PAGE
policy analysis on growth and employment

Access to child care and mothers' employment quality: lessons from Chile

RESEARCH PROPOSAL

Presented to

Partnership for Economic Policy (PEP)

By

Diana I. Kruger

&

Matias Berthelon
Veronica Vienne
Carlos Zamora

CHILE

November 14, 2017

SECTION I – PROJECT OVERVIEW & OBJECTIVES

1. **Abstract** (max 100 to 250 words)

Barriers to women's labor market entry can be detrimental to gender equality. Across different contexts, women typically have lower labor force participation rates and lower quality jobs relative to men. Female labor force participation in Chile is 48%, among the lowest in Latin America, and the likelihood of employment is two times greater in the highest income quintile relative to the lowest. Understanding barriers to female employment is a relevant policy question for Chile. Motherhood—and the gender roles associated with it—is an important determinant of women's employment outcomes. Chilean mothers declare that among the most important reasons for not working/seeking employment is lack of childcare, even among mothers of school-aged children. In this project, we will study the effect of a reform that extended daily school schedules from half to full days in Chile on traditional measures of maternal employment, as well as several measures of maternal job quality. Job quality has received little attention and has never been studied in this context. Understanding the effects of the FDS reform on job quality can help in the design of policies intended at improving women's welfare. The gradual implementation of the FDS reform (over time and geographically) provides an identification strategy. Thus, we will implement estimations using a panel of working age mothers over a 13-year period. We will estimate a model that includes individual fixed-effects, which controls for women's time-invariant unobservable characteristics that may influence her employment and job quality outcomes. Data sources are publicly available surveys from the Ministries of Social Development and Education.

2. **Main research questions and contributions** (max 500 to 700 words)

Despite its relatively high level of income, the rate of female labor force participation in Chile—48%—is similar to the rate in Haiti and Honduras, two of the poorest countries in the region. Furthermore, large disparities exist within Chile, where women in the wealthiest 25% of the population are twice as likely to participate in the labor market relative to the poorest 25%.

The two most relevant reasons for women's absence from the labor market—domestic chores and lack of childcare—are gender-related barriers. Lack of child care is the focus of this paper, and it is the second most frequent reason—after

housework—that Chilean mothers cite for not participating in the labor force; poorer women are three times as likely to cite this as the most important reason for not working. This project will investigate whether an education reform that extended school schedules from half to full days in Chile impacted mothers' employment and employment quality. The reform is known in Chile as the Full Day Schooling (FDS) reform.

One possible reason that longer school schedules can aid mothers in finding better quality jobs is that they have more time available for a rigorous job search. Another possibility is that in a labor market that has inflexible legislation or where fixed costs of employment are high—such as in Chile—providing additional hours of children's supervision on school grounds can facilitate mothers' full-time employment (which tends to have higher salaries and other benefits).

The concept of employment quality includes several dimensions of a person's job, which include income, hours worked, legal protection, and social security (and other) benefits. Some studies analyze measures of each dimension separately, while other approaches create an index along the aforementioned dimensions.

In this project, we will explore the following research questions.

1. Does time spent in school by school-aged children facilitate mother's entry to jobs that are of better quality? We will explore whether formal child-care provided by longer school schedules (FDS) impacts mothers on several outcomes:
    a. Labor supply outcomes:
        i. Labor force participation
        ii. Employment (any)
        iii. Hours worked
    b. Job quality outcomes:
        i. Income
        ii. Full-time employment
        iii. Employment with a contract (any)
        iv. Employment with a permanent contract (requires pension, health, compensation, unemployment insurance and other benefits)
        v. Employment in a large firm (200+ workers)
        vi. A multidimensional index of employment characteristics.

2. Does the impact of time spent in school differ for younger vs. older mothers?

3. Does the impact of time spent in school differ for high vs. low-education mothers?

4. Does the impact of time spent in school differ for mothers living in different regions of the country?

These research questions are relevant for several reasons. First and foremost, lack of

child care is an important barrier to women's participation in the labor market in Chile, especially among poor women; thus, it is important to understand the impact of policies that promote women's entry to the labor force.

Second, employment quality plays a role in reducing poverty and income inequality: women's employment in Latin America was responsible for about one third of the gains in income and reduction in inequality during the 2000-2010 period (World Bank 2011). Additionally, women's labor outcomes have positive effects on their children's welfare. Finally, increases in women's employment rates, income, and job quality can be important determinants of gender equality.

Evidence from developed and developing countries suggests that expanding day care and pre-school coverage may increase women's labor force participation. Less is known about the effect of formal child care arrangements for older children (which schools provide implicitly), especially in developing countries. Nothing is known about the impact of child care on mothers' employment quality.

The findings of this project will provide new knowledge on the effects of child care on mothers' employment quality. Results from this project can be useful in the design of policies that can potentially aid mothers in finding higher quality jobs. Many countries in Latin America and other regions are currently considering extending school schedules, and thus findings of this project can provide useful insight as to the positive effects of such policies.

SECTION II – CAPACITY BUILDING

2.1. Team composition and experience

Team leader

Name	**Age**	**Sex (M, F)**	**Highest degree/diploma**
Diana I. Kruger	47	F	Ph.D.
Training and experience	Ph.D. in Economics, University of Maryland, College Park, MD., U.S.A. Over 13 years of academic experience in Chile, Nicaragua and the United States. Successful publication of academic research in peer-reviewed journals. Several years of experience consulting for International Organizations (World Bank, Interamerican Development Bank, U.N. Economic Commission for Latin America and the Caribbean, among others), providing scientific evidence for policy design. Experience consulting for government agencies, in Nicaragua and Chile.		

Expected capacity building	Deepen knowledge and practice of applied micro-econometric techniques and data management. Deepen knowledge of literature on policy evaluation. Acquire knowledge on the theoretical and empirical literature on employment quality. Deepen knowledge of the literature on education policy reform, specifically the literature on school schedules and child care. Ms. Kruger currently has experience evaluating the school schedule reform in Chile on other outcomes (teen motherhood, adolescent crime) and on mother's employment decisions. The skills developed in this paper will allow her to extend understanding of the impact of child care on the quality of employment accessible to mothers, and to consolidate her research expertise in understanding human capital formation and women's employment decisions in Latin America. Ms. Kruger has past experience organizing academic conferences for the national Chilean conference of the Economics Society of Chile. She served on the Board of this Society for eight years, serving as President for three years. During her tenure she developed a large national network of professional economists who are potential participants to workshops and seminars to present results of this project.
Contribution to project	Guide the younger members of the research team; coordinate various analytical activities; support the coordinator of the policy engagement and communications strategy. Specific tasks will include: synthesize literature review; guide and provide feedback regarding empirical methodology; write various versions of the final report (in collaboration with Mr. Berthelon). Guide and participate in discussions regarding empirical results.

