firm´s size during any given year, thus in Table 4 the sum of small, medium and large firm fractions may not add to 1.

higher wages, less hours worked and are more likely to have permanent, formal and unionized jobs. In turn, self-employed women have similar wages to employed ones but work a slightly fewer hours, and their occupation is less likely to be permanent. These are also reasonable correlations, since it is likely that self-employed women work in small firms (sole proprietorship), and as such they may have more flexibility to manage their working hours. In fact, as also shown in the table, women that work in small firms have lower wages, work fewer hours and are less likely to have contract and belong to a union. Finally, on the other end of the firm size spectrum, women that are employed by large firms have higher wages, work more hours, and are more likely to have jobs that are permanent, a signed contract, and to participate in a union.

Regarding our policy variable of interest, the mothers in our sample live in municipalities where on average 56 percent of primary schools are under the FDS regime. The municipal average share of FDS schools increases consistently over the 2002-2009 period, from 42 to 76 percent, respectively. Also, in our sample mother's average age is almost 38 years, the average number of years of education completed is 10.8 and 27 percent of them are head of their households. The average mother lives in a municipality with a poverty rate of 16 percent and unemployment rate of 9 percent.

5. Results

In order to estimate the effect of the FDS policy we estimate equation (1) for labor force participation and for each of our ten job quality measures. Table 6 shows that increases in access to FDS schools led to higher labor force participation. This result is consistent with findings of the child care/mothers' employment literature: mothers that have more access to child care can devote more time to actively participate in the labor force. The result is also consistent with previous studies of the Chilean FDS reform (Berthelon, et al., 2015; Contreras, et al., 2010; Hernando, 2009).

Our point estimate for FDS indicates that if the share of FDS schools in a municipality increases by 1 (or 100 percentage points), then the probability that a woman participates in the labor force would increase by 18.5 percentage points. To put this result in relevant context, an increase of 25 percentage points in FDS, i.e., moving to full FDS coverage, would

lead to a predicted increase in female LFP of 4.6 percentage points, or 6.5 percent.[27] Columns 2 to 11 report results for estimates of the effect of FDS on our measures of job quality. We find that none of the employment quality measures are significantly affected as FDS coverage increases.

A possible explanation is that average effects for all mothers ignore heterogeneous effects on different groups. Contreras et al. (2005) found empirical evidence that cohort effects were significant in determining women's participation in the labor market We explored whether mothers' responses to the FDS reform were due to their birth cohort, because generational differences may translate into (i) differences in preferences regarding employment (labor force attachment or jobs of certain characteristics), (ii) demand factors in the labor market—for instance, due to different costs related to fertility, or (iii) different preferences regarding child care arrangements.

We separated our sample in two groups: mothers born before 1969 and mothers born in 1969 or after. As our sample includes women between 25 and 55 years old, we select 1969 as the cutoff point because it is the mid-point between ages 25 and 55 in 2009. Summary statistics for both groups are reported in Table 7. We observe that younger women (post 1969 columns) have a higher LFP rate and are more likely to work with a contract. In turn, older women (pre 1969), are more likely to work either on the public sector or as self-employed. Mothers in the older cohort are more likely to work in small firms—possibly because the work more as self-employed—whereas the younger cohort is more likely to work in medium size firms. In terms of our policy variable, younger mothers live in municipalities with more access to FDS.

We estimate a fully interacted model, interacting all explanatory variables of equation (1) with a categorical variable that takes the value of one for the younger cohort.[28] Results are reported in Table 8. The effect of the policy on mothers born before 1969 is reported as

[27] The marginal effect reported is relative to the average fraction of the year in which women participated in the labor force, and is obtained by multiplying the point estimate (0.185) by 0.255 and dividing by the average of the dependent variable (0.716).

[28] We estimate a fully interacted model in order to gain efficiency in our estimates and to facilitate comparisons across groups.

the coefficient of FDS. For younger women, the effect is the sum of the policy variable and the interaction term of the policy with the younger birth cohort variable.

