MARINA BASSI
Inter-American Development Bank

MATIAS BUSSO
Inter-American Development Bank

JUAN SEBASTIÁN MUÑOZ
University of Illinois–Urbana-Champaign

Enrollment, Graduation, and Dropout Rates in Latin America: Is the Glass Half Empty or Half Full?

ABSTRACT We use 292 household surveys from eighteen Latin American countries to document patterns in secondary school graduation rates over the period 1990–2010. We find that enrollment and graduation rates increased during that period, while dropout rates decreased. We provide two types of explanations for these patterns. Countries implemented changes on the supply side to improve access, by increasing the resources allocated to education and designing policies to help students stay in school. Despite this progress, graduation rates are still generally low, and there are remarkable gaps in educational outcomes in terms of gender, income quintiles, and regions within countries. The quality of education is also generally low.

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The average years of education of the population across the world have increased dramatically in the last sixty years, and Latin America was no exception.[1] A larger fraction of Latin American children and youth are now able to attend secondary school—especially among vulnerable families that were previously excluded from the education system. This large expansion brought with it a greater student heterogeneity, which increased the challenges of retaining children in school until graduation as well as providing a good quality of education for all students. Despite the magnitude of these changes, few attempts have been made to document and explain the patterns and trends of enrollment, graduation, and dropout rates in Latin America over the last two decades. This is what we do in this paper.

High school graduation has been a major concern in developed countries such as the United States. After showing an extraordinary growth from 6 percent in the beginning of the twentieth century to around 80 percent in the

1. These dramatic gains were part of a trend that affected most regions of the world. In advanced economies, the ratio of secondary school graduates to the population aged 15 or more increased from 12.7 percent in 1950 to 37.7 percent in 2010, while in East Asia it improved from 4.2 percent to 38.1 percent in the same period (Barro and Lee, 2013).

early 1970s, high school graduation rates stagnated or even declined slightly over the following three decades.[2] This stagnation led many to refer to the problem as the dropout crisis or epidemic. Concerns with completion of secondary education in the United States generated a great deal of attention from researchers and government institutions, which led to an intense debate and a large literature on the measurement and definition of graduation and dropout rates. This literature presents a very wide range of estimates. As Heckman and LaFontaine state, "Depending on the data sources, definitions, and methods used, the U.S. graduation rate is claimed to be anywhere from 66 percent to 88 percent in recent years—a wide range for such a basic educational statistic."[3]

This paper examines patterns and trends of educational outcomes (in terms of graduation, dropout, enrollment, and overage rates) from 1990 to 2010 in eighteen Latin American countries for which comparable data from household surveys are available.[4] In view of the significant changes in the education systems, educational policymakers need to have a clearer picture of these empirical regularities, its plausible explanations, and the potential challenges that might arise in the near future.

We build statistics that are comparable over time and across countries. Although we document levels and trends for several educational outcomes by country, we try not to emphasize individual countries' dynamics. The ultimate goal is to find common trends. The paper focuses mainly on secondary education, but it also analyzes educational outcomes in primary education as a precondition to be able to enroll in secondary education. We also explore heterogeneity in terms of countries, gender, income, and region, and we analyze outcomes for different birth cohorts.

We show that graduation rates in Latin America have improved remarkably since the early 1990s. The percentage of students graduating from primary and secondary school on time increased in the majority of countries included in our sample. Countries that showed lower graduation rates in the early 1990s have experienced larger improvements in graduation rates (especially in primary), converging toward countries that started with higher graduation rates in the beginning of the period analyzed. In addition, on average, every birth cohort since the early twentieth century shows a higher graduation rate in primary and secondary education than previous generations. The moment of the highest probability of school dropout in the education cycle shifted

2. Heckman and LaFontaine (2010); Murnane (2013).
3. Heckman and LaFontaine (2010, pp. 244).
4. Our methods follow Heckman and LaFontaine (2010) and Murnane (2013).

from primary and the transition to secondary to later in secondary schooling, implying that students stay longer in the education system.

Our results suggest that the increase in secondary school graduation can be associated with three factors: an increase in enrollment in and graduation from primary schools and in the efficacy of secondary schools to capture and retain those graduates; an increase in expected returns to education, which provided economic incentives to stay in secondary school; and several education policies implemented in the region. The improvement in the secondary school graduation rates shows a glass half full.

