

**Does lengthening the school day  
reduce the likelihood of early school  
dropout and grade repetition:  
Evidence from Colombia**

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Sandra García

Camila Fernández

Christopher C. Weiss

Serie Documentos de Trabajo EGOB 2013

Edición No. 7

ISSN 2215 – 7816

Edición electrónica

Octubre 2013

© 2012 Universidad de los Andes - Escuela de Gobierno Alberto Lleras Camargo

Carrera 1 No. 19 -27, Bloque AU

Bogotá, D.C., Colombia

Teléfonos: 3394949 / 99 Ext. 2073

escueladegobierno@uniandes.edu.co

<http://gobierno.uniandes.edu.co>

Director Escuela de Gobierno Alberto Lleras Camargo

Carlos Caballero Argáez

Autor

Sandra García

Camila Fernández

Christopher C. Weiss

Asistente editorial

Olga Lucía Forero Rojas

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# Does lengthening the school day reduce the likelihood of early school dropout and grade repetition: Evidence from Colombia

Sandra García<sup>a</sup>

Camila Fernández<sup>b</sup>

Christopher C. Weiss<sup>c</sup>

## Abstract

Previous research on the effects of the length of instructional time has found that academic performance is higher when more time is spent in instruction. These findings have been reported in research examining both the length of the school day, as well as the length of the school year (Patall, Cooper, & Allan, 2010). However, most research on the topic has focused on academic assessments, such as standardized tests, or on longer-term outcomes, such as wages. Overlooked in these studies are the more proximate measures of schooling that also influence student trajectories. Specifically, as yet, no analysis has focused on the effects of the length of school schedule on the likelihood of grade repetition, nor on the risk of dropping out of school before graduation. In this analysis, we use data from a new source in Colombia to examine the effects of a change from half-day schooling (*media jornada*) to full-day schooling (*jornada completa*) on near-term student outcomes. We estimate family-fixed effects models and find that the implementation of full-day schooling significantly reduces the probability early dropout and grade repetition. We complement our analysis with a qualitative case study comparison of schools with high and low dropout rates, and discuss the possible mechanisms underlying the effect of school schedule on student outcomes.

<sup>a</sup> School of Government, Universidad de los Andes Cra. 1 No. 19-27. Bogotá – Colombia. Email: [sagarcia@uniandes.edu.co](mailto:sagarcia@uniandes.edu.co)

<sup>b</sup> Mathematica Policy Research. 600 Alexander Park. Princeton, NJ 08540. Email: [CFernandez@mathematica-mpr.com](mailto:CFernandez@mathematica-mpr.com)

<sup>c</sup> Department of Sociology, New York University. 295 Lafayette Street, Room 4111 New York, NY 10012. Email: [chrisweiss@nyu.edu](mailto:chrisweiss@nyu.edu)

This study was supported by a grant from Educación Compromiso de Todos. The authors gratefully thank Fabio Sánchez, Gabriel Torres and Carlos Alberto Casas for their input throughout the different stages of this research project. We also extend special thanks to Tatiana Velasco and Mara Minski for their hard work as research assistants during data collection and analysis. An earlier version of this paper was presented at the Population Association of America 2012 Annual Meeting, San Francisco, CA.

# ¿Extender la jornada escolar reduce la probabilidad de deserción temprana y repetición escolar? Evidencia de Colombia

Sandra García<sup>a</sup>

Camila Fernández<sup>b</sup>

Christopher C. Weiss<sup>c</sup>

## Resumen

Investigaciones previas sobre el efecto de la jornada escolar han concluido que el desempeño académico es mejor cuando el tiempo de estudio es mayor. Estos resultados provienen de estudios que observan tanto la duración del día como la del año escolar (Patall, Cooper, y Allan, 2010). La mayoría de estas investigaciones se han concentrado en evaluar logros académicos a través de exámenes estandarizados, o en observar resultados a largo plazo como el salario. Otras medidas más cercanas al desempeño de los estudiantes e influyentes en la trayectoria escolar, han sido dejadas de lado. En efecto, hasta ahora ningún estudio ha observado el impacto de la jornada escolar en la probabilidad de repetición escolar o en el riesgo de deserción escolar. Este análisis utiliza datos de una nueva fuente en Colombia para examinar los efectos a corto plazo del cambio de media jornada a jornada completa. Con la estimación de un modelo con efectos fijos de familia se encontró que la implementación de la jornada completa reduce significativamente la probabilidad de deserción temprana y repetición escolar. Este análisis se complementa con un estudio de caso cualitativo que compara colegios con alto y bajo índice de deserción, y finalmente discute los posibles mecanismos subyacentes del efecto del horario escolar en los resultados de los estudiantes.

<sup>a</sup> Escuela de Gobierno, Universidad de los Andes Cra. 1 No. 19-27. Bogotá – Colombia. Email: [sagarcia@uniandes.edu.co](mailto:sagarcia@uniandes.edu.co)

<sup>b</sup> Investigación políticas matemáticas. 600 Alexander Park. Princeton, NJ 08540. Email: [CFernandez@mathematica-mpr.com](mailto:CFernandez@mathematica-mpr.com)

<sup>c</sup> Departamento de sociología, Universidad de Nueva York. 295 Lafayette Street, Room 4111 New York, NY 10012. Email: [chrisweiss@nyu.edu](mailto:chrisweiss@nyu.edu)

Este estudio fue apoyado por una subvención de Educación Compromiso de Todos. Los autores agradecen a Fabio Sánchez, Gabriel Torres y Carlos Alberto Casas por sus aportes a lo largo del proceso del proyecto de investigación. Además, dan un agradecimiento especial a Tatiana Velasco y Mara Minski por su duro trabajo como asistentes de investigación durante la recolección y análisis de los datos. Una edición previa de esta investigación fue presentada en la Reunión Anual de Population Association of America, en San Francisco, California.