Results reveal different responses for these cohorts. Older mothers respond to increases in FDS access by increasing their labor force participation—the effect is slightly bigger than for the overall sample. An increase of 25 percentage points in FDS access increases this group's LFP by 5.6 percentage points (8 percent). Additionally, mothers in this group increase their probability of working as self-employed/employers by 4.9 percentage points (25 percent) and reduce their working hours by 2.9 hours per week (6.8 percent) due to a similar increase in FDS coverage.

Among mothers in the younger cohort, an increase of 25 percentage points in FDS access increases LFP by 3.4 percentage points—or by 4.6 percent, which is about half the size of the impact on older mothers.[29] This is expected, as younger mothers are more attached to the labor market. The same change in FDS access increases the number of hours worked per week by 2.7 hours, which amounts to a 6.3 percent increase. Younger mothers are also more likely to have jobs with higher unionization rates as a result of higher FDS access, increasing their probability of belonging to a union by 7 percentage points (or by 50 percent).

Consistent with this result, if FDS coverage increases, younger mothers are less likely to work in smaller firms, with a reduction of 12.5 percentage points or 31.4 percent. In terms of contractual status and medium firm size, the total effect (FDS + birth cohort coefficients) is not significant for younger mothers. However, the statistical significance of the interaction term in both equations suggests that younger women are more likely to work in jobs with signed contracts and more likely work in medium sized firms, consistent with simple correlations: women working in medium-sized firms are also more likely to have contracts (Table 5). Even though the regression results of the total FDS effect on the likelihood of having a contract or on working in medium firms, they are consistent with descriptive statistics and with statistically significant results of other variables, in the sense that the FDS

[29] For LFP, the interaction term of the young cohort is not statistically significant, however, a joint significance test reported at the bottom of the table indicates that the FDS and young cohort coefficients are jointly significant.

policy allows younger women to access jobs in larger firms, and in turn larger firms are more likely to offer contracts and have unions.

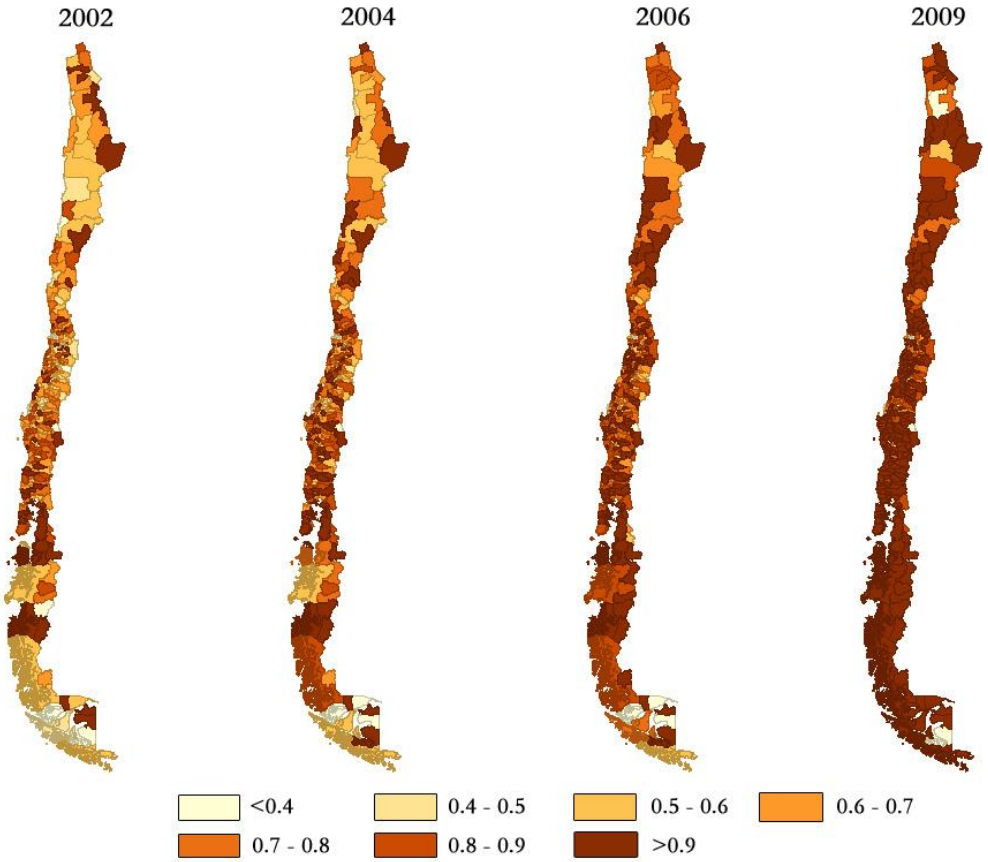
Our results reveal that the FDS policy had significant and important effects on job quality, and that these effects were heterogeneous across groups. While older mothers tend to move to smaller firms thus away from unionized, permanent or with contractual arrangements, younger mothers tend to take more formal and permanent jobs in larger firms. In both cases there seems to be a positive effect on wages, although not statistically significant.