Team member #2

Name	**Age**	**Sex (M, F)**	**Highest degree/diploma**
Matias Berthelon	44	M	Ph.D.
Training and experience	Ph.D. in Economics, University of Maryland, College Park, MD., U.S.A. Over 15 years of academic experience in Chile and the United States. Successful publication of academic research in peer-reviewed journals. Experience consulting for International Organizations such as the World Bank and the International Monetary Fund.		
Expected capacity building	Deepen knowledge of literature on policy evaluation. Deepen knowledge and practice of applied micro-econometric techniques and data management. Acquire knowledge on the theoretical and empirical literature on employment quality. Deepen knowledge of the literature on education policy reform, specifically the literature on school schedules and child care. Acquire experience with policy		

	consultation and engagement with relevant stakeholders and organizing outreach activities. Mr. Berthelon has prior experience evaluating the school schedule reform in Chile on other outcomes (teen motherhood, adolescent crime) and on mother's employment decisions. The skills developed in this paper will allow him to extend understanding of the impact of child care on the quality of employment accessible to mothers, and to consolidate his research expertise in understanding human capital formation and women's employment decisions in Latin America. Mr. Berthelon will also develop new experience making direct links between research products and relevant policy makers, as well as communicating results to wider audiences. Mr. Berthelon has past experience organizing several academic conferences for the national Chilean conference of the Economics Society of Chile. He currently serves in the Board of Director of this Society (and was recently elected to serve as Vice-President for the period 2018-2019 and as President during the 2020-2021 period). He also has a large network of potential participants to workshops and seminars to present results of this project.
Contribution to project	Mr. Berthelon will be responsible for coordinating and reporting on the design/implementation of the projects' policy engagement and communication strategy. He will also guide the younger members of the research team. Specific tasks will include: guide and monitor the data and variable construction, guide and supervise empirical estimations; write various versions of the final report (in collaboration with Ms. Kruger).

Team member #3

Name	**Age**	**Sex (M, F)**	**Highest degree/diploma**
Veronica Vienne	27	F	Masters of Arts in Economics
Training and experience	Masters of Economics and Public Policy (2014), Adolfo Ibañez University. MSc Economics (2016), University of Manchester (UK) Ms. Vienne is starting her academic career, having recently obtained a graduate degree in Economics from the University of Manchester, where her Masters Thesis received an Academic Excellence Award. She has worked for several years as a research assistant evaluating educational policies. Her research also involves evaluation of environmental problems.		
Expected capacity building	Acquire experience working with panel data: conceptual experience learning econometric models, as well as practical experience handling panel data set and estimating panel data models. Deepen her knowledge of		

	policy evaluation. Acquire experience coordinating policy engagement and communications strategy. These skills will help Ms. Vienne better prepare for her Ph.D. in Economics, which she plans to pursue in the future. With regards to this proposal, she has prior experience evaluating the impact of the Chilean school schedule reform on early reading outcomes, so she is familiar with the policy we will evaluate.
Contribution to project	Ms. Vienne will collaborate creating the required data bases, will collaborate on estimations of panel data models. She will prepare tables of the descriptive analyses and presentations for technical and general audiences. She will support Mr. Berthelon in coordinating the policy engagement and communications strategy.

Team member #4

Name	Age	Sex (M, F)	Highest degree/diploma
Carlos Zamora	28	M	Masters of Management Science
Training and experience	Masters of Management Science (2014), Adolfo Ibañez University Mr. Zamora began his academic career in 2015, one year after acquiring his Master's degree in Management Science. He has worked as a lecturer in various economics courses for the Universidad Adolfo Ibáñez and has worked as a research assistant studying topics such as employment quality and wage discrimination in imperfect labor markets. His Masters Thesis obtained an Excellence Award at the Annual Conference of the Chilean Economics Society in 2015. He has also worked as an Instructor leading a Stata workshop, and has ample experience working with databases in general, and more specifically, constructing panel databases.		
Expected capacity building	Acquire experience working with panel data: conceptual experience learning econometric models, as well as practical experience constructing and administrating a panel data set and estimating panel data models. Deepen his knowledge of how to evaluate causal effects of a policy. Deepen experience in carrying out a thorough and extensive literature review. These skills will help Mr Zamora better prepare for his Ph.D. in Economics, which he plans to pursue in the future. With regards to this proposal.		
Contribution to project	Mr. Zamora will conduct an extensive updated literature review on female employment, employment quality and school schedule reforms; he will construct a panel data set from four rounds of Social Protection Surveys and from administrative school system data on full-day school enrollment. He will also estimate panel data models to estimate the effects of the policy. He will prepare tables of descriptive analysis and tables of regression results to include in the final report, and in presentations to technical and general audiences. Mr. Zamora has prior experience evaluating the impact of the Chilean school schedule reform, so she is familiar with the policy we will evaluate.		

1. **List of past, current or pending (non-PEP) projects in related areas involving team members, including resulting publications (If any)**

Name funding institution, title of project and related publications, list of team members involved.

Name of funding institutions	**Title of projects and related publications (link)**	**Team member(s) involved**
National Commission of Science and Technology (Chile)	*Title:* "The effect of longer school days on household time allocation decisions: Mothers labor supply, juvenile crime, and youth employment and schooling in Chile"	Diana Kruger (Principal Investigator), Matias Berthelon (Co-Investigator), Veronica Vienne (Research assistant), Carlos Zamora (Research assistant)
	Publication (reference): *1.* "Does adolescent motherhood affect education and labor market outcomes of mothers? A study on young adult women in Chile during 1990-2013", with M. Berthelon, *International Journal of Public Health*, 62(2), 2017, 293-303. 2. "Estimating the effects of teen motherhood in Chile: a family fixed effects approach", with M. Berthelon and J. Eberhard, *Estudios de Economía*, 44 (1), 2017, 5-32.	
National Commission of Science and Technology (Chile)	*Title:* "The role of gender in youth employment and school enrollment in Chile"	Diana Kruger (Principal Investigator), Matias Berthelon (Co-Investigator)
	Publication (reference): "Risky behavior among youth: Incapacitation effects of school on adolescent motherhood and crime in Chile", with Matias Berthelon. *Journal of Public Economics*, v95(1-2), 2011, 41-53.	
National Commission of Science and Technology (Chile)	*Title:* "Child labor and schooling: A structural model and its empirical application"	Diana Kruger (Principal Investigator), Matias Berthelon (Co-Investigator)
	Publication (reference): "Household Choices of Schooling and Child Labor: A Structural Model with Applications to Brazil", with Matias Berthelon and Rodrigo Soares. *Journal of Human Resources*, v47(1), 2012, 1-31.	