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## **Background**

One of the basic questions that any state or government must address is how long youth should spend in school. Length of instructional time is a fundamental issue in education and education policy, whether the focus is on the minimum number of years of school required, the number of days in the school year, or the length of the school year. The notion that student learning is a function, at least in part, of time in school is a central idea in education research (Brown & Saks, 1986).

The issue is one that receives regular, if not sustained, attention from educational policymakers. Both President Barack Obama and his Secretary of Education, Arne Duncan, have made public statements calling for American students to spend more time in school each year. In a recent interview, Duncan said, “I think the school day is too short, the school week is too short, and the school year is too short” (April 15, 2009 interview with Richard Stengel, TIME Magazine, quoted in Patall et al., 2010). The matter has also been explicitly included in policy reforms, such as No Child Left Behind, which specifies the number of minutes that students should spend studying various subjects (Center on Educational Policy, 2006).

Research in education policy has examined the effects of length of schooling on student learning, with generally positive results. However, most research on the effects of time in school has focused either on academic assessments, such as standardized tests, or on longer-term outcomes, such as adult wages. Yet, we also expect that a number of more proximate measures of schooling might also be affected by changes to the length of schooling. Specifically, as yet, no analysis has focused on the effects of the length of school schedule on the likelihood of grade repetition, nor of dropping out of school before graduation.

In this paper, we examine the effects of a change in the length of school day on near-term student outcomes. Using data from a new source in Colombia, we examine the effects of a change from half-day schooling (*media jornada*) to full-day schooling (*jornada completa*) on near-term student outcomes. To anticipate our findings, the results of our models show

that the implementation of full-day schooling significantly reduces the probability early dropout and grade repetition.

## **1. Literature Review**

### ***1.2 Research on the Effects of Length of Schooling***

Researchers generally hypothesize a significant, positive relationship between the amount of time students spend in school and student outcomes (Carroll, 1963; Bloom, 1974; Good & Beckerman, 1978; Millot, 1995). Logically, it would seem likely that the longer a student spends in school, the greater his/her learning and the better his/her outcomes. Research has shown a general, though not consistent, relationship between time spent in school and academic outcomes.

In some cases, the unit of study is the length of the school year. The number of days a student attends school has been shown to be positively related to learning in the near-term (D'Agostino, 2000) as well as earnings over the life course (Card & Krueger, 1992; Llach, Adroque, Gigaglia, & Rodriguez, 2009). Evidence from innovations to the school calendar, such as the implementation of year-round schooling or alteration of the school calendar to eliminate the long summer break, have shown positive benefits to academic achievement (Gandara & Fish 1994; Cooper, Valetine, Charlton, & Melson, 2003).

Other studies focus on the effects of the length of the school day or time spent on subject on students' performance. The great bulk of research on the effects of instructional time has found a positive association with student learning and performance (Berliner, 1990; Hofferth & Sandberg, 2001; Wiley & Harnischfinger, 1974); however, not all studies have found a benefit, with critics asserting that increasing the length of schooling will not necessarily increase the time that students spend learning (e.g., Karweit, 1985; Levin, 1984).

Temporal dimensions of schooling occasionally become the focus of reform efforts – such as the landmark proposal, *A Nation at Risk*, which called for increasing the length of the average school day (to seven hours) and school year (from 180 days to 220) in the United States (see Levin, 1984). More recently, in a pilot project Massachusetts experimented with

extending the length of the school day in 10 schools to assess whether the additional time improved student performance. A study conducted among elementary school children in Illinois found a positive benefit of instructional time on students' standardized test scores in reading and mathematics (Coates, 2003). And at a more micro-level of instructional time, a set of recent papers have documented the positive relationship between class attendance and student learning (Gottfried, 2010; Stanca, 2006).

Much of the recent evidence on the effects of instructional time and length of school period comes from reports examining international comparisons. A number of these have drawn a link between the higher levels of achievement among students (relative to the United States) in other countries and the fact that students in the United States spend much less time in school than those who score higher (Gonzales et al., 2004; Lewis & Seidman, 1994). Nearly three decades ago, *A Nation at Risk* highlighted the disparity between the length of school term in the United States, as compared with Western Europe and Japan (National Commission on Excellence in Education, 1983).

Not all research has found that increasing the length of the schooling has beneficial effects. For example, some studies have found that increasing the length of time is not in and of itself beneficial, since there is significant variation in how time is used in school (Karweit, 1985). More generally, not all studies examining the relationship between length of schooling and performance have found positive effects (Aronson, Zimmerman, & Carlos, 1999).

Only a handful of studies have examined the effect of changes in the length of school day on non-academic outcomes. Some studies have found that increasing the length of the day decreases the number of disciplinary problems (Bishop, Worner, & Weber, 1988; Ross, McDonald, Alberg, & McSparrin-Gallagher, 2007). However, there are a number of dimensions of school performance that remain unexamined with respect to their relationship with instructional time.



