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The Duration of Compulsory Education and the Transition to Secondary Education: Panel Data Evidence from Low-Income Countries

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The Duration of Compulsory Education and the Transition to Secondary Education: Panel Data Evidence from Low-Income Countries

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Abstract

A straightforward way of keeping children in school is increasing the duration of compulsory education. Evidence of the impact of this type of policy in Western countries is abundant. However, its effectiveness has been rarely tested in low-income countries. Using panel data of low-income and lower-middle-income countries covering the period 1996-2017, this paper analyzes the impact of lengthening the duration of compulsory education on the transition of children from primary to secondary education. The empirical results show that in those countries where this policy is implemented, there is a significant increase in the share of children transiting from primary to secondary education but only in those countries where the reform implies that the duration of compulsory education becomes longer than the duration of primary education.

JEL Classification: I21, I25, I28

Keywords: compulsory education, educational achievement, educational transitions, low-income countries, panel data, education policy

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1. Introduction

Universal primary education in low-income countries is one of the crucial goals of the UN's Millennium Declaration by 2015 (UN 2012). The achievement of this goal is a necessary condition to push educational attainment in these countries. As Western economies did during the twentieth century, this objective can only be accomplished by ruling and reinforcing compulsory education laws. The interest of policy makers in this issue is due to that compulsory education is beneficial for many economic and non-economic outcomes. In terms of earnings, Angrist and Krueger (1991) and Acemoglu and Angrist (2001), using data from the United States, estimate that annual adult earnings are about 10% higher for students compelled to stay a year longer in compulsory education. Harmon and Walker (1995) and Oreopoulos (2006) find about 14% higher earnings from one additional year of compulsory school in the United Kingdom. However, Devereux and Hart (2010) find zero returns for women and returns of 3 to 4% for men. The latter authors used richer data containing earnings information superior to that in Harmon and Walker (1995) and Oreopoulos (2006).[1] Regarding non-pecuniary outcomes (schooling externalities), Lochner and Moretti (2004) estimate that compulsory schooling in the U.S. lowers the likelihood of committing crime or ending up in jail. Black et al. (2004) find that compulsory schooling reduces the chances of teen pregnancy in the U.S. and Norway. Lleras-Muney (2005)[2] estimates that an additional year of compulsory schooling increases the age of death among elderly people in the United States.

In low-income countries, the increase of youth's educational attainment must be reached in situations where households are too poor to cover the schooling costs out of pocket if governments do not devote enough resources. In this context, poor families are economically constrained by the direct costs derived from schooling. Some evidence reports dramatic increases

[2] The *ETPSE* divides the number of new entrants in the first grade of secondary education by the number of pupils who were enrolled in the final grade of primary education in the previous school year, and multiplies it by 100.

in school enrollment in developing countries where there are initiatives to eliminate school fees (Deninger, 2003; Kremer, 2003)[3,4] and to reduce costs associated with accessing schooling (Kremer et al., 1997).[5] Jacoby (1994) also finds empirical evidence in developing countries that supports the idea that borrowing constraints affect children's progression through the school system, causing them to withdraw from school earlier.

Another important cost attached to the educational investment are the foregone earnings arising from the time their children spend in school instead of in alternative productive activities in paid work, generally in the informal sector, or unpaid work at home. The importance of foregone earnings in human capital acquisition has been widely conceptualized and analyzed in Western countries (Becker, 1965; Schultz, 1960); yet, empirical evidence from developing countries is virtually inexistent.[6] Unlike Western countries, in low-income countries, parental preferences play a more crucial role in these schooling decisions. Rosenzweig and Evenson (1977) appear to be the first published study to explicitly apply this framework to analyze child labor in a developing country context. Using data from rural India, they find evidence of a connection between the economic contribution of children, child labor, and schooling decisions. Analogously, Shafiq (2007) do find that higher child wages encourage households to practice child labor in rural Bangladesh. Schultz (2004) shows that an income subsidy program in poor rural communities in Mexico called *Progresa* increased school enrollment among participant households, compared to

[3] See Kremer (2003) for a summary of evaluations of educational programs in developing countries.
[4] Deininger (2003) evaluates the impact of the "Universal Primary Education" program in Uganda, which dispensed with fees for primary enrollment. He finds that a dramatic increase in primary school attendance and a substantial reduction in inequalities in attendance related to gender, income, and region were associated with the program.
[5] Kremer et al. (1997) evaluate a randomized intervention in Kenya providing uniforms to students who would otherwise need to pay for uniforms. After five years, students with the free uniforms had completed 15 percent more schooling than their counterparts without free uniforms. Also, the dropout rate was 6.8 percent at program schools, and 16.5 percent in comparison schools. The analysis suggests that reducing school fees would reduce drop-out rates.
[6] See Edmonds (2007) for an extensive review of studies analyzing the role of foregone earnings on school enrollment and child labor decisions.

those not participating in the program.[7] All this evidence taken together suggests that one of the reasons why households might choose not to send children to or have them drop-out of school is a low perceived return of attending school (Edmonds and Pavcnik, 2005). However, this perception of low returns from schooling in developing countries contrasts with recent evidence that estimates in Africa and Latin America a return to primary and secondary education between 8 and 9% (Peet et al., 2015).

In the 1960s and 1970s, in the U.S. and Europe, primary education was universal. After this achievement, during the 1960s and 1970s, many European countries passed legislation prolonging compulsory education beyond primary education, generally between 2 and 4 years. The idea behind this policy was to universalize (lower) secondary education. Nowadays, low-income countries face the same educational challenges that Western countries faced during the second half of the twentieth century. Thus, in low-income countries, educational programs typically adopt traditional Western models of education intending to have the same positive results in terms of children's educational achievement and socio-economic benefits. However, in the context of low-income countries, where families live at the subsistence level, increasing the duration of compulsory education makes school enrollment and termination decisions more difficult for households and foregone earnings have a greater say in the decision.