Inter American Development Bank, Latin American Research Network	*Title:* "The role of social networks in the economic opportunities of Bolivian women"	Diana Kruger (Co-Investigator)
	Publication (reference): "Child labor and schooling in Bolivia: Who's Falling Behind? The roles of domestic work, gender and ethnicity," with Daniela Zapata and Dante Contreras. *World Development*, Volume 39(4), 2011, 588-599.	
National Commission of Science and Technology (Chile)	*Title:* "Evolution and Determinants of the Extensive Margin in Developing Countries: An Empirical Application"	Matias Berthelon (Principal Investigator)
	Publication (reference): "Chilean Export Performance: The Role of Intensive and Extensive Margins", Economía Chilena, Volume 4, No. 1, pp. 25-38, April 2011.	

2. **List of past or current PEP-supported projects involving team members, including resulting publications**

Project code (e.g. PMMA-12345)	**Title of project and related external (non-PEP) publications, if any**	**Team member(s) involved**
	Title:	
	Publication (reference):	
	Title:	
	Publication (reference):	
	Publication (reference):	

SECTION III – RESEARCH

1. **Literature review** (max 1000 to 1500 words)

Explain specific gaps in existing literature that your research aims to fill. You might want to explain whether or not this question has been addressed before in this context (including key references), and if so, what you wish to achieve (in addition) by examining the question again?

Women's attachment to the labor markets plays an important role in households' welfare and gender equality, so that policies promoting female labor force participation and employment are of paramount importance for economic development. Women's decisions to engage in the labor market are determined by multiple factors. Among the most relevant ones are those related to motherhood, which is one of the main determinants of inactivity among women, because it is often women who suspend their labor force activities when they have children. The possibility of reconciling work and family life can be affected by public policies that address this issue, directly or indirectly, such as family-friendly employment policies (Blau and Kahn 2013) or flexible work schedules (Chioda et al. 2011, Del Boca 2002).

One policy with potentially large benefits for mothers' employment is child care provision, which has recently been the focus of international development institutions like the World Bank and the International Financial Corporation (IFC 2017). In the early child care literature the emphasis was on the responsiveness of female labor supply to prices, finding price elasticities in the U.S. ranging between 0.04 to -1.26 (Blau and Robins, 1988; Blau and Currie, 2006). Similar results are also found in Sweden (Lundin et al., 2008); Russia (Lokshin, 2004); Canada (Powell, 2002); Rumania (Fong and Lokshin, 2000); and Kenya (Lokshin et al., 2004).

More recent research focuses on child care availability (for pre-school children) and mothers' employment. This relationship has been broadly studied in the literature, although it has mainly focused on developed countries: in the U.S., Gelbach (2002), Cascio (2009), and Fitzpatrick (2012) find that access to public kindergarten in the U.S. increased mothers' labor supply, and Barua (2014) finds that these effects can be long lasting. Studies in other developed countries include Baker et al. (2008) and Lefebvre and Merrigan (2008) in Canada, and Schlosser (2011) in Israel. Most find positive impact of increased pre-school access and mothers' employment.

The existing empirical evidence for developing countries is growing. Berlinski and Galiani (2007) and Berlinski, Galiani and Mc Ewan (2011) analyze the effects of a pre-school expansion in Argentina on mothers' labor supply, finding that greater access to pre-schools increases mothers' labor force participation. Working papers for Latin America find similar effects (Peña-Parga and Glassman (2004) for Colombia and

Calderon (2012) for Mexico).

Several studies have evaluated the effect of access to daycare and preschool in Chile, because public child care provision for preschoolers has increased dramatically in Chile in recent years. Between 2006 and 2009, the number of slots/vacancies in publicly funded pre-school centers (for children up to four years old) increased by almost 50%. However, take-up has been low and the large increase in pre-school access has not impacted mothers' employment (Aguirre, 2012; Martínez and Medrano, 2009; Martínez and Encina, 2009). Possible explanations for the low take-up rates include low quality of pre-school centers, mothers' lack of trust in available centers, and strong mothers' preferences for caring for their young children.

An area that has received much less attention is on the effects of access to formal child care school-aged children, i.e, older children. In particular, to our knowledge, no studies exist on the effect on quality of mothers' employment. As children access different forms or child care, with different schedules, it is likely that their access to different types of child care arrangements might affect parental employment decisions, and along with this decision the quality of the jobs they are able to obtain. For instance, the mismatch between access to full-day child care or schooling might affect parental decisions to apply for full-time jobs, which are typically associated with higher quality jobs.

Recently, empirical evidence suggests that time in school leads to greater female employment in Chile. Berthelon et al. (2015) and Contreras and Sepulveda (2016) find that the FDS reform had a positive impact on women's labor force participation and hours worked, while Martinez and Perticara (2017) find that an on-site after-school program in Chile led to greater mothers' employment. However, there are no published studies on the impact that time spend in schools on women's quality of jobs.

Objectives of the Project

This project will analyze whether longer daily school schedules affect not only labor force participation and employment but also the quality of mothers' employment, which has not been previously addressed by the literature. Employment quality goes beyond measures of labor force participation or employment, and captures several dimensions of a job such as hours worked, wages, legal protection, and type of work, among others. Women's access to good jobs can empower women and reduce gender inequalities.

Channels through which time in school may affect job quality

If mothers can access subsidized, supervised child care, then part of their time can be spent on job search activities. The full day reform implicitly provides additional

hours of supervised child care, so that mothers become more likely to improve their match to offered job positions and will also be more likely to access better jobs. Acemoglu and Shimer (2000) and Van Ours and Vodopivec (2008) study a similar channel when analyzing the effects of unemployment insurance and job quality.

