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Longer school schedules, childcare  
and the quality of mothers' employment:  
Evidence from School Reform in Chile

Matias Berthelon  
Diana Kruger  
Catalina Lauer  
Luca Tiberti  
Carlos Zamora

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# Longer school schedules, childcare and the quality of mothers' employment: Evidence from School Reform in Chile

## Abstract

Ample empirical evidence has shown that access to childcare for preschool children increases mothers' labor-force participation and employment. By estimating the causal effect of a school schedule reform in Chile, we investigated whether increased childcare for primary school children improved the quality of the jobs that mothers found. Combining plausibly exogenous temporal and spatial variations in school schedules with a panel of mothers' employment between 2002 and 2015, we estimated a fixed-effects model that controlled for unobserved heterogeneity. We found a positive effect of access to full-day schools on several measures of the quality of mothers' jobs, which were correlated to working full-time. We also found small, positive effects on the quality of fathers' jobs. Our evidence suggests that the mechanism driving the effect was the effect of the reform's implicit subsidy to the cost of childcare on the opportunity cost of mothers' time. We also found that less-educated mothers benefited most from the reform. Childcare can increase household welfare by improving parents' jobs and, thus, can play a role in reducing inequality.

**JEL:** H41, H52, I25, I28, J13, J16, J18, J22, O15.

**Keywords:** Employment quality; job quality; women's labor-force participation; women's labor supply; full-day schooling; childcare; education reform; Chile.

## Authors

### Matias Berthelon

Universidad Adolfo Ibáñez and  
COES, Viña del Mar, Chile  
[matias.berthelon@uai.cl](mailto:matias.berthelon@uai.cl)

### Diana Kruger

Universidad Adolfo Ibáñez, IZA  
and COES, Viña del Mar, Chile  
[diana.kruger@uai.cl](mailto:diana.kruger@uai.cl)

### Catalina Lauer

Universidad Adolfo Ibáñez,  
Viña del Mar, Chile  
[catalinalauer@gmail.com](mailto:catalinalauer@gmail.com)

### Luca Tiberi

Laval University and  
Partnership for Economic Policy  
(PEP), Quebec, Canada,  
[luca.fiberti@ecn.ulaval.ca](mailto:luca.fiberti@ecn.ulaval.ca)

### Carlos Zamora

Ministry of Finance,  
Santiago, Chile  
[czamora@hacienda.gov.cl](mailto:czamora@hacienda.gov.cl)

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## I. Introduction

Women's participation in the labor force and their job quality play an important role in household well-being and poverty reduction. Recent reductions in poverty and income inequality in Latin America were positively affected by increases in women's income and labor-force participation (LFP) (World Bank, 2012). If women's employment is relevant to household welfare and women's empowerment (Heath & Jayachandran, 2017), then public policies that foster women's employment are relevant to economic development.

One of the most relevant factors that determine women's employment decisions is motherhood because the time-intensive nature of childrearing often causes mothers to delay entry to or exit from the labor force. Recent empirical studies have shown that a "motherhood penalty" exists when mothers who exit the labor market are temporarily unable to catch up to the earned wages of women who were never mothers or never exited the market during their employment life (Kleven, Landais & Egholt Sogaard, 2018).

Public policies that help reconcile work and family life can have a positive impact on mothers' employment. Flexible work schedules, for instance, can facilitate mothers' entry or re-entry into the labor market after child birth (Chioda, 2016; Del Boca, 2002), while lack of such policies explains almost 30% of the decrease in U.S. women's labor-force participation in the last 25 years (Blau & Kahn, 2013).

Another policy is childcare. Considerable literature exists that documents the positive relationship between access to childcare and mothers' participation in the labor market.<sup>1</sup> Expansion of daycare or preschool centers for children from birth to 4 has led to increased maternal employment (Berlinski & Galiani, 2007; Berlinski, Galiani & McEwan, 2011; Baker,

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<sup>1</sup> For instance, Gelbach (2002), Cascio (2009), and Fitzpatrick (2012) found that greater access to public kindergarten in the United States led to an increase in the labor supply of mothers, and Barua (2014) found that these effects could be long-lasting. In developing countries, findings have been similar: Berlinski & Galiani (2007) and Berlinski, Galiani, and McEwan (2011) found that in Argentina, the construction of pre-school centers led to increased maternal workforce participation and hours worked. Similarly, Calderón (2014) found that, in Mexico, a large expansion of pre-school centers increased the probability that mothers of pre-school children were employed. Positive effects of childcare on mothers' employment outcomes were also found in Germany, France, and China (Bauernschuster & Schlotter, 2015; Givord & Marbot, 2015; Li, 2017, respectively). In contrast to other countries, the effects of a national and rapid expansion of pre-school centers in Chile, which began in 2006, have had unclear effects on mothers' labor-force participation and employment. Aguirre (2011), Medrano (2009), and Encina & Martínez (2009) found no effects while Contreras & Sepulveda (2016) found that the policy had a positive effect). These contradictory findings for Chile could be the result of the quality of childcare services (Bassi & Urzúa, 2010).

Gruber & Milligan, 2008; Lefebvre & Merrigan, 2008; Schlosser, 2011; Brilli, Del Boca & Pronzato, 2016), as has access to kindergarten (Gelbach, 2002; Cascio, 2009; Fitzpatrick, 2012; Sall, 2014; and Cannon, Jackowitz & Painter, 2006). More recent studies have analyzed the role of childcare for older, school-aged children on mothers' labor-market outcomes. After-school programs, school-extension policies, and lowering school entry age have been found to affect mothers' employment and labor supply positively (Felfe, Lechner & Thiemann, 2016; Martínez & Peticar, 2017; Padilla-Romo & Cabrera-Hernández, 2019; Contreras & Sepulveda, 2016; Finseraas, Hardoy & Schøne, 2017; Berthelon, Kruger & Oyarzún, 2015), while shorter school schedules have reduced mothers' labor-market participation (Takaku, 2019). Finally, the positive effects of childcare on mothers' labor-force participation have been found to be long-lasting (Barua, 2014).

Recent policy discussions have recognized that individual well-being depends not only upon having a job, but upon the quality of employment (Cazes, Hijzen & Saint-Martin, 2015), especially in less developed countries. Though research into employment equality and well-being has been widely recognized as desirable, relatively little work has been done to determine the impact of public policies on the quality of jobs. Part of the reason has been the large conceptual debate concerning measurement of job quality, and consensus on measurement has only recently begun to appear. In this paper, we have followed the framework of Cazes, Hijzen & Saint-Martin (2015), who proposed that job quality consists of earnings quality and labor-market security.<sup>2</sup> According to Chilean national household surveys, approximately 66% of women participated in the labor force and 62% were employed in 2015. Mothers in Chile were about 15% less likely to be employed than non-mothers, however, and mothers worked fewer hours per week and had worse employment terms: they earned slightly lower wages than non-mothers and were less likely both to hold jobs with contracts and to have permanent jobs.

We extended previous research on the effect of access to childcare and analyzed whether that access facilitated mothers' entry into better-quality jobs. To the best of our knowledge, no previous studies on the impact of childcare have analyzed labor-market security or other dimensions of quality of employment (other than wages). As such, this

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<sup>2</sup> Cazes, Hijzen & Saint-Martin (2015) also proposed a third dimension—quality of working environment. Because of data limitations, however, we were not able to construct measures of this dimension.

study contributes to the growing literature and debate regarding policies that affect job quality and decent work (Findlay, Kalleberg & Warhurst, 2013; International Labour Office, 1999) and to the literature regarding motherhood and employment (Kleven, Landais & Egholt Sogaard, 2018).

In Chile, mothers of young children cite lack of formal or informal childcare as the second most important reason for not working (Table 1). Beginning in 1997, a nationwide school-schedule-extension policy was gradually implemented to improve school quality and learning; however, because school-age children were kept on school grounds for longer hours, the policy also provided them with childcare. We explored the quasi-experimental nature of the policy implementation to analyze the impact of childcare on the quality of mothers' jobs.

Using a longitudinal dataset that contained rich information on employment characteristics, we constructed several variables using measures of dimensions of work quality and employment conditions that are standard in the literature (United Nations Economic Commission for Europe, 2010; Muñoz de Bustillo et al., 2011). Combining plausibly exogenous changes in access to extended school schedules with a panel dataset of about 2,300 mothers, we estimated a fixed-effects model that controlled for individuals' unobserved heterogeneity, which was arguably an important determinant in employment decisions. We found that greater access to childcare for school-aged children had significant and positive effects on the quality of mothers' jobs. Our results suggest that an increase in full-day school (hereafter, FDS) coverage of twenty-four percentage points—the equivalent of extending FDS coverage to all schools from observed 2015 levels—would lead to an increase in wages of 5%, would increase the likelihood of full-time employment by 7.7%, and would increase mothers' chances of being employed with a contract by 7%. We were able to confirm the positive effects of the policy on mothers' labor-force participation, employment, and hours worked) that previous research has found regarding Chile,<sup>3</sup> and found small, positive effects on the quality of fathers' jobs.<sup>4</sup> Most of the

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<sup>3</sup> Previous studies on the effects of the FDS reform on participation and employment decisions include Hernando (2009), Contreras and Sepulveda (2016), and Berthelon, Kruger & Oyarzún (2015).

<sup>4</sup> A related literature dealing with the effects of family-friendly policies or contracts involving fathers (e.g., paternal leaves or parental leaves imposing "daddy" quotas) has provided mixed results. While Patnaik (in press) showed that reserving some father quotas in parental leaves increased mothers' time in paid work as well

beneficial effects of the policy on job quality were concentrated among lower-educated mothers and those living with a partner. These heterogeneous results have clear socioeconomic and policy implications. Furthermore, we found no evidence of greater educational investment by mothers as a result of the policy, suggesting that the policy's driving mechanism is its effect on the shadow price of childcare and the opportunity cost of mothers' working time. Our results were robust to possible confounding effects such as the (almost) simultaneous expansion of public access to childcare for preschool children, pre-existing trends in women's employment rates, and other socioeconomic characteristics at the municipal level that may have been correlated with the variation in job quality and FDS. Our findings were also robust to potential omitted-variable bias.

In general, few studies have analyzed the effect of public policies on job quality.<sup>5</sup> Our findings may provide important policy lessons for other countries that are considering or are in the process of implementing similar policies. In recent years, countries such as Colombia, Brazil, Uruguay, Peru, and Germany have implemented policies that increased school hours in at least some schools while, in the states of Colorado, New Mexico, Oregon, and Wyoming (among others in the United States) have reduced the total time that children spend in school (Anderson & Walker, 2015).

This paper is organized as follows: the next section provides a description of the Chilean school system and the FDS reform, implemented since 1997. We discuss our identification strategy and the empirical model in Section 3, followed by a section describing our data and variables. Section 5 presents our results and Section 6 concludes.

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as their likelihood of being in full-time jobs, Rege and Solli (2013) found no effects of paternal leaves on mothers' labor supply. Cools, Fiva & Kirkebøen (2015), meanwhile, found some evidence that women's labor supply decreased when their spouses took paternity leave.

<sup>5</sup> An exception is unemployment insurance, which has different effects depending upon context. Van Ours & Vodopivec (2008) found no effects of reductions in unemployment insurance on salary, type of job contract, and probability of job loss in Slovenia, but Nekoei, Arash & Weber (2017) reported that greater unemployment-insurance benefits led to better firm quality and higher wages in Austria.



## II. Institutional Framework

### 2.1 The Chilean School System

During our period of analysis, three types of schools existed in the general education system in Chile,<sup>6</sup> based on school's' ability to select students and their funding schemes: (i) public schools—administered at the municipal level and funded by a per-student subsidy from the central government and from (optional) resources allocated by each municipality; (ii) *private subsidized (or voucher) schools*, which were privately owned, for-profit organizations that received the same per-student subsidy from the central government, but which could charge their students additional fees;<sup>7</sup> and (iii) *private schools* that did not receive public funding and were allowed to set fees . Private and private subsidized schools can select their students, but public (municipal) schools cannot.<sup>8</sup>

Chile's education system is also characterized by family school choice, referred to as "open enrollment" in other countries. Families are not restricted to a specific geographic location or district in choosing publicly-funded schools because the per-student subsidy available to schools is independent of a family's residence. Families can enroll their children in the school of their choice, according to their preferences and financial capacity. Even though school choice is not legally bound to place of residence, empirical evidence has revealed that school proximity is an important determinant in parents' choice of school, particularly for children of primary-school age (Chumacero, Gómez & Paredes, 2011).

### 2.2 The Full-Day School Reform

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<sup>6</sup> Chilean education consists of three cycles: pre-school (pre-kindergarten and kindergarten), general education (primary education, eight years and secondary education, four years), and higher education (universities and technical institutes). Only general education is mandatory, and the government has the mandate to offer public education from grades 1 through 12 for all. The government also provides subsidized pre-school and university enrollment to low-income families. We limited our description to general education.