6. Conclusions

The present study analyzes the effect that a national school reform in Chile that extended the school day from half to full day schedules, had on mothers' labor force participation and employment quality. We study a group of mother, which in principle, should have been affected the most by the policy: mothers with children in primary school, who report lack of child care as an important reason for not entering the labor market. Our identification strategy relies on individual responses across time to changes in access to FDS schools, and on the quasi-experimental implementation of the policy across time and municipalities during the 2002-2009 period.

For our complete sample, estimations indicate that mothers responded to increases in access to FDS schools by significantly increasing their labor force. If FDS supply at the municipal level was to increase by 25 percentage points mothers' LFP would increase

Figure 2
Evolution of Municipal Share of Primary schools under FDS regime, 2002-2009



Source: Authors' estimates based School Directory/Administrative JEC data (MINEDUC).

Table 1
Main reason mothers do not participate in labor force

	Mother whose youngest child is of:		
Reason	**Pre-school age**	**Primary school age**	**Secondary school age**
Household chores	37%	54%	63%
Lack of childcare	48%	24%	4%
Student	1%	1%	1%
Not interested	3%	4%	1%
Other reasons	10%	17%	32%
Total	100%	100%	100%
Observations	369,263	383,854	202,616

Source: Authors' estimates from CASEN 2009. Includes mothers aged 25-55 years who are inactive in the labor force. Pre-school age: 0-5 years; primary school age: 6-12 years; secondary school age: 13-18 years.

Table 2

Primary schools under FDS regime, 1997-2009 (% of total number of schools), by Region

Region	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Primary Enrollment in 1997 (% total)
I	43	40	48	61	59	67	74	65	75	75	80	71	88	3%
II	38	42	44	48	55	65	70	73	79	82	84	87	89	3%
III	47	50	55	62	64	67	77	81	83	89	88	91	95	2%
IV	36	42	43	50	56	63	68	72	74	76	78	82	87	4%
V	24	32	40	48	53	63	69	73	78	79	81	84	85	10%
VI	25	33	34	41	51	59	65	71	76	80	83	86	89	5%
VII	32	39	43	45	51	59	64	68	71	75	80	83	89	7%
VIII	28	34	39	46	52	60	64	65	70	74	76	79	83	13%
IX	47	53	60	64	68	71	74	77	79	80	85	87	94	7%
X	55	66	68	72	73	77	78	81	83	84	86	88	96	8%
XI	41	46	56	61	67	70	87	86	90	93	94	94	99	1%
XII	33	35	39	50	47	56	56	65	59	65	68	64	81	1%
XIII	11	16	21	27	37	41	49	54	61	65	68	72	75	36%
Regional Ave.	**32**	**39**	**43**	**49**	**55**	**61**	**66**	**70**	**74**	**77**	**79**	**82**	**87**	**100%**
National Total	**27**	**33**	**37**	**44**	**50**	**56**	**62**	**66**	**70**	**74**	**76**	**79**	**84**	**100%**

Source: Authors' estimates from administrative data, Ministry of Education. Share of schools with at least 50 percent of all their grade levels under the FDS regime. Includes schools that receive public funds (municipal and voucher schools, represent 92% of total enrollment nationwide). Primary enrollment shares by region are shown only for 1997 as they remain relatively constant across the period. Years shadowed are those included in our estimates. Santiago, the capital city, is located in the XIII region.