Although in low-income countries there has been considerable progress in terms of educational achievement, most of these countries are still far from achieving the universalization of primary education. In turn, this is also a barrier to the students' progression to secondary education. In 2015, in low-income countries, the *Effective Transition of Students from Primary to*

[7] *Progresa* started in 1997 and provided cash payments to families in exchange for regular school attendance. Since 2002, this program has been replaced by a new one called *Oportunidades*, which, in addition, also provides participant households with health clinic visits and nutrition support. Schultz (2004) finds an average increase in enrollment of 3.4 percent for all students in grades 1 through 8; the increase was largest among girls who had completed grade 6, at 14.8 percent.

Secondary Education (hereafter, *ETPSE*) was only 77%. This figure contrasts with the one attained in high-income countries, 96%. There is also a consensus that child labor elimination and universalization of compulsory education are interrelated, i.e. one cannot be achieved without the other. Indeed, during the early twentieth century, industrialized countries practically eliminated child labor by legislating the minimum legal age to work, combined with educational requirements that became compulsory. Thus, compulsory education took a crucial role in eliminating child labor in the past and in the present time. In this regard, school attendance (compulsory education) may be easier to enforce than minimum working age laws (Weiner, 1991).

In developed countries, the success of boosting secondary education through successive reforms of the compulsory education laws crucially depends on the fact that lengthening the duration of compulsory education implies delaying the minimum legal age to enter in formal employment. While staying in school is mandatory, children/adolescents are not legally allowed to take a formal job. However, although education is compulsory and free for almost all children, the law in these countries is loosely enforced.[8] The existence of labor markets where the informal sector is at least as important as the formal sector may be also one of the reasons why in low-income countries the adoption of these Western educational models may not be effective.

Despite the impact of compulsory education laws on educational outcomes and youth employment has been widely analyzed in Western countries, empirical evidence from low-income countries is scant. To the best of our knowledge, this paper is the first to analyze the impact of lengthening the duration of compulsory education on school achievement in low-income countries. In this paper, we test the impact of changes in the duration of compulsory education on the share

[8] For instance, in Brazil "...Although working is only legal at the age of 16, over 15 percent of 15-year-old children from the bottom quartile households in the income distribution were not enrolled in school in 2006, and over 22 percent reported having a job during the week they were interviewed for the 2006 PNAD..." (Bursztyn and Coffman, 2012, p. 365).

of students progressing from primary to secondary education in low-income countries. Data is taken from the World Bank DataBank, and the series on educational data starts in 1970; however, data regarding compulsory education began to be collected in 1995. Therefore, to carry out our analysis, we use cross-country panel data covering the period 1996-2017. Our results are quite revealing, and the direction and magnitude of the impact of an educational reform consisting of lengthening the duration of compulsory education are very different depending on whether the reform implies expanding compulsory education beyond primary education. When the duration of compulsory education remains the same after the reform as the completion age of primary education, the share of students progressing to secondary education do not experience statistically significant changes during the post-reform period. In contrast, when the lengthening of the duration of compulsory education is extended beyond primary education, we estimate a sizable positive impact on the progression of students from primary to secondary education.

The rest of the paper is structured as follows. The next section provides the conceptual framework of our study. Section 3 describes the data, the econometric strategy, and the empirical results. Finally, in Section 4, we discuss our main findings.

2. Contextualization of the Analysis

Despite the adoption in low-income countries of the educational models used in Western countries and efforts to fulfill the educational gap between these two groups of countries, in low-income countries, educational convergence with high-income countries is still far. Lower-middle-income countries have remarkably reduced the gap in the *ETPSE* compared to high-income countries during the last 30 years: from 77% vs. 96% in 1984 to 89% vs 96% in 2017, respectively. However, in low-income countries, this variable exhibits a very irregular pattern, broken into three periods. The first, 1971-1984, is characterized by a decreasing trend, where the *ETPSE* felt from 65% to 56%.

The second, 1985-2006 is characterized by a sharp increase in the *ETPSE* from 60% to 80%. However, after 2006 this variable initiated a downward trend, decreasing by almost five percentage points between 2006 and 2017.

[Figure 1, around here]

As we already pointed out in the introduction, one of the problems in developing countries that may obscure the efficacy of policies regarding compulsory education is the high level of informal employment. The interesting feature of compulsory education is that it establishes educational requirements that become compulsory before youth enter the labor market, thus increasing the minimum legal age to formally access a job. However, in low-income countries, informality is a recurrent phenomenon, which means that adolescents and children can drop out of the educational system and have access to the labor market through the back door. In our sample, the average size of the informal employment of overall employment is above 80% in low-income countries and above 63% in lower-middle-income countries. In other words, compulsory education keeps children away from formal employment but has a limited effect in keeping school leavers from working in the informal sector, for instance in agriculture or home production. This is what we show in Figure 2, where we depict the link of informal employment with the *ETPSE* in the countries used in this study. The link between informal employment and the *ETPSE* is negative.

[Figure 2, around here]

Raw elasticities estimated from the data depicted in Figure 2 are high for the period 2000-2012; in low and lower-middle-income countries a 1 percentage point increase in the employment

in the informal sector is associated with 0.66 percentage points decrease of the *ETPSE*. This figure suggests that in low and lower-middle-income countries, where the size of the informal economy is very high and families live at the subsistence level, policies affecting the duration of compulsory education might not have the expected result since the informal sector is an alternative to schooling.