<sup>7</sup> Fee charged to students are regulated, and the government's per-student subsidy is reduced as private fees increase.

<sup>8</sup> Recent reforms that began in 2018 will gradually change the funding scheme by 2020 and will mostly affect public subsidized (voucher) schools. As of 2018, schools that received public funds could not charge additional fees or select students. Schools that wished to continue to charge fees and select students began to operate as private schools and did not receive public funds. This reform occurred after our period of analysis.

In 1997, Chile initiated large-scale educational reform that included an increase in instructional time without extending the academic year. The reform increased daily school schedules and came to be known as the Full-Day School (hereafter, FDS) reform.<sup>9</sup> FDS mandated that all primary and secondary schools that received public funds—whether public or privately subsidized—had to offer a full-day program by 2007 and 2010, respectively; the change to full-day schedules was to be implemented gradually within a school.<sup>10</sup> In primary schools—the focus of this paper—daily time spent at school increased by about 1.5 to 2 hours, which represented an increase of approximately 35%.<sup>11</sup> Full-day first and second grade were not mandatory, yet the majority of schools offered full-days at these levels. The law did not apply to (fully) private schools, so we excluded them from our analysis.<sup>12</sup> By increasing the time that children spent in school and under adult supervision, the FDS policy was an implicit childcare subsidy for school-aged children, which might reasonably be assumed to have had an impact of mothers' employment outcomes. This is a reasonable hypothesis because mothers of young children in Chile cite lack of childcare arrangements as one of the main reasons for not working or seeking employment (Table 1).

The law set a deadline for FDS implementation, and each school principal was able to decide the timing of entry into the full-day regime in a decentralized manner. In Chile, school districts are defined at the municipal level but, while public schools are under the oversight of municipal authorities, principals in the public system have gained increasing levels of autonomy (Núñez, Weinstein & Muñoz, 2010) In the private subsidized system,

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<sup>9</sup> The reform is referred to as JEC in Chile, the Spanish acronym of its official name, *Jornada Escolar Completa*, approved as law No.19,532.

<sup>10</sup> Schools that switched to the FDS schedule did not have to change all grade levels at the same time. However, if a grade level did become full-day, all classrooms within that grade level had to adopt the FDS program. Additionally, all publicly funded schools created after 1997 had to initiate operations as full-day schools.

<sup>11</sup> For most schools this meant changing from a system of half-day shifts to one continuous full-day schedule. A typical half-day schedule was from 8:00 a.m. until 1:30 p.m., while a typical full-day schedule ran from 8:00 a.m. until 3:30 p.m. In Chile, the Ministry of Education requires that schools comply with a minimum number of pedagogical hours per subject, which allows schools to determine their daily schedules independently and in flexible ways so they can fulfill this requirement. We had no systematic information regarding actual school schedules (opening and closing times).

<sup>12</sup> During the period of analysis, less than 8% of primary-school enrollment in Chile was in fully private schools (see Figure 1b). Additionally, we excluded private schools from the analysis because we lacked systematic information regarding their schedules.

most schools operate without coordinating with each other (Elacqua et al., 2011).

In order to implement longer schedules, schools that followed the FDS regime received funds from the Ministry of Education (MINEDUC) to cover additional costs. The per-student subsidy was 40% higher for students in full-day schools, and schools could apply for infrastructure funds from MINEDUC to finance construction of new buildings. When faced with excess demand for infrastructure funds, MINEDUC prioritized schools according to several criteria, one of which was the socioeconomic or educational vulnerability of the school's students.<sup>1314</sup> In Section 3 below, we discuss the role of this feature of the policy in our identification strategy.

Figure 1 reveals the gradual trend towards FDS for primary-school enrollment. Only after nine years did enrollment in FDS surpass enrollment in half-day school schedules and, by 2015—eighteen years after the reform was implemented—FDS coverage had reached only 68% of total primary-school enrollment. In the first two years of the reform, schools with excess capacity (mostly in rural areas) entered the program because the cost to switch was relatively low; in subsequent years, schools entered the program gradually. By the first year of our analysis, just over 50% of primary schools had moved to full-day schedules. The implementation of the policy took place in a context in which the relative share of enrolment in publicly funded schools had not changed significantly over time. On average, 92.6% of children attended publicly funded schools between 1990 and 2015.

As a result of the decentralized nature of decisions by school principals, the FDS program was taken up at different rates across Chilean administrative regions and municipalities (see Section 3). Table 2 reports the average share of primary schools that were under a full-day regime in Chile's administrative regions. Several features of the policy immediately stand out. First, there was a sustained increase in full-day school coverage in

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<sup>13</sup> Through the law, the Ministry of Education grants schools authorization to operate under the full-day regime and also, through special competitive programs, provides 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 may use one or more of the following four selection criteria: a) socioeconomic or educational vulnerability of the school's students; b) 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 funding that would be covered by the school's own administration.

<sup>14</sup> To our knowledge there are no publicly available data regarding schools' application for permits and/or funds. There is also no public information on the decision-making process regarding the allocation of funds by the Ministry.

all regions. Second, there has been significant variability in reform take-up across regions. Third, there is an inverse relationship between enrollment and FDS implementation. The Metropolitan Region (XIII Region), where Santiago is located, was home to 36% of Chilean primary-school students in 1997, yet reform was slowest there—with 56% take-up—mainly because schools in this predominantly urban area faced space constraints or higher costs of expansion of their infrastructures. The fastest implementation occurred in less-populated regions with a larger share of rural areas and smaller urban centers.

Given that there are 334 municipalities in Chile, in Table 3 and Figure 2 we report the fraction of all municipalities that fall within different ranges of FDS implementation. As expected, we observed an increase over time in the share of municipalities that reached high levels of coverage and a decrease in the number of municipalities with low coverage. More importantly for our empirical strategy, it became clear that wide variation in FDS implementation existed in any given year, particularly for the years in which we computed our estimates. This can also be seen in Figure 3, which presents a map of the depth of FDS implementation across municipalities in 2002, 2004, 2006, 2009, and 2015 (the years in which our labor-market data were available). These descriptions revealed that phase-in of the reform varied significantly in both time and place. Our empirical strategy took advantage of the quasi-experimental nature of implementation of the reform.

### **III. Identification Strategy and Estimation**

We estimated a reduced-form, panel-data model of mothers' labor-force participation and employment outcomes, controlling for individual fixed effects. The fixed effect allowed us to control for time-invariant, individual characteristics, including unobservable traits that may jointly have affected women's employment, fertility preferences, choice of residency, and choice of school. In our fixed-effects model, therefore, the effect of access to longer school schedules on job quality was identified through exogenous, within-individual changes in FDS access, under the assumption that preferences did not change over time. This assumption may not be true, and thus we attempted to control for changes in fertility preferences with variables that captured

household composition and by restricting these variables to women who did not migrate.

Identification in our model depended upon the quasi-experimental nature of policy implementation—i.e., that FDS implementation was not correlated to women’s employment outcomes. As indicated previously, given the dynamics of the Chilean school system—which is the result of the aggregation of highly independent school decisions—we believed this assumption was reasonable. Additionally, Berthelon, Kruger & Oyarzún (2015) showed that no evidence existed that FDS had been implemented in response to changes in local labor markets for women. Finally, our estimations controlled for pre-existing trends in women’s employment rates and for other municipal socioeconomic characteristics that could potentially have affected mothers’ labor outcomes.

To estimate the effect of the FDS policy, we restricted our sample to women who were potentially affected and who did not change their municipality of residence. Thus, our sample was composed of mothers whose youngest child was of primary-school age in any of the survey round because they were concerned about childcare (see Table 1). Women in our sample were not necessarily affected by the FDS policy in every year they were surveyed—for instance, when a mother had a preschooler in one survey round but the child moved into primary school in the following round. Therefore, in order to identify the effect of FDS access on mothers’ employment outcomes precisely, we interacted FDS availability in a given year with a dummy variable that equaled one if a mother’s youngest child was of primary-school age that year.

We estimated the following empirical model:

$$Q_{imrt} = \theta FDS_{mrt} + \gamma(FDS_{mrt} \times PSAge_{imrt}) + X_{imrt}\beta + M_{mt}\mu + \alpha_i + \tau_{rt} + \delta_t D_{mr} + \epsilon_{imrt} \quad (1)$$

where the dependent variable  $Q_{imrt}$  represented an indicator of labor-force participation or job quality (variables are described below in section 4) for woman  $i$  living in municipality  $m$  and region  $r$  in year  $t$ . The policy variable of interest,  $FDS_{mrt}$ , measured the share of full-day primary schools in municipality  $m$  and region  $r$  in year  $t$ .<sup>15</sup>  $PSAge_{imrt}$  was a dummy

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<sup>15</sup> Our data also allowed us to measure total enrollment under the FDS program. However, we believe that parental’ choice was affected by the availability of FDS rather than by aggregated municipality enrollment because parents observed the proximity of an FDS but not aggregated enrollment. Nonetheless, we also estimated our models with an FDS measure that used total enrollment at the municipal level. The results were similar to the ones reported here and are available upon request.

variable that equaled 1 if the youngest child was of primary-school age (6-13 years) in year  $t$ , and 0 if younger than 6 (we excluded mothers whose youngest child was older than 13). The effect of the FDS policy was  $\theta$  when the youngest child was in preschool (aged 0-5 years) and  $\theta + \gamma$  when the youngest child was in primary school. If the channel through which the policy affects mothers' employment was an implicit childcare subsidy for primary school children, then we would have expected that FDS access would not affect mothers before their child was in primary school, i.e.,  $\theta = 0$ . Our parameter of interest was  $\gamma$ , as it captured the marginal effect of the policy on mothers when they were most affected by the policy; we reported this estimate in our results. Identification in Equation 1 came from the interaction of exogenous variation in municipal FDS availability and exogenous timing of the age of a mother's youngest child, which determined the timing of policy exposure.<sup>16</sup> Because we did not know whether mother  $i$ 's child attended a school offering FDS,  $\gamma$  could be interpreted as an intention-to-treat (ITT) effect. For this reason, the estimates shown below actually represent a lower bound of the effect of the treatment on the treated (impact of having a child attending a full-day school with respect to having a child in a half-day primary school).

We also controlled for time-varying individual characteristics in vector  $X_{imrt}$  and for municipality-level characteristics, including time-varying labor market conditions, in vector  $M_{mrt}$ . We included an individual-level fixed effect,  $\alpha_i$ , which allowed us to control for individual unobserved heterogeneity and region-time fixed effects,  $\tau_{rt}$ , to control for regional trends.

Another concern was the possibility that FDS was more quickly implemented in municipalities with higher labor-force participation. Therefore, we controlled for pre-existing trends in the labor market by interacting year fixed effects ( $\delta_t$ ) with a dummy variable that defined a municipality as "low" LFP if its LFP rate in 2000 was below the median ( $D_{mr}$ ). These interaction terms cleansed the estimated FDS effect of any differences in trends in labor-force participation by women that may have been in place before the first EPS survey (2002). Finally,  $\epsilon_{imrt}$  was an idiosyncratic error term.

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<sup>16</sup> A possible threat to this identification strategy would be increased fertility as a result of the policy. We estimated regressions of fertility on FDS access and individual and local characteristics and found no effect of the FDS policy on fertility. Results are available upon request to the authors.

## Threats to Identification

A first challenge to identification was associated with the possible confounding effect of the expansion, which began in 2006, of public access to childcare for preschool children. We addressed this concern by controlling for the presence of children of preschool age after 2005. A second possible threat was related to endogeneity issues underlying the choices of school and location. In the Chilean education system, parents are not geographically limited in their choice of school, so availability of FDS in the municipality of residence does not necessarily reflect parental choice. However, previous research in Chile has shown that most children of primary-school age attend schools in their municipality (Chumacero, Gómez & Paredes, 2011; Schneider, Elacqua & Buckley, 2006).<sup>17</sup> Furthermore, an aggregated measure of FDS access was exogenous to families' residence as long as families did not decide where to live based on access to FDS schools. Berthelon, Kruger & Oyarzún (2015) analyzed migration decisions by families and found that their choice of municipality of residence was uncorrelated with access to FDS schools. From their work, we concluded that the availability of FDS at the municipal level should be exogenous to family decisions related to municipality of residence. In our data, 79.2% of women with children of primary-school age did not change their municipality of residence during 2002-2015.<sup>18</sup>

Another concern regarding identification was the non-random nature of allocation of FDS funding and, more specifically, whether funding could be correlated with mothers' employment outcomes. As indicated above, schools that adopted the policy could apply for infrastructure funds, which were targeted to more vulnerable schools, potentially biasing the effects of FDS. For example, if mothers with children in schools with higher poverty levels participated less in the labor force, or if they had lower-quality jobs, then examining the effect of FDS policy might capture spurious correlations between mothers' employment and the policy. We addressed this possibility in several ways: first, we included a control for pre-existing trends in municipal labor-force participation rates for women and, second, we

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<sup>17</sup> In 2009, approximately 11% of 4th grade students went to school in a municipality different from their place of residence (statistics from the Chilean Agencia de Calidad de la Educación, <https://www.agenciaeducacion.cl/home>).

