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School Day Extension and Female Labor Supply: The case of the Dominican Republic

Patricia Mones

Abstract

Since 2012 the Dominican education authorities have been transitioning the schools from a four-hour to an eight-hour per day schedule. As time spent in school is a proxy of childcare, the extension translates into a childcare cost reduction for participating families. Considering the long-studied relationship between childcare costs and mothers’ labor decisions, this study explores the effect of the implementation of the new school schedule on female labor supply both to the extensive and to the intensive margins in the Dominican Republic. Results suggest higher shares of students attending the new schedule within a municipal district are associated with a significant increase in the labor supply to the intensive and extensive margin.

1. Introduction

Despite public efforts to promote gender equality in the labor market, developing countries still struggle to narrow certain existing gaps. In Latin America, unemployment rates among females are significantly higher while wages and participation rates are lower. Since 2014, the Female Labor Force Participation in the Dominican Republic has been higher than the regional average (WB-DATA, 2017); however, the unemployment and wage gaps between genders are also higher (CEPAL, 2017). Although these gaps might be the consequence of institutional constraints, social issues and cultural patterns, the decision of being part of the labor force is to a
large extent a function of family decisions. Thus, policies that provide parental support\(^1\) tend to have an impact on individuals labor decisions, especially females’.

Childcare cost is considered an important determinant of Females’ Labor Supply as they are often in charge of taking care of children in the household. The costs associated with childcare have effects both on the decision of entering the labor market, as well as the number of hours worked (also educational decisions and fertility rates). Hence, policy makers in the Latin American region often promote different types of childcare support for communities with the purpose of incentivize Female Labor Force Participation.

Although the extension of the school day by four hours has mainly educational goals, it could also be considered as a childcare policy that provides parental support beyond education. The new schedule would provide families with four additional hours of high quality childcare, with an improved curriculum and free provision of meals, which might encourage the labor decisions of their parents, and especially of mothers. This paper examines whether Dominican females have changed their labor decisions as a consequence of the new policy.

2. Childcare provision and Female Labor Supply

\(<a href="#" id="2.1">a. Public provision of children day care</a>

Researchers have studied the existence of a causal relation between child care and Female Labor Supply (FLS) indicators as women are traditionally viewed as the main caregiver of children during their first years (Baker, Gruber, & Milligan, 2005; Berlinski

\(^1\) Parental leave, childcare support, Pre-partum paid time off etc.
The availability of childcare and its affordability is often highlighted for its significant effects on fertility rates and female labor force participation with different results depending on the national context of the case studied and the research design.

Lee & Lee (2014) examined the long-term relation between childcare availability, fertility and Female Labor Force Participation (FLFP) in Japan. The authors found that the insufficiency of the existing public childcare system’s capacity to accommodate children of working mothers has resulted in the problem of wait lists that combined with other factors discourages childbearing. They did not find a long-term relationship between the childcare situation and labor force participation. Breunig et al, (2012) find that the price of child care has statistically significant effects on mothers’ labor supply and childcare demand when analyzing the case of Australia.

Both Anderson and Levine (2000) and Blau and Currie (2004) provide a detailed review of estimates for the elasticity of FLS with respect to the cost of childcare in the United States. Their findings suggest that, as the price of childcare falls, maternal labor force participation increases. However, there is a large variation in the magnitude of the estimates (non-statistically significant estimates).

Similar results are found for European countries as in Chone et al. (2004) for France; Lundin et al. (2007) for Sweden; Del Boca (2002) and Del Boca and Vuri (2006) for Italy. In these three cases child care costs are found to have small and statistically significant effects on FLS, with the case of France being the largest (4 percentage points effect).

Regarding Latin-America, the public provision of childcare centers programs consistently had some form of FLS effect (either in labor force participation, number of
hours worked or both) in Ecuador (Rosero & Oosterbeek, 2011), Guatemala (Hallman et al., 2005), Colombia (Attanasio & Vera-Hernandez, 2004) and Brazil (Deutsch, 1998), no significant effects for Chile (Encina, 2008). The childcare provided is very heterogeneous across countries and sometimes even within a single country in terms of the number of hours they receive the children and in terms quality\(^2\).

The “Estancias Infantiles” (EIP) in the Dominican Republic (DR) would be the equivalent to these programs and it was modeled after the Chilean model (INTEGRA and JUNJI) (Araujo, 2015). EIP provides educational services for pregnant women, health services for mothers and infants, childcare for children ages 0-4 and educational services for children age 5. The program is still incipient in the country and as of 2016 only provided seats for approximately 43,000 children ages 0-5 which represents less than 5 percent of the population that age in the country (CONDEI, 2018; ONE, 2017). Additionally, the data available on these programs is still limited thus making it more difficult to assess its early impact on expected outcomes (which include FLS, educational and health indicators).

b. School hour extension as a proxy of childcare

In the past three decades, the promotion of longer school days has been a central part of the educational reforms in Latin America as an effort to improve learning outcomes. Lengthening of the school day has been implemented in Mexico, Chile, Peru, Brazil, Argentina, Venezuela, Dominican Republic and Colombia among several others since the late 1980’s. The general trend is that countries re-define their curricular structure

\(^2\) In the case of the “Hogares Comunitarios” program in Honduras, for example, the childcare is provided by neighbors with no qualifications (Díaz & Rodríguez-Chamussy, 2012), while in the case of Chile the public childcare centers are handled by licensed teachers, psychologists and pediatricians (Encina & Martínez, 2009)
and goals and due to this process increase the length of the school day (UNESCO, 2010). Thus, the main objective of this policy is to better serve newly established curriculum goals that aim to improve learning outcomes.