3. Data and Empirical Framework

3.1. Data and variables

We use data extracted from the World Bank Databank, which collects from other sources and elaborate various annual measures on education, demography, labor market, and economics. More specifically, our outcome variable is the *Effective Transition from Primary to Secondary Education* (ETPSE). This variable is elaborated by the UNESCO Institute for Statistics and measures the number of students admitted to the first grade of secondary education in a given year, expressed as a percentage of the number of students enrolled in the final grade of primary education in the previous year. We choose this variable because, compared to other indicators such as enrollment in secondary education, it is the one that is more likely to be affected by compulsory education legislation. For the transition from primary to secondary education to be effective, a student should complete primary education and enroll in secondary education the following year. This decision is generally taken within or in the limit of the completion of compulsory education. In contrast, other indicators, such as the secondary education enrollment rate, are not so accurate, since individuals may enroll in secondary education at any age. Therefore, an undetermined number of new enrollments are likely to be outside of the completion age of compulsory, thus not being affected by compulsory education laws.

Our policy variable is *the duration of compulsory education*, (hereafter *DCE*). This variable is collected by the UNESCO Institute for Statistics. In our econometric analysis, we also control for the *GDP per capita* and the *Share of Urban Population* overall population (hereafter *URBPOP*). *URBPOB* is provided by the United Nations Population Division, and refers to the share of population living in urban areas, as defined by national statistical offices, of the overall population. This variable is included since children living in rural areas are less likely to be enrolled in school (Deininger, 2003). Finally, the *GDP per capita* is provided by the World Bank national accounts data. This variable is in constant 2010 U.S. dollars. In total, the data used in this analysis contains information regarding 49 low-income and lower-middle-income countries for the period 1996-2017. We select this period since information regarding compulsory education, our policy variable, is only available from 1996.

In the analysis, we distinguish two groups of countries. One group is composed of the countries that did not change the duration of compulsory education during our sample period, while the other is composed of those countries that lengthened the duration of compulsory education at least once during the sample period. For the sake of brevity, we refer to the first group as the "comparison" group, while we refer to the second as the "treated" group. In Table 1, we report a statistical summary of the variables used in the analysis. The "comparison" group comprises 35 countries, while the number of countries in the "treated" group is 15. Additionally, since in some countries compulsory education comprises only primary education, and in others, compulsory education includes primary education plus some/all grades of secondary education, we also distinguish those countries that move from primary education or less to secondary education through reformed compulsory education.

In the "comparison" group, the average duration of compulsory education during our sample period is 8.4 years, which is a bit higher than in the "treated" group before implementing

the educational reform, which was 7.8 years. In this group, the average duration of compulsory education is lengthened, on average, up to 10.1 years after implementing the educational reform. A comparison between the "comparison" and "treated" group regarding the behavior of our outcome variable also provides some interesting figures. On average, in the "treated" group, the share of students progressing to secondary education from primary education (*ETPSE*) increases by only 1.7 percentage points after implementing the educational reform; however, this increase is driven by those countries where, with the reform, the duration of compulsory education goes beyond the duration of primary education. In this group, after implementing the educational reform, the share of students progressing from primary to secondary education increases by around 11 percentage points. By contrast, in those countries where compulsory education comprises the same educational levels before and after the reform, the *ETPSE* falls by -5.2 percentage points after the reform. As a result, after the reform, the *ETPSE* is the same in both groups, 91.8 vs. 91.4 percentage points, respectively. For the comparison group, the average *ETPSE* during de sample period is of 83.8%, 6 percentage points smaller than in the "treated" group before the reform. It is also worth noting that *GDP per capita* in the "comparison" and the "treated" group is practically the same, $1,627 vs $1,725, respectively. Regarding the share of population living in urban areas, figures between both groups are similar, 58.3% vs. 51%, respectively.

[Table 1, around here]

Given the high heterogeneity across countries in the "treated" group, we could expect the response to the implementation of the educational policy to not be the same. In Tables 2 and 3, we report a detailed statistical summary of the countries in the "treated" and "comparison" groups.

In the "treated" group, the policy variable (duration of compulsory education), as well as the *ETPSE* and their response to the "treatment" are quite heterogeneous. In both groups of

countries, we observe a high degree of variability in the duration of compulsory education. In the "comparison" group (Table 3) the duration of compulsory education ranges from 5 years (Madagascar, Bangladesh, Myanmar, Lao PDR) to 11 years (Philippines, Sri Lanka, and Ukraine).

[Table 2, around here]

In Table 2, we also compare the duration of compulsory education with the duration of primary education. After the reform (Table 2), in the "treated" group, the duration of compulsory education ranges from 6 years (Angola) to 12-14 years (Egypt, Honduras, Kenya, Uzbekistan, and Bolivia). In this group, the dimension of the reform in terms of the number of years is also quite heterogeneous, and as one might expect, the size of the reform is negatively correlated with the duration of compulsory education before the reform. The lengthening of compulsory education in one reform ranges from 1-2 years (Angola and Uzbekistan) to 5-6 years (Senegal and Bolivia). The most common lengthening of compulsory education is 3 years. The *ETPSE* is also quite heterogeneous across "treated" countries, ranging from 46.7% (Angola), 68.3% (Honduras), 71.9% (Senegal) to values above 90% in most of the remaining countries. In eight of the seventeen "treated" countries, the duration of compulsory education becomes higher than the duration of primary education after the educational reform.