<sup>18</sup> Our results were robust to the inclusion of women that change municipality of residence, and they are available upon request.

included municipality characteristics—poverty rates, women’s participation rates, average income, etc.—as control variables in all regressions.<sup>19</sup> Furthermore, as discussed above, the decentralized nature of decisions in the Chilean school system made it likely that FDS funding decisions followed a quasi-experimental design.

A final concern was the eventual presence of omitted variables, which may have invalidated our estimations. To address this, we ran the test proposed by Oster (2019) to check whether the estimated causal effect of FDS reform on women’s labor-market outcomes were robust against omitted-variable bias.

## IV. Data and Variables

Our main source of information was Chile’s Social Protection Survey (hereafter, EPS for its Spanish acronym, Encuesta de Protección Social). The EPS was administered in several rounds (2002, 2004, 2006, 2009, and 2015) and collected detailed information regarding respondents’ current labor status and job characteristics as well as other socioeconomic variables of the respondent and household members.<sup>20</sup> From this data source, we obtained individual information for our dependent variables on labor supply and job quality ( $Q_{imt}$ ) and mothers’ socioeconomic characteristics ( $X_{imrt}$ ). From the EPS data, we were able to construct an unbalanced panel of about 2,049 women who were surveyed in at least two of the years in which the instrument was used. In terms of the structure of the panel, detailed information is provided in Appendix 1. Our panel included 654 women who appeared twice, 679 women who appeared three times, 586 women who appeared in all but one round, and 130 women who appeared all five times. The structure of our sample was determined by our selection criteria. Because our sample was composed of mothers with children of preschool or primary-school age, this criterion implied that, over time, as children aged and moved into high school, the women would exit our sample. In terms of

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<sup>19</sup> As a robustness check, we also estimated regressions controlling for municipality measures of job quality, and the main results did not change.

<sup>20</sup> Another round of the survey was conducted in 2012. The Ministry of Labor deemed it “incomplete,” however, and does not recommend its use. Therefore, we did not include it in our analysis (Ministerio del Trabajo y Previsión Social, 2015).



attrition, technical reports by the agency that collected the data suggested that attrition was not systematically correlated to observable characteristics (Ministerio del Trabajo, 2016). We also provide an analysis of attrition in Appendix 1.

In addition, Chile's National Household Surveys (CASENs) provided time-varying municipal-level variables (vectors  $M_{mrt}$  and  $D_{mr}$ ): average adult educational attainment; poverty rate; percentage of rural population; women's and men's labor-force-participation rates; and women's and men's employment rates.

## 4.1 Measures of Job Outcomes

We adopted several measures of job quality and formality that have been widely accepted in the literature: hourly wage (in logs);<sup>21</sup> categorical variables for whether the job was full-time; presence of a contract; whether the job was open-ended; whether the worker was self-employed or a business owner; whether the job was unionized; and categorical variables for size of the firm where the woman worked: small (fewer than ten employees), medium (10-199 employees), and large firms (200 or more employees).<sup>22</sup> We also constructed three measures of labor supply—participation, employment, and weekly hours worked—to compare our results to previous evaluations of the effects of the FDS reform on participation (Contreras & Sepulveda, 2016, and Berthelon, Kruger & Oyarzún, 2015, for example).

We included measures of women's individual characteristics that may have affected decisions to participate in the labor market as well as women's employment outcomes: years of education, age and age squared as proxies for experience, and family demographics (number of children of pre-school, primary, and secondary-school or university age). The individual fixed effects of our estimates controlled for time-invariant unobservable characteristics that could be related to work preferences, including women's decisions to enter the labor force, preferred jobs, or fertility decisions, if they did not change over time.

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<sup>21</sup> Hourly wages are expressed in Chilean pesos as of the 2015 value.

<sup>22</sup> Data on firm size were not available in ELPI 2015; therefore, estimates for these variables included data for the 2002-2009 period.

#### 4.1.1 Defining Full-Day School (FDS) Access

To construct a measure of FDS access at the municipal level, we used administrative data from the Ministry of Education.<sup>23</sup> As previously discussed, one feature of the FDS program was that it did not require implementation at all grade-levels simultaneously (or in any specific order). It only required that, if a school implemented FDS at a specific grade-level, all students in that grade-level had to be included. In this context, we defined a school as full-day if at least half of primary-school grade-levels at the school functioned as FDS (some schools did not offer all eight grade-levels). We then aggregated this information at the municipal level to construct the share of FDS in a municipality in a given year. Alternatively, we also constructed two additional measures of FDS access—one in which we defined a school as full-day if all of the primary-school grade-levels in the school functioned as FDS schools, and another that measured the fraction of enrolment at municipal level under FDS. The results reported below were robust to the use of these two alternative variables (they are available upon request).

Although full-day schedules are not mandatory for 1st and 2nd grade, we included them in our measure of access to FDS on the premise that parents chose a school that they expected their child would attend for several years. Furthermore because most primary school enrollment was in grades 3 through 8, access to FDS in 1st through 8th grades was strongly correlated with FDS access in 3rd through 8th grades (simple correlation = 0.99).<sup>24</sup>

#### 4.1.2 Sample Definition and Descriptive Statistics

We restricted our sample to women who were potentially affected by the FDS policy—i.e., mothers of preschool and primary school children—because they were concerned with childcare in those age groups (see Table 1). We defined the sample based on the age of the youngest child to reflect the household's demand for mothers' time in child-rearing. Though the FDS policy applies only to primary school students, we included

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<sup>23</sup> We obtained these data through the Open Data platform of the Ministry of Education website: <http://datosabiertos.mineduc.cl>.

<sup>24</sup> We would have liked to estimate regressions that tested whether mothers anticipated future levels of FDS coverage. However, in the first year of our data, the reform had already been in place for several years (average coverage was 42%), so that approach was not feasible. Contreras & Sepulveda (2016) were able to analyze this question given the nature of their data, and they found that women's employment decisions did not anticipate the reform.

mothers when their youngest child was aged 0 to 5 if she was surveyed when the child reached primary school. Our sample, therefore, included mothers whose youngest child was of primary-school age (between 6 and 13 years) in any of the survey years. We excluded from the panel women whose youngest child was aged 14 years or older when surveyed because, at this age, childcare was no longer a concern. We also excluded women who were never mothers during the survey period. We were able to observe women's trajectories in the labor market over (up to) a 14-year period. Thus, women in our sample were not necessarily affected by the FDS policy in every year they were surveyed; for instance, before their youngest child was of school age (younger than 6) or after the youngest child was in secondary school (older than 13).

Table 4 reports summary statistics for all variables in our sample, for each year, and for the period's average. Approximately 74% of mothers participated in the labor force during the period; 63% were employed, and they worked an average of 26.8 hours per week.<sup>25</sup> It is interesting to point out that, even though in 2005 the legal working week was reduced from forty-eight to forty-four hours, the average number of hours worked increased between 2004 and 2006. This was consistent with a larger fraction of women working in full-time jobs and may be due to increased access to full-day schools. About 54% of mothers had full-time employment, 44% had a formal contractual arrangement; 50% had a permanent job (either with or without contract), 12% were self-employed or owned their business, and 10% belonged to a union. Lastly, over the whole period, 25% of women reported having worked in a small firm, 23% in medium-size firms, and 17% in large firms. Some of the differences between 2002 and later years were the result of the sample framework of the ELPI in 2002. In that year, the survey was designed to be representative of the population that contributed to the country's pension system. Later rounds of the survey were designed to be representative of the whole adult population. This change explains the large differences between 2002 and 2004.

Regarding our policy variable of interest, the mothers in our sample lived in municipalities where, on average, 55% of primary schools were defined as FDS schools.

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<sup>25</sup> Because we were interested in analyzing how the policy affected women's participation in work and the quality of employment they could access, this includes mothers who did not work. Conditional on being employed, mothers worked forty-two hours per week, slightly below the legal forty-four-hour work week.

Coverage increased during the 2002-2015 period: average access to FDS increased from 39% to 76%. Also, mother's average age was almost 37 years in our sample, the average education attainment was 10.6 years, and the average poverty rate in their municipalities of residence was 17%.

## V. Results

### 5.1 Effects of FDS Reform on Mothers' Labor-Market Outcomes

We estimated Equation 1 for each of our job-quality and labor-supply variables. Table 5 presents baseline results of the ITT effects of FDS access. We found that increased access to FDS increased mothers' labor-force participation and employment (Columns 1 and 2), which was similar to the earlier research assessing the effects of the policy (Contreras & Sepulveda, 2016; Berthelon, Kruger & Oyarzún, 2015). This was reaffirming evidence of the policy's effect because our dataset and empirical model were different from earlier studies. In particular, Contreras & Sepulveda (2016) used repeated rounds of CASEN household surveys and identified the effect of the policy comparing mothers of 8-to-14-year-old children to mothers of 6 to 7 year olds. Berthelon, Kruger & Oyarzún (2015) used ELPI data until 2009 and focused their research question on the effects of FDS on women's labor supply. In contrast to results in Contreras & Sepulveda (2016), we found large and positive effect of FDS access on hours worked by mothers: our point estimate indicated that, if all the schools in an average municipality became full-day schools (with an FDS variable that moved from 0 to 1, or one hundred percentage points), then mothers of primary school children would work an 8.7 additional hours per week (Column 3). To put this result in relevant context, instead of considering a movement from zero to full implementation, we considered an increase of about twenty-four percentage points in our FDS variable, which was equivalent to reaching full implementation at the national level from the 2015 level. An increase in access to full-day schools would lead to a predicted

increase in weekly hours of 2.1 hours or 7.8%.<sup>26</sup>

Columns 4 to 12 of Table 5 report our results of the estimated effect of FDS access on employment quality. We also found that greater access to FDS had a positive effect on several quality indicators: increasing FDS coverage by twenty-four percentage points would lead to a predicted increase of 5.6% in mothers' hourly wage. Because the hourly wage was only observed for working mothers, we estimated the Lee (2009) bounds and found that the treatment effect continued to be significant (at 10%). In the note to Table 5 we report the 90% coefficient interval; note that, for this validation exercise, we transformed our treatment variable into a binary variable taking value 1 if  $(FDS_{mrt} \times PSAge_{imrt}) > 65\%$ ; for lower thresholds, we could not exclude the possibility that the results were affected by selection bias. Additionally, the same increase in FDS coverage would have increased the likelihood of full-time employment by 7.6%, of being employed with a formal contract by 7.0%, and of working in a large firm by 10.8% (Columns 5, 6, and 12, respectively).

We found no statistically significant effect of the policy on the likelihood of having an open-ended contract, being self-employed, owning a business, being unionized, or on working in small- or medium-sized firms.

Our main results suggest that the greater access to childcare provided by the FDS policy in primary schools not only facilitated mothers' entry into the labor force and increased the hours they supplied to the labor market—i.e., the extensive and intensive labor-supply margins—but that the policy also allowed these mothers to enter into better-quality jobs. Mothers with children in primary school were able to find higher-paying jobs, and they were more likely to hold jobs that had a higher degree of formality (contract). One potential explanation, consistent with our results, is that if children spent more hours in school, mothers were able to obtain more full-time jobs at a lower cost than previously because the extended hours under adult care that schools provided lowered the cost of taking full-time positions or allowed mothers to look more intensively for better jobs.

Because the labor market is very rigid in Chile and part-time employment is uncommon (Rau, 2010), availability of full-day schools reduced the need for childcare

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<sup>26</sup> The marginal effect reported for women with children in primary school was estimated relative to the average weekly hours that women worked and was obtained by multiplying the point estimate (8.721) by 0.24 and dividing by the average of the dependent variable (26.79).

arrangements outside schools and extended the feasible set of jobs that mothers could access (full-time jobs, in particular). As our results also reveal, women with children in primary school were more likely to be employed full-time when access to FDS increased. Therefore, our results point towards a mechanism through which the policy lowered the cost of childcare and facilitated an increase in both hours worked and full-time jobs, which were associated with higher wages and more for formal contractual relationships.

## 5.2 Testing Impact Mechanisms

### Did FDS reduce the opportunity cost of working for mothers?

To explore whether the policy affected mothers' employment outcomes through an implicit subsidy to the cost of childcare, we estimated Equation 1 for groups that would respond differently to access to childcare: women and men without children of primary-school age (i.e., either mothers or fathers of older children or those who were not parents), and fathers.