However, the implementation of longer school days or longer school years has also been associated to other social outcomes outside of the intended educational ones such as crime rate reduction (Jacob & Lefgren, 2003; Luallen, 2006; Berthelon & Kruger, 2011), drug abuse (Shilts, 1991), decrease in teenage pregnancy (Black, Devereux, & Salvanes, 2008; Berthelon & Kruger, 2011), increase in female labor force participation (Gelbach, 2002; Cascio, 2009; Berthelon, Kruger & Oyarzún, 2015) and poverty reduction (UNESCO, 2010).

The extension of school hours provides families with a cost-free child care extension period enabling mothers with additional time that could potentially be used to change their labor supply. The most frequently studied country experience in terms of school hours extension is Chile, one of the first Latin-American countries in extending the school day. Contreras, Sepúlveda, & Cabrera, (2010) studied the relationship between the 1996 decision by Chilean Education authorities to increase the school hours by 30 percent (1.5 hours) and the consequential effect on FLS. They found positive significant effect on female labor market participation, but negative and significant impacts on the number of hours worked per week. The authors concluded that this combination of findings might have happened because new women entering the labor market may be selecting part-time work, thus lowering the average hours worked for those in the market; or that the policy decreased child care costs for women in the market, pushing

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3 Same schedule, but with fewer days off
them to fewer hours via the income effect. Similar results were found by Hernando (2009), Gelbach, (2002); Cascio, (2009); Berthelon, Kruger & Oyarzún (2015) for the Chilean case in terms the labor participation effect. Further exploring this effect in Chile Siervo & Ibáñez, (2014) found no effect on the quality of the employment obtained by women caused due to the new reform using household surveys with detailed information of wages, type of job, contract and union affiliation.

In the case of Mexico, Knaul & Parker (1996) analyzed survey data and the progress of childcare policies qualitatively and concluded that the lack of child care for children 0-5 years old was a main constraint for FLFP in 1995. Padilla-Romo & Cabrera-Hernández (2018) used a difference-in-differences approach to study the effect of a 3.5-hour increase in the school day extension on FLS and average income. The author found that a 25-percentage point increase in the share of students that attend a full-time school in a municipality leads to a 1.25 percentage point increase in Female Labor Force Participation, a 0.45-hour increase in the average worked hours per week by females and a 9-percentage point increase on average income earned by females.

3. Background

a. Dominican Republic: Country Overview

The Dominican Republic is a small and open economy, occupying the 9th position in Latin America and the first position in the Central American and Caribbean sub-region in terms of Gross Domestic Product (World Bank, 2016). The country has experienced one of the largest economic expansions in the region during the last decades, showing an average growth of 5.4 percent between 2000 and 2015. Employment and wealth
generation are driven by agriculture, mining, light industry, foreign direct investment and services, especially tourism.

The country has also made progress in different social indicators. Since 2000, life expectancy has increased (70.6 years-old in 2000 vs. 73.7 years-old in 2015), infant mortality has declined (35.9 in 2000 vs. 19.6 in 2014 per 1000 live births) and access to primary education has become universal (World Bank, 2016). Nevertheless, the country faces structural problems that constraint development and income equality.

By October 2016, monetary poverty reached 30.5 percent of the population and 6.5 percent of the population lived in extreme poverty (MEPYD, 2017). According to the World Bank, despite a 50 percent increase in per capita income between 2000 and 2011, the number of people living in poverty increased and the middle class remained stagnant (World Bank, 2014). Moreover, a highly unequal income distribution persists. The Dominican Republic maintains a Gini coefficient of 0.45, and was, with Costa Rica, the only Latin American country that did not managed to reduce inequality between the years 2000 and 2013 (ECLAC, 2015).

c. Labor Market Statistics for Dominican Females

Despite the slight improvements that occurred in the past two decades, significant differences remain between Female Labor Supply as compared to Male Labor Supply in the labor market. Dominican FLFP is higher than the regional average of 41.2% as it increased faster than the region in the past decade (World Bank, 2016). However, the

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4 Percentage of individuals in the country that live under the official national poverty threshold, which varies every year according to inflation rates.

5 There have been reductions in the past 3 years (See appendix A)
FLFP was 22.8 percentage points lower than it was for males as of October 2016 (BCRD-ENFT, 2016).