### ***1.3 Double-Shift Schooling***

One particularly marked change in instructional time – a point at which particular insight on its effects might be gained – is when educational systems eliminate practices such as “double-shift schooling.” Double-shift schooling has appeared in various school systems across the world, including in the United States, as a particular policy response to increase the number of students receiving instruction, while working to accommodate constraints related to funding, teachers, or physical space. For example, Neckerman (2007) describes how the city of Chicago addressed overcrowding in black schools during the 1930s and 1940s by imposing double-shift schedules, which reduced the length of the school day from five hours to four. The practice was so widespread that by 1940, three-quarters of all-black elementary school students in the city attended school on double-shifts, with some on triple shifts (Homel, 1982, cited in Neckerman, 2007). Detroit public schools used double-shift scheduling, particularly to address budgets shortfalls, into the late 1950s (Mirel, 1999).

A good portion of recent work in evaluating half-day and full-day schooling comes from policy research examining the effects of different kindergarten arrangements in the United States. Data examining the effects of full-day kindergarten, relative to half-day, has shown significant benefits to the longer program (Entwisle, Alexander, Cadigan, & Pallas, 1987; Lee, Burkham, Ready, Honigman, & Meisels, 2006; Zvoch, Reynolds, & Parker, 2008).

Based at least in part upon this research, over the past two decades, a number of countries in Latin America have adopted proposals to lengthen the school day (Gajardo, 1999; Martinic, 1998). For example, a recently published paper based upon results from a natural experiment in Chile reveal that an increase in the school day – from half-day to full-day – resulted in significant gains in academic performance (Bellei, 2009).

The structure of the policy change implemented in Chile in the mid-1990s is very similar to the changes in Colombia that are the basis of our evaluation. In 1996, the Chilean government implemented a policy to end the practice of schooling in “shifts” – in which two different groups of students attend the same school, one attending in the morning, another in the afternoon – to full school days with students attending all morning and half the afternoon (Bellei, 2009; Cariola, Bellei, & Nuñez Prieto, 2003).

In the case of Colombia, double-shift schooling (*media jornada*) was designed in the late 1960s as a strategy to increase education enrollment. While Colombia has not implemented a change of “*jornada*” at national level, some municipalities have made some changes in this direction. Technically, in the early 1990s there was a law that mandated full-time schooling as a strategy to improve education quality (law 115, 1994); however, the implementation of the law has been very slow and it was actually derogated in 2002 giving more freedom to school administrators to organize school time instruction depending on the particular needs of municipalities.

As stated, the law specifies the number of hours that students of different grades must spend in school each week. Students in preschool are to receive a minimum of 20 hours of educational instruction each week. Minimum time of instruction in primary grades is 25 hours per week, while for middle school and high school students is 30 hours. Yet, compliance with the law has been limited and, at present, only 18 percent of students are in “full-time” schooling.

Specifically, research on the effects of instructional time have not examined whether and how the risk of dropping out before completing a terminal degree nor the risk of repeating a grade change in response to changes in the length of the instruction.

## **2. Focus on Near-Term Student Outcomes**

As noted earlier, most of the research on the effects of length of schooling has examined either immediate outcomes, such as test scores, or longer-term issues, such as adult wages. Although no studies have examined length of schooling on grade retention or dropping out before graduation, both outcomes have been the focus as determinants for other educational outcomes.

### ***2.1 Consequences of Grade Repetition***

Research on grade repetition has generally found that repeating a grade in school has negative consequences for the retained student. A recent meta-analysis of studies of repetition’s effects concluded that students who are held back a grade have worse

academic, socio-emotional, and behavioral outcomes, relative to students who do not repeat a grade (Jimerson, 2001).

Further, many studies have found that grade repetition increases the odds of dropping out of high school. Several analyses have concluded, for example, that retained students are more likely to drop out of high school before graduation than are similar groups of low-achieving students not retained (Alexander, Entwisle, & Dauber, 1994; Brooks-Gunn, Guo, & Furstenberg, 1993; Cairns, Cairns, & Neckerman, 1989; Eide & Showalter, 2001; Jimerson, 1999). Moreover, a number of studies have concluded that one of the best predictors for leaving school before graduation is prior grade repetition and the subsequent condition of being overage for grade (Grissom & Shepard, 1989; Jacob & Lefgren, 2009; Roderick, 1993; Rumberger & Larson, 1998).

Although the majority of research on the effects of grade retention has been conducted on data from the United States, there are studies that have shown similar effects in Central and South American contexts. School repetition also represents an important risk factor for school dropout among Colombian children (Pardo & Sorzano, 2004), as it has also been shown in Uruguay (Manacorda, 2010).

In addition to having higher odds of dropping out, those who have been retained have significantly lower odds of post-secondary enrollment than those never held back (Fine & Davis, 2003; Jimerson, 1999). Repetition has also been shown to be associated with lower future earnings and poorer employee competence ratings than poor performing, but non-retained, students (Eide & Showalter, 2001; Jimerson, 1999).

Lastly, existing research on behavior problems following grade repetition, though sparse, suggests that there may be adverse effects of repetition, although they are not as strong as the effects on academics (Jimerson, 2001). For example, repetition has been associated with poorer emotional health and more behavioral problems such as aggression in the long term (Jimerson, Carlson, Rotert, Egeland, & Sroufe, 1997; Jimerson & Ferguson, 2007; Meisels & Liaw, 1993). A comparison of children retained between kindergarten and third grade to similarly low achieving peers found that at age 16, those who were retained were rated as lower in emotional health by their teachers, net of initial differences in their social

adjustment (Jimerson et al., 1997). Interestingly, this difference was not evident one year after the promotion. In another study, children who were retained before sixth grade demonstrated higher levels of anxiety, inattentiveness and disruptiveness at ages 10-12 than other children (Pagani, Tremblay, Vitaro, Boulerice, & McDuff, 2001). Results for anxiety and inattentiveness were particularly pronounced for children retained early in grade school, such that their symptoms were stronger even than those children who had just been retained.