The availability of full-day primary schools should not have affected women without children because they did not benefit from longer school schedules. Also, in general, we did not expect large effects for men because women are the primary care-takers of children in Chile and men have a stronger attachment to the labor force than women. However, it is possible that fathers' labor-market outcomes would change in response to the policy because mother's employment in better jobs could also facilitate more leisure among men or because women's employment may have increased the need for fathers to dedicate time to household work and childrearing.

Results for these three groups—women, men without children, and fathers—are found in Panels A, B and C of Table 6.<sup>27</sup> Panels A and B reveal that in general, the FDS policy did not affect labor supply or employment quality of women or men that had no children during the years of the EPS panel. These results suggest that the policy affected the implicit cost of childcare.

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<sup>27</sup> For simplicity, we reported results for our variable of interest. Tables with all control variables are available upon request.

Greater access to FDS also affected fathers' employment: it increased fathers' employment with an open-ended contract and decreased the likelihood of being self-employed; additionally, fathers earned lower wages and were less likely to work in large firms or to be in a union. The first two effects were considered an improvement in job quality, whereas the latter effects were less clear. These results indicate that the policy had some effects on fathers, which suggests that they were also sensitive to changing access to childcare. This was consistent with a context of changing norms regarding gender roles and child-rearing activities; however, our data did allow us to analyze the potential mechanisms behind this result more deeply.

We also estimated whether effects differed for mothers with and without older children and other adults other than their partner (such as grandparents) in the household. If FDS provides childcare, then mothers living in households in which other family members provide childcare for younger children should be less affected by the policy. The results appear presented in Table 7. We found that, among mothers who lived with other adults, greater access to childcare for young children affected participation decisions and intensity of their employment, but the results were marginally significant (10% level) and, therefore, possibly less sensitive to the policy (Panel A of Table 7). As expected, mothers who did not live in a household with other adults (Panel B) were more strongly affected by the policy, and they were much more likely to work, to work more hours, and to work full-time; they were also more likely to work with a contract.

### **FDS Reform and Maternal Investments in Education**

FDS reform may also affect job quality through an indirect channel: mothers' investments in education. By subsidizing the cost of childcare, FDS reform could affect mothers' decisions regarding educational investments because the policy lowered the cost of investing in education for mothers of children affected by the policy. Mothers may have deferred entering the job market and enrolling in educational institutions because their children were under (subsidized) formal childcare for most of the day. In turn, greater investments in education could facilitate access to jobs of better-quality once mothers entered the labor market.

Our data allowed us to analyze the effect of the FDS policy on two measures of

formal education: an indicator variable that captured whether the mother currently (at the time of the survey) attended an education establishment (primary, secondary, or tertiary) and years of education completed. The results are reported in Table 8. For both measures, we found that the FDS policy did not affect maternal decisions regarding formal education.

### 5.3 Confounding Effects

We identified four possible threats to identification: endogeneity in location and school choices, non-randomness in FDS fund allocation across municipalities, preschool childcare expansion, and, more generally, the presence of omitted variables. We addressed the first concern by building on past evidence reported in the literature. For the second, in all our estimations we controlled for pre-existing trends in women’s municipal labor participation as well as for various municipality characteristics. Below we explain how we addressed the third and fourth challenges.

#### **FDS Policy and Preschool Childcare Expansion in Chile**

The Chilean government began expanding public access to childcare in 2006, a program that has continued to increase access to publicly funded daycare for lower-income children aged 3 months through 4 years of age. One potential concern of this expansion was that its effect on mothers’ employment outcomes may be confounded with the effects of the FDS policy. In order to control for this possibility, we estimated Model 1 by including a categorical variable that was equal to one if the woman had a child of preschool age after 2005. This variable was intended to control for the potential effect that expansion of childcare facilities had on labor-market outcomes for women with children in that age group. The results reported in Table 9 show that the overall effect of the FDS policy on mothers with children of primary-school age was basically unchanged, indicating that our results for the FDS policy were not driven by increasing access to preschool programs.<sup>28</sup>

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<sup>28</sup> We also estimated the regressions in Table 9, excluding mothers when they were affected by the national childcare policy; point estimates and significance did not change. Results are available upon request.



## Omitted Variables

The expansion of primary-school schedules may correlate with unobservable social and infrastructural developments at the municipality level. Based on the main specification, we followed Oster (2019) to estimate the lower and upper bounds of our statistically significant estimates (Columns 1-6 in Table 5). As shown in Table 10, the identified set of the FDS coefficient excluded zero for all reported outcomes, confirming that our estimates were robust against omitted-variable bias. This was not surprising, given that our identification relied on temporal and spatial variations in FDS schools, which we can plausibly argue to be exogenous to individual-level household behaviors.

## 5.4 Additional Investigations

### Effects of FDS Reform

We studied whether effects of the policy were different for some groups of mothers. First, we studied whether the effects varied with a mother's income. We proxied a woman's permanent income with her education level in the first year she was interviewed, defining two groups: low education mothers were those who had completed twelve or fewer years of schooling (equivalent to a high school diploma or less), and high education mothers were those who had completed thirteen years of schooling or more (equivalent to having ever completed at least one year of university or college education). We present results for low- vs. high-education mothers in Panels A and B of Table 11, respectively.

We found marginal effects of the policy differed depending upon the educational level of the mother. Reaching full implementation of the policy, i.e. an increase of twenty-four percentage points in access to FDS schools, increased labor-force participation by 4.7% among women with low education and by 8.5% among women with high education levels. The policy had a similar impact on employment (8%) and a relatively larger effect for low-education women in hours worked: a 9.6% increase among low-education women and 7% for high-education women. For wages, the effect was larger in high-education women, with an effect of 7.4% compared to an increase of 5% in low-education women.

We also found that the benefits of the FDS policy on other quality measures mostly

occurred among low-education mothers: greater access to FDS increased the likelihood of having a full-time job and a contract, but only among low-education mothers. The point estimates for the high-education group were positive, but they were not statistically significant. In addition, among the low-education group, we found a higher likelihood of working in a larger firm, which was consistent with finding a full-time job with a formal contract. For the high-education group, greater FDS access increased the likelihood of working in a medium-sized firm. Overall, it appeared that most of the positive effects of the policy on employment quality were concentrated among mothers with lower levels of initial education. This was a relevant finding because it suggested that the policy could have had some positive effects in terms of reducing inequalities in the labor market.

We were also interested on how the policy interacted with household structure and in studying whether effects varied depending upon whether women were married or cohabitating with a partner. Based on our estimates, we expected the effect of the policy to be stronger in women with a partner because unpartnered women were probably more attached to the labor market, meaning that the reduction in childcare costs offered by the policy would be relatively smaller for them. Our results are reported in Table 12 and reveal that, as expected, the labor-market outcomes of unpartnered women were generally not affected (Panel B). The exception was that increased access to FDS increased the likelihood of employment. This was interesting because it was again consistent with women being able to make their work schedules more compatible with those of their primary-school children.

In turn, for married/cohabitating mothers of children in primary schools, the effects were stronger and similar to our baseline estimates (Panel A). Increasing access to full-day schools increased their labor-force participation, their employment, hours worked, and likelihood of finding a full-time job.

## VI. Conclusions

We analyzed the effect of access to childcare on mothers' labor supply and quality of employment. We analyzed a national school reform in Chile that extended the school day from half- to full-day schedules and studied the impact on mothers who were most affected by the policy: those whose youngest child was of primary school-age in at least one of the years she was interviewed. Conditional on time-invariant individual fixed effects and on pre-existing trends in women's employment, our identification strategy relied both on exogenous changes in availability of full-day primary schools across time and municipalities and on whether the mother's youngest child was in primary school in a given year.

Our estimates indicated that mothers responded to greater access to FDS by increasing their labor supply. An increased FDS access of twenty-four percentage points lead to an increase in mothers' LFP and employment of about 5% and 7%, respectively, which were sizable effects. Mothers also increased hours worked per week by 8% as a response to the policy. We also found that mothers not only worked more but worked in better jobs as a response to the policy: they earned higher wages, and they were more likely to hold jobs that were full-time, to have an employment contract, to hold permanent positions, and to be employed in large firms. Many employment-quality benefits were concentrated among low-educated mothers.

Our results contribute to the literature by finding that policies that expand childcare for school-aged children may have positive effects on the quality of jobs that mothers are able to access as a result of the implicit childcare subsidy provided by longer school schedules. Mothers plausibly have more time to engage in more successful job searches, and the employment options available to them expand, particularly in the case of full-time jobs that are associated with other dimensions of improved quality. We were also able to explain the likely mechanisms driving the result, finding that the implicit childcare subsidy provided by the FDS policy reduced mothers' opportunity cost of work, facilitated their entry into the labor force, and lengthened their work hours, all of which allowed them access to better jobs.

These findings are novel and complement our understanding of how childcare

affects mothers' labor supply and job quality. They suggest that longer school schedules not only benefit children themselves, but that they also affect other family members. Additionally, by increasing mothers' employment quality, access to childcare plays an important role in reducing within-household gender inequality (through higher maternal incomes) and income inequality in general because the policy has greater benefits among poorer, lower-educated women. Finally, access to schools with longer schedules, by improving household incomes, leads to an increase in overall family welfare.

This section should report the discussion and interpretation of the results together with the associated tables and figures. All tables and figures should be accurately cited in the text. In order to keep the main text as brief as possible, some less relevant but still necessary tables and figures can be moved into an Annex (see below).

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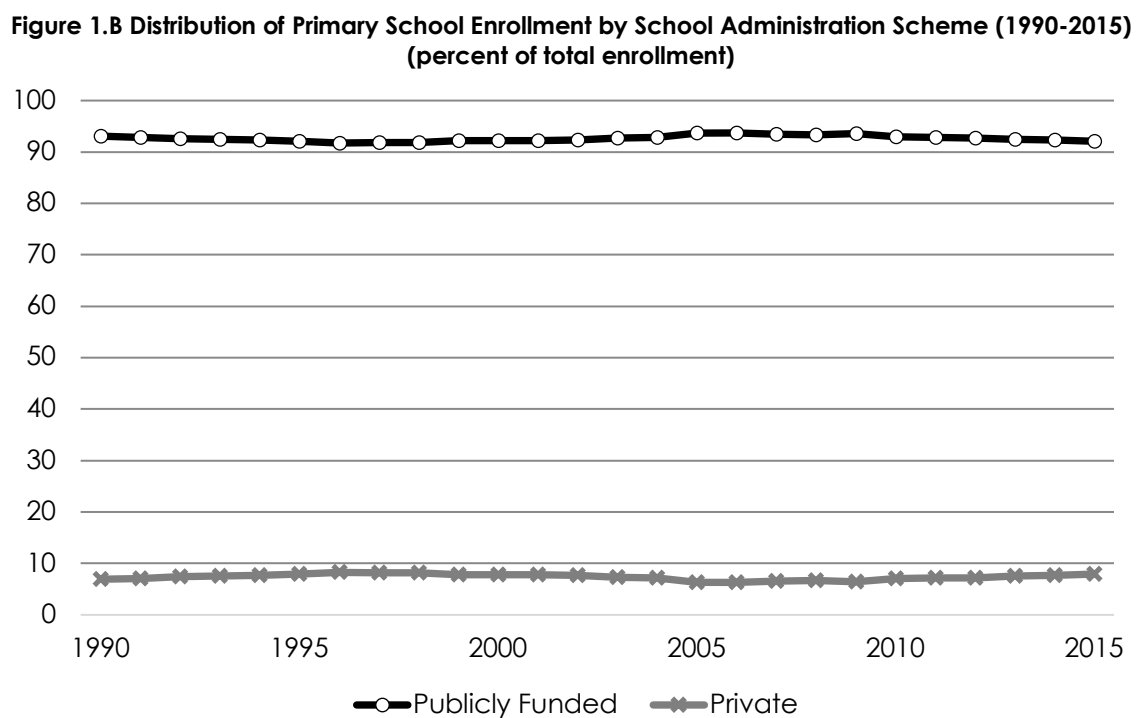
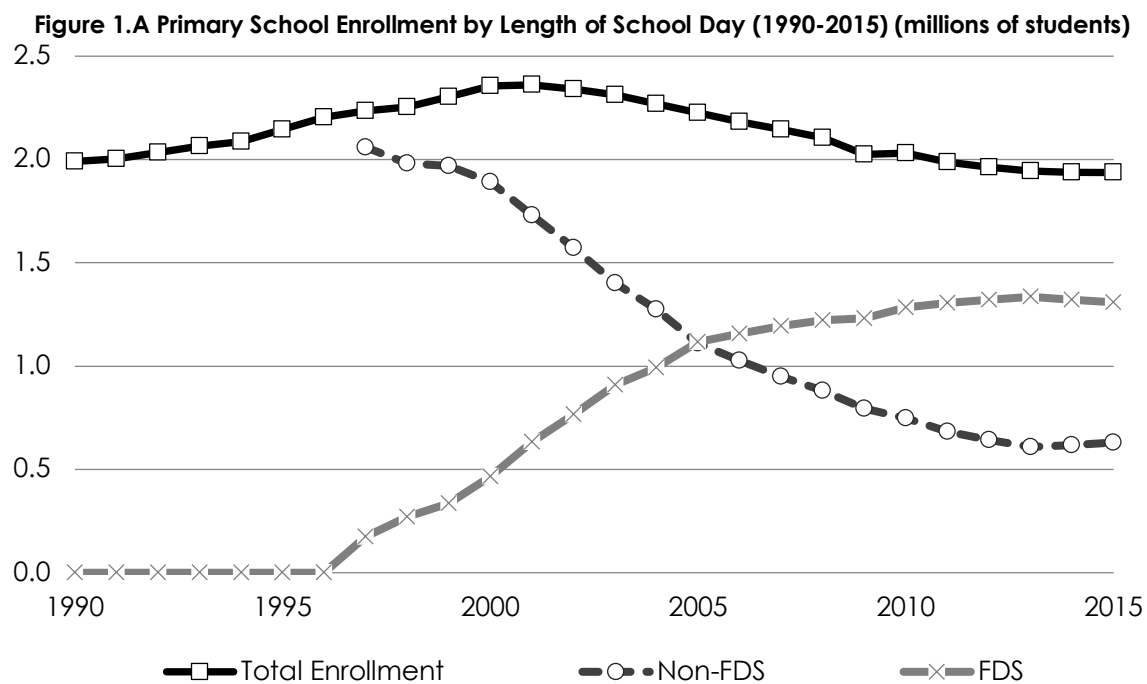
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## Figures & tables