There is limited research on what has determined the rapid entry of females into the labor force. Empirical cross-country evidence suggests that family-oriented programs (Staab and Gerhard, 2010) and female educational attainment (Brundage, 2017) contributes to help increase FLFP. Although is an almost impossible task to rapidly change cultural settings and labor market conditions through policy, OECD, (2004) also suggest that policy action could be taken to compensate the negative effects of these cultural settings. Some of these actions include: removing barriers to part-time working arrangements, avoiding taxing second earners heavily in the household as it discourages FLP, family support (parental leave, childcare etc.), avoiding heavy regulations to the service sector among others (OECD, 2004). In the case of the DR, the main policy actions similar to these suggestions in the past decade are related to the provision of parental support in the form of childcare with two main policies.

The first program in place, is the “Estancias Infantiles” Program (EIP), a chain of publicly funded childcare centers specialized on providing health, education and early stimulation services for pregnant mothers and their kids from 0-5 years. Although EIP’s coverage is still low, it has provided communities it serves with a service that is not offered by neither the public education system nor the public health system.

The Dominican Education Law 66-97 (still in place today) states as mandatory the public provision of education services for children with ages 6 years old and above and only recognizes the validity of educational services for children 3-5 years. This means the law does not require the government to provide pre-elementary education (Ages
However, as the elementary education enrollment was becoming universal, the beginning of last decade called for efforts to expand the incipient services for 5-years old children. Despite efforts to do so, the gross enrollment rate for 5 years-old in the country was 72.1 percent and 31.8 percent of enrolled 5-year-old attended private schools in the year 2016 (MINERD, 2016). The low levels of public provision of educational services for children ages 3-5 as well as the lack of subsidized childcare programs for children ages 0-5 has made the EIP a government priority in the past 5 years. The second and major effort has been the extension of the school day by 4 hours will be addressed in the following section.

Along these policies, female educational outcome improvements over time, economic development as well as cultural changes might have also influenced the LFP growth in the country. However, the conditions for females in the labor market are still remarkably disadvantageous. Males’ average hourly pay is 21 percent higher than females and the gap is higher for individuals with lower educational attainment (CBDR-ENFT, 2016). Urban unemployment is 4.7 percentage points higher for females, this gap being about 50 percent larger than the regional average of 2.3 percentage points (CEPAL, 2016). General unemployment rate for males in 2016 was 4.6 percent, while for females was 10.1 percent (CBDR-ENFT,2016). Although female unemployment has lowered in the past 20 years, it still does not correspond with female educational outcome relative to men improvement.

Dominican females are on average more educated than their male counterparts, for almost all age groups, and for almost all income levels. However, the market seems to have a preference both in payment and in opportunity for males. When studying the
rates of return of educational attainment for the DR, Dominguez et al. (2016) found that the returns of each year of schooling is 11 percent higher for females when using instrumental variables to correct for income-education endogeneity problems. The authors suggest that the results might be a confirmation of hiring and salary discrimination towards females. Thus, it is more important for females than it is for man to get educated to access a job or to reach better salaries.

Additionally, protections to motherhood in the Dominican labor code make it even more unattractive to hire females. The Dominican labor code in its articles 230-235, establishes hard sanctions for employees that fire females in pregnancy periods, regardless the situation. Moreover, Dominican females in the formal sector can opt to 4 months of post-partum paid leave that can be combined with paid vacations (MT, 2017). The law also contemplates 3 paid absences per month during infant breastfeeding period, as well as paid leave if there are situations considered as harmful to the baby during pregnancy (MT, 2017). If an employer does not meet the law, it is easy to receive effective legal assistance from the Ministry of Labor. Regulations apply also to the informal sector with exceptions. Although these provisions might help protect a healthy fertility rate for the country and secure women rights in the labor market, it also might discourage female employment, especially at lower levels of educational attainment.

c. Education system reform and Extended Day Schools

The Dominican Republic faces major challenges in the public education system. The country has made progress by incorporating the 6-11 years old population into elementary education, achieving a net enrollment rate of 98 percent. However, there
are lags at the preschool (3 to 5 years) and secondary (12 to 17 years) levels, with net enrollment rates of 37 percent and 64 percent, respectively. Both, elementary and secondary education suffer from high rates of over-age and drop-outs. As a consequence only 3 out of 5 adults between the ages of 20 and 24 have completed secondary education (EDUCA; Inter-American Dialogue, 2016).

The challenges become deeper for low socioeconomic background individuals. According to the 2010 National Census of Population, a 20- to 24-year-old person from the poorest socio-economic group averaged only 4.4 years of schooling, while those from the same age group but from the highest socioeconomic quintile averaged 12.4 years of formal education. Reflecting a high level of inequality in the access and permanence within the educational system (ONE, 2012) (EDUCA; Inter-American Dialogue, 2015).

In terms of learning outcomes, the Dominican Republic presented the lowest performance among 15 countries in Latin America, in the TERCE tests of 2013, which measures the proficiency levels of 3rd and 6th grade students in literacy, mathematics and Science (UNESCO, 2014). Similarly, the country came among the last places in the most recent PISA international test conducted in 2015, an assessment that examines cognitive skills in reading, math and science of 15 years old students regardless of grade (OECD, 2016).