Big challenges remain, however, in terms of secondary school performance: graduation rates in the region are low relative to developed countries; a large fraction of young students drops out of school before completing secondary school; there are still important differences in achievement levels among students in urban and rural areas, among families with high and low levels of income, and among countries; and, finally, education quality is well below other countries with a similar gross domestic product (GDP). These challenges show a glass half empty.

This paper is organized as follows. The next section describes the data. Subsequent sections discuss how we measure educational outcomes; present patterns on Latin America's secondary school indicators; show the main explanations for the increase in secondary education graduation rate; and outline the region's education challenges. The final section concludes.

Data

Our analysis is based on 292 household surveys carried out in eighteen Latin American countries and in the United States from 1990 to 2010.[5] In the online appendix, we provide further details about surveys, including their regional and time coverage.[6] Household surveys in Latin America are one of the few available data sources for analyzing schooling decisions for different cohorts and different time periods. They also allow us to build measures

5. The surveys include individual-level data from Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela, and the United States. In the case of Guatemala, we had no information for 1990–95.

6. The online appendix is available at www.matiasbusso.org/papers. It also contains a data set of all the statistics described in this paper, as well as supplemental statistics.

with common definitions that are comparable across countries and time. They cover people of all ages, include information on both schooling achievement and labor market outcomes, and have an annual frequency, which is useful for studying trends and breaks in the time series.[7]

The main limitation of household surveys in Latin America is that questionnaires and sampling definitions vary somewhat across countries and, in some cases, have changed during the period of analysis for a given country.[8] To mitigate this limitation, we made country samples comparable by keeping constant geographical areas and unifying the legal starting/finishing age in each school cycle. Most surveys have national coverage, except in the cases of Argentina, Bolivia, Ecuador, and Uruguay, which only cover urban areas. Therefore, statistics for these countries are less comparable with those of other countries.

We also use several auxiliary sources of information. First, we compile a set of measures of schooling indicators from the United Nations Educational, Scientific, and Cultural Organization (UNESCO), including number of teachers, expansion of mandatory education, enrollment in private schools, and others. Second, we complement this data set with a group of policy variables that capture the implementation of conditional cash transfer (CCT) programs, education decentralization laws, the introduction of flexible modalities of secondary schooling, changes in the mandatory starting school age, and changes in the legal duration of the schooling cycle. We construct these policy variables based on information published in the literature and on websites of the Ministries of Education.[9] Finally, we use data from the Program for International Student Assessment (PISA) to measure school quality and relate it to the observed trends in enrollment and graduation.

7. Estimates of graduation and dropout rates are affected by the source of information analyzed. Heckman and LaFontaine (2010) estimate high school graduation rates in the United States by applying a unified methodology to different sources of data. They argue that in the United States, household surveys can result in an overestimation of graduation rates (because they do not include military or incarcerated populations), while administrative data can lead to an underestimation of the graduation rates.

8. For example, Argentina changed from the *Encuesta Permanente de Hogares* to the *Encuesta Permanente de Hogares Continua* in 2003; and Colombia moved from the *Encuesta Continua de Hogares* to the *Gran Encuesta Integrada de Hogares* in 2006.

9. Stampini and Tornarolli (2012) review all the CCT programs in Latin America, which is our main source of information for the construction of the CCT policy variable used in this paper. We complemented this information with OVE (2013). For the decentralization policy variable, our main source is Navarro (2007).

Measurement and Definitions

The computation of school enrollment, graduation, and dropout rates would ideally use longitudinal data of a representative sample of a country's population, which allows the researcher to follow the same individuals over time and observe their transition from one state (namely, being in school) to another state (that is, being either a graduate or a dropout). Although some household surveys in Latin America include panel data sets, they track individuals for relatively short periods of time (up to two years) and suffer substantial attrition. Thus, the estimates in this paper are calculated using multiple cross-sections.

We start with some definitions. For schooling level $k \in \{p = \text{primary}, s = \text{secondary}\}$, let E_k denote the event of being enrolled in schooling level k; D_k, the event of not being enrolled in schooling level k; G_k, the event of having graduated from that schooling level; L_k, the event of lagging behind more than one year in that schooling level (according to the individual's age relative to the legal starting/finishing age); A_k, the event of being in the legal age group corresponding to schooling level k; and F_k, the event of having an age which is equal to the legal finishing age from schooling level k plus one.