Source: Authors' calculations using School Directory/Administrative JEC data (MINEDUC).

**Figure 2 Distribution of Municipal Share of Primary Schools under FDS regime (1997-2015) (selected years)**

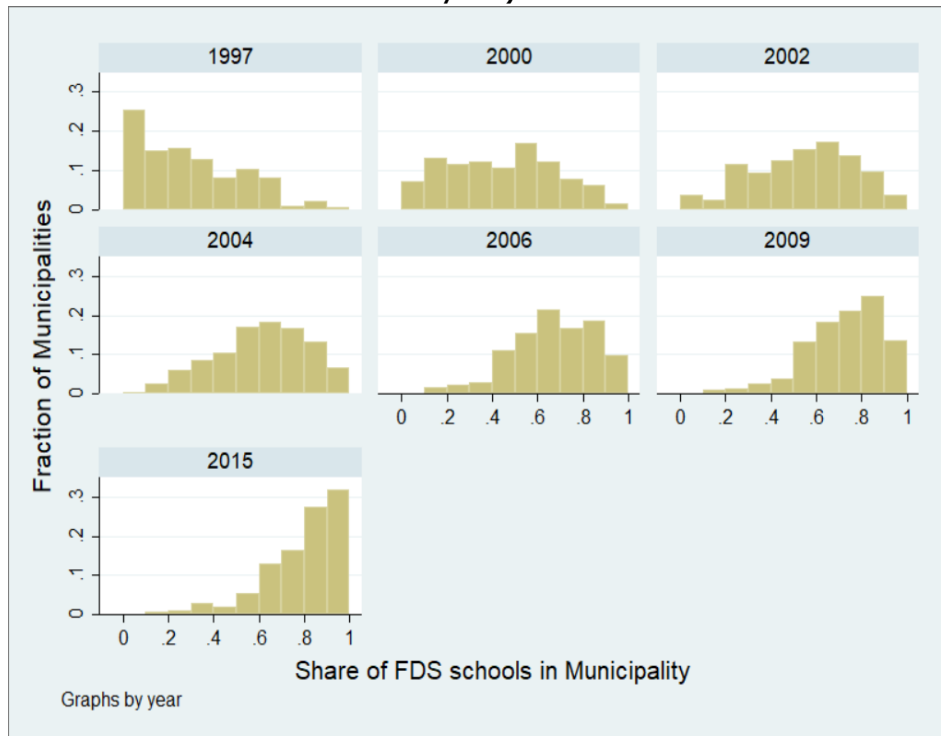
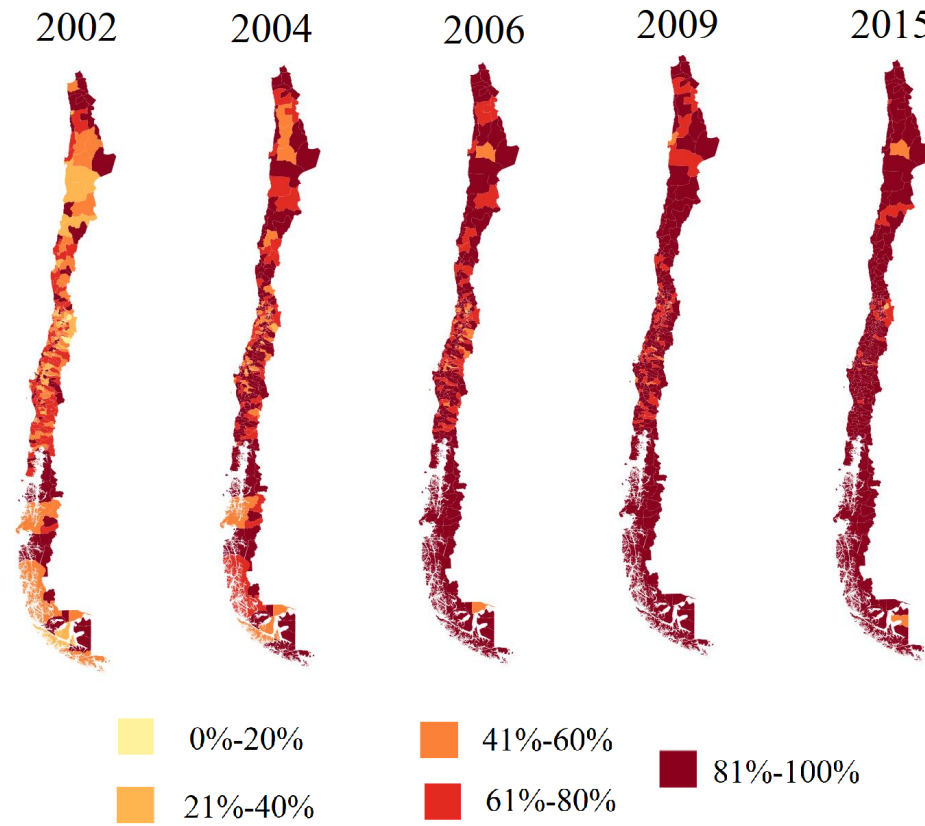


Figure 3 Geographic Evolution of Municipal Share of Primary Schools under FDS Regime (2002-2015)



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

**Table 1. Main reason mothers did not participate in labor**

<b>Mother whose youngest child was of:</b>			
<b>Reason</b>	<b>Preschool age</b>	<b>Primary-school age</b>	<b>Secondary school age</b>
Household chores	49%	63%	67%
Lack of childcare	42%	22%	6%
Not interested	1%	1%	3%
Other reasons	7%	14%	24%
Total	100%	100%	100%

Source: Authors' calculations using CASEN, 2015. Includes mothers aged 25-55 years who were inactive in the labor force. Preschool age: 0-5 years; primary-school age: 6-12 years; secondary school age: 13-18 years.

**Table 2. Percent of primary schools under FDS regime by region (1997-2015)**

Region	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Primary Enrollment in 1997 (% total)
I	36	45	50	64	63	71	71	68	73	74	79	77	77	75	76	78	82	82	82	1.5
II	33	36	36	40	47	53	57	58	62	65	64	67	68	70	71	71	71	71	71	3.2
III	38	43	48	55	55	57	63	67	70	75	74	76	79	78	79	79	81	81	81	1.9
IV	40	44	47	51	57	61	67	69	72	74	76	77	78	81	83	84	85	85	85	4.1
V	21	30	35	42	51	57	64	65	68	68	71	74	72	75	75	76	75	75	74	5.5
VI	22	29	33	39	45	53	58	62	66	68	71	72	75	77	80	81	83	82	82	10.0
VII	30	36	39	41	47	54	58	62	64	67	72	75	78	79	82	85	86	86	85	6.4
VIII	27	32	36	42	49	54	57	59	62	66	68	70	71	72	74	76	79	79	79	13.1
IX	41	47	51	56	59	62	64	66	69	70	73	75	78	81	84	87	89	87	87	6.2
X	49	61	63	67	69	71	73	75	77	78	80	81	82	83	86	89	93	93	93	4.8
XI	29	38	42	47	50	54	67	66	72	74	76	77	77	78	78	80	80	79	79	0.7
XII	25	27	37	45	47	55	60	69	71	74	83	85	86	86	87	87	87	87	82	1.0
XIII	6	10	12	18	23	26	32	37	43	45	47	50	51	53	55	56	57	56	56	35.5
XIV	36	42	45	47	55	56	60	62	65	69	70	72	74	76	79	83	85	84	85	4.9
XV	60	68	70	71	72	82	81	83	89	89	91	92	92	93	94	93	94	90	91	1.3
<b>Total</b>	<b>29</b>	<b>35</b>	<b>39</b>	<b>44</b>	<b>49</b>	<b>54</b>	<b>58</b>	<b>61</b>	<b>64</b>	<b>67</b>	<b>69</b>	<b>71</b>	<b>73</b>	<b>74</b>	<b>77</b>	<b>79</b>	<b>80</b>	<b>80</b>	<b>80</b>	<b>100</b>

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

**Table 3. Distribution of FDS share at municipal level (1997-2015)**

FDS share at municipal level	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
0-9	25.5	16.6	12.0	7.1	4.6	3.7	1.8	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10-19	15.1	15.4	15.1	13.2	7.4	2.5	2.5	2.5	1.8	1.5	1.2	0.9	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0.6
20-29	15.7	13.2	12.6	11.7	11.7	11.7	6.8	6.2	2.2	2.2	2.2	1.8	1.2	1.2	0.6	0.6	0.6	0.6	0.6	0.9
30-39	12.9	13.2	12.6	12.3	10.5	9.5	9.5	8.6	5.8	3.1	2.5	2.2	2.5	2.2	2.5	2.5	2.5	2.5	3.1	2.8
40-49	8.3	11.7	11.7	10.8	12.0	12.6	12.3	10.5	10.5	11.1	9.8	6.2	4.0	2.8	1.8	1.5	1.5	1.8	1.8	1.8
50-59	10.5	12.6	14.2	16.9	18.2	15.4	17.5	16.9	19.4	15.4	13.2	14.8	13.3	12.0	8.9	7.7	5.8	4.9	4.9	5.5
60-69	8.3	8.0	10.2	12.3	15.4	17.2	17.2	18.5	18.2	21.5	20.0	18.5	18.2	16.6	16.3	14.8	11.7	13.5	13.5	12.9
70-79	0.9	5.5	6.8	8.0	10.5	13.8	14.2	16.6	17.8	16.6	17.8	19.1	21.3	20.9	20.6	15.1	15.7	16.0	16.0	16.3
80-89	2.2	3.1	4.0	6.2	7.1	9.8	12.9	13.2	15.4	18.8	21.5	24.3	25.0	27.1	26.2	28.6	26.8	27.4	27.4	27.4
90-100	0.6	0.6	0.9	1.5	2.8	3.7	5.2	6.8	8.6	9.8	11.7	12.3	13.6	16.6	22.5	28.6	34.8	32.0	32.0	31.7

Source: Authors' calculations using administrative data, Ministry of Education. In every year there were 325 municipalities. Includes schools that received public funds (municipal and voucher schools, representing 92% of total enrollment nationwide). Schools were considered FDS when at least 50% of their grade levels were under the FDS regime. Years shadowed are those included in estimates.