Another possible channel comes from the increased feasibility of full-time work. because the need for formal care outside of school is reduced. Full-time jobs are generally associated with better employment (wages, contract, etc.), so that extended schedules might affect maternal job quality (see, for instance, Hirsch (2005), Manning and Petrongolo (2008) and Bardasi and Gornick (2008), which discuss the trade-off in job quality between full-time and part-time employment).

2. **Methodology** (max 1200 to 1600 words)

We propose a methodology to estimate the causal effect of access to full-day schooling on employment and employment quality outcomes for mother with children in schooling age. We will estimate the effects using a panel data model that includes individual-level fixed effects. We will identify the causal effect of full-day school access from the gradual phase-in of the FDS reform in Chile, which has been implemented across the country since 1997 (more details of the policy are provided in Section IV.1).

Several studies analyzing the reform's effects on different outcomes have applied similar methodologies, exploiting the gradual phase-in of the policy to identify its effects (Berthelon and Kruger 2011; Contreras and Sepulveda 2016). These studies have used repeated cross-sectional data. A necessary condition to identify a causal effect of the policy is the parallel trends assumption: as long as the pre-existing trends in regions with high/low levels of female employment (or other outcomes) are not correlated with the policy's implementation. Even if this assumption is satisfied, it's possible that individual unobservable characteristics are correlated with the outcome of interest or the policy variable.

In this project, we will be able to address this potential bias by constructing a panel of mothers, allowing us to estimate an individual fixed effects model that controls for time-invariant individual unobservable characteristics that may be correlated with employment outcomes. This is an improvement relative to previous studies. The empirical model to be estimated can be summarized as follows:

$$L_{imrt} = \gamma_1 FDS_{mrt} + \gamma_2 (FDS_{mrt} \times PSAge_{imrt}) + \gamma_3 PSAge_{imrt} + X_{imrt}\beta + M_{mt}\vartheta + \alpha_i + \eta_m +$$

$$\tau_{rt} + \omega_t D_{mr} + \epsilon_{imrt} \quad (1)$$

where the dependent variable L_{imrt} is an employment outcome of woman i living in municipality m and region r in year t.

In addition to labor supply variables that have been used in previous studies—participation; employment; hours worked—we will also consider several measures of job quality and formality that are widely accepted in the existing literature: labor income; full-time employment; employment with a contract; employment with a permanent contract (requires pension, health, compensation, unemployment insurance and other benefits); employment in a large firm (200+ workers); and a multidimensional index of employment characteristics.

The policy variable of interest is access to FDS schools, FDS_{mrt}. It measures the availability of full-day primary schools in municipality m and region r in year t. As not all schools in a municipality have to enter the full-day regime at the same time (more details are included in Section IV.1), we can measure availability of FDS at the municipal level in two ways: as the fraction of schools that have adopted the full-day policy, or as the share of municipal enrollment under full-day schooling. Both variables are continuous and range between 0 and 1.

The individual-level fixed effect is α_i, which will control for individual mother's unobserved heterogeneity. In our panel data model, mothers are observed at different moments in time when their youngest child may or may not be affected by the FDS policy. Some years of the data will use overlap with a policy of preschool expansion that began in 2006. The FDS and preschool policy were designed and implemented independent of each other (implemented by different agencies, with different objectives, at different periods); however, we will address the possible effects of the preschool policy by including municipal supply of preschools as a control variable in the estimations.

Women with children in primary school should benefit most from the FDS policy because the FDS reform applied to primary and secondary schools (not pre-schools). To focus our estimates on the most affected group of mothers, we will interact our policy variable with a categorical variable ($PSAge_{imrt}$) that equals one if the youngest child of mother i is of primary school age (6 or more) in year t, and zero if the child is younger than 6 (we will not include mothers of children of high school age or older because child care is not a concern for that group of mothers). Identification in the model, therefore, comes from exogenous municipal-level variation in the availability of full-day primary schools, and from within-mother variation in the child's age, which determines the timing of policy exposure.

The effect of access to longer school schedules is $(\gamma_1 + \gamma_2)$ when the mother's

youngest child is in primary school, and it is γ_1 when the youngest child has not entered the primary school system (preschool age). With the individual fixed-effects estimation, the coefficients of interest $(\gamma_1 + \gamma_2)$ will be unbiased under the assumptions that individuals' unobserved preferences are stable through time. Since pre-school children are not affected by the policy, we expect γ_1 to be zero.

We will also include a group of time-varying individual characteristics in X_{imrt} and time-varying municipality-level characteristics, M_{mt}, to control for municipality-level variables that can affect mothers' labor outcomes. Our estimation will also include municipality fixed-effects (η_m); region-year fixed effects (τ_{rt}), to control for factors at the regional level that vary across time (such as regional labor market conditions), among others.

Estimating a causal effect of the full-day school policy faces several potential identification challenges; we describe them below and how we plan to address them.

Pre-existing trends
Implementation of the full-day policy was not random, so that identification in our model also rests on the assumption that trends in women's labor outcomes are independent of the full-day schooling implementation. We plan to control for the possibility of pre-existing trends in labor force outcomes by including differential trends in municipalities with low and high initial levels of female labor force participation prior to the reform's implementation $(\omega_t D_{mr})$. Controlling for differential trends will clear estimations of any differences in trends that may have existed prior to the policy.

Endogeneity challenges
It is possible that endogeneity exists between mothers' employment and full-day school enrollment, because in Chile parents can choose their child's school. It is theoretically possible that families choose a full-day school in order to facilitate mothers' employment. However, we will measure the impact of potential access to FD schooling at the municipality of residency of the family (FDS_{mrt}). Thus, our measure of access to FD schools is exogenous to family decisions (the actual choice is not) if location choices by families are not correlated with the implementation of the FD policy. Berthelon et. al, 2015 finds that in Chile families do not consider higher access to FDS in their decisions to migrate.

Endogeneity would also occur if schools switch to FD as a reaction to mothers' employment decisions and preferences. For two reasons related to the Chilean school system we believe that is unlikely. First, the public-school system is highly decentralized, as school districts are defined at the municipality level, with school districts operating independently. Second, principals in public schools have increasingly gained more autonomy (Núñez, Weinstein and Muñoz 2010) in their

decisions (including those related to participate in the FD policy. In terms of privately subsidized schools more than 70 percent of them are single standing schools, thus they are not franchises likely coordinate in their decisions (Elacqua et al 2011). As we aggregate school decisions at a municipal level, these two characteristics induce large variation in the implementation rate over time and across municipalities.