In the context of the abysmal conditions of public schools, social movements started demanding the compliance with the General Education Law 66-1997, particularly with the requirement of allocating 4 percent of GDP or 16 percent of total public spending, whichever was higher, to pre-university public education (EDUCA; Inter-American
Because of these movements’ success at driving attention at the country’s school system issues and the upcoming 2012 presidential election process, political agreements were made to increase the budget for k-12 education. In 2013, the public budget for k-12 education experienced an unprecedented increase of approximately 70 percent (Foro Socioeducativo, 2014). Between 2011 and 2013, the public expenditure on education increased by 124 percent. This has also boosted the social investment, which rose from 6.8 percent of the GDP in 2011 to 8.8 percent in 2013. Although social spending has moderated in subsequent years, spending on education has remained above 4 percent of GDP.

This new budget helped finance a series of reforms to impact the quantity and quality of the education services in multiple dimensions. The policies included salary increases for teachers and additional hours of professional development, the construction of new schools to achieve class size reduction, among several others. The main policy put in place was the expansion of the school time from 4 to 8 hours a day. This new modality, called Extended School Journey (JEE), was declared as a national priority policy by the National Education Council (CNE) in 2014. The JEE has expanded rapidly and is estimated that by the school year 2016-2017, 55 percent of all students enrolled in the public system attended to this modality. The process has demanded an intensive school building program that aims to transition 100 percent of students to the new schedule by 2030. (PACTO-Educativo, 2014)

Policy makers in the country expect both educational and social results from the JEE policy. A study made in 2011, showed that less than 2.5 hours of the official 4 hours schedule were considered instructional, with the rest of the time used in non-
academic activities (EDUCA, 2011). Viewing that instructional time is a key input on student learning, a first objective of the program is to increment time dedicated to academic activities and a better use of time in the classrooms (Martinic, 2015). In terms of social results, social authorities expect effects on labor participation of mothers, teenage pregnancy (among the highest in the Latin American region) and reduction of crime rates among teenagers in urban settings, which is a main concern of local authorities. This study will evaluate the early effects of the implementation of the policy on Female Labor Supply.

4. Research Methods

a. Data

The analysis will require the use of two sources of data. The information used to account for households will be from the National Labor Force Survey (NLFS) for the years 2012-2016. The survey is conducted twice a year by the Dominican Central Bank (April and October), however only the survey of April will be used. The data comes from a nationwide representative sample of households and for this study will be grouped to the municipal district level. Although each year is a sample, over 60% of the survey comes from the same households, as the Central Bank performs a longitudinal internal analysis using the same survey. Thus, the same municipal districts repeat each year on the data set, allowing the construction of a longitudinal

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6 The DR’s territory is divided into 32 provinces. Each province has up to 7 municipalities and each municipality has up to 4 Municipal districts. There is a total of 158 municipalities and 387 Municipal Districts (ONE, 2013)

7 The data base they share with the public does not contain ID for the households that are interviewed repeatedly.
base to the municipal district level. Information regarding FLS, and socio-demographic characteristics will be taken from this survey.

The second source of information is the official enrollment database from the Ministry of Education from 2012 to 2016. The database has all the students of the Dominican Education System, their age, gender, the school they attend, their school schedule (extended journey or half-day journey), the sector that school belongs (Public or Private), geographical details of the school, among others. The information can be grouped to the municipal district level and merged with the information from the NLS through the geographical identifiers of municipal districts. The official identifiers for geographical units are set by the Department of Cartography of the National Statistics Office (ONE).

b. Modeling

Researchers study the effect of policy changes at the intensive and extensive margin of labor supply adjustments. The labor supply of society is defined as the total number of hours worked \( (H_t) \) in given period. The total amount of hours worked can be decomposed into an extensive component \( (h_{it}) \) and an intensive component \( (p_{it}) \) as follows,

\[
H_{it} = h_{it} * p_{it}
\]

The most common understanding of the extensive margin is whether an individual has been working or not in a reference period \( t \), while the intensive margin is how many hours the individual worked in that period \( t \) (Bundell et al, 2013). The distinction allows understanding better the way individuals have responded to the policy.
For the case of this study, each component of the Female Labor Supply (as described above) will be used as dependent variable separately, using as interest variable the implementation of the JEE policy and controls for females’ characteristics. The model will follow a longitudinal fixed-effects design for Dominican municipal districts from a nationwide sample data set. The model will take the following form:

\[
h_{it} = f(\%jee_{it}, \alpha_i, controls_{it}, u_{it})
\]

\[
p_{it} = f(\%jee_{it}, \alpha_i, controls_{it}, u_{it})
\]

Where,

\( h_{it} \) is the percentage of adult women who are part of the labor force (either employed, actively looking for a job or willing to accept a job) in the district \( i \) and the year \( t \)

\( p_{it} \) is the average hours worked by adult women in the district \( i \) and the year \( t \)

\( \%jee_{it} \) is the percentage of students in the district \( i \) and the year \( t \) in the public system that attend an Extended Journey School (JEE)

\( \alpha_i \) unobserved time-invariant municipal district effect for the municipal district \( i \)

\( controls_{it} \), is a vector of socio-demographic characteristics of the women in district \( i \) and the year \( t \)

The outcome variable, percentage of students attending an extended day school (JEE)\(^8\), is increasing over time as the policy was implemented gradually. The design allows to observe whether the increase of the JEE enrollment is associated with variations on the female labor outcomes within the municipal district. The proposed specification

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\(^8\) Acronym from official name of the policy in Spanish: Jornada Escolar Extendida (JEE)
assumes that families send their children to schools within the districts which is to be expected as it is highly unlikely for a student to attend a school outside their municipal district\textsuperscript{9}.