**Table 4. Summary statistics for all women: mean and standard deviations (2002-2015)**

Variable	2002 n= 1744		2004 n=2069		2006 n=1889		2009 n=1475		2015 n=431		Average 2002-2015 n=7608	
	Mean	Sd.	Mean	Sd.	Mean	Sd.	Mean	Sd.	Mean	Sd.	Mean	Sd.
<b>Labor-market outcomes</b>												
LFP	0.82	0.38	0.68	0.47	0.73	0.44	0.77	0.42	0.69	0.46	0.74	0.44
Employment	0.70	0.46	0.56	0.50	0.61	0.49	0.68	0.47	0.65	0.48	0.63	0.48
Weekly hours worked	30.97	22.96	24.73	24.14	25.24	23.69	27.27	21.96	24.84	21.24	26.79	23.31
Wage (\$/hour) for all mothers	959	1875	779	1114	1038	3021	1181	1509	1393	1785	997	2015
Full-Time Job	0.62	0.49	0.49	0.50	0.50	0.50	0.56	0.50	0.51	0.50	0.54	0.50
Contractual status	0.52	0.50	0.39	0.49	0.40	0.49	0.48	0.50	0.44	0.50	0.44	0.50
Permanent job	0.58	0.49	0.43	0.50	0.46	0.50	0.57	0.50	0.53	0.50	0.50	0.50
Self-employed/Employer	0.11	0.32	0.08	0.26	0.12	0.33	0.16	0.37	0.15	0.36	0.12	0.32
Union	0.11	0.31	0.07	0.26	0.09	0.29	0.15	0.36	0.13	0.33	0.10	0.30
Small firm (≤ 9 empl.)	0.31	0.46	0.23	0.42	0.25	0.43	0.20	0.40	N.A.	N.A.	0.25	0.43
Medium firm (10-199 empl.)	0.31	0.46	0.20	0.40	0.22	0.41	0.18	0.39	N.A.	N.A.	0.23	0.42
Large firm (≥, 200 empl.)	0.23	0.42	0.15	0.36	0.15	0.35	0.14	0.35	N.A.	N.A.	0.17	0.37
<b>Full-Day Schooling</b>												
Municipal share of FDS schools	0.39	0.19	0.50	0.19	0.60	0.17	0.69	0.16	0.76	0.13	0.55	0.21
<b>Individual and household variables</b>												
Years of schooling	10.16	4.12	10.68	3.34	10.73	3.36	10.88	3.15	11.29	3.56	10.64	3.53
Age	34.54	6.78	36.36	7.41	37.56	7.13	38.68	6.84	42.38	5.91	37.03	7.27
Women w/Child. < 14 years (fraction)	0.74	0.44	0.82	0.39	0.86	0.35	0.89	0.32	0.90	0.30	0.83	0.38
No. Children aged 0-5 in household	0.61	0.66	0.43	0.58	0.34	0.52	0.29	0.52	0.17	0.43	0.41	0.58
No. Children aged 6-13 in household	1.01	0.80	1.07	0.72	1.11	0.67	1.11	0.62	1.11	0.57	1.08	0.70
No. Children aged 14-18 in household	0.30	0.57	0.40	0.63	0.43	0.65	0.45	0.64	0.50	0.65	0.40	0.63

**Table 4 (continued). Summary statistics for all women: mean and standard deviations (2002-2015)**

Variable	2002 n= 1744		2004 n=2069		2006 n=1889		2009 n=1475		2015 n=431		Average 2002-2015 n=7608	
	Mean	Sd.	Mean	Sd.	Mean	Sd.	Mean	Sd.	Mean	Sd.	Mean	Sd.
No. Children aged 18+ in household	0.14	0.45	0.28	0.62	0.39	0.74	0.47	0.81	0.43	0.69	0.32	0.68
Married (or partner)	0.68	0.47	0.68	0.46	0.69	0.46	0.66	0.48	0.61	0.49	0.68	0.47
Number of household members	4.80	1.64	5.23	1.87	5.63	2.05	5.93	2.26	5.58	2.00	5.39	2.00
<b>Municipal variables</b>												
Average school attainment	9.90	1.20	9.92	1.20	9.92	1.14	10.04	1.10	10.88	0.86	9.99	1.17
Poverty rate	0.19	0.07	0.17	0.07	0.14	0.06	0.17	0.07	0.12	0.06	0.17	0.07
Women's employment rate	0.88	0.04	0.88	0.03	0.90	0.04	0.87	0.04	0.91	0.03	0.88	0.04
Men's employment rate	0.91	0.03	0.93	0.02	0.94	0.03	0.91	0.03	0.93	0.03	0.92	0.03
Women's LFP rate	0.41	0.07	0.42	0.07	0.42	0.08	0.41	0.06	0.47	0.06	0.42	0.07
Men's LFP rate	0.74	0.04	0.73	0.04	0.73	0.05	0.70	0.05	0.71	0.05	0.72	0.05

Source: EPS panel (2002-2015), CASEN surveys, and administrative data from the Ministry of Education. N.A.: information not available in survey. The sample included women who had primary school-aged children when they were surveyed. The share of FDS at the municipality level is the fraction of schools with 50% of their grade levels under the FDS regime. Hourly wages are expressed in Chilean pesos of 2015. Average exchange rate during period: 597 CLP/US\$1.

**Table 5. Effect of full-day schedules on quality of mothers' employment (2002-2015)**

VARIABLES	Labor Supply				Employment Quality							
	LFP (1)	Employment (2)	Hours (3)	Wage (4)	Full-Time (5)	Contract (6)	Permanent (7)	Self-Emp./ Employer (8)	Union (9)	Small Firm (10)	Medium Firm (11)	Large Firm (12)
Youngest Child in Primary School x Fraction of FDS in municipality	0.155*** (0.0436)	0.204*** (0.0518)	8.721*** (2.376)	1.002** (0.401)	0.171*** (0.0544)	0.129** (0.0625)	0.0646 (0.0584)	-0.0207 (0.0432)	0.00905 (0.0357)	0.0751 (0.0497)		0.0747* (0.0419)



Youngest Child in Primary School	-0.0332 (0.0404)	-0.0906** (0.0387)	-3.071 (2.004)	-0.330 (0.294)	-0.0581 (0.0463)	-0.0183 (0.0461)	-0.00712 (0.0465)	0.00428 (0.0297)	0.0369 (0.0228)	-0.0238 (0.0337)	-0.0600 (0.0451)	-0.0183 (0.0322)
Fraction of FDS	-0.0688 (0.0906)	-0.116 (0.0938)	-0.818 (4.075)	-0.512 (0.682)	-0.0438 (0.0937)	-0.185** (0.0846)	-0.109 (0.0977)	0.165** (0.0735)	0.140** (0.0594)	-0.0694 (0.0890)	-4.37e-05 (0.113)	-0.0860 (0.0784)
Years of Education	0.00346* (0.00192)	0.00587** (0.00270)	0.222* (0.129)	0.0557*** (0.0194)	0.00546* (0.00288)	0.00435 (0.00275)	0.00528* (0.00294)	0.000541 (0.00177)	0.00198 (0.00138)	0.00345 (0.00223)	0.00406 (0.00272)	0.000644 (0.00239)
Age	0.00125 (0.0131)	0.00964 (0.0123)	0.0117 (0.555)	0.215** (0.0881)	0.00318 (0.0117)	0.0199* (0.0114)	0.0232* (0.0135)	0.00200 (0.00947)	0.0143* (0.00834)	-0.0214 (0.0144)	-0.00313 (0.0104)	-0.000997 (0.0113)
Age squared	-0.000166 (0.000129)	-0.000249** (0.000114)	-0.00855 (0.00548)	0.00341*** (0.000820)	-0.000149 (0.000121)	-0.000386*** (0.000121)	-0.000365*** (0.000121)	-1.27e-05 (9.57e-05)	-0.000212** (9.85e-05)	0.000119 (0.000134)	3.71e-05 (0.000113)	-8.15e-05 (0.000140)
N. Child aged 0-5 in household	-0.0184 (0.0260)	-0.0592** (0.0255)	-2.451* (1.358)	-0.379** (0.178)	-0.0440 (0.0297)	-0.0375 (0.0244)	-0.0445* (0.0262)	-0.0148 (0.0194)	0.0284* (0.0165)	-0.0255 (0.0281)	-0.0250 (0.0281)	0.00952 (0.0187)
N. Child aged 6-13 in household	-0.0442*** (0.0155)	-0.0412** (0.0161)	-1.846** (0.856)	-0.414*** (0.110)	-0.0524*** (0.0161)	-0.0617*** (0.0159)	-0.0529*** (0.0163)	0.00786 (0.0132)	-0.0198* (0.0105)	-0.0126 (0.0197)	-0.0167 (0.0199)	-0.00840 (0.0144)
N. Child aged 14-18 in household	0.00344 (0.0146)	0.00728 (0.0158)	0.0592 (0.723)	-0.0934 (0.108)	-0.00637 (0.0158)	-0.0299* (0.0177)	-0.0124 (0.0163)	0.0161 (0.0119)	-0.0170* (0.0100)	0.0173 (0.0186)	0.0100 (0.0188)	-0.00280 (0.0125)
N. Child aged 18+ in household	-0.0300 (0.0181)	-0.0224 (0.0180)	-0.987 (0.778)	-0.338*** (0.127)	-0.0372** (0.0183)	-0.0183 (0.0206)	-0.0146 (0.0178)	-0.00465 (0.0174)	-0.0229* (0.0135)	-0.0108 (0.0240)	0.00252 (0.0232)	0.00340 (0.0150)
Married/has partner	-0.0905*** (0.0169)	-0.104*** (0.0183)	-2.939*** (0.859)	-0.740*** (0.130)	-0.0456*** (0.0172)	-0.0400** (0.0183)	-0.0389* (0.0227)	-0.0271* (0.0137)	-0.0234** (0.0111)	-0.0487*** (0.0152)	-0.0163 (0.0203)	-0.0393*** (0.0140)

**Table 5 (continued). Effect of full-day schedules on quality of mothers' employment (2002-2015)**

VARIABLES	Labor Supply				Employment Quality							
	LFP (1)	Employment (2)	Hours (3)	Wage (4)	Full-Time (5)	Contract (6)	Permanent (7)	Self-Emp./ Employer (8)	Union (9)	Small Firm (10)	Medium Firm (11)	Large Firm (12)
N. Pers. in household (incl. self)	0.00703 (0.00657)	0.00443 (0.00790)	0.00679 (0.352)	0.0865 (0.0604)	0.000201 (0.00746)	0.00855 (0.00686)	-0.00272 (0.00720)	0.00232 (0.00565)	0.00663 (0.00526)	0.00113 (0.0106)	-0.00456 (0.00947)	0.00317 (0.00631)
Munic. Ave. School Attain.	-0.0151 (0.0211)	-0.0284 (0.0214)	1.255 (1.070)	-0.00240 (0.170)	0.0236 (0.0246)	-0.0349* (0.0206)	-0.0187 (0.0281)	0.0101 (0.0149)	-0.00130 (0.0162)	-0.00148 (0.0267)	-0.0144 (0.0236)	-0.0167 (0.0219)
Munic. Poverty rate	-0.0620 (0.157)	-0.177 (0.189)	-4.520 (8.450)	-1.830 (1.578)	-0.274 (0.200)	-0.368* (0.207)	-0.330* (0.196)	-0.0308 (0.138)	-0.190 (0.120)	-0.329* (0.195)	0.115 (0.186)	-0.201 (0.170)
Munic. rate of Rural Pop.	0.0319 (0.185)	0.00710 (0.181)	2.932 (7.935)	0.271 (1.438)	0.0789 (0.187)	0.193 (0.201)	0.204 (0.173)	0.0657 (0.141)	0.130 (0.108)	-0.0728 (0.174)	-0.0750 (0.172)	0.413*** (0.154)
Munic. rate Women's Empl.	-0.383 (0.254)	-0.649** (0.283)	-24.35* (13.05)	-6.158** (2.575)	-0.227 (0.321)	-0.483* (0.275)	-0.510 (0.374)	0.130 (0.240)	-0.314 (0.215)	-0.771*** (0.290)	-0.268 (0.256)	-0.411 (0.280)
Munic. rate Men's Empl.	0.160 (0.218)	0.341 (0.245)	5.434 (10.32)	0.999 (1.842)	0.161 (0.245)	-0.168 (0.224)	-0.145 (0.240)	0.403** (0.166)	-0.211 (0.178)	0.576** (0.231)	0.304 (0.211)	-0.327* (0.195)
Munic. rate Women's LFP	0.381* (0.224)	-0.0891 (0.278)	-12.39 (11.65)	0.221 (2.000)	-0.394 (0.278)	0.0663 (0.281)	-0.127 (0.278)	-0.0313 (0.165)	-0.134 (0.183)	0.347 (0.263)	0.189 (0.203)	-0.185 (0.237)
Munic. rate Men's LFP	1.133** (0.460)	1.570*** (0.538)	57.05** (24.69)	6.579 (5.378)	0.905 (0.639)	1.064* (0.616)	0.982 (0.603)	-0.416 (0.398)	0.171 (0.318)	1.290** (0.519)	0.543 (0.441)	0.863* (0.453)
Constant	0.0905*** (0.0169)	-0.104*** (0.0183)	2.939*** (0.859)	-0.740*** (0.130)	0.0456*** (0.0172)	-0.0400** (0.0183)	-0.0389* (0.0227)	-0.0271* (0.0137)	-0.0234** (0.0111)	0.0487*** (0.0152)	-0.0163 (0.0203)	0.0393*** (0.0140)
Observations	7,608	7,608	7,608	7,608	7,608	7,608	7,608	7,608	7,608	7,177	7,177	7,177

R-squared	0.051	0.060	0.045	0.062	0.042	0.044	0.057	0.040	0.046	0.042	0.032	0.027
Num. of women in panel	2,347	2,347	2,347	2,347	2,347	2,347	2,347	2,347	2,347	2,347	2,347	2,347
Mean of Dependent Var.	0.744	0.632	26.79	4.257	0.539	0.442	0.504	0.117	0.104	0.249	0.227	0.166

Data from the EPS surveys for 2002, 2004, 2006, 2009, and 2015. The sample included women who had primary school-aged children when they were surveyed. The share of FDS was the fraction of schools with 50% of their grade levels under the FDS regime. Robust standard errors, clustered at the municipal level, in parentheses. Statistical significance is shown at \*\*\*1%, \*\*5%, and \*10% levels. Not shown: region-year fixed-effects, interactions between a categorical variable for municipal women's labor-force participation rate in 2000 and year fixed-effects, and individual fixed-effects. For specification (4), we estimated the coefficient interval (CI) of  $\gamma$  corresponding to the Lee bounds. The CI was [0.0115 - 0.1246]. Note that, to estimate the Lee bounds, our treatment was a binary variable taking value 1 if  $(FDS_{mrt} \times PSAge_{imrt}) > 65\%$ , and 0 otherwise. As discussed in the text, below this threshold, the CI crossed zero.