[Table 3, around here]

3.2. Empirical Model

To evaluate the impact of the lengthening of the duration of compulsory education on the progression of students to secondary education, we use the diff-in-diff approach. We do not have experimental data, but we can design an identification strategy is based on that the educational

reform (treatment) is implemented only in some countries. Therefore, we can have a "comparison" group composed of those countries for which the policy has never been implemented. The diff-in-diff model is generally expressed as follows:

$$y_{it} = \gamma D_i + \delta T + \lambda (D_i \cdot T) + \beta \mathrm{X}_{it} + \varepsilon_{it}, \quad (1)$$

where y_{it} is the outcome variable in the country *i* at time *t*; D_i is a dummy variable that takes the value 1 for all those countries who received the treatment (lengthening of compulsory education); T is a dummy variable that takes the value 1 for the post-treatment period, and ε_{it} is a time-varying error. The impact of the treatment on the treated is picked-up by the parameter λ. This is not an experiment, which means that the assignment to the treated/comparison group is not random. Therefore, we also include country controls (X_{it}) such as GDP per capita and the share of urban population overall population in the country.

Due to the non-randomization in the implementation of the educational reform, to identify the effect of the "treatment" on the outcomes, it is convenient to keep constant the cross-country differences by including country fixed-effects. In the model, we also need to take into account that the educational reform has been implemented in a different year in each country. With all these considerations, equation (1) becomes:

$$y_{it} = \theta_t + \alpha_i + \lambda \left(\sum_{t=k}^{T} D_{it} \right) + \beta \mathrm{X}_{it} + \varepsilon_{it}, \quad (2)$$

where α_i is country fixed-effects that also allows us to control for country's unobserved heterogeneity (such as history and culture that might affect global macro-trends − e.g., rising levels of educational attainment); and θ_t are year dummies. In this setting, the inclusion of country

fixed-effects removes D_i from equation (1) since this variable is constant throughout the sample period in all "treated" countries. Analogously, the dummy for the post-treatment period (T) in equation (1) is absorbed by the year dummies in equation (2), which account for the fact that the treatment is applied in each country in different years. In equation (2), D_{it} is a dummy variable that takes the value of one in the country i treated in period k during the subsequent periods (D_{ik}, D_{ik+1}, …, D_{iT}). Our main coefficient of interest is λ, which picks-up the impact of the treatment (lengthening of the duration of compulsory education) on our outcome variables (effective transition from primary to secondary education). In equation (2), the parameter λ picks-up the (in)decrease in the outcome after the implementation of the treatment ($t=k, k+1, \ldots, T$). Analogously, if we want to know whether the impact of the treatment is time-constant or time-varying, we can also estimate the following equation:

$$y_{it} = \theta_t + \alpha_i + \sum_{t=m}^{-1} \gamma_t T_{it} + \sum_{t=1}^{k} \lambda_t D_{it} + \beta X_{it} + \varepsilon_{it} \tag{3}$$

In equation (3), we estimate pre- and post-treatment trends by standardizing the time dimension in m periods before and k periods after the treatment. Thus, we create a certain time window around the adoption of the policy (t=-m, …, -2, -1, 0, 1, 2, …, k), where t=0 is the moment the reform is implemented. T_{it} are interactions of the treatment indicator and time dummies for the m pre-treatment periods, and D_{it} are interactions of the treatment indicator and time dummies for the k post-treatment periods. This is a test for whether the outcome variable evolves similarly across "treated" and "comparison" groups before the implementation of the policy. To conclude that the implementation of the policy is causing an impact on the outcome variables, in equation (4) we should observe that the coefficients associated with the pre-treatment periods are not statistically significant, while the coefficients associated with the post-treatment period are

statistically significant. This result would indicate that the outcome variable has the same behavior in both the "comparison" and "treated" countries during the pre-treatment period; however, if the treatment is effective, during the post-treatment period the outcomes would exhibit a different evolution in the "treated" group, respect to the "comparison" group. Still, if coefficients associated with the pre-treatment period are statistically significant, but we observe a jump in the parameters related to the post-treatment periods, it would also be indicative that the implementation of the policy has been effective.

3.3. Econometric results

Tables 4 and 5 report the empirical estimates of the diff-in-diff models evaluating the impact of the lengthening of the duration of compulsory education on the *ETPSE*. In these tables, we report the estimates of equations (2) and (3), respectively, for the full population of students, and girls and boys separately. In Table 4, Model (1) corresponds to the estimation of equation (2), while in Table 5, Model (3) corresponds to the estimation of equation (3). In both tables, in Model (2) and (4) our policy dummy variable picking up the post-treatment period for the "treated" (D_{it}) is interacted with a dummy variable taking the value 1 for those countries where the reform also implies that the duration of compulsory education becomes higher than the completion age of primary education (hereafter, CP dummy). As we already reported in Table 1, this distinction can make a difference because, with this reform, compulsory education also takes some/all grades of secondary education. This situation legally forces many children who would otherwise abandon the educational system before or after completing primary education to progress to secondary education. In all models, standard errors are clustered at the country level.

Results reported in Table 4 reveal that the reform is only effective in those countries where the reform makes the duration of compulsory education to be above the duration of primary

education (Model 2). In these countries, we estimate an annual average long-run increase in the share of students progressing from primary to secondary education of 7.3 percentage points. These figures are very similar for boys and girls, 6.8 vs. 7.7 respectively. Indeed, in these countries, before the reform, the share of students progressing to secondary education fell by -5.3 percentage points for both boys and girls.