## ***2.2 Consequences of Dropping Out of School before Graduation***

The negative effects of dropping out of school are well documented (Cairns & Cairns, 1994). The most immediate consequence of dropping out of school is the disruption in the accumulation of human capital. School dropouts have less favorable outcomes in the labor market in terms of employment and wages (Sum, Fogg, & Mangum, 2000). They are also more likely to become single parents (Sum, Khatiwada, & McLaughlin, 2009) and to participate in unhealthy or delinquent behaviors (Sweeten, Bushway, & Paternoster, 2009; Townsend, Flisher, & King, 2007).

In the developing countries context, where dropping out starts occurring many years before graduation, leaving school without completing even an intermediate level of schooling is a pathway towards poverty and its intergenerational transmission (Morán, 2003).

## **3. Research Questions**

Based upon previous research about the effects of time in school on student outcomes, in this analysis we examine the effects of a structural change in the educational system in Colombia. Specifically, we want to know whether and to what extent the risk of negative educational outcomes change as a result of the change in educational structure. We have chosen two outcome measures that have not been examined in previous research on the effects of length of schooling: grade repetition and early school dropout. We examine three related research questions in our analysis:

- What is the effect of one-shift schooling (jornada completa) on early school dropout?

- What is the effect of one-shift schooling (jornada completa) on grade repetition?
- What are the mechanisms that explain such effects?

## **4. Data and Methods**

We use panel data on Colombian children in public schools in 2007 and 2008. Provided by the Ministry of Education, these data have unique identifiers for every child in the public school system, allowing us to track every child over time and to detect dropout and grade repetition. Moreover, the unique identifiers allow us to merge these educational data to data from a household national survey that is used to target social programs (SISBEN<sup>1</sup>).

By doing so, we are able to identify the households of children in the educational data, and therefore construct unique household identifiers. In our analysis, we seek to exploit the fact that there is variation within some households in the form of schooling that different children experienced. We estimate a causal effect by examining households with at least two children, at least one of whom experienced half-day schooling in the early years and another who experienced full-day schooling. This estimation strategy fixes household resources, allowing us to better isolate the effect of schooling differences.

In order to understand more in-depth our quantitative results, we complement our analysis with a qualitative case study comparison of two municipalities in Colombia with distinct socio-economic conditions. In each municipality we selected two schools for the case study comparison, one school with extremely high dropout rates and another with low dropout rates.

### ***4.1 Causal estimation strategy***

One of the main challenges in estimating the effects of double-shift on schooling is that the characteristics of children (and parents) from double-shift schools are different from those of full-shift schools. Many of these characteristics are unobserved, such as expectations from schooling, motivation or ability. The data we were able to assemble have unique

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<sup>1</sup> Identification System of Potential Beneficiaries of Social Programs (*Sistema de Identificación de Potenciales Beneficiarios de Programas Sociales*). The SISBEN is a score based on a survey of socio-demographic household characteristics used to focalize public policy programs in Colombia.

identifiers of households (parents). Since we have all children who were in public schools in 2007 and 2008, we were able to identify pairs of siblings and estimate family-fixed-effect models, which account for unobserved characteristics at the family level that do not vary over time and, therefore, yield a better estimate of the effect of double-shift on education outcomes.

The estimated model is

$$p(Y_{ifst} = 1) = \beta X_{ifs(t-1)} + \theta T_{ifs(t-1)} + \gamma S_s + \alpha_f + \varepsilon_{ifs}$$

where  $p_{ifst}$  is the probability of dropping out of school or repeating a grade in year  $t$ ,  $X_{ifs(t-1)}$  are child characteristics,  $S_s$  are school characteristics,  $\alpha_f$  are family fixed effects, and  $T_{ifs(t-1)}$  is a dummy for one-shift schooling. The coefficient of interest is  $\theta$ , which captures the effect of the double-shift on school outcomes.

Child characteristics include gender, age, whether or not the child belongs to an ethnic group, whether or not the child has a disability, whether or not the child is victim of the internal conflict and whether or not the child comes from another municipality. School characteristics include whether or not the school is located in an urban area, the education levels offered by the school, and the teaching methodology (new school, ethnoeducation or other). Household characteristics include education of the household's head and socioeconomic strata.

## 4.2 *Qualitative approach*

The goal for the comparative case studies was to understand mechanisms behind early school dropout drawing on the experiences of children, parents and teachers associated with schools that differed substantially in their dropout rates. To this end, we drew upon administrative data and selected the sites for the case studies following a three-step selection procedure. First, all municipalities in the country were clustered into a high poverty or low poverty group based on the Unmet Basic Needs Index (median split of the distribution). As the second step, we selected municipalities with the 10% highest variance in dropout rates in each group. This ensured that extreme cases (low vs. high dropout schools) were identifiable within the municipality. One municipality was randomly selected from each group (Pereira for low poverty case; Corozal for high poverty). Finally, we

randomly selected one school from the top and one from the bottom 10% of the dropout distribution for each municipality. Thus, the four school case studies represent: (1) a high dropout school within a high poverty municipality (HPHD); (2) a low dropout school within a high poverty municipality (HPLD), (3) a high dropout school within a low poverty municipality (LPHD); and (4) a low dropout school within a low poverty municipality (LPLD). We conducted focus groups with students enrolled in first and second grade, parents of those students, and first and second grade teachers. In addition, we interviewed school principals or academic coordinators. All focus groups and interviews were audio recorded and transcribed verbatim. The text files were imported into ATLAS.ti version 5.6. and coded for thematic analysis.