The models will be estimated for different groups of students’ ages. All females with ages 18-50 years old will be considered since 18 years old is the official age for formal employment in the Dominican Republic. Females younger than 18 years old could work, but a significant portion of this population is likely to be attending school. Females older than 50 years old are less likely to have young children and might have already started to make early retirement decisions. Only households with members 0-18 years-old will be considered for the analysis.

The students considered will be those attending public kindergarten grades (Nivel Inicial) and elementary grades (Nivel Primario). Students will be divided into age groups associated with the Ministry of Education’s official theoretical ages for educational levels: 3-5 years old for Kindergarten and 6-11 for elementary. However, considering that over 50\% of elementary school students have repeated at least 1 grade and thus are overage, a third group will be defined for all students attending kindergarten and elementary regardless of their age.

c. Results

Table 1 shows modeling results for FLFP results for (1) 3-5 years old (2) students 6-11 years old and (3) all students regardless their age.

\textsuperscript{9}Municipal districts tend to be large. However, it is possible to attend a different municipal district school at boarders.
- The first specification yields a significant 6.1 percentage points estimate. This age group is more likely to be limiting mothers to look for a job; however, the offer of grades that receive children in this age group is still very limited in some parts of the country, especially 3-4.

- The second treatment yields a significant 7.3 percentage points estimate, which is the highest among all specifications. This group of age has universal national coverage and 74.2 percent of students within these ages that are enrolled in school in the DR go to the public system. This means that the transition of elementary schools affects majority of households with children this ages in the country. Additionally, it is still a vulnerable age that would make mothers restrain themselves from entering the labor force if appropriate childcare is not accessible.

- The third treatment variable yields a 7.0 percentage points significant effect, meaning that when the share of students in the public system attending a JEE school increases from none to all students, the FLFP increases by 7.0 percentage points. This group include children with ages 13, 14 and 15 that are overage and that might not restrain mothers from entering the labor force as much as the previous group.

In the case of hours worked results are presented in Table 2. Treatment definitions by students age groups were also considered in this opportunity: (1) 3-5 years old (2) students 6-11 years old and (3) all students regardless their age.
• The first age group estimate was positive 3.9 hours and statistically significant. Results are the highest among the three age groups studied, including students with ages 3-5 which are the most vulnerable group.
• The second and third definitions were positive, significant and very similar (3.8 and 3.7 hours respectively).
• These results suggest that the growth on the share of students attending an extended journey school has a positive impact on average hours worked by females. Literature suggests that there might be the case that there are two effects playing a role in these estimates. When a school within a community transitions from 4 hours to an 8 hours schedule, the price of leisure increases. If we define the net price of leisure to be hourly wages minus the hourly cost of childcare, an extension of the school day (reduction of the cost of childcare) is an increase in the net price of leisure. The price change would trigger two opposite effects over the average hours worked by females.
• The first one is a substitution effect of women replacing leisure hours for working hours, which increases the average hours worked within the municipal districts. The second is the income effect of females that were already paying childcare costs before the policy implementation. After the policy is implemented these families do not have to pay childcare costs anymore and therefore could afford to reduce their hours. The second effect reduces the average hours worked in the municipal district. In this case, results suggest that the substitution effect is larger than the income effect (positive coefficient) and that the effect of females entering the labor market is larger than the effect of females reducing their hours.
• Most of upper middle income and high-income households work in the formal sector while the opposite happens for lower income levels. The lack of flexibility in the Dominican formal sector to adjust hours makes it very difficult for employees to adjust their hours. Traditionally in the DR, formal employment implies a contract for 40 hours per week schedule. In the individual survey dataset that was grouped for this analysis the average hours worked by females in the formal sector is 40.7 (s.d.=10) and for the informal sector is 35.1 (s.d=15.6). Thus, the income effect under this scenario might be coming from the informal sector where females can modify their hours and that represents over 30 percent of the Dominican economy (CBDR, 2016).

5. Robustness check

The general trend on FLP in the DR has been upward in the past few years. To reduce the possibility of the estimates being a consequence of the general market trend, the analysis was performed a second time. The second analysis only includes households that do not have among its members children in school age (0-18). If the same results from the first estimation are found, it may be a suggestion that the specification is invalid or that the results are not accurate.

It is important to highlight that the implementation of the policy might generate second hand effects over families that do not have children. It is possible that females take care of children other than their own (grandchildren, nephew/niece etc.) to help a family member. Moreover, for the policy to be implemented in a given neighborhood, the construction of new schools near the old ones is needed. Females in the community might have an opportunity to increase their working hours or might get
motivation to enter the labor force as new positions are created in the newly built schools\textsuperscript{10}. These opportunities could be taken by families with or without children and thus making it possible for the policy to have a mild effect on the labor supply of females who are not mothers. However, these cases are believed not be the norm and thus the effect of the policy should not be statistically significant.