[Table 4, around here]

In Table 5, we report the estimates of equation (3). In this model we split the pre-treatment years into three periods: 1-2 years before, 3-4 years before, and 5 or more years before the implementation of the policy. The post-treatment years have been divided into four periods, 1-2 years after, 3-4 years after, 5-6 years after, and 7 or more years after. We focus on the results reported by Model 4. As before, we observe that the estimated effects are statistically significant and positive only in the post-treatment years and in those countries where the reform makes the duration of compulsory education to be above the duration of primary education, thus confirming the effectiveness of the reform in these countries. Estimated effects in the post-treatment periods are quite sizable. During the firsts two years after the reform, the share of students progressing to secondary education increases by around 4 percentage points, while 6 years after this figure is above 10 percentage points for both boys and girls. In the long term, the share of girls progressing to secondary education is 3 percentage points higher than the share of boys progressing to secondary education, 13.8 vs. 10.6 percentage points.

[Table 5, around here]

Estimated effects reported in Table 5 are depicted in Figure 3. This figure provides a clearer interpretation of the results. The vertical line marks the last pre-reform year. In those countries where the reform makes the duration of compulsory education to be longer than the duration of primary education, we observe during the post-treatment periods a sharp upwards trend of the share of students progressing from primary to secondary education that stabilizes after 6 years. We observe this pattern for both boys and girls.

[Figure 3, around here]

Finally, regarding our control variables, the share of urban population (URBPOP) has not reported statistically significant effects on the progression of students from primary to secondary education. This result is not consistent with previous findings in the literature reporting that children in rural areas are less likely to enroll in education (Deninger, 2003). *GDP* per capita reports a negative effect, which is statistically significant at 5 and 10 percent level. One plausible explanation for this result is that in wealthier low-income countries, children from low-income households with a high opportunity cost relative to household income may have lower attendance since the employment opportunities for children in these countries are higher.

4. Conclusions

The impact of the duration of compulsory education on the progression of students from primary to secondary education in low-income countries has received little attention. In this paper, using panel data for low-income and lower-middle-income countries covering the period of 1996-2017, we analyzed the impact of a reform consisting of lengthening the duration of compulsory education on the progression of students to secondary education. Although the low educational

achievement in low-income countries is a recurrent problem, to the best of our knowledge previous empirical evidence analyzing this issue is virtually inexistent. Following the educational models in Western countries, the lengthening of the duration of compulsory education has been implemented in some low-income countries. During the 1970s and 1980s in Western countries, these reforms allowed the achievement of the universalization of primary education, the expansion of secondary education, and the eradication of child labor. However, in the context of low-income countries, where most of the families live at the subsistence level, informal employment is high and the (in)direct costs of education have a greater impact, it would not be surprising for compulsory education laws to not have the expected effect.

We estimate a dif-in-dif model and observe that this policy is effective in promoting the progression from primary to secondary education, but only in those countries where the reform makes the duration of compulsory education to be higher than the duration of primary education. In these countries, we estimate a sizable impact of the reform for both girls and boys. During some periods after the implementation of the reform, we estimate increments of above 10 percentage points in the effective transition of students from primary to secondary education. These results have important policy implications: developing countries could raise the years of minimum compulsory education and obtain improvements in the transition from primary to secondary. The costs of such a policy are low and the expected gains are quite big.[9] Despite we do not have information regarding the completion rate of secondary education in low-income countries, the increase of the share of students progressing from primary to secondary education anticipates an increase in the secondary education completion rate. However, policies consisting of lengthening

[9] The list of Low-Income and Lower-Middle-Income countries where the duration of compulsory education is bellow the duration of of primary education that could benefit from this policy is still long: Afghanistan, Angola, Bangladesh, Benin, Cabo Verde, Cameroon, Chad, Comoros, Georgia, Guinea, Haiti, Lao PDR, Lesotho, Liberia, Madagascar, Myanmar, Nicaragua, Senegal, Syrian Arab Republic, Tanzania, Uganda, Vietnam, Zambia and Zimbabwe.

compulsory education might also comprise other measures. Therefore, estimated coefficients might be also be partially capturing some of these unobserved measures. Unfortunately, this information is not available.

The link between our results and potential effects on child labor is also unavoidable. However, it is hard to draw inferences regarding this link when children outside school are unobserved. Because of this, there is a lack of reliable information, quantitatively and qualitatively, regarding child labor. We acknowledge that the impossibility to test empirically for this link is maybe one of the limitations of this study and leaves a lot of open questions with respect the impact of this policy on labor market outcomes in low-income countries, even though in the literature, the importance of the duration of compulsory education is stressed for delaying entry of children in the labor market. Further research should bring more insights into the role of the duration of compulsory education on the timing of entry in the labor market for children in low-income countries.