## 5. Results

Table 1 presents the descriptive statistics of our analytic sample, comparing students who attend half-day with those attending whole-day. On average, children attending half-day school are more likely to belong to an ethnic group, be a conflict victim and come from another municipality than children attending full-day schooling. In terms of households characteristics, children attending half-day school are more likely to live in a household where the head of household has a high school degree and more likely to belong to socioeconomic strata one (second to lowest) than those in full-day. This may be a counterintuitive result because one might expect that more educated parents would look for a full-day program. It is important to remember that this is a sample of only public schools and that in Colombia many well-off families send their children to private schools. Therefore, the data in Table 1 suggest important differences within the public-schools system between students attending a full-day and those attending half-day.

Table 2 extends the comparisons of Table 1, displaying information about school characteristics by length of school-day offered. On average, half-day schools are more likely to be located in urban areas and more likely to offer traditional methodologies of instruction, as opposed to “new school<sup>2</sup>” methodologies that are implemented mostly in

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New school or *Escuela Nueva* was implemented in the late 1970s in rural areas as a strategy to impart primary education in low density areas where one teacher per grade is not possible. The core of the strategy was to

rural areas. Also, half-day schools are more likely have teachers with college or masters degrees; however, despite this advantage, half-day schools are also larger and have higher student-teacher ratios. Taken together, the data presented in Tables 1 and 2 document some of the important differences related to students and schools between half-day and full-day institutions.

Tables 3 and 4 present the estimates of the effects of full-time schooling on school dropout and repetition using the siblings sample. The sequence of analysis is the same for both tables, with Table 3 presenting results for the effects on dropping out and Table 4 containing the models examining grade repetition. The first column present OLS estimates controlling for child and household characteristics, while the second column adds as control variables a set of school characteristics. The third and fourth columns present models adding municipality and household fixed effects respectively. For both sets of analysis, model 4 is preferred because it includes school characteristics and, by using household fixed effects, takes into account unobserved characteristics of households and therefore the endogeneity that could emerge from the fact that parents' preferences affect the probability of attending a full-day program.

The data presented in Table 3 reveal a number of anticipated results, the most important of which is the coefficient on the variable for full-time schooling. Across all four sets of models, the measure is statistically significant and negative, indicating that students who attend full-time schooling are significantly less likely to leave school before graduating, as compared to students attending a school with part-time schooling. Although the magnitude of the coefficient changes, the findings are robust across model specification.

The results shown in Table 4 reveal a similar pattern, with full-time schooling associated with a lower risk of repeating a grade in school. The effect of this variable is not as strong in the final specification – model 4; however, it is consistent and in the expected direction.

Taken together, the results from Tables 3 and 4 show that full-day schooling has a desirable effect both on early dropout and grade repetition. One-day schooling reduces early school

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have flexible curriculum, cooperative learning, teacher training and instruction in a multi-grade setting (one or two teachers for several grades) (Colbert, 1999).



dropout by 2.3 percentage points. Also, full-day schooling has a positive effect on reducing grade repetition by 1.7 percentage points.<sup>3</sup>

### *5.1 Qualitative results*

Results from the qualitative case study comparisons shed some light on the mechanisms possibly underlying the effect of full time vs. part time schooling on school dropout on first and second graders. We identified school-related and family-related mechanisms that suggest ways in which the length of the school day schedule might influence children's permanence in the school system. The first mechanism relates to the constrained use of the physical learning environment in part-time schools and its consequences on pedagogy. The second mechanism centers on greater availability of adult supervision, academic guidance and socio-emotional support in full-time schools. In this section, we describe qualitative findings that offer plausible explanations about the mechanisms by which double-shift schools may have a negative effect on first and second graders permanence in the school system.

During the field site visits and through teacher focus groups we found that limitations in the use of the physical learning environment in part-time schools constitute a plausible mechanism by which students in double-shift school are more likely to repeat a grade or dropout. We observed that elementary and high school students in part-time schools share the same classrooms in alternating shifts (morning/afternoon). In double-shift schools, the classroom set-up needs to be open and flexible in order to accommodate children of various grade-levels all year round. These types of classrooms were striking in their lack of "identity". Children's work in the walls, reference materials, library corners, instructional poster boards or welcoming messages were absent in these classrooms. Since students in these schools share the classroom space with students from other grades, they do not have an opportunity to take ownership of their learning environment or have access to educational resources appropriate for their grade level.

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<sup>3</sup> We also estimated an instrumental variables model to test the robustness of our findings (results not shown). Consistent with the household fixed-effects models, the IV models showed that full-day schooling reduces drop-out and grade repetition.

These limitations in the use of the classroom space pose serious challenges for teachers to use the physical environment productively towards learning goals. It is known from the educational literature that the infrastructure and the characteristics of the physical space influence students' learning, attitudes and behavior (Durán-Narucki, 2008; Morrow, 1990; Tanner, 2008). During the early elementary years, children's access to a rich literacy environment is crucial for their academic achievement. Studies have shown that classrooms that provide access to stimulating literacy materials facilitate students' vocabulary growth and afford the teacher with a variety ways to exploit instructional strategies that help compensate the effects of low literacy-environment in the home (Snow, Barnes, Chandler, Goodman, & Hemphill, 1991). Therefore, the constrained use of the physical learning environment in part time schools is likely to have an effect on school dropout through its negative effect of students' academic achievement and school engagement.