Results are shown in Table 3 and Table 4, for both the case of LFP and hours worked the JEE coefficient is positive, however is smaller than previous analysis and not statistically significant (p-value>0.10). Results are similar for all groups of age studied.

6. Limitations

- The links between the two sources of data only allowed merging them at the municipal district level. However, there is data at the individual level in both sources as well as to the neighborhood level. While grouping the data was necessary to link both databases, it leads to a less than ideal usage of the information as variation is lost when the date is grouped.

- To further explore the size of the substitution and income effect of hours worked, it would be interesting to explore variations in the informal market hours. However, with the current dataset, the sub segment of the data set is small and results although yield expected signs are insignificant. Informal levels do not vary greatly at the municipal district level, thus grouped data might not be adequate to analyze sectors.

- There is a variable only present in one year of the data set and thus could not be included of the longitudinal analysis. The variable reports the type of

\textsuperscript{10} Especially as the new schools have spaces that were not found in previously existing schools such as school kitchen, school labs and school greenhouse for crops.
education that minors receive in the households. When describing households that marked “Private schools” in that year, the majority (48 percent) were double income households in the 70th income percentile or above, living in an urban setting. These households could not be identified in the rest of the years, and thus are not part of the final sample considered for the analysis. Mothers of these households did not receive the treatment (a free extension of school hours for their children) but are considered in the labor force participation estimates. This suggests that estimates could be larger than these results show.

7. Conclusions

This study explores the effect of a 4-hour lengthening of the school day on FLS in the Dominican Republic. The extension of the school day can be considered a proxy of high-quality childcare as children would spend time in a controlled environment with professional personnel. Thus, making this new school schedule available for families should influence mothers’ use of time as they no longer must provide care for this 4-hour period. The analysis uses repeated cross-section samples to the municipal district level to perform a longitudinal analysis of the FLS to the intensive and extensive margins. Results suggest a positive and statistically significant relation between FLS and an extension of the school day.

The estimates are larger when the share of students attending a school with the new schedule (JEE) are between 6-11 years old respect to children 3-5 years old. The 3-5 years old children effect might be lower due to the low offer of seats for children with those ages in the public system. Transitioning children 3-5 years old from a 4-hour schedule to an 8-hour schedule would not have as large effect in labor supply because
the coverage for Kindergarten in the community is lower than it is in the case of Elementary.

The estimate of the JEE of children 6-11 years old is also larger when compared to the group that considers all children attending Kindergarten or Elementary regardless their age. This might be because of two reasons: 1) The percentage of children ages 3-4 in the country attending the public system is below 30%. This low coverage in these age groups might cause that a significant portion of mothers of children these ages remain unaffected by the policy change and 2) It includes overage children that could be 13, 14 or 15 years old. Mothers of children with these ages might be less likely to feel restrained to leave them under the care of a family member, neighbor or alone for 4-hours. Thus, childcare was not affecting their labor supply decisions before the school extension and therefore they are not changing their behavior due to the policy.

Results may be a suggestion that childbearing has been limiting mother’s ability to participate in the labor market. The school day extension does have a significant effect on Females Labor Supply, especially for females with children that are infants as opposed to teenagers and for females whose children attend a grade that has high coverage in the public system.
8. References


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8. Appendix

a. Dominican Republic Overview

**GDP, per capita, Current US$**

*Latin American Region*

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**GINI COEFFICIENT (0=PERFECT EQUITY)**

*Latin America vs DR*

<table>
<thead>
<tr>
<th>Year</th>
<th>Dominican Republic</th>
<th>LA average</th>
</tr>
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<tbody>
<tr>
<td>2006</td>
<td>51.9</td>
<td>38.0</td>
</tr>
<tr>
<td>2007</td>
<td>51.6</td>
<td>38.3</td>
</tr>
<tr>
<td>2008</td>
<td>50.5</td>
<td>38.5</td>
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<td>38.8</td>
</tr>
<tr>
<td>2010</td>
<td>49.0</td>
<td>39.2</td>
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<td>39.9</td>
</tr>
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<td>2013</td>
<td>47.6</td>
<td>40.1</td>
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<td>2014</td>
<td>47.2</td>
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<td>2015</td>
<td>44.5</td>
<td>40.1</td>
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**FEMALE LABOR FORCE PARTICIPATION (PERCENTAGES%)**