The function $N(X \mid Y)$ provides the number of people for whom the event X holds, conditional on the occurrence of the event Y. We can estimate different probabilities of events $\{E_k, G_k, D_k, L_k\}$ using their sample analogues. We call unconditional probabilities those that provide information about an individual in a certain age group regardless of his or her past schooling achievement. Conditional probabilities, on the other hand, capture the probability of an event for particular subgroups within an age group (such as the percentage of individuals of secondary school age that graduated from the primary school level).

Latin American educational systems vary in their definitions of mandatory school age. Thus, to estimate these probabilities, we use information on starting primary school age and duration of primary and secondary school in order to build three country-specific age intervals: primary, secondary, and post-secondary schooling age. The exact date in which mandatory school begins for any given individual is typically determined by his or her date of birth. Since this information is usually not observed, we construct the primary school interval by considering only children that are at least one year older than the primary school starting age and have less than the secondary school starting age. Similarly, the secondary school interval age group includes persons that are of secondary starting age to secondary finishing

TABLE 1. Enrollment, Graduation, Dropout, and Overage Measures

Variable	*Unconditional measure*	*Conditional measure*
Enrollment rate in school level *k*	$\hat{P}(E_k)=\frac{N(E_k \mid A_k)}{N(A_k)}$	$\hat{P}(E_k \mid G_{k-1})=\frac{N(E_k \mid A_k, G_{k-1})}{N(A_k, G_{k-1})}$
Graduation rate from school level *k*	$\hat{P}(G_k)=\frac{N(G_k \mid F_k)}{N(F_k)}$	$\hat{P}(G_k \mid E_k)=\frac{N(G_k \mid F_k, E_k)}{N(F_k, E_k)}$
Dropout rate from school level *k*	$\hat{P}(D_k)=\frac{N(\neg E_k \mid A_k)}{N(A_k)}$	$\hat{P}(D_k \mid G_{k-1})=\frac{N(\neg E_k \mid A_k, G_{k-1})}{N(A_k, G_{k-1})}$
Overage rate in school level *k*	$\hat{P}(O_k)=1-\hat{P}(D_k)-\frac{N(\neg L_k \mid A_k)}{N(A_k)}$	$\hat{P}(O_k \mid G_{k-1})=1-\hat{P}(D_k \mid G_{k-1})-\frac{N(\neg L_k \mid A_k, G_{k-1})}{N(A_k, G_{k-1})}$

age.[10] Table 1 provides the formal definitions of conditional and unconditional rates measured in this paper.

For example, the unconditional secondary school enrollment rate, $\hat{P}(E_s)$, is defined as the number of secondary-school-aged individuals that are enrolled in secondary school, $N(E_s \mid A_s, G_p)$, divided by the population with secondary school age, $N(A_s)$.[11] The conditional secondary school enrollment rate, $\hat{P}(E_s \mid G_p)$, only takes into account people who are eligible to be in secondary school and therefore divides by the population with secondary school age that has completed primary school, $N(A_s, G_p)$.

Similarly, the unconditional secondary school graduation rate, $\hat{P}(G_s)$, is calculated as the population that is one year older than the legal finishing age for secondary school and has graduated from secondary school, $N(G_s \mid F_s)$, divided by the population of individuals that are one year older than the legal graduation age at the secondary school level, $N(F_s)$. This ratio is a relevant indicator of the efficiency of the education system as a whole. However, it does not capture the graduation rate among those that were eligible to enroll in secondary school, given that some of the individuals in this age range did not complete primary school and, consequently, could not start secondary school. To account for this, the conditional graduation rate uses as the denominator the population that is one year older than the secondary school

10. The online appendix also presents results for the post-secondary school population, which comprises people over secondary finishing age, but younger than twenty-six years old.