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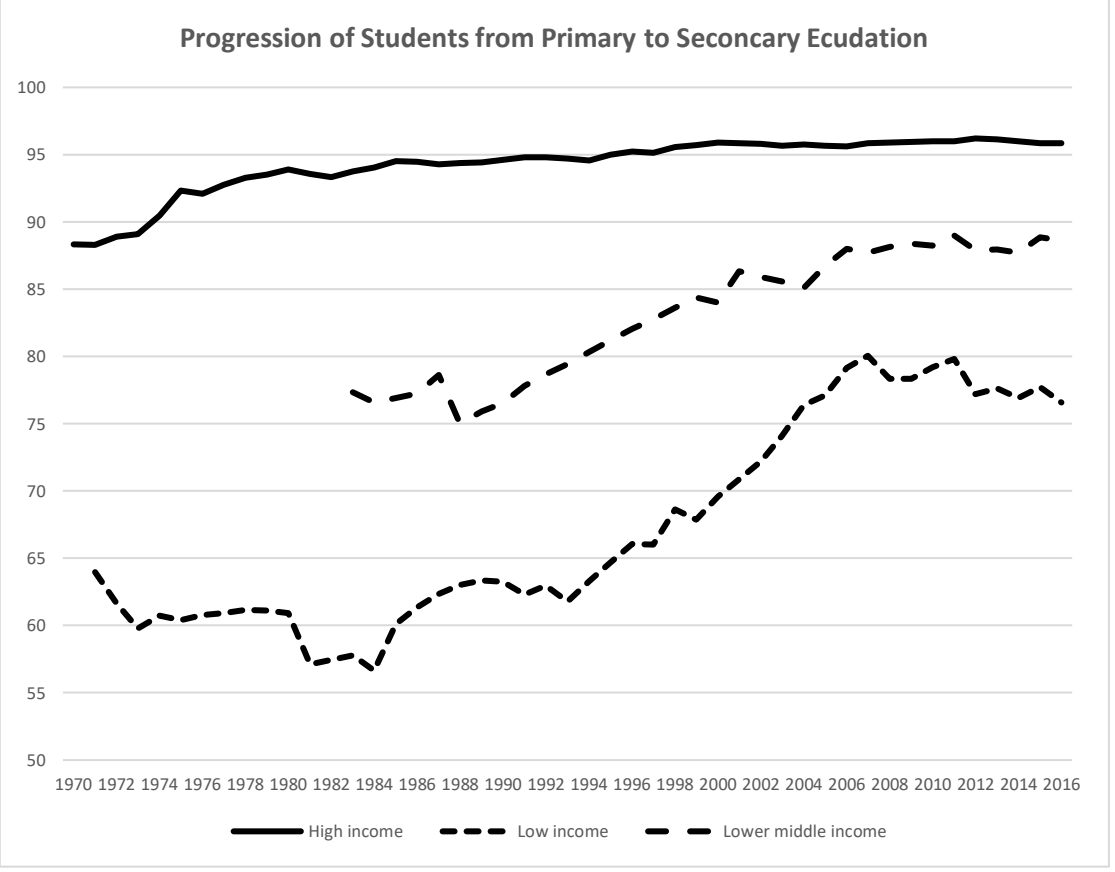
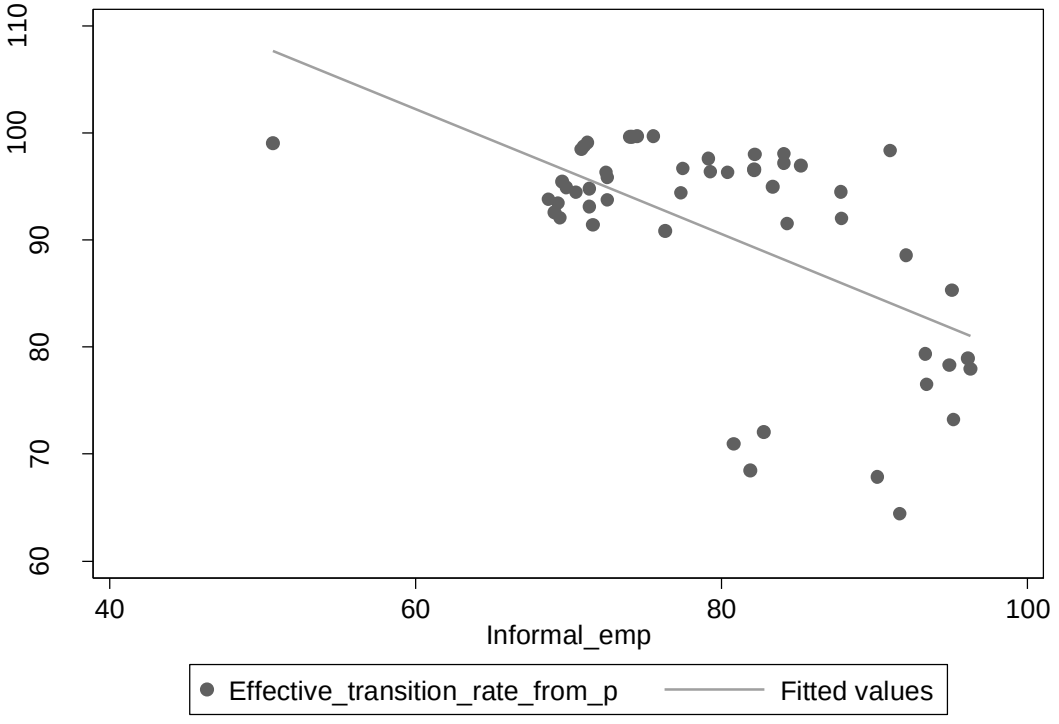
Figure 1
Trends in Educational Achievement



Source data: UNESCO Institute for Statistics

Figure 2
Link between Informal Employment and Educational Achievement



Source data: UNESCO Institute for Statistics and ILO

Figure 3

Estimated effects of the lengthening of the duration of compulsory education on the transition from primary to secondary education