To formally address these two challenges, Berthelon et al. 2017 examined whether the reform was affected female labor market outcomes by estimating a model of the determinants of full-day schooling implementation at the municipal level. We summarize those findings here.

The policy variable of interest (FDS implementation) was regressed on several municipal characteristics, including female employment outcomes (lagged). The model can be represented as:

$$FDS_{mrt} = M_{mt-1}\phi + \omega_r + \varphi_m + \mu_{mrt} \quad (2)$$

where the dependent variable FDS_{mrt} is the share of full-day primary schools in municipality m and region r in year t. M_{mt-1} is a group of lagged municipality-level characteristics. Lagged municipal characteristics are included because the decision to enter FDS by schools in period t, had to be taken at least in period $t-1$; relevant local conditions should be measured prior to entry into FDS. Municipal-level variables include: total enrollment in primary schools in the municipality, number of students per school, average years of schooling in the municipality, municipal poverty rate, average household income, rural population, male and female employment rates, male and female labor force participation rates, average school quality in the municipality, region-year fixed effects (φ_m) or municipal fixed effects (ω_r). The authors found no systematic correlation between full-day implementation at the municipal level and women's labor market outcomes.

The methodology described in this section is standard in the policy evaluation literature; as discussed above, one of the novelties of this project will be the availability of a large (unbalanced) panel data set that follows approximately 8,000 women over a 13-year period.

3. **Data requirements and sources** (max 400 to 700 words)

Previous research for developed and developing countries has used repeated cross-sections to identify the effect of access to child care on mothers' employment outcomes. However, as mentioned above, it is possible that individual's

unobservable characteristics are correlated with observable control variables and the outcome of interest. This problem can be addressed with panel data, i.e., repeated observations on the same women. For this reason, we will work with a panel of women that were interviewed several times during a 13-year period. The main data source for this project is the Chilean Social Protection Survey or EPS (Encuesta de Protección Social). EPS has been carried in 2002, 2004, 2006, 2009, 2012 and 2015.

EPS collects information of respondent's employment and their employment histories. The EPS surveys include all the individual-level variables of our proposed models, i.e., the various employment outcomes (which include employment and employment quality), and information on women's education, health, household characteristics, and family demographics. The source of this data is the Ministry of Labor and Social Protection of Chile; we have already obtained the data through the public channel (www.previsionsocial.gob.cl/sps/biblioteca/encuesta-de-proteccion-social).

In order to study the effect of child care on women's employment and employment quality, we will need to measure access to full-day schools in the municipality where a woman resides, as well as other municipal-level control variables. For this purpose, we have obtained several data sets. The policy variable of interest is access to full-day primary schools in the municipality. We will also construct measures of supply of preschools in the municipality. This information comes from administrative enrollment data provided by the Ministry of Education of Chile through its website (http://datosabiertos.mineduc.cl/investigadores).

To isolate the effect of the full-day school program, it is important control for other time-varying municipal-level characteristics that may be correlated with women's employment quality. These variables can be constructed from Chile's Socioeconomic Characterization Surveys, referred to as CASEN for its Spanish acronym. These are repeated waves of household surveys carried out since 1990, with data that is representative at the municipal level (for most of Chile during the 1990s and early 2000s, and for all of Chile since 2009). The source of this data is the Ministry of Social Development of Chile, and all CASENs are available on the institutional website (http://observatorio.ministeriodesarrollosocial.gob.cl/casen-multidimensional/casen/casen_2015.php#)

One of the municipal-level variables that we wish to include in our model is average school quality in the municipality's schools. This variable will be obtained from national standardized test scores that are taken by all Chilean students in 4th grade (in mathematics and language). We will generate average municipal test scores—referred to as the SIMCE tests for its Spanish acronym—from the School Quality Agency, a branch of the Ministry of Education of Chile that is responsible for the SIMCE tests (http://www.agenciaeducacion.cl/evaluaciones/que-es-el-simce).

The research team has already obtained these data sources and has previous

experience with the full-day schooling data, CASENs, SIMCE data, and earlier waves of the EPS. It is necessary to update all the data sets with the more recent EPS surveys.

SECTION IV – POLICY ENGAGEMENT

1. Policy relevance

1. Describe policy context and needs

Describe the specific policy issues or needs that your research aims to address; how your potential outcomes and findings may be used in policy making? Please be as precise as possible, indicating specific current or prospective policies and the specific contributions your research would make.

Also, justify timing of your research in terms of policy and socioeconomic needs and context – e.g. reference to existing, planned or potential policies at the national, regional or local level; specific political context; international examples of similar policy problems or solutions, etc.

Policy makers in Chile have been aware for decades that policies are needed to promote women's entry to the labor force; despite notable achievements in poverty reduction and economic development, the country's gains in female employment have been moderate. Today, Chile's level of female labor force participation are similar to Haiti and Honduras, two of the poorest countries in the Latin American region. Furthermore, policy makers recognize gender disparity in wages and employment quality, and efforts have been made to enforce and highlight labor laws that prohibit discrimination due to a person's sex.

Recognizing the role of child care in women's employment decisions, laws exist that protect mothers' employment. First, women under formal employment are entitled to several maternity rights, such as maternal immunity (they cannot be dismissed from a job during pregnancy nor during the 12 months after birth of her child) and paid maternity leave that can range from 3 to 6 months. Second, firms that employ 20 or more women are mandated by law to provide day care services for employee's children until age 2; firms can provide a facility on the premises, or subsidize day care expenses in an external and independent facility. In 2006, the Government of Chile began to expand day care and pre-school coverage for children aged 2 to 6 years of age, targeted to low-income families; in 2013 the policy was extended to all women. Finally, in 2013, mandatory Kindergarten was passed into law. Other countries have implemented similar policies that expand coverage of child care for children of preschool age (IFC, 2017).

However, relatively less attention has been paid by policymakers to the child care

needs that many families with school-age children have, for the hours that children end school until a typical work schedule ends. In this sense, schools provide a formal child care arrangement because children are under adult supervision during school hours.