**Table 6. Effect of full-day schedules on quality of mothers' employment: women and men without children, and fathers (2002-2015)**

VARIABLES	Labor Supply				Employment Quality							
	LFP (1)	Employment (2)	Hours (3)	Wage (4)	Full-Time (5)	Contract (6)	Permanent (7)	Self-Emp. - Employer (8)	Union (9)	Small Firm (10)	Medium Firm (11)	Large Firm (12)
<b>A. Women without children</b>												
Fraction FDS in municipality	-0.204*	0.0896	7.239	1.059	0.0536	0.156	-0.0116	-0.00782	0.0702	0.175	0.110	0.0631
	(0.103)	(0.108)	(6.842)	(1.110)	(0.130)	(0.118)	(0.138)	(0.123)	(0.0809)	(0.133)	(0.133)	(0.115)
Observations	2,939	2,939	2,939	2,939	2,939	2,939	2,939	2,939	2,939	2,750	2,750	2,750
R-squared	0.116	0.086	0.090	0.083	0.105	0.099	0.110	0.056	0.058	0.066	0.058	0.051
Num. of women in panel	926	926	926	926	926	926	926	926	926	925	925	925
Mean of Dependent Variable	0.734	0.664	28.61	4.484	0.578	0.489	0.568	0.113	0.0960	0.275	0.249	0.156
<b>B. Men without children</b>												
Fraction FDS in	-0.00499	-0.0533	-0.747	-0.647	0.0176	0.0490	-0.136	0.0715	0.156**	0.0490	-0.206	0.0925

municipality	(0.0759)	(0.0867)	(5.142)	(0.823)	(0.113)	(0.0989)	(0.119)	(0.0993)	(0.0718)	(0.112)	(0.142)	(0.119)
Observations	5,141	5,141	5,141	5,141	5,141	5,141	5,141	5,141	5,141	4,835	4,835	4,835
R-squared	0.058	0.050	0.051	0.048	0.048	0.055	0.083	0.033	0.045	0.066	0.048	0.032
Num. of women in panel	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,566	1,563	1,563	1,563
Mean of Dependent Variable	0.883	0.817	36.52	5.487	0.740	0.521	0.621	0.253	0.114	0.340	0.311	0.204

**C. Fathers with children of primary-school age**

Youngest Child in Primary School x Fraction of FDS in municipality	-0.0137	-0.0434	-2.898	-0.555**	-0.0572	0.0845*	0.118***	-0.0851*	-0.104**	0.00230	0.0421	-0.125**
	(0.0199)	(0.0279)	(1.844)	(0.261)	(0.0397)	(0.0462)	(0.0398)	(0.0509)	(0.0464)	(0.0602)	(0.0579)	(0.0567)
Observations	7,387	7,387	7,387	7,387	7,387	7,387	7,387	7,387	7,387	7,047	7,047	7,047
R-squared	0.022	0.025	0.050	0.036	0.041	0.050	0.059	0.032	0.052	0.055	0.059	0.047
Num. of men in panel	2,626	2,626	2,626	2,626	2,626	2,626	2,626	2,626	2,626	2,583	2,583	2,583
Mean of Dependent Variable	0.984	0.960	46.26	6.732	0.914	0.689	0.797	0.289	0.179	0.366	0.418	0.275

Data from the EPS surveys for 2002, 2004, 2006, 2009, and 2015. Panels A and B include women or men who did not have primary school-aged children when they were surveyed; panel C includes fathers of children that were in primary school at least one year during the panel. The share of FDS was the fraction of schools with 50% of their grade levels under the FDS regime. Robust standard errors, clustered at the municipal level, in parentheses. Statistical significance is shown at \*\*\*1%, \*\*5%, and \*10% levels. Variables not shown: youngest child in primary school, fraction of FDS in municipality, mother's years of education, mother's age and age squared, presence of children aged 0-5, 6-13, 14-18 and 18+ in household, municipal average school attainment, municipal rates of poverty, rural population, women's and men's employment, women's and men's labor-force participation, region-year fixed-effects, interactions between a categorical variable for municipal women's labor-force participation rate in 2000 and year fixed-effects, and individual fixed-effects.

**Table 7. Effect of full-day schedules on quality of mothers' employment: with and without other adults in household (2002-2015)**

VARIABLES	Labor Supply				Employment Quality							
	LFP (1)	Employment (2)	Hours (3)	Wage (4)	Full-Time (5)	Contract (6)	Permane nt (7)	Self-Emp. - Employer (8)	Union (9)	Small Firm (10)	Medium Firm (11)	Large Firm (12)
<b>A. Mothers with other adults in household</b>												
Fraction FDS in municipality	0.140*	0.147*	6.688	0.451	0.172*	0.115	0.120	-0.0671	0.0762	0.133	-0.143	0.0754
	(0.0788)	(0.0875)	(4.186)	(0.584)	(0.102)	(0.0899)	(0.112)	(0.0725)	(0.0648)	(0.105)	(0.119)	(0.0778)
Observations	3,082	3,082	3,082	3,082	3,082	3,082	3,082	3,082	3,082	2,856	2,856	2,856
R-squared	0.063	0.059	0.051	0.074	0.060	0.056	0.083	0.078	0.071	0.072	0.055	0.047
Num. of women in panel	1,380	1,380	1,380	1,380	1,380	1,380	1,380	1,380	1,380	1,285	1,285	1,285
Mean of Dependent Variable	0.738	0.643	26.95	4.333	0.541	0.434	0.504	0.139	0.0967	0.265	0.210	0.157
<b>B. Mothers without other adults in household</b>												
Fraction FDS in municipality	0.203***	0.220***	10.16***	1.196**	0.215***	0.181**	0.0345	-0.0371	-0.0632	0.0232	0.155**	0.103*
	(0.0683)	(0.0757)	(3.304)	(0.539)	(0.0689)	(0.0835)	(0.0672)	(0.0454)	(0.0495)	(0.0618)	(0.0773)	(0.0525)
Observations	4,481	4,481	4,481	4,481	4,481	4,481	4,481	4,481	4,481	4,279	4,279	4,279
R-squared	0.074	0.086	0.071	0.085	0.064	0.070	0.082	0.064	0.058	0.047	0.045	0.038
Num. of women in panel	1,705	1,705	1,705	1,705	1,705	1,705	1,705	1,705	1,705	1,681	1,681	1,681
Mean of Dependent Variable	0.747	0.624	26.64	4.197	0.538	0.446	0.504	0.102	0.108	0.239	0.236	0.172

Data from the EPS surveys for 2002, 2004, 2006, 2009, and 2015. Panels A and B include mothers who lived in households with and without other adults (children aged 19 or older or grandparents), respectively (in addition to spouse/partner, if any). The share of FDS was the fraction of schools with 50% of their grade levels under the FDS regime. Robust standard errors, clustered at the municipal level, in parentheses. Statistical significance is shown at \*\*\*1%, \*\*5%, and \*10% levels.

Variables not shown: youngest child in primary school, fraction of FDS in municipality, mother's years of education, mother's age and age squared, presence of children aged 0-5, 6-13, 14-18 and 18+ in household, municipal average school attainment, municipal rates of poverty, rural population, women's and men's employment, women's and men's labor-force participation, region-year fixed-effects, interactions between a categorical variable for municipal women's labor-force participation rate in 2000 and year fixed-effects, and individual fixed-effects.

**Table 8. Effect of full-day schedules on mothers' educational decisions (2002-2015)**

VARIABLES	Dependent variable:	
	Years of Education Completed	Attends Education Establishment
	(1)	(2)
Youngest Child in Primary School x Fraction of FDS in municipality	-0.0822	-0.0383
	(0.345)	(0.0299)
Observations	7,608	7,607
R-squared	0.063	0.028
Num. of women in panel	2,347	2,347

Data from the EPS surveys for 2002, 2004, 2006, 2009, and 2015. The sample included women who had primary school-aged children when they were surveyed. The share of FDS was the fraction of schools with 50% of their grade levels under the FDS regime. Robust standard errors, clustered at the municipal level, in parentheses. Statistical significance is shown at \*\*\*1%, \*\*5%, and \*10% levels. Variables not shown: youngest child in primary school; fraction of FDS in municipality; mother's years of education; mother's age and age squared; presence of children aged 0-5, 6-13, 14-18, and 18+ in household; municipal average school attainment; municipal rates of poverty; rural population; women's and men's employment; women's and men's labor-force participation; region-year fixed-effects; interactions between a categorical variable for municipal women's labor-force participation rate in 2000 and year fixed-effects; and individual fixed-effects.

**Table 9. Effect of full-day schedules on quality of mothers' employment and daycare policies (2002-2015). Controlling for national daycare policy**

VARIABLES	Labor Supply				Employment Quality							
	LFP (1)	Employ- ment (2)	Hours (3)	Wage (4)	Full- Time (5)	Contract (6)	Permanent (7)	Self- Emp./ Employer (8)	Union (9)	Small Firm (10)	Medium Firm (11)	Large Firm (12)
Youngest Child in Primary												
School x Fraction of FDS in municipality	0.148*** (0.0436)	0.204*** (0.0503)	8.887*** (2.384)	1.016*** (0.380)	0.178*** (0.0550)	0.125** (0.0610)	0.0581 (0.0590)	-0.0226 (0.0420)	0.00378 (0.0358)	0.0645 (0.0473)	0.0814 (0.0605)	0.0767* (0.0426)
Daycare policy	-0.0151 (0.0227)	6.38e-05 (0.0248)	0.359 (1.139)	0.0292 (0.179)	0.0150 (0.0244)	-0.00916 (0.0222)	-0.0142 (0.0245)	-0.00399 (0.0169)	-0.0114 (0.0170)	-0.0313 (0.0279)	0.00120 (0.0249)	0.00593 (0.0221)
Observations	7,608	7,608	7,608	7,608	7,608	7,608	7,608	7,608	7,608	7,177	7,177	7,177
R-squared	0.051	0.060	0.045	0.062	0.042	0.044	0.057	0.040	0.046	0.043	0.032	0.027
Num. of women in panel	2,347	2,347	2,347	2,347	2,347	2,347	2,347	2,347	2,347	2,347	2,347	2,347
Mean of Dependent Var.	0.744	0.632	26.79	4.257	0.539	0.442	0.504	0.117	0.104	0.249	0.227	0.166

Data from the EPS surveys for 2002, 2004, 2006, 2009, and 2015. The sample included women who had primary school-aged children when they were surveyed. The share of FDS was the fraction of schools with 50% of their grade levels under the FDS regime. Daycare policy was a categorical variable equal to one if the woman has child of preschool age after 2005. Robust standard errors, clustered at the municipal level, in parentheses. Statistical significance is shown at \*\*\*1%, \*\*5%, and \*10% levels. Variables not shown: youngest child in primary school; fraction of FDS in municipality; mother's years of education; mother's age and age squared; presence of children aged 0-5, 6-13, 14-18, and 18+ in household; municipal average school attainment; municipal rates of poverty; rural population; women's and men's employment; women's and men's labor-force participation; region-year fixed-effects; interactions between a categorical variable for municipal women's labor-force participation rate in 2000 and year fixed-effects; and individual fixed-effects.