Table 3

Percentage of municipalities by share of FDS implementation, 1997-2009.

Share of schools within municipality under FDS	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
0-9	22,8	12,6	9,3	5,4	3,3	2,4	1,2	0,9	0,6	0,6	0,6	0,9	0,6
10-19	12,6	13,5	13,2	7,8	3,6	1,8	0,9	0,9	0,0	0,0	0,0	0,0	0,0
20-29	14,1	12,9	11,7	14,4	11,1	4,8	3,0	2,1	1,2	0,9	0,6	0,6	0,3
30-39	12,6	13,2	12,9	8,7	9,9	10,2	7,8	5,1	2,7	1,5	0,9	0,9	0,6
40-49	8,4	12,6	11,7	13,5	13,2	10,8	9,9	9,0	6,0	3,6	3,0	2,4	0,9
50-59	5,4	7,5	9,3	9,3	14,4	12,3	13,2	11,7	10,5	11,1	9,3	5,1	3,0
60-69	8,1	7,8	10,2	9,9	9,6	15,3	12,9	15,9	20,1	14,7	13,8	14,6	9,6
70-79	2,1	6,6	7,8	11,4	12,3	15,9	21,0	18,6	15,6	20,4	17,4	19,1	12,2
80-89	0,6	1,5	1,8	3,6	7,8	10,8	12,6	15,6	20,4	21,9	22,8	23,0	16,4
90-100	13,5	12,0	12,3	16,2	15,0	15,9	17,7	20,4	23,1	25,4	31,7	33,4	56,4
	100	100	100	100	100	100	100	100	100	100	100	100	100
Number of municipalities	334	334	334	334	334	334	334	334	334	334	334	335	335

Source: Authors' estimates from administrative data, Ministry of Education. Includes schools that receive public funds (municipal and voucher schools, represent 92% of total enrollment nationwide). Years shadowed are those included in our estimates.