Full-day Schooling Reform

Schools in Chile began to expand schedules in 1997, seeking to improve education quality. Promoting mothers' employment was the last of a long list of objectives of the policy. Today, most schools in Chile have extended schedules, typically from about 8:00 a.m. until 2:30 to 4:00 p.m. (depending on the child's grade level).

This Full Day School (FDS) reform stipulated that all publicly funded schools—municipal or private subsidized—must offer full-day program to all their students by 2007 and 2010, respectively. Private fee-paying schools that did not receive funds were not required to implement longer schedules (though most did before the reform). Approximately 94 percent of students in Chile attend publicly funded schools, while 6 percent attend private, fee-paying schools.

Each individual school was not mandated to enter the program at any specific moment during the period, leaving the timing of the entrance decision to be determined by each school, as long as they met their respective deadline. Additionally, all publicly funded schools created after 1997 are required to enter the system as full-day schools.

The phase-in of the reform was gradual, due to schools' infrastructure and financial constraints, which included both operational and infrastructure costs. Operational costs were subsidized by the increasing the per-student subsidy regularly transferred from the Government to all public and voucher schools by 40%.

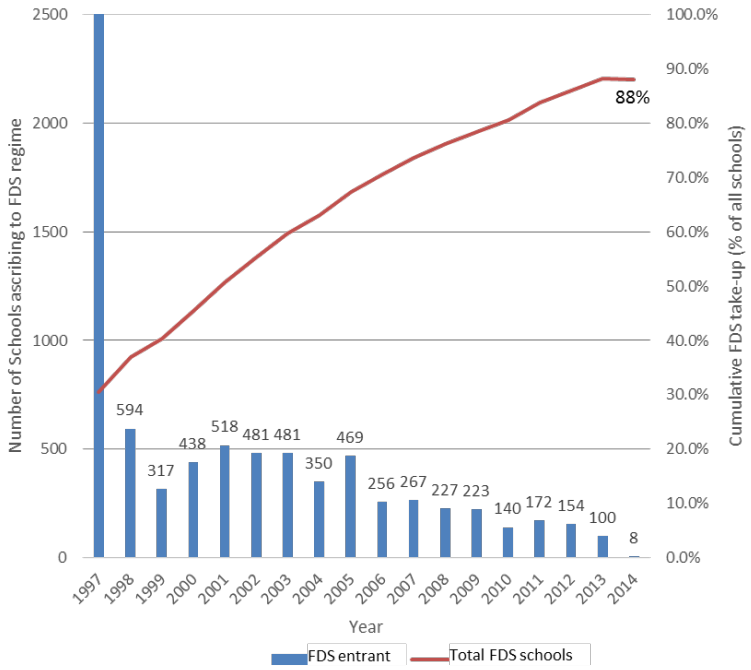
The most important constraint was associated schools' infrastructure and their capacity to accommodate, in many cases, twice the number of students at any given time. Rural schools and small urban schools adopted the full-day regime earlier in the period, because they had the infrastructure to do so. Many large schools in urban areas, however, needed to construct additional infrastructure—such as classrooms and cafeterias—to accommodate students from multiple shifts.

Financially constrained schools could compete for public funds from Ministry of Education. The funds were not allocated randomly but rather, administrative criteria were followed to select among the applying schools. There is no publicly available information that reports how the actual funds-allocation process was carried out; however, the FDS Law indicated that some of the following four criteria be used in selecting schools to finance: a) Socio-economic or educational vulnerability of the school's students; b) Amount of resources requested on a per-student basis; c) Quality of the proposal with regard to technical, pedagogical, economic and social

specifications; and d) Percentage of total requested funding that would be covered by the school's own administration.

As previously discussed the Chilean school system is highly decentralized, thus the FDS program was implemented at different speed across municipalities in the country. Figure 1 below summarizes the implementation at the national level, from 1997 – 2015. By 2014, almost 90% of all publicly funded schools in Chile were FDS.

Figure 1
Chile: Full Day Schooling Implementation
Yearly take-up and Cumulative rate



Many other countries in Latin America (Colombia, Brazil, El Salvador, Uruguay, Dominican Republic) and Europe (Germany) are considering similar policies, and Chile can provide insightful policy lessons. The lessons learned from Chile may also be helpful to policymakers in the United States, where many states have recently begun to reduce school schedules in efforts to reduce public spending.

This research proposal can inform the child care policy discussion by revealing whether the quality of mothers' employment benefitted from the implicit child care subsidy in longer school days. It can also help determine whether policies, such as longer school schedules, should be targeted to lower-income women. Finally, the results from this research proposal will shed light on whether child care policies can facilitate employment that is of better quality, which can help reduce gender inequalities between men and women.

The findings of our research would be timely to provide insights to a recent policy implemented by the Government of Chile, which provided a subsidized after-school program in a small scale in 2015; evaluations of the program suggest it was conducive to women's entry into the labor force (Martinez and Perticará, 2017). Lessons learned from this research project can help understand whether expanding such after-school programs would have an effect on the quality of mothers' employment.

2. Consultations to date

Name of institution/organization #1	Ministry of Education
List the key representative involved in consultations (names and titles/positions)	
1. Carlos Araneda, Executive, General Education Team	
Describe main outcomes of consultation – feedback or inputs received	
Mr. Araneda has worked at the Ministry of Education for almost 30 years, and he actively participated in all stages of the full-day school reform in Chile. He gave the research team an extensive, two hour interview where he provided useful feedback regarding the implementation of the reform. He also provided the researchers with valuable legal and administrative documents that describe the reform's implementation and various addendums and modifications since it became law in 1997.	

Name of institution/organization #2	Center for the Study of Conflict and Social Cohesion (*Centro de Conflicto y Cohesión Social - COES*)
List the key representative involved in consultations (names and titles/positions)	
2. Dante Contreras, Director, COES 3. Constanza Perez, Communications Director, COES	
Describe main outcomes of consultation – feedback or inputs received	
We received valuable academic feedback from Mr. Contreras regarding our proposed research. He is an expert in education and labor, and has analyzed the school-day reform in Chile. He has invited our team to present results of the project in an academic seminar and for a wider audience. Constanza Perez has offered logistical support organizing outreach activities related to this project.	