**Table 10. Lower and upper bounds of treatment effects using the Oster approach (2019)**

Outcome variable	(1) Uncontrolled (baseline) Effects, $[\hat{R}]$	(2) Controlled Effects, $[\tilde{R}]$	(3) Identified Set
LFP	0.056*** [0.003]	0.155*** [0.051]	[0.155, 0.261]
Employment	0.110*** [0.010]	0.204*** [0.060]	[0.204, 0.317]
Hours	3.305*** [0.003]	8.721*** [0.045]	[8.721, 14.789]
Wage	0.892*** [0.011]	1.002** [0.062]	[0.868, 1.002]
Full-Time	0.061*** [0.002]	0.171*** [0.042]	[0.049, 0.171]
Contract	0.071*** [0.003]	0.129** [0.044]	[0.067, 0.129]

Data from the EPS surveys for 2002, 2004, 2006, 2009, and 2015. The sample included women who had primary school-aged children when they were surveyed. The share of FDS was the fraction of schools with 50% of their grade levels under the FDS regime. In Columns 1 and 2, numbers in parentheses report  $R^2$ . Statistical significance is shown at \*\*\*1%, \*\*5%, and \*10% levels. As in Oster (2019), in the estimations reported in Column 3,  $R_{\max} = \min(2\tilde{R}, 1)$ ,  $\delta = 1$ , the results were qualitatively the same when a lower share of  $\tilde{R}$  (i.e.,  $< 2$ ) was used. Similarly, results held consistent for the other extreme bound of  $\delta$  (i.e.,  $= -1$ ). For Column 2, we used the full set of controls reported in Table 5.

Table 11. Effect of full-day schedules on quality of mothers' employment: women by education level (2002-2015)

VARIABLES	Labor Supply				Employment Quality							
	LFP (1)	Employment (2)	Hours (3)	Wage (4)	Full- Time (5)	Contract (6)	Permanent (7)	Self- Emp./ Employee (8)	Union (9)	Small Firm (10)	Medium Firm (11)	Large Firm (12)
<b>A. Low-education mothers</b>												
Youngest Child in Primary School x Fraction of FDS in municipality	0.139** (0.0540)	0.208*** (0.0565)	9.918*** (2.616)	0.802** (0.396)	0.192*** (0.0608)	0.178** (0.0684)	0.0879 (0.0634)	-0.0328 (0.0493)	0.0120 (0.0370)	0.0784 (0.0725)	0.0320 (0.0682)	0.0959** (0.0451)
Observations	5,953	5,953	5,953	5,953	5,953	5,953	5,953	5,953	5,953	5,622	5,622	5,622
R-squared	0.063	0.073	0.056	0.070	0.049	0.050	0.067	0.045	0.040	0.050	0.035	0.025
Num. of women in panel	2,080	2,080	2,080	2,080	2,080	2,080	2,080	2,080	2,080	2,060	2,060	2,060
Mean of Dependent Var.	0.713	0.591	25.02	3.859	0.492	0.386	0.446	0.119	0.0769	0.266	0.191	0.136
<b>B. High-education mothers</b>												
Youngest Child in Primary School x Fraction of FDS in municipality	0.304***	0.282**	9.634**	1.749*	0.144	0.0551	0.188	-0.000758	0.0109	0.0287	0.209*	0.134

	(0.106)	(0.120)	(4.619)	(1.001)	(0.116)	(0.122)	(0.141)	(0.0906)	(0.103)	(0.0882)	(0.113)	(0.136)
Observations	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,655	1,555	1,555	1,555
R-squared	0.085	0.094	0.087	0.113	0.093	0.112	0.117	0.102	0.126	0.123	0.080	0.113
Num. of men in panel	736	736	736	736	736	736	736	736	736	698	698	698
Mean of Dependent												
Var.	0.856	0.783	33.16	5.688	0.709	0.640	0.714	0.112	0.200	0.190	0.354	0.276

Data from the EPS surveys for 2002, 2004, 2006, 2009, and 2015. The sample included women who had primary school-aged children when they were surveyed. The share of FDS was the fraction of schools with 50% of their grade levels under the FDS regime. Robust standard errors, clustered at the municipal level, in parentheses. Statistical significance is shown at \*\*\*1%, \*\*5%, and \*10% levels. Variables not shown: youngest child in primary school; fraction of FDS in municipality; mother's years of education; mother's age and age squared; presence of children aged 0-5, 6-13, 14-18, and 18+ in household; municipal average school attainment; municipal rates of poverty; rural population; women's and men's employment; women's and men's labor-force participation; region-year fixed-effects; interactions between a categorical variable for municipal women's labor-force participation rate in 2000 and year fixed-effects; and individual fixed-effects.

**Table 12. Effect of full-day schedules on quality of mothers' employment: household structure (2002-2015)**

VARIABLES	Labor Supply					Employment Quality						
	LFP (1)	Employment (2)	Hours (3)	Wage (4)	Full-Time (5)	Contract (6)	Permanent (7)	Self- Emp./ Employer (8)	Union (9)	Small Firm (10)	Medium Firm (11)	Large Firm (12)
<b>A. Women with a Partner/Husband</b>												
Youngest Child in Primary School x Fraction of FDS in municipality	0.200*** (0.0597)	0.166*** (0.0633)	8.969** *	1.019* (0.523)	0.151** (0.0712)	0.0658 (0.0639)	0.0396 (0.0665)	0.00674 (0.0490)	-0.0335 (0.0433)	0.203*** (0.0573)	0.0252 (0.0751)	0.0162(0. 0580)
Observations	5,138	5,138	5,138	5,138	5,138	5,138	5,138	5,138	5,138	4,875	4,875	4,875
R-squared	0.056	0.056	0.053	0.060	0.049	0.060	0.060	0.049	0.051	0.040	0.036	0.034
Num. of women in panel	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,850	1,835	1,835	1,835
Mean of Dependent												
Var.	0.673	0.554	23.38	3.729	0.471	0.383	0.448	0.108	0.0971	0.214	0.202	0.140

## B. Women without a Partner/Husband

Youngest Child in Primary School x Fraction of FDS in municipality	-0.001 (0.0831)	0.212* (0.112)	1.494 (5.212)	0.574 (0.819)	0.0966 (0.140)	0.0943 (0.120)	-0.0387 (0.101)	-0.0479 (0.0888)	0.0135 (0.0742)	-0.0914 (0.0935)	0.0476 (0.160)	0.126 (0.0935)
Observations	2,470	2,470	2,470	2,470	2,470	2,470	2,470	2,470	2,470	2,302	2,302	2,302
R-squared	0.045	0.078	0.065	0.073	0.062	0.073	0.096	0.069	0.095	0.072	0.066	0.063
Num. of men in panel	1,098	1,098	1,098	1,098	1,098	1,098	1,098	1,098	1,098	1,049	1,049	1,049
Mean of Dependent Var.	0.891	0.797	33.88	5.355	0.681	0.563	0.620	0.136	0.117	0.323	0.278	0.220

Data from the EPS surveys for 2002, 2004, 2006, 2009, and 2015. The sample included women who had primary school-aged children when they were surveyed. The share of FDS was the fraction of schools with 50% of their grade levels under the FDS regime. Robust standard errors, clustered at the municipal level, in parentheses. Statistical significance is shown at \*\*\*1%, \*\*5%, and \*10% levels. Variables not shown: youngest child in primary school; fraction of FDS in municipality; mother's years of education; mother's age and age squared; presence of children aged 0-5, 6-13, 14-18, and 18+ in household; municipal average school attainment; municipal rates of poverty; rural population; women's and men's employment; women's and men's labor-force participation; region-year fixed-effects; interactions between a categorical variable for municipal women's labor-force participation rate in 2000 and year fixed-effects; and individual fixed-effects.

## Appendices

### Appendix 1. Panel Structure and Attrition

In the appendix we describe the structure of our panel and analyze attrition over the, 2002 and, 2015 period. Table A1.1 summarizes the panel structure of our sample, which included 2,347 women, 573 of whom appeared twice in our panel, 807 of whom appeared three times, 794 of whom appeared in all but one round, and 173 of whom appeared in all five rounds of the panel. The full structure of the distribution of appearances in the panel, with all its possible combinations is reported in the table.

It is relevant that our sample selection affected the structure of our panel. The sample was composed of mothers with children of preschool or primary-school age. This criterion implies, as children aged, women tended to leave our sample. This, combined with the fact that EPS did not include refreshment samples in the, 2006 and, 2009 round, resulted in fewer women continuing in the panel through, 2015.

The analysis compared means of observable characteristics in 2002 for women who remained in the survey in 2015 and for those that did not. The results are reported in Table A1.2. For the overall survey, they show that women who did not appear in the, 2015 round of EPS were on average 5.5 years older and were five percentage points or 8.4% less likely to have a partner. Their household size was 7.7% smaller; they had 0.5 (5%) fewer years of education; and they lived in municipalities with higher average years of education, lower poverty rates, and higher labor-force participation rates. Although the differences in the means of these observable variables were statistically significant between these groups, some of those differences were not economically large. For the group of women included in our sample (women who had at least a child of primary-school age during any of the survey years), we found fewer differences in observable characteristics between the groups of women interviewed in 2015 and those not interviewed: women who were not followed in 2015 were 7.1 years older in 2002 and had larger households (by 6.5%). The attrition rate for the overall sample between, 2002 and, 2015 the rate was 55%. For our sample, attrition was 88%, although this larger rate is explained by the criteria for sample selection. As indicated previously, as women and their children aged and moved away from primary school, they were dropped from the sample.

**Table A1.1. Panel Structure: distribution of sample observations (2002-2015)**

Num. Times in Sample	2002	2004	2006	2009	2015	Number of Observations	Number of Women in Panel		
2	X	X				564	282		
2	X		X			120	60		
2	X			X		68	34		
2	X				X	10	5		
2		X	X			266	133		
2		X		X		50	25		
2		X			X	8	4		
2			X	X		22	11		
2			X		X	2	1		
2				X	X	36	1,146	18	573
3	X	X	X			1,056	352		
3	X	X		X		156	52		
3	X	X			X	30	10		
3	X		X	X		249	83		
3	X		X		X	9	3		
3	X			X	X	12	4		
3		X	X	X		750	250		
3		X	X		X	24	8		
3		X		X	X	30	10		
3			X	X	X	105	2,421	35	807
4	X	X	X	X		2,536	634		
4	X	X	X		X	56	14		
4	X	X		X	X	56	14		
4	X		X	X	X	96	24		
4		X	X	X	X	432	3,176	108	794
5	X	X	X	X	X	865	865	173	173
Observations	1,744	2,069	1,889	1,475	431	7,608		2,347	

Source: Authors' calculations from the EPS surveys for 2002, 2004, 2006, 2009, and 2015.

**Table A1.2. EPS Attrition Analysis for Women Interviewed in 2002 and Followed-Up in 2015:  
Mean Of Observable Characteristics**

	All Women (in 2002 round)		Women in Sample (in 2002 round)	
	Followed-up in 2015:		Followed-up in 2015:	
	Yes	No	Yes	No
<b>Individual characteristics</b>				
Age	36.5	42.0 *	29.6	36.7 *
Married/partner	0.59	0.54 *	0.70	0.68
Household Size (num. persons)	4.6	4.3 *	4.5	4.8 *
Years of education	10.0	9.5 *	10.4	10.0
<b>Municipality of residence</b>				
Average yrs. Education	9.9	10.1 *	10.1	9.9
Poverty rate	0.20	0.19 *	0.20	0.19
Unemployment rate	0.10	0.10	0.10	0.10
Labor-force participation rate	0.57	0.57 *	0.57	0.57
Employment rate	0.90	0.90	0.90	0.90
Region 1	0.01	0.01	0.00	0.02
Region 2	0.03	0.04	0.03	0.04
Region 3	0.01	0.02	0.03	0.02
Region 4	0.05	0.04	0.06	0.05
Region 5	0.05	0.06	0.03	0.04
Region 6	0.12	0.10	0.13	0.10
Region 7	0.07	0.06	0.10	0.08
Region 8	0.13	0.11	0.15	0.12
Region 9	0.05	0.04	0.04	0.05
Region 10	0.07	0.06	0.04	0.06
Region 11	0.01	0.01	0.01	0.01
Region 12	0.01	0.01	0.02	0.02
Region 13	0.30	0.38 *	0.30	0.32
Region 14	0.06	0.04 *	0.04	0.06
Region 15	0.02	0.01	0.02	0.02
<b>Frequency</b>	<b>2,051</b>	<b>2,476</b>	<b>247</b>	<b>1,841</b>
<b>Attrition</b>		<b>55%</b>		<b>88%</b>

Data from the 2002 and 2015 EPS surveys. \* Reflects differences in means that were statistically significant at 1%.