*Latin America vs DR*

<table>
<thead>
<tr>
<th>Year</th>
<th>Dominican Republic</th>
<th>LA average</th>
</tr>
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<tbody>
<tr>
<td>2000</td>
<td>40.0</td>
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<td>2001</td>
<td>42.0</td>
<td>37.1</td>
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<td>2002</td>
<td>44.0</td>
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<tr>
<td>2003</td>
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<td>37.4</td>
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<tr>
<td>2004</td>
<td>48.0</td>
<td>37.4</td>
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<tr>
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<td>37.9</td>
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<tr>
<td>2006</td>
<td>52.0</td>
<td>38.4</td>
</tr>
<tr>
<td>2007</td>
<td>54.0</td>
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<td>38.0</td>
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<tr>
<td>2009</td>
<td>58.0</td>
<td>38.0</td>
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<tr>
<td>2010</td>
<td>60.0</td>
<td>38.0</td>
</tr>
<tr>
<td>2011</td>
<td>62.0</td>
<td>38.0</td>
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<tr>
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<td>64.0</td>
<td>38.0</td>
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<tr>
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<td>66.0</td>
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<td>2014</td>
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<td>2015</td>
<td>70.0</td>
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<tr>
<td>2016</td>
<td>72.0</td>
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</tr>
<tr>
<td>2017</td>
<td>74.0</td>
<td>38.0</td>
</tr>
</tbody>
</table>
Average School Years in the DR

Source: Bi-annual poverty reports, Dominican Ministry of Economy, Planning and Development
Note: Shaded areas show local financial crisis (2003), and international financial crisis (2008).
b. Labor outcomes

**Laborforce Participation (%)**

- **Male**
  - 2010: 75%
  - 2011: 75%
  - 2012: 75%
  - 2013: 75%
  - 2014: 75%
  - 2015: 75%
  - 2016: 75%

- **Female**
  - 2010: 55%
  - 2011: 55%
  - 2012: 55%
  - 2013: 55%
  - 2014: 55%
  - 2015: 55%
  - 2016: 55%

**Unemployment in the DR by Gender**

- **Hombres**
  - 2010: 7%
  - 2011: 7%
  - 2012: 7%
  - 2013: 7%
  - 2014: 7%
  - 2015: 7%
  - 2016: 7%

- **Mujeres**
  - 2010: 9%
  - 2011: 9%
  - 2012: 9%
  - 2013: 9%
  - 2014: 9%
  - 2015: 9%
  - 2016: 9%

**Average Hours Worked Per Week**

- **Male**
  - 2012: 42.5
  - 2013: 42.6
  - 2014: 42.5
  - 2015: 42.3
  - 2016: 42.3

- **Female**
  - 2012: 37.3
  - 2013: 37.4
  - 2014: 37.3
  - 2015: 38.8
  - 2016: 38.8
c. School day Extension analysis

Share of JEE schools by province from 2013-2014

<table>
<thead>
<tr>
<th>Year</th>
<th>% Share of JEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>60+ 45 to 60 30 to 45 15 to 30 0 to 15</td>
</tr>
<tr>
<td>2014</td>
<td>60+ 45 to 60 30 to 45 15 to 30 0 to 15</td>
</tr>
<tr>
<td>2015</td>
<td>60+ 45 to 60 30 to 45 15 to 30 0 to 15</td>
</tr>
<tr>
<td>2016</td>
<td>60+ 45 to 60 30 to 45 15 to 30 0 to 15</td>
</tr>
</tbody>
</table>
Table 1. FLFP

<table>
<thead>
<tr>
<th></th>
<th>(1) Ages 3-5</th>
<th>(2) Ages 6-11</th>
<th>(3) All ages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share of students attending a JEE</td>
<td>0.0614**</td>
<td>0.0727**</td>
<td>0.0702**</td>
</tr>
<tr>
<td></td>
<td>(0.0339)</td>
<td>(0.0130)</td>
<td>(0.0146)</td>
</tr>
<tr>
<td>Unemployment</td>
<td>0.661***</td>
<td>0.661***</td>
<td>0.661***</td>
</tr>
<tr>
<td></td>
<td>(0.0000)</td>
<td>(0.0000)</td>
<td>(0.0000)</td>
</tr>
<tr>
<td>Years of schooling</td>
<td>0.0198***</td>
<td>0.0196***</td>
<td>0.0197***</td>
</tr>
<tr>
<td></td>
<td>(0.00438)</td>
<td>(0.00483)</td>
<td>(0.00480)</td>
</tr>
<tr>
<td>% Household lead by female</td>
<td>0.0596</td>
<td>0.0590</td>
<td>0.0592</td>
</tr>
<tr>
<td></td>
<td>(0.185)</td>
<td>(0.189)</td>
<td>(0.187)</td>
</tr>
<tr>
<td>Median age</td>
<td>0.00513**</td>
<td>0.00514**</td>
<td>0.00515**</td>
</tr>
<tr>
<td></td>
<td>(0.0163)</td>
<td>(0.0159)</td>
<td>(0.0158)</td>
</tr>
<tr>
<td>Log(income)</td>
<td>0.0744***</td>
<td>0.0719***</td>
<td>0.0721***</td>
</tr>
<tr>
<td></td>
<td>(0.000812)</td>
<td>(0.00120)</td>
<td>(0.00116)</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.580***</td>
<td>-0.559***</td>
<td>-0.561***</td>
</tr>
<tr>
<td></td>
<td>(0.00364)</td>
<td>(0.00527)</td>
<td>(0.00509)</td>
</tr>
<tr>
<td>rho</td>
<td>.300</td>
<td>.301</td>
<td>.300</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.190</td>
<td>0.189</td>
<td>0.189</td>
</tr>
</tbody>
</table>