Name of institution/organization #3	Ministry of Labor and Social Protection of Chile / UC Center for Longitudinal Surveys and Studies
List the key representative involved in consultations (names and titles/positions)	

4. David Bravo, Director
Describe main outcomes of consultation – feedback or inputs received
This data collection center is sub-contracted by the Ministry of Labor to collect the data of the EPS survey. It is currently housed at the Catholic University of Chile, and formerly it was housed at the University of Chile. After informing its Director, Mr. Bravo, of our research proposal, he provided a key input, which was the variable that identifies each individual's municipality of residence in the *Social Protection Surveys*. With this variable we can identify where an individual woman resides and match that information to the availability of full-day schools in her place of residence.

1. Engagement strategy

1. Identify target audiences

Identify potential users of your research findings – institutions/organizations that may use your findings to inform, advise or influence policy or other relevant decision-making processes. Please explain why you believe these institutions/organizations are the most important potential users of your research, to inform relevant development/policy decisions.

Name of institution/organization #1	Ministry of Finance – Gender Advisor
Explain relevance of this user to inform key decisions	
In 2014, the President of Chile appointed a Gender Advisor to the Ministry of Finance, to assess and promote women's participation in public programs. The Ministry of Finance has the most influence in policy decisions within the Chilean Government. The findings of this project will help inform policy decision makers at this highest level of the role of child care for school-aged children. This can influence the decision to expand small-scale policies currently under way (a publicly funded after-school program), and inspire new policies. Past participation by Ms. Kruger and current involvement of Mr. Berthelon in the Board of Directors of Chile's Economics Society has given them direct access to this institution.	

Name of institution/organization #2	Ministry of Education
Explain relevance of this user to inform key decisions	
The main objective of the full-day school reform was to increase classroom instruction time to improve the quality of Education. The costs of achieving modest gains in test scores as a result of the reform, has led to criticism of the full-day reform by different stakeholders of the education sector (teachers, parents, administrators, among others). It is important that authorities at the Ministry of Education be informed of indirect benefits of longer school schedules, so that the policy is not reversed and so that it continues to expand.	

Name of institution/organization #3	Ministry of Gender
Explain relevance of this user to inform key decisions	
The Ministry of Gender was created in June 2016, According to the founding legislation, its objective is to "create policies, strategies and programs that benefit women, and work towards eliminating all types of gender discrimination so that Chile becomes a more equitable country." This project will investigate whether eliminating or reducing one of the barriers women face to access higher quality employment—i.e., lack of child care—is consistent with the Ministry's objectives and its results should be of interest to its authorities.	

Name of institution/organization #4	Comunidad Mujer
Explain relevance of this user to inform key decisions	
Comunidad Mujer is a non-profit NGO that promotes women's issues. According to its mission statement, it seeks to "promote women's rights and contribute to the generation of public policies that promote gender equality and equity in education, labor and politics." Among its activities, it has carries out several outreach and advocacy activities and is well connected with relevant stakeholders in the country's public and private sector. Comunidad Mujer is a potential ally in the outreach and engagement activities of this proposal.	

2. Define outreach and engagement strategy

How, from proposal design to the dissemination of your research results, will you consult and communicate with these users to both gather their inputs and keep them informed of your project, in order to increase chances of research uptake?

(1) Ms. Kruger is an Associate Researcher at the Center for Conflict and Social Cohesion (COES), a multidisciplinary center that organizes academic seminars, as well as seminars to more general audiences. An activity to be carried out early in the research project will be to organize a workshop on what is known to date regarding child care access and women's employment.

Ms. Kruger and Mr. Berthelon would be one of the presenters of prior research on this topic, and other researchers in Chile would be invited to participate. Among those invited would be key persons such as the Gender Advisor – Ministry of Finance, Minister of Gender, and the Director of Comunidad Mujer. This venue would establish a direct line of communication between the researchers and key policy stakeholders.

(2) As preliminary results become available, the researchers will participate in discussion groups on gender, both promoted by COES and by Comunidad Mujer.

(3) The researchers will organize seminars for the Adolfo Ibañez, where they will invite key persons from the user institutions to maintain an active line of communication throughout the project.

(4) When final results are available, the researchers will present the results at academic seminars at the various Universities in Chile that hold regular weekly seminars.

(5) When final results are available, the researchers will organize a seminar for a general audience, to disseminate the results of their project. Authorities from one or more of the institutions cited above will be invited to participate.

3. Outline your preliminary dissemination strategy

Outline your preliminary dissemination strategy (channels, tools, events, audiences, etc.).

Note that PEP expects grantees to disseminate information about their research work and (expected) outcomes throughout the project cycle, and not only after publication.

Event	Audience	Time frame	Media coverage
Initial Discussions/Lectures	Advocacy groups (Comunidad Mujer, COES); academic economists, undergraduate and graduate students (of economics, sociology and related fields)	Initial stage	Yes
General Seminar	Policy makers; undergraduate students	Middle stage	Yes
Academic seminars	Academic economists; graduate students	Final stage	No
Workshop	Policy makers; undergraduate and graduate students (of economics, sociology and related fields)	Final stage	Yes

SECTION V – OTHER CONSIDERATIONS

1. Describe any ethical, social, gender or environmental issues or risks that should be noted in relation to your proposed research project.

2. **References and plagiarism**:

References

Acemoglu, D. & Shimer, R., 2000. Productivity gains from unemployment insurance. European Economic Review, 44(7), pp. 1195-1224.

Aguirre, J. 2012. If you build it they will come: Evidence of the impact of a large expansion of childcare centers over attendance and maternal labor supply. Pontificia Universidad Católica de Chile, Instituto de Economía. Mimeo.

Baker, Michael, Jonathan Gruber, Kevin Milligan. 2008. Universal child care, maternal labor supply, and family well-being. Journal of Political Economy 116(4):709–45.

Bardasi, E. & Gornick, J. C., 2008. Working For Less? Women'S Part-Time Wage Penalties Across Countries. Feminist Economics, 14(1), pp. 37-72.

Barua, Rashmi. 2014. Intertemporal substitution in maternal labor supply: Evidence using state school entrance age laws. Labour Economics 31:129-140.

Berlinski Samuel, Sebastian Galiani. 2007. The effect of a large expansion of pre-primary school facilities on preschool attendance and maternal employment. Labour Economics 14(3):665–80.

Berlinski, Samuel, Sebastian Galiani, Patrick Mc Ewan. 2011. Preschool and maternal labor market outcomes: evidence from a regression discontinuity. Economic Development and Cultural Change 59(2):313-344.