11. Age ranges are defined according to the legal starting and finishing age in each country, as explained above.

legal finishing age that has completed primary school and enrolled in secondary school, $N(F_s, E_s)$. This indicator is a better proxy of the efficiency of education systems at the secondary school level. The conditional secondary school graduation rate could improve while the unconditional rate worsens. This would happen if larger school abandonment happens before students graduate from primary school and, at the same time, a larger proportion of those that do enroll in secondary school graduates.

The unconditional dropout rate at the secondary school level is calculated as the population with secondary school age who are not enrolled in secondary school divided by the population with secondary school age, $N(E_s \mid A_s)/N(A_s)$.[12] The conditional secondary school dropout rate conditions on having finished primary school, G_p. That is, the denominator is the population with secondary school age that has completed primary education. Once again, the unconditional rate captures the overall dropout rate among youths in the secondary age range, while the conditional rate measures abandonment among those that have ever been enrolled in secondary school.

The secondary school overage rate is the proportion of people who are still enrolled in secondary school but lag behind schedule in terms of completed education years. Using the same criteria as above, unconditional overage rates compute the proportion based on individuals in the secondary school age and the conditional overage rate takes the subgroup that has graduated from primary school.[13]

We compute all probabilities for all countries, years, and groups using country-year weights in order to obtain national (or urban) representative values. Since we do not have continuous series, we interpolate the missing values.

Patterns and Trends: A Glass Half Full

To provide a comprehensive overview of the education systems in the eighteen Latin American countries, table 2 presents the unconditional probabilities of enrollment, graduation, dropout, and overage in the early 1990s and

12. By construction, the unconditional dropout rate is the complement of the unconditional enrollment rate.

13. Analogous criteria were applied to enrollment, graduation, and dropout rates at the primary school level. In this case, however, conditional and unconditional rates are the same, since in the years and countries included in this study, there were no prerequisites in terms of schooling to enroll in primary school. This changed in some countries after reforms in the mandatory years of education, but these reforms were relatively recent and might not have affected the cohorts analyzed in this paper.

TABLE 2A. Education Achievement in Latin America and the Caribbean: Unconditional Probabilities of Enrollment, Graduation, Dropout, and Overage in Primary School Age[a]

Period and country	Enrolled in primary: On time (1)	Enrolled in primary: Overage (2)	Graduation rate in primary (3)
Early 1990s			
Argentina	0.97	0.02	0.83
Bolivia	0.91	0.07	0.79
Brazil	0.54	0.35	0.23
Chile	0.96	0.02	0.88
Colombia	0.74	0.18	0.53
Costa Rica	0.78	0.19	0.63
Dominican Republic[c]	0.59	0.05	0.76
Ecuador	0.94	0.05	0.57
Guatemala[b]	0.57	0.26	0.33
Honduras	0.73	0.18	0.51
Mexico	0.77	0.19	0.70
Nicaragua[c]	0.59	0.19	0.34
Panama	0.88	0.10	0.76
Peru	0.92	0.07	0.76
Paraguay	0.85	0.11	0.42
El Salvador[c]	0.78	0.10	0.58
Uruguay	0.91	0.08	0.84
Venezuela	0.78	0.19	0.66
United States	0.94	0.01	0.97
United States (Latin population)	0.95	0.01	0.97
Regional average	0.79	0.13	0.62
Weighted regional average	0.70	0.22	0.51
Late 2000s			
Argentina	0.93	0.06	0.84
Bolivia	0.95	0.05	0.83
Brazil	0.83	0.16	0.58
Chile	0.95	0.04	0.91
Colombia	0.86	0.10	0.72
Costa Rica	0.86	0.13	0.71
Dominican Republic	0.92	0.07	0.79
Ecuador	0.97	0.01	0.89
Guatemala	0.73	0.21	0.50
Honduras	0.85	0.08	0.74
Mexico	0.94	0.04	0.89
Nicaragua	0.73	0.19	0.57
Panama	0.92	0.07	0.83
Peru	0.92	0.07	0.81
Paraguay	0.94	0.04	0.67
El Salvador	0.86	0.10	0.71
Uruguay	0.92	0.08	0.81
Venezuela	0.92	0.06	0.84

(*continued*)

TABLE 2A. Education Achievement in Latin America and the Caribbean: Unconditional Probabilities of Enrollment, Graduation, Dropout, and Overage in Primary School Age[a] (*Continued*)