The second mechanism we identified is related to more instructional time and greater availability of adult supervision, academic guidance and socio-emotional support in full-time schools. Parents' and teachers' discourse in the focus groups revealed that first and second grade teachers play an important subsidiary care-taker role for their children. Teachers are not only expected to deliver academic instruction, but also to provide socio-emotional support, to transmit values and moral standards and to provide adult supervision during non-parental care hours. Teachers in part time schools expressed their concern for children of single working mothers (the majority), particularly, for their lack of homework support and academic guidance. After their part-time school shift, many of these students stay unsupervised at home or under the care of neighbors or grandparents who are rarely in capacity to provide adequate academic support. In full-day schools, the extended instructional time and adult supervision seems to have a positive effect of students' school permanence by leveraging children's social capital, increasing their sense of belongingness to a learning community and compensating (to some extent) for the unavailability of parental supervision and academic support at home.

## 6. Conclusions

Full-day schooling has a positive effect both on early dropout and grade repetition. Full-day schooling reduces early school dropout by 1 to 2 percentage points. This represents an effect size of 10% to 20%, suggesting that is a potential intervention for reducing school dropout. Also, we find that full-day schooling reduces grade repetition by 2 to 5 percentage points. Our findings are consistent with previous evidence in Colombia and Chile on the positive effects of full-day (*jornada completa*) on high school test scores (Bellei, 2009; Bonilla, 2011).

The debate of whether or not grade repetition is a desirable policy still remains (Manacorda, 2010). Proponents of grade repetition policies may argue that the threat of repeating a grade is an incentive for students' academic performance and that students who fail to meet achievement standards for a given grade may benefit from additional instruction in order to match their peers on curricular content and skills. On the other hand, such policies add burden and cost to the school system and may compromise students' self-efficacy and socio-emotional adjustment. Evidence from this study suggests that full-time schools reduce the likelihood of school repetition which also represents an important risk factor for school dropout among Colombian children (Pardo & Sorzano, 2004), as it has also been shown in Uruguay (Manacorda, 2010).

We also explore possible mechanisms of the effects of double-shifting using qualitative case study comparisons and find two main mechanisms: (1) the constrained use of the physical learning environment in part-time schools, which is particularly important for young children, and (2) compensatory effects of adult supervision, academic guidance and socio-emotional support in full-day schools.

In terms of policy implications, Colombia is a middle-income country that can afford the implementation of full-day schooling (at least gradually, as Chile did). One argument against the implementation of such policy can be that the operational costs will double because of hiring of new teachers. However, at least in the Colombian context, this will not be the case because both "*jornadas*" are served by different groups of teachers. Therefore a

change to full-day instruction may imply a small salary increase for current teachers' longer hours of instruction, but it will not entail hiring twice as many teachers.

Another argument against the implementation of full-day schools is that to keep enrollment at the same level, there is a need to invest in school infrastructure or to increase classroom size (more students per classroom). A higher student-teacher ratio may not be in favor of student learning. However, it can be complemented with a strategy to incorporate low cost teaching aides in larger classrooms and make it financially viable. As per the need to invest in infrastructure, not all schools that offer "double-shift" have two shifts in the same school (Bonilla, 2011) so there is already the infrastructure to change at least some of the schools to full-day.

One limitation of our study is that we have a sample of public schools and elementary grades only. Thus, we cannot extrapolate our results to the entire school system. Future research should incorporate private schools into the analysis as well as all grades. We expect that for higher grades the effects on dropout may be even higher because adolescents have higher opportunity costs (more opportunities in the labor market) and are exposed to more risks (for example, higher exposure to gangs or "*pandillas*") in the hours that they are not attending school.

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## Appendix

**Table 1. Descriptive statistics: sample of children enrolled in primary school in 2007 with at least one sibling**

	Length of school day	
	Full day	Half-day
<b>Child characteristics</b>		
Girl	47.66	47.56
Belongs to an ethnic group	2.30	7.20
Age	6.09	6.16
Has a disability	0.68	0.53
Conflict victim	0.81	2.02
Comes from another municipality	2.64	3.54
<b>Household characteristics</b>		
Household's head education		
No education	13.77	12.92
Primary	72.04	58.55
High school	13.20	27.00
Higher education	0.99	1.53
Socioeconomic strata		
0 (lowest)	25.75	20.36
1	26.37	43.78
2	43.98	30.73
3 or more	3.91	5.12
Number of siblings in the household		
2	56.67	61.82
3	26.81	25.47
4 or more	16.52	12.71
Urban area	29.21	64.47
Number of children	997,389	