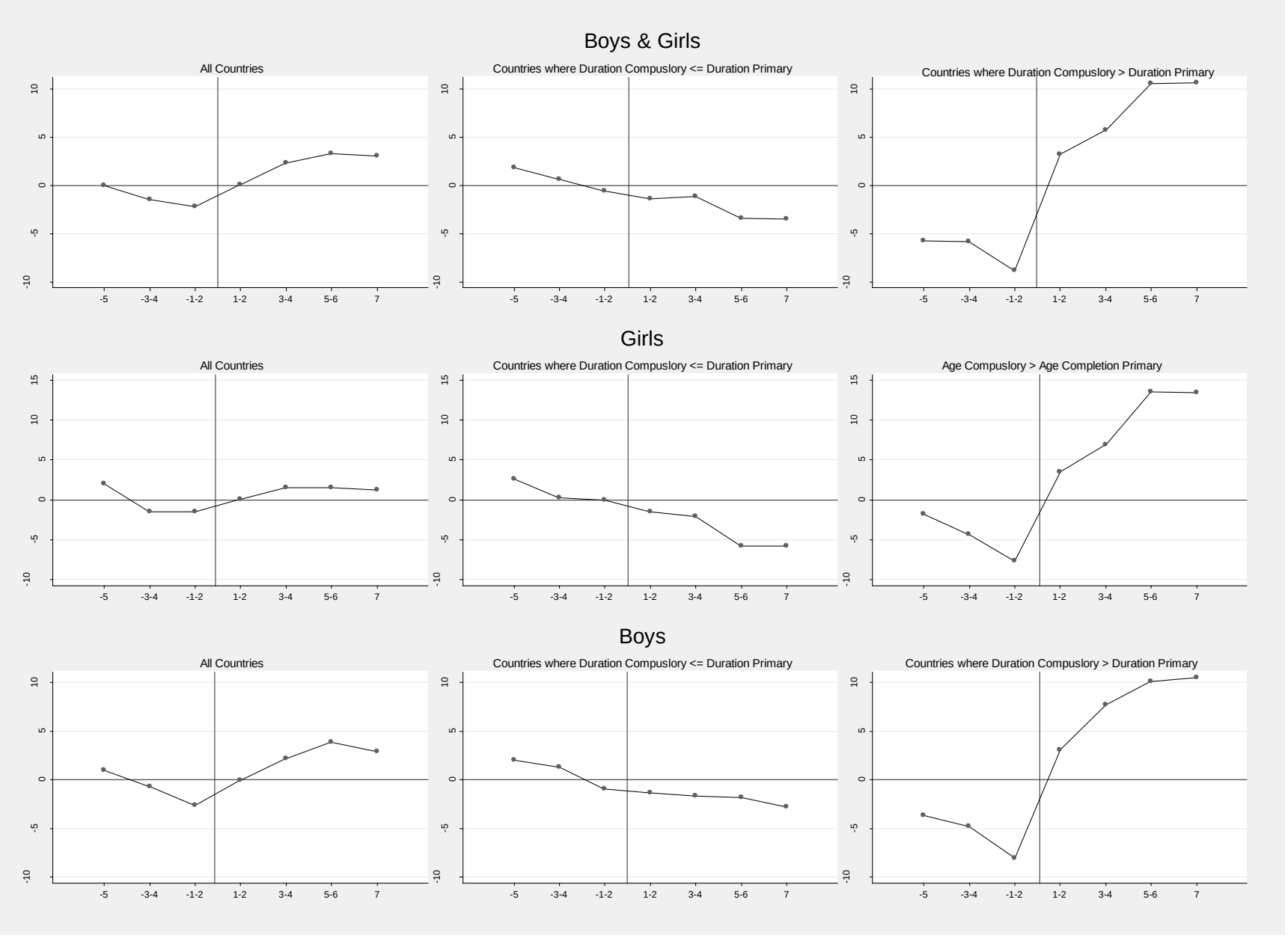


Table 1
Summary Statistics Outcome and Control Variables

	Comparison			Treated		
	Before	***After***	***diff***	***Before***	***After***	***diff***
Transition Primary to Secondary	86.3	91.4	5.1	89.9	91.6	1.7
DCE<= DPE				96.6	91.4	-5.2
DCE> DPE after the reform				80.8	91.8	11.0
DCE	8	8.2		7.8	10.1	2.3
GDP pc (constant US $ 2000)	1,067.9	1,504.2	436.3	1,472.7	2,025.9	553.1
% or urban population	50.4	57.0	6.6	42.2	54.8	12.6
Number of Countries		35			14	

Source data: UNESCO Institute for Statistics, ILO and World Bank
DCE: Duration of compulsory education
DPE: Duration of primary education

Table 2
Descriptive analysis for countries implementing the reform

Country	Year Reform	DCE		DPE		DCE> DPE After reform	ETPSE
		Before	*After*	*Before*	*After*		
Afghanistan	2008	6	9	6	6	Yes	N/A
Angola	2007	4	6	4	6	No	46.7
Bolivia	2009	8	14	5	5	No	96.1
Cabo Verde	2010	6	10	6	6	Yes	94.8
Chad	2006	6	10	6	6	Yes	78.8
Egypt, AR.	2015	9	12	5	6	No	94.1
Georgia	2005	6	9	6	6	Yes	99.1
Honduras	2011	9	12	4	4	No	68.3
Kenya	2013	8	12	7	7	No	99.0
Moldova	2017	9	11	6	6	No	98.4
Mongolia	2002	8	9	5	5	No	97.5
Morocco	2000	6	9	6	6	Yes	87.7
Senegal	2004	6	11	6	6	Yes	71.9
Syrian AR	2002	6	9	6	6	Yes	88.6
Tajikistan	1999	9	9	6	6	No	98.5
Uzbekistan	2011	11	12	6	6	No	99.4
Vietnam	2005	5	9	5	5	Yes	95.1

Source data: UNESCO Institute for Statistics, ILO and World Bank
DPE: Duration of primary education
DCE: Duration of compulsory education
ETPSE: Effective transition from primary to secondary education