Table 4

Summary statistics: mean and standard deviations

	2002			2004			2006			2009			Average 2002-2009		
Variable	**Mean**	**Sd.**	**N**	**Mean**	**Sd.**	**N**	**Mean**	**Sd.**	**N**	**Mean**	**Sd.**	**N**	**Mean**	**Sd.**	**N**
LFP	0.81	0.39	2166	0.65	0.48	2388	0.72	0.45	2296	0.68	0.47	1950	0.71	0.45	8800
Wage ($/hour)	1344	1418	1093	1339	1343	1093	1771	4604	1062	1506	1928	940	1487	2689	4188
Weekly hours worked	44.10	13.22	1511	43.74	14.11	1276	42.30	14.11	1317	41.55	13.27	1083	43.02	13.72	5187
Contractual status	0.82	0.38	1320	0.81	0.40	1069	0.80	0.40	1106	0.81	0.39	929	0.81	0.39	4424
Job is Permanent	0.82	0.38	1512	0.75	0.43	1284	0.75	0.43	1354	0.78	0.41	1128	0.78	0.42	5278
Union	0.15	0.35	1509	0.11	0.32	1281	0.15	0.36	1349	0.16	0.36	1110	0.14	0.35	5249
Public sector	0.18	0.38	1512	0.14	0.35	1284	0.16	0.37	1354	0.16	0.37	1128	0.16	0.37	5278
Self-employed/Employer	0.17	0.38	1512	0.16	0.36	1284	0.21	0.41	1354	0.17	0.38	1128	0.18	0.38	5278
Small firm (≤ 9 empl.)	0.46	0.50	1496	0.43	0.50	1269	0.42	0.49	1268	0.40	0.49	990	0.43	0.50	5023
Medium firm (10-199 empl.)	0.44	0.50	1496	0.36	0.48	1269	0.39	0.49	1268	0.34	0.48	990	0.39	0.49	5023
Large firm (≥ 200 empl.)	0.32	0.47	1496	0.24	0.43	1269	0.26	0.44	1268	0.27	0.44	990	0.28	0.45	5023
Share of FDS schools in Mun.	0.42	0.19	2166	0.55	0.19	2388	0.65	0.16	2296	0.76	0.16	1950	0.59	0.21	8800
Years of schooling	10.90	3.44	2166	10.49	3.43	2383	10.79	3.41	2277	11.02	3.16	1930	10.78	3.38	8756
Female head of HH.	0.24	0.43	2149	0.23	0.42	2357	0.29	0.45	2266	0.35	0.48	1914	0.27	0.45	8686
Age	36.87	6.37	2166	37.59	6.65	2388	37.80	6.64	2296	38.36	6.56	1950	37.64	6.58	8800
Average school attainment	10.05	1.29	2105	10.03	1.25	2373	10.00	1.22	2296	10.12	1.14	1950	10.05	1.23	8724
Average female LFP	0.73	0.04	2105	0.73	0.04	2373	0.73	0.04	2296	0.70	0.05	1950	0.72	0.05	8724
Average male LFP	0.41	0.07	2105	0.42	0.07	2373	0.43	0.08	2296	0.41	0.07	1950	0.42	0.07	8724
Poverty rate	0.19	0.08	2105	0.17	0.07	2373	0.14	0.06	2296	0.16	0.07	1950	0.16	0.07	8724
Unemployment rate	0.10	0.03	2105	0.09	0.02	2373	0.07	0.02	2296	0.11	0.03	1950	0.09	0.03	8724
Ave. income p.c. (1000s)	124.2	61.5	2105	130.8	59.3	2373	151.5	72.1	2296	176.4	87.1	1950	144.8	72.9	8724

Source: EPS panel (2002-2009), CASEN surveys, and administrative data from the Ministry of Education. Sample includes women aged 25 to 55, who had school aged children when they were surveyed. Share of FDS schools at municipality level is the fraction of schools with 50 percent of their grade levels under the FDS regime. Average exchange rate during period: 597 CLP/US$1. See Appendix 1 for the definition of each variable.

Table 5
Summary statistics: Cross tabulations of Job´s Quality variables (2002-2009)

	Contract Status			Type of Job			Union		
Variables	**No**	**Yes**		**Temp.**	**Perm.**		**No**	**Yes**	
Wages	1105.5	1578.9	***	1090.2	1570.2	***	1422.2	1838.2	***
Hours	37.30	44.66	***	38.97	44.14	***	42.78	44.52	***
Permanent	0.594	0.836	***				0.749	0.950	***
Contract				0.634	0.858	***	0.778	0.986	***

	Public Sector			Employer		
Variables	**No**	**Yes**		**No**	**Yes**	
Wages	1395.2	1922.6	***	1499.0	1450.3	
Hours	43.28	41.60	***	43.23	41.95	**
Permanent	0.758	0.876	***	0.787	0.731	***
Contract	0.781	0.941	***	0.819	0.595	***
Union	0.097	0.386	***	0.162	0.057	***

	Small Firm			Medium Firm			Large Firm		
Variables	**No**	**Yes**		**No**	**Yes**		**No**	**Yes**	
Wages	1766.3	1125.1	***	1388.5	1663.5	***	1389.2	1757.3	***
Hours	44.22	41.66	***	42.59	43.97	***	42.58	44.58	***
Permanent	0.786	0.779		0.787	0.775		0.771	0.814	***
Contract	0.929	0.598	***	0.737	0.909	***	0.748	0.953	***
Union	0.227	0.034	***	0.140	0.151		0.079	0.314	***

Women aged 25 to 55, who had school aged children when they were surveyed. *** , ** , * reflect statistical significance at 1%, 5% and 10% levels, respectively.