<sup>a</sup> n= 696,889

<sup>b</sup> n =588,643

**Table 2. School characteristics by length of school day offered –sample of children with at least one sibling-**

	Full-day	Length of school day		
		Half-day		
		All	Morning	Afternoon
Urban area	10.22	30.92	24.00	82.16
Teaching				
Traditional	23.92	60.53	55.76	95.81
New school	74.12	34.20	38.52	2.20
Ethno-education	1.91	4.98	5.48	1.32
Other	0.06	0.29	0.24	0.66
Educational level offered by school				
Preeschool	60.13	64.46	64.75	62.33
Primary	92.31	85.73	86.84	77.53
Middle-school	31.27	54.81	94.71	49.42
High school	16.79	43.06	37.09	87.22
All grades (primary through HS in the same school)	24.87	40.73	36.44	72.47
Number of teachers				
Preeschool	0.36	0.58	0.53	0.97
Primary	1.48	2.42	2.23	4.16
Middle-school	3.10	5.02	4.81	5.96
High school	2.10	3.00	2.75	3.92
Teachers educational level (%)				
High school degree	9.64	13.67	14.99	3.85
Pedagogy high school degree	26.10	10.96	12.06	2.85
Pedagogy technical degree	2.89	2.54	2.57	2.27
College degree	47.33	55.47	54.92	59.52
Masters degree or more	14.04	17.35	15.46	31.29
Number of students				
Preeschool	27.92	53.60	46.86	104.97

	Full-day	Length of school day		
		Half-day		
		All	Morning	Afternoon
Primary	72.17	164.04	140.12	366.28
Middle-school	150.31	281.37	252.94	391.31
High school	86.50	128.22	115.66	168.90
Student /teacher ratio				
Primary	42.61	96.75	81.32	206.78
Middle-school	68.69	133.19	104.95	215.13
High school	48.62	84.10	77.65	98.81
N	1,781	3,813	3,359	454

**Table 3. Effects of full-time schooling on early school dropout**

	(1)		(2)		(3)		(4)	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Full time schooling	-0.037***	(0.001)	-0.036***	(0.001)	-0.017***	(0.002)	-0.025***	(0.007)
<b>Child characteristics</b>								
Girl	0.019***	(0.001)	0.019***	(0.001)	0.020***	(0.001)	0.022***	(0.002)
Belongs to an ethnic group	0.030***	(0.002)	0.026***	(0.002)	-0.024***	(0.003)	-0.009	(0.010)
Age	0.065***	(0.000)	0.065***	(0.000)	0.066***	(0.000)	0.078***	(0.000)
Has a disability	-0.049***	(0.006)	-0.050***	(0.006)	-0.049***	(0.006)	-0.059***	(0.013)
Conflict victim	0.001	(0.003)	-0.001	(0.003)	-0.004	(0.003)	-0.001	(0.009)
Comes from another municipality	-0.005*	(0.002)	-0.007*	(0.002)	0.008*	(0.003)	0.010+	(0.006)
<b>Household characteristics</b>								
Household's head education (omitted: no education)								
Primary	0.006***	(0.001)	0.007***	(0.001)	0.015***	(0.001)		
High school	0.025***	(0.002)	0.027***	(0.002)	0.034***	(0.002)		
Higher education	0.074***	(0.004)	0.076***	(0.004)	0.077***	(0.004)		
Socioeconomic strata (omitted: 0 (lowest))								
1	0.009***	(0.001)	0.008***	(0.001)	0.008***	(0.001)		
2	0.009***	(0.001)	0.010***	(0.001)	0.026***	(0.001)		
3 or more	0.000	(0.002)	0.006*	(0.002)	0.036***	(0.002)		
<b>School characteristics</b>								
Urban area			-0.003*	(0.001)	0.008***	(0.001)	-0.009	(0.007)
Teaching methodology (omitted: Traditional)								
New school			-0.004*	(0.001)	-0.004*	(0.002)	-0.042***	(0.005)
Ethno-education			0.014*	(0.005)	0.019*	(0.006)	0.016	(0.020)

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	(1)	(2)	(3)	(4)		
Other	0.101***	(0.007)	0.109***	(0.007)	0.088***	(0.016)
Educational level offered by the school						
Preschool	-0.001	(0.001)	0.002	(0.002)	0.011	(0.008)
Primary	-0.057***	(0.010)	-0.078***	(0.011)	-0.169***	(0.039)
Secondary	-0.027*	(0.010)	-0.079***	(0.011)	-0.150***	(0.039)
High School	-0.012***	(0.002)	-0.000	(0.002)	-0.017+	(0.010)
All grades (primary through HS in the same school)	0.053***	(0.010)	0.078***	(0.011)	0.166***	(0.039)

**Table 3 (cont). Effects of full-time schooling on early school dropout**

Number of teachers in each education level

Preschool	-0.004***	(0.001)	-0.003*	(0.001)	0.003	(0.004)
Primary	0.000+	(0.000)	0.000	(0.000)	-0.001	(0.001)
Secondary	0.001***	(0.000)	-0.000	(0.000)	-0.000	(0.001)
High School	-0.002***	(0.000)	-0.000	(0.000)	-0.001	(0.001)

Teachers educational level (%)

High school degree	0.000	(0.000)	0.000	(0.000)	0.001	(0.003)
Pedagogy high school degree ( <i>normalista</i> )	-0.000	(0.000)	0.000	(0.000)	0.001	(0.003)
Pedagogy technical degree	0.000	(0.000)	0.000	(0.000)	0.001	(0.003)
College degree	0.000	(0.000)	0.000	(0.000)	0.001	(0.003)
Masters degree	0.000	(0.000)	0.000	(0.000)	0.001	(0.003)

Number of students by education level (/100)

Preschool	0.010***	(0.001)	0.003*	(0.001)	-0.005	(0.005)
Primary	-0.002***	(0.000)	-0.000	(0.000)	-0.000	(0.001)
Secondary	0.001***	(0.000)	0.001*	(0.000)	0.001	(0.002)
High School	-0.007***	(0.001)	-0.001+	(0.001)	-0.001	(0.003)