Table 3
Descriptive analysis for countries not implementing the reform

	DCE	TPSE
Bangladesh	5	94.5
Benin	6	85.8
Cameroon	6	55.9
Central African Republic	10	71.5
Comoros	6	88.2
Congo, Rep.	10	74.5
Djibouti	10	85.7
El Salvador	10	95.0
Eritrea	8	95.6
Ghana	10	94.0
Guinea	6	72.6
India	8	91.1
Indonesia	9	89.5
Kiribati	9	96.3
Kyrgyz Republic	9	99.3
Lao PDR	5	83.0
Lesotho	7	85.7
Liberia	6	80.1
Madagascar	5	72.2
Malawi	8	86.2
Mali	9	81.2
Mauritania	9	56.1
Myanmar	5	73.8
Nicaragua	7	98.8
Philippines	11	97.4
Sri Lanka	11	99.0
Tanzania	7	31.5
Timor-Leste	9	91.7
Togo	10	82.0
Tunisia	9	94.7
Uganda	7	59.8
Ukraine	11	98.9
Yemen, Rep.	9	88.8
Zambia	7	65.9
Zimbabwe	7	76.2

Source data: UNESCO Institute for Statistics, ILO and World Bank
DCE: Duration of compulsory education
ETPSE: Effective transition from primary to secondary education

Table 4
Dif-in-Dif estimates of equation 2

	Model (1)			Model (2)		
	All	**Girls**	**Boys**	**All**	**Girls**	**Boys**
Pre-Reform Period (t=--m,…,-1)	-0.923	-0.114	-0.203	1.394	1.582	1.521
	(1.513)	(1.402)	(1.223)	(0.903)	(1.022)	(0.947)
X (Compulsory>Primary)				-6.563**	-5.367**	-5.353**
				(2.678)	(2.620)	(2.368)
Post-Reform Period (t=1,…,k)	2.316	1.211	2.207	-1.514	-2.498*	-1.075
	(2.711)	(2.915)	(2.696)	(1.025)	(1.267)	(1.000)
X (Compulsory>Primary)				7.312**	7.709*	6.779*
				(3.495)	(4.264)	(3.945)
GDP pc	-0.00384	-0.00340	-0.00335	-0.00377*	-0.00350*	-0.00346*
	(0.00237)	(0.00217)	(0.00212)	(0.00191)	(0.00177)	(0.00195)
% of Urban Population	0.135	0.122	0.286	-0.0428	-0.0762	0.102
	(0.396)	(0.415)	(0.381)	(0.320)	(0.343)	(0.299)
Constant	77.94***	78.18***	70.04***	86.99***	87.79***	78.94***
	(20.99)	(22.00)	(21.05)	(17.09)	(18.33)	(16.61)
Observations	471	442	442	471	442	442
R-squared	0.189	0.132	0.184	0.279	0.203	0.253
Number of Countries	49	48	48	49	48	48

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 5
Dif-in-Dif estimates of equation 3

	Model (3)			Model (4)		
	All	**Girls**	**Boys**	**All**	**Girls**	**Boys**
5 or more Years Before Reform	0.0311	2.191	1.122	1.545	2.315	1.605
	(1.547)	(1.461)	(1.299)	(1.357)	(1.521)	(1.421)
X (Compulsory>Primary)				-4.548**	-0.197	-1.379
				(2.230)	(2.307)	(2.188)
3-4 Years Before Reform	-1.377	-1.643	-0.668	0.105	-0.270	0.741
	(1.435)	(1.339)	(1.377)	(0.699)	(0.811)	(0.833)
X (Compulsory>Primary)				-3.844*	-2.757	-2.933
				(2.231)	(2.236)	(2.188)
1-2 Years Before Reform	-2.299	-1.460	-2.776*	-0.445	0.153	-0.876
	(1.469)	(1.279)	(1.511)	(0.625)	(0.745)	(0.588)
X (Compulsory>Primary)				-9.082**	-8.071***	-8.329**
				(3.648)	(2.701)	(3.901)
1-2 Years After Reform	-0.132	-0.0901	-0.301	-1.989**	-1.974**	-1.885**
	(1.318)	(1.287)	(1.407)	(0.785)	(0.893)	(0.728)
X (Compulsory>Primary)				4.218**	4.465**	4.226*
				(1.833)	(1.930)	(2.263)
3-4 Years After Reform	2.828	1.708	2.563	-0.732	-1.968	-1.230
	(2.230)	(2.238)	(2.343)	(1.259)	(1.290)	(1.286)
X (Compulsory>Primary)				5.904*	6.994*	7.464**
				(3.203)	(3.496)	(3.688)
5-6 Years After Reform	3.673	1.737	3.893	-2.891	-5.448*	-1.648
	(3.852)	(4.300)	(3.485)	(2.193)	(2.775)	(1.575)
X (Compulsory>Primary)				10.87***	13.85***	10.57**
				(3.933)	(5.098)	(4.107)
7 or more Years After Reform	3.540	1.446	2.863	-2.552	-5.113**	-2.235
	(5.380)	(5.233)	(4.581)	(2.034)	(2.189)	(2.195)
X (Compulsory>Primary)				10.70**	13.00**	10.05*
				(5.291)	(5.607)	(5.431)
GDP pc	-0.00407	-0.00323	-0.00337	-0.00347	-0.00246	-0.00276
	(0.00275)	(0.00239)	(0.00229)	(0.00225)	(0.00194)	(0.00215)
% of Urban Population	0.108	0.0957	0.252	-0.0552	-0.0700	0.0949
	(0.393)	(0.428)	(0.378)	(0.311)	(0.337)	(0.290)
Constant	79.54***	78.67***	71.72***	86.94***	85.08***	78.07***
	(20.97)	(22.61)	(20.90)	(16.74)	(17.84)	(16.00)
Observations	471	442	442	471	442	442
R-squared	0.204	0.152	0.207	0.297	0.236	0.279
Number of Countries	49	48	48	49	48	48

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1