Berthelon, Matias, Diana Kruger. 2011. Risky behavior among youth: Incapacitation effects of school on adolescent motherhood and crime in Chile. Journal of Public Economics 95(1):41–53.

Berthelon, Matias, Diana Kruger, Melanie Oyarzun. 2017. An education reform of school schedules: Evidence of its effects on mothers' labor outcomes in Chile. Mimeo Universidad Adolfo Ibáñez.

Berthelon, Matias, Diana Kruger, Melanie Oyarzun. 2015. The Effects of Longer School Days on Mothers' Labor Force Participation. IZA Discussion Paper No. 9212.

Berthelon, Matias, Diana Kruger, Veronica Vienne. 2016. Longer School Schedules and Early Reading Skills: Effects from a Full-Day School Reform in Chile. IZA Discussion Paper No. 10282.

Blau, D., Currie, J. 2006. Pre-School, Day Care, and After-School Care: Who's Minding the Kids? Handbook of the Economics of Education. Vol. 2, chapter 20, 1163–1278, Elsevier.

Blau, D. M., & Robins, P. K. 1988. Child-care costs and family labor supply. The Review of Economics and Statistics, 374-381.

Blau, F., Kahn, L. 2013. Female Labor Supply: why is the U.S. falling behind? National Bureau of Economic Research, Working Paper No.18702.

Borjas, George J., Stephen G. Bronars, Stephen J. Trejo. 1992. Self-selection and internal migration in the United States. Journal of Urban Economics 32(2): 159-185.

Calderon, G., 2012. What is Good for the Goose is Good for the Gander: The Effects of Child Care Provision in Mexico. pp. 1-73.

Capizzano, Jeffrey, Katherine Tout, Gina Adams. 2000. Child Care Patterns of School-Age Children with Employed Mothers. Washington, D.C.: The Urban Institute. Assessing the New Federalism Occasional Paper No. 41.

Cascio, Elizabeth U. 2009. Maternal labor supply and the introduction of kindergartens into American public schools. The Journal of Human Resources 44(1):140–70.

Chioda, Laura, Rodrigo Garcia-Verdu and Ana Maria Muñoz. 2011. "Work and Family: Latin American and Caribbean Women in Search of a New Balance." World Bank: Washington, D.C.

Contreras, Dante, and Paulina Sepúlveda. 2016. Effect of lengthening the school day on mother's labor supply. The World Bank Economic Review.

Del Boca, D., 2002. The effect of child care and part time opportunities on participation and fertility decisions in Italy. Journal of Population Economics, 15(3), pp. 549-573.

Elacqua, Gregory, Dante Contreras, Felipe Salazar, Humberto Santos. 2011. The effectiveness of private school franchises in Chile's national voucher program. School Effectiveness and School Improvement 22(3):1-42.

Fitzpatrick, Maria D. 2012. Revising our thinking about the relationship between maternal labor supply and preschool. The Journal of Human Resources Economics 47(3):583-612.

Fong, M. Lokshin, M. 2000. Child care and women's labor force participation in Romania. Policy Research Working Paper Series 2400, The World Bank.

Gelbach, J. 2002. Public schooling for young children and maternal labor supply. American Economic Review 92(1): 307–22.

Hirsch, B., 2005. Why do part-time workers earn less? The role of worker and job skills. Industrial and Labor Relations Review, 58(4), pp. 525-51.

IFC. 2017. Tackling Childcare: The Business Case for Employer-Supported Childcare. International Finance Corporation: Washington, D.C.

Lefebvre, Pierre, Philip Merrigan. 2008. Child-care policy and the labor supply of mothers with young children: A natural experiment from Canada. Journal of Labor Economics 26(3):519–48.

Lokshin, M. 2004. Household childcare choices and women's work behavior in Russia. Journal of Human Resources, Vol. 39(4), 1094–1115.

Lokshin, M.M., Glinskaya, E. and Garcia, M., 2004. The effect of early childhood development programmes on women's labour force participation and older children's schooling in Kenya. Journal of African Economies, 13(2), pp.240-276.

Manning, A. & Petrongolo, B., 2008. The Part-Time Pay Penalty for Women in Britain. The Economic Journal, 118(526), pp. F28-F51.

Martínez, C., Perticará, M., 2017. Childcare effects on maternal employment: Evidence from Chile. Journal of Development Economics, 126, pp.127-137.

Martínez, C., Encina, J. 2009. Efecto de una mayor cobertura de salas cuna en la participación laboral femenina: Evidencia de Chile. Universidad de Chile, Departamento de Economía. Documento de Trabajo Nº 303.

Martínez, C., Medrano, P. 2009. Public day care and female labor participation: evidence from Chile. Universidad de Chile, Departamento de Economía. Mimeo.

Núñez, Iván, José Weinstein, Gonzalo Muñoz. 2010. ¿Posición olvidada? Una mirada desde la normativa a la historia de la dirección escolar en chile. Psicoperspectivas 9(2):53-81.

Pena-Parga, X., Glassman, A. 2004. Demand for child care and female employment in Colombia. Universidad de Los Andes-CEDE, Documentos CEDE 002267.

Powell, L. 2002. Joint labor supply and childcare choice decisions of married mothers. Journal of Human Resources. Vol. 37(1), 106–28

Schlosser, A., 2005. Public preschool and the labor supply of Arab mothers: Evidence from a natural experiment. Manuscript, The Hebrew University of Jerusalem.

Van Ours, J. & Vodopivec, M., 2008. Does reducing unemployment insurance generosity reduce job match quality?. Journal of Public Economics, 92(3), pp. 684-69.

World Bank. 2011. World Development Report 2012: Gender Equality and Development. The World Bank: Washington, D.C.

Applicants should be very careful to avoid any appearance of plagiarism. Any text of five or more consecutive words that is borrowed from another source should be carefully contained between quotation marks with a reference to the source (including page number) immediately following the quotation. It is essential that we be able to distinguish what you have written yourself from what you have borrowed from elsewhere.

Note also that copying large extracts (such as several paragraphs) from other texts is not a good practice, and is usually unacceptable. For a fuller description of plagiarism, please refer, for example, to the following website:

1. http://writing.yalecollege.yale.edu/advice-students/using-sources/understanding-and-avoiding-plagiarism

PEP will be using a software program to detect cases of plagiarism.