Table 6
Effect of Full-Day Schooling at the Municipal level on LFP and Job´s Quality

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
VARIABLES											

Table 8
Effect of Full-Day Schooling at the Municipal level on LFP and Job´s Quality

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
VARIABLES	LFP	Wage	Hours	Contract	Perma-nent	Union	Public Sector	Self-Emp. Employer	Small Firm	Medium Firm	Large Firm
Share of FDS schools in Municipality	0.225**	0.167	-11.755**	-0.128	0.009	-0.190	0.042	0.197*	0.157	-0.226	-0.126
	(0.112)	(0.264)	(5.641)	(0.141)	(0.136)	(0.149)	(0.130)	(0.113)	(0.155)	(0.206)	(0.146)
Share of FDS * Born after 1969	-0.091	0.249	22.544***	0.345*	0.108	0.468***	-0.152	-0.149	-0.659***	0.585*	0.032
	(0.204)	(0.411)	(7.931)	(0.199)	(0.245)	(0.174)	(0.168)	(0.215)	(0.251)	(0.337)	(0.253)
Observations	8,450	4,036	4,994	4,267	5,082	5,056	5,082	5,082	4,836	4,836	4,836
R-squared	0.095	0.211	0.122	0.150	0.132	0.127	0.124	0.125	0.128	0.139	0.116
Num. of women in panel	3,765	2,342	2,701	2,361	2,731	2,722	2,731	2,731	2,651	2,651	2,651
Mean-Dep. Var.: Born before 1969	0.704	6.998	43.20	0.790	0.789	0.148	0.188	0.197	0.453	0.372	0.278
Mean-Dep. Var.: Born after 1969	0.730	6.970	42.83	0.834	0.769	0.139	0.127	0.152	0.400	0.404	0.282
Joint significance test (p-value)	0.0969	0.225	0.0194	0.222	0.792	0.0167	0.638	0.222	0.0292	0.213	0.663

*Data from EPS survey, years 2002, 2004, 2006 and 2009. Women aged 25 to 55, who had school aged children when they were surveyed. Share of FDS schools is the fraction of schools with 50 percent of their grade levels under the FDS regime. Robust standard errors, clustered at the municipal level, in parentheses. *** , ** , * reflect statistical significance at 1%, 5% and 10% levels, respectively. Not shown: individual characteristics (yrs. schooling, head of the household, age, and age squared), municipality characteristics (educational attainment, male LFP rate, female LFP rate, extreme poverty rate, poverty rate, unemployment rate, and average household income per capita), region-year fixed effects, municipality fixed effects, interactions between a categorical variable for municipal female labor force participation rate in 2000 and year fixed effects, and individual fixed effects.*

Appendix 1: Variables definition

1. *Labor force participation*: Se define a partir de la historia laboral del individuo, tomando valor 1 si la persona trabajó o buscó trabajo alguna vez en el año y 0 si no trabajó ni buscó trabajo alguna vez durante el año

2. *Wages*: corresponde al salario por hora del individuo. La variable de ingreso mensual promedio del último periodo (último mes en el caso de la EPS 2002 y último año en el caso de la EPS 2004, 2006 y 2009) está ajustada a pesos reales del 2009 y divido por las horas semanales promedio que el individuo trabaja durante el mismo periodo. Para efectos de las estimaciones se consideró esta variable de forma logarítmica.

3. *Hours worked*: corresponden al promedio de las horas semanales trabajadas por el individuo durante el año.

4. *Contract*: variable dicotómica que toma valor 1 cuando el individuo trabajó alguna vez bajo contrato durante el año y 0 si no lo hizo en ningún momento.