Robust p-values in parentheses
*** p<0.01, ** p<0.05, * p<0.1
### e. Effect of JEE on Female Labor Supply: Intensive margin results

<table>
<thead>
<tr>
<th>Table 2. Hours worked</th>
<th>(1) Ages 3-5</th>
<th>(2) Ages 6-11</th>
<th>(3) All ages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share of students attending a JEE</td>
<td>3.900*** (0.000)</td>
<td>3.764*** (0.000)</td>
<td>3.717*** (0.000)</td>
</tr>
<tr>
<td>Unemployment</td>
<td>-15.97*** (0.000)</td>
<td>-16.00*** (0.000)</td>
<td>-16.02*** (0.000)</td>
</tr>
<tr>
<td>Years of schooling</td>
<td>1.360*** (0.000)</td>
<td>1.361*** (0.000)</td>
<td>1.362*** (0.000)</td>
</tr>
<tr>
<td>% Household lead by female</td>
<td>1.875 (0.188)</td>
<td>1.861 (0.192)</td>
<td>1.869 (0.190)</td>
</tr>
<tr>
<td>Median age</td>
<td>0.291*** (0.000)</td>
<td>0.289*** (0.000)</td>
<td>0.289*** (0.000)</td>
</tr>
<tr>
<td>Log(hourly wage)</td>
<td>-2.334*** (0.000)</td>
<td>-2.325*** (0.000)</td>
<td>-2.322*** (0.000)</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.376 (0.765)</td>
<td>-1.304 (0.777)</td>
<td>-1.342 (0.770)</td>
</tr>
<tr>
<td>Rho</td>
<td>0.456</td>
<td>0.456</td>
<td>0.456</td>
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<tr>
<td>R-squared</td>
<td>0.182</td>
<td>0.181</td>
<td>0.180</td>
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</tbody>
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Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
f. Robustness check: Households without children

<table>
<thead>
<tr>
<th>Table 3. FLFP</th>
<th>(1) Ages 3-5</th>
<th>(2) Ages 6-11</th>
<th>(3) All ages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share of students attending a JEE</td>
<td>-0.00561 (0.890)</td>
<td>0.00351 (0.928)</td>
<td>0.00522 (0.892)</td>
</tr>
<tr>
<td>Unemployment</td>
<td>-0.455*** (3.10e-05)</td>
<td>-0.455*** (3.12e-05)</td>
<td>-0.455*** (3.13e-05)</td>
</tr>
<tr>
<td>% Household lead by female</td>
<td>0.0237*** (0.00228)</td>
<td>0.0237*** (0.00222)</td>
<td>0.0237*** (0.00221)</td>
</tr>
<tr>
<td>Median age</td>
<td>0.146** (0.0148)</td>
<td>0.144** (0.0152)</td>
<td>0.144** (0.0154)</td>
</tr>
<tr>
<td>Log(income)</td>
<td>5.36e-07 (1.000)</td>
<td>-1.22e-05 (0.994)</td>
<td>-1.41e-05 (0.993)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.0555** (0.0253)</td>
<td>0.0546** (0.0281)</td>
<td>0.0545** (0.0286)</td>
</tr>
<tr>
<td>rho</td>
<td>.397</td>
<td>.397</td>
<td>.399</td>
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<tr>
<td>R-squared</td>
<td>0.046</td>
<td>0.046</td>
<td>0.046</td>
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Robust p-values in parentheses
*** p<0.01, ** p<0.05, * p<0.1
<table>
<thead>
<tr>
<th>Table 4. Hours worked</th>
<th>(1) Ages 3-5</th>
<th>(2) Ages 6-11</th>
<th>(3) All ages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share of students attending a JEE</td>
<td>2.422 (0.458)</td>
<td>2.089 (0.495)</td>
<td>1.985 (0.512)</td>
</tr>
<tr>
<td>Unemployment</td>
<td>2.546 (0.566)</td>
<td>2.505 (0.572)</td>
<td>2.478 (0.576)</td>
</tr>
<tr>
<td>% Household lead by female</td>
<td>-0.320 (0.291)</td>
<td>-0.324 (0.287)</td>
<td>-0.325 (0.287)</td>
</tr>
<tr>
<td>Median age</td>
<td>2.415 (0.267)</td>
<td>2.479 (0.253)</td>
<td>2.496 (0.250)</td>
</tr>
<tr>
<td>Log(income)</td>
<td>0.0367 (0.594)</td>
<td>0.0379 (0.583)</td>
<td>0.0379 (0.583)</td>
</tr>
<tr>
<td>Constant</td>
<td>-2.295*** (0.00133)</td>
<td>-2.285*** (0.00142)</td>
<td>-2.282*** (0.00145)</td>
</tr>
<tr>
<td>rho</td>
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<td>.488</td>
<td>.489</td>
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<tr>
<td>R-squared</td>
<td>0.029</td>
<td>0.028</td>
<td>0.028</td>
</tr>
</tbody>
</table>

Robust p-values in parentheses
*** p<0.01, ** p<0.05, * p<0.1