Teacher/student ratio (\*10)

Preschool	0.094*	(0.039)	0.041	(0.042)	-0.098	(0.240)
Primary	0.045+	(0.024)	0.018	(0.025)	-0.104	(0.131)
Secondary	0.109*	(0.035)	0.118*	(0.038)	0.143	(0.197)
High School	0.103***	(0.020)	0.095***	(0.023)	0.122	(0.118)

Municipality fixed effects

X

Household fixed effects

X



Number of schools	5,541	5,541	5,541	5,541
Number of children (with at least one sibling)	997,389	997,389	997,389	997,389

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**Table 4. Effects of full-time schooling on early grade repetition**

	(1)		(2)		(3)		(4)	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Full time schooling	-0.046***	(0.001)	-0.065***	(0.001)	-0.012***	(0.002)	-0.014+	(0.009)
<b>Child characteristics</b>								
Girl	-0.038***	(0.001)	-0.037***	(0.001)	-0.037***	(0.001)	-0.041***	(0.002)
Belongs to an ethnic group	0.076***	(0.002)	0.057***	(0.002)	-0.008*	(0.004)	-0.007	(0.014)
Age	0.002***	(0.000)	0.002***	(0.000)	0.001***	(0.000)	-0.007***	(0.001)
Has a disability	0.067***	(0.007)	0.067***	(0.007)	0.071***	(0.007)	0.075***	(0.017)
Conflict victim	0.001	(0.003)	0.007*	(0.003)	0.006+	(0.003)	0.008	(0.012)
Comes from another municipality	0.003	(0.002)	-0.000	(0.002)	0.004	(0.002)	0.002	(0.007)
<b>Household characteristics</b>								
Household's head education (omitted: no education)								
Primary	-0.044***	(0.001)	-0.038***	(0.001)	-0.026***	(0.001)		
High school	-0.084***	(0.002)	-0.065***	(0.002)	-0.054***	(0.002)		
Higher education	-0.102***	(0.003)	-0.083***	(0.003)	-0.082***	(0.003)		
Socioeconomic strata (omitted: 0 (lowest))								
1	-0.025***	(0.001)	-0.016***	(0.001)	-0.019***	(0.001)		
2	-0.062***	(0.001)	-0.046***	(0.001)	-0.029***	(0.001)		
3 or more	-0.089***	(0.002)	-0.065***	(0.002)	-0.033***	(0.002)		
<b>School characteristics</b>								
Urban area			-0.032***	(0.001)	-0.020***	(0.001)	-0.021*	(0.010)
Teaching methodology (omitted: traditional)								
New school			-0.000	(0.002)	0.015***	(0.002)	0.019*	(0.006)
Ethno-education			0.003	(0.006)	0.023*	(0.007)	-0.011	(0.030)

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	(1)	(2)	(3)	(4)		
Other	-0.058***	(0.007)	-0.050***	(0.007)	-0.057*	(0.026)
Educational level offered by the school						
Preschool	-0.015***	(0.001)	-0.005***	(0.002)	-0.006	(0.010)
Primary	-0.003	(0.007)	-0.004	(0.008)	-0.031	(0.039)
Secondary	-0.001	(0.007)	-0.019*	(0.008)	-0.058	(0.040)
High School	-0.018***	(0.002)	-0.010***	(0.002)	0.007	(0.013)
All grades (primary through HS in the same school)	0.004	(0.007)	0.007	(0.008)	0.047	(0.039)

**Table 4 (cont). Effects of full-time schooling on early grade repetition**

Number of teachers in each education level						
Preschool	-0.002*	(0.001)	-0.003***	(0.001)	-0.008+	(0.004)
Primary	-0.001***	(0.000)	0.001*	(0.000)	0.001	(0.001)
Secondary	0.001***	(0.000)	-0.000***	(0.000)	0.000	(0.001)
High School	-0.002***	(0.000)	-0.000	(0.000)	-0.000	(0.001)
Teachers educational level (%)						
High school degree	0.001***	(0.000)	0.001*	(0.000)	-0.001	(0.003)
Pedagogy high school degree ( <i>normalista</i> )	0.001*	(0.000)	0.001*	(0.000)	-0.002	(0.003)
Pedagogy technical degree	0.001+	(0.000)	0.001	(0.000)	-0.002	(0.003)
College degree	0.001*	(0.000)	0.001*	(0.000)	-0.002	(0.003)
Masters degree	0.001	(0.000)	0.001+	(0.000)	-0.002	(0.003)
Number of students by education level (/100)						
Preschool	0.009***	(0.001)	0.002*	(0.001)	-0.000	(0.006)
Primary	-0.001***	(0.000)	-0.001*	(0.000)	-0.002	(0.002)
Secondary	0.002***	(0.000)	0.000	(0.000)	0.002	(0.002)
High School	-0.006***	(0.001)	0.002*	(0.001)	-0.004	(0.004)
Student/Teacher ratio						
Preschool	0.067	(0.042)	-0.041	(0.045)	0.254	(0.328)
Primary	0.136***	(0.027)	-0.099***	(0.030)	-0.024	(0.150)
Secondary	0.378***	(0.038)	0.145***	(0.040)	0.021	(0.278)
High School	0.066*	(0.022)	0.027	(0.024)	-0.072	(0.174)
Municipality fixed effects			X			
Household fixed effects			X			

Schools N	3,826	3,826	3,826	3,826
Siblings N	671,787	671,787	671,787	671,787

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