5. *Permanent*: variable dicotómica construida a partir de diferentes arreglos contractuales. Toma valor 1 si el individuo tuvo contrato de tipo permanente en algún momento del año y 0 si el individuo trabajó de manera temporal, a plazo fijo, por tarea o servicio o algún otro tipo de relación contractual no permanente.

6. *Union*: variable dicotómica que indica si el individuo estuvo afiliado a un sindicato alguna vez en el año. Toma valor 1 si el individuo perteneció a un sindicato y 0 si no lo hizo.

7. *Self-employed/employer*: variable dicotómica construida a partir de una pregunta de ocupación del entrevistado. Esta variable toma valor 1 si el individuo trabajó por cuenta propia, como patrón o como empleador alguna vez en el año y 0 si no lo hizo.

8. *Public sector*: variable dicotómica construida a partir de una pregunta de ocupación del entrevistado. Esta variable toma valor 1 si el individuo trabajó en el sector público alguna vez en el año y 0 si no lo hizo.

9. *Small firm*: variable dicotómica que indica si el individuo trabajó alguna vez durante el año en una empresa pequeña, tomando valor 1 si el individuo lo hizo alguna vez y 0 si no. Para estos efectos consideramos como empresa pequeña a aquella que tiene entre 1 y 9 trabajadores, según el reporte del entrevistado.

10. *Medium firm*: variable dicotómica que indica si el individuo trabajó alguna vez durante el año en una empresa mediana, tomando valor 1 si el individuo lo hizo alguna vez y 0 si no. Para estos efectos consideramos como empresa mediana a aquella que tiene entre 10 y 199 trabajadores, según el reporte del entrevistado.

11. *Large firm*: variable dicotómica que indica si el individuo trabajó alguna vez durante el año en una empresa grande, tomando valor 1 si el individuo lo hizo alguna vez y 0 si no.

Para estos efectos consideramos como empresa grande a aquella con más de 200 trabajadores, según el reporte del entrevistado.

12. *Share of FDS schools in Municipality*: indica la cantidad de colegios con al menos el 50% de sus niveles de enseñanza básica en régimen JEC con respecto a la oferta total de colegios con enseñanza básica de la comuna. Corresponde a una variable de proporción que toma valores entre 0 y 1 según la fracción de colegios en JEC.

13. *Años de escolaridad*: variable discreta que indica los años de educación cursados reportados por el individuo.

14. *Mujer es jefe de hogar*: variable dicotómica que indica si la mujer es jefe del hogar en su núcleo familiar o no. Toma valor 1 cuando la mujer es jefe de hogar y 0 si no lo es.

15. *Age*: edad reportada por el individuo en el momento en el que se le entrevista.

16. *Escolaridad promedio del municipio*: variable continua que indica el nivel de escolaridad (años de educación) promedio de la comuna.

17. *Participación laboral masculina promedio del municipio*: variable de proporción que indica la tasa de participación laboral masculina promedio del municipio. Es decir, la cantidad de hombres que trabajan o buscan trabajo con respecto al total de hombres de la comuna.

18. *Participación laboral femenina promedio del municipio*: variable de proporción que indica la tasa de participación laboral femenina promedio del municipio. Es decir, la cantidad de mujeres que trabajan o buscan trabajo con respecto al total de mujeres de la comuna.

19. *Tasa de pobreza del municipio*: variable de proporción que señala la tasa de pobreza promedio de la comuna. Es decir, la cantidad de pobres con respecto al total de habitantes de la comuna.

20. *Tasa de desempleo de la comuna*: variable de proporción que señala la tasa de desocupación promedio de la comuna.

21. *Ingreso autónomo del hogar per cápita del municipio*: Variable continua que indica el ingreso autónomo del hogar per cápita del municipio. Donde el ingreso autónomo incluye ingresos por concepto de sueldos y salarios, ganancias provenientes del trabajo independiente, auto-provisión de bienes producidos por el hogar, bonificaciones, gratificaciones, rentas, intereses, así como jubilaciones, pensiones, montepíos y transferencias entre privados.