Period and country	Enrolled in primary: On time (1)	Enrolled in primary: Overage (2)	Graduation rate in primary (3)
United States	0.96	0.02	0.96
United States (Latin population)	0.95	0.03	0.94
Regional average	0.89	0.09	0.76
Weighted regional average	0.88	0.10	0.73

a. Age intervals vary by country according to the mandatory school legal age: columns 1–2 are based on the population from (primary school starting age + 1) to (secondary school starting age − 1) years old; column 3 on the population of (secondary school starting age + 1) years old. All data are nationally representative, except for Argentina, Bolivia, Ecuador, and Uruguay, which only gather data in urban areas. The regional average corresponds to a simple average of the countries in the Latin American and Caribbean sample, while the weighted regional average corresponds to a population-weighted average. The United States (Latino population) is defined as people who consider themselves Hispanics or Latino and who were born in the United States.

b. Only one household survey used.

c. We used the 1998 household survey to compute the early 1990s values.

TABLE 2B. Education Achievement in Latin America and the Caribbean: Unconditional Probabilities of Enrollment, Graduation, Dropout, and Overage in Secondary School Age[a]

	Incomplete primary		Complete primary				
			Do not assist secondary		Enrolled in secondary		
Period and country	Do not assist (1)	Assist (2)	Never assisted (3)	Assisted (4)	On time (5)	Overage (6)	Graduation rate in secondary (7)
Early 1990s							
Argentina	0.03	0.13	0.14	0.02	0.66	0.02	0.43
Bolivia	0.05	0.11	0.01	0.05	0.66	0.12	0.48
Brazil	0.32	0.35	0.03	0.01	0.17	0.05	0.14
Chile	0.03	0.06	0.02	0.10	0.74	0.05	0.58
Colombia	0.09	0.21	0.09	0.04	0.35	0.20	0.20
Costa Rica	0.08	0.21	0.18	0.04	0.33	0.13	0.23
Dominican Republic[b]	0.13	0.07	0.06	0.24	0.41	0.07	0.29
Ecuador	0.03	0.19	0.09	0.05	0.53	0.12	0.46
Guatemala[c]	0.24	0.16	0.13	0.04	0.20	0.06	0.13
Honduras	0.18	0.17	0.25	0.03	0.22	0.08	0.15
Mexico	0.08	0.12	0.13	0.12	0.40	0.10	0.25
Nicaragua[b]	0.17	0.20	0.06	0.04	0.21	0.10	0.12
Panama	0.04	0.11	0.13	0.06	0.53	0.12	0.39
Peru	0.02	0.13	0.03	0.03	0.65	0.14	0.54
Paraguay	0.15	0.26	0.16	0.05	0.32	0.04	0.19

(*continued*)

TABLE 2B. Education Achievement in Latin America and the Caribbean: Unconditional Probabilities of Enrollment, Graduation, Dropout, and Overage in Secondary School Age[a] (*Continued*)

	Incomplete primary		*Complete primary*				
			Do not assist secondary		*Enrolled in secondary*		
Period and country	*Do not assist (1)*	*Assist (2)*	*Never assisted (3)*	*Assisted (4)*	*On time (5)*	*Overage (6)*	*Graduation rate in secondary (7)*
El Salvador[c]	0.20	0.11	0.05	0.09	0.42	0.05	0.29
Uruguay	0.02	0.09	0.09	0.11	0.60	0.08	0.35
Venezuela	0.06	0.18	0.07	0.04	0.47	0.16	0.29
United States	0.00	0.01	0.00	0.05	0.90	0.03	0.82
United States (Latin population)	0.00	0.02	0.00	0.06	0.88	0.03	0.73
Regional average	0.11	0.16	0.10	0.06	0.44	0.09	0.31
Weighted regional average	0.17	0.22	0.08	0.05	0.35	0.09	0.24
Late 2000s							
Argentina	0.02	0.10	0.03	0.07	0.67	0.11	0.56
Bolivia	0.02	0.10	0.01	0.04	0.74	0.09	0.60
Brazil	0.11	0.25	0.04	0.02	0.48	0.07	0.45
Chile	0.00	0.06	0.00	0.05	0.79	0.08	0.74
Colombia	0.03	0.14	0.03	0.06	0.57	0.16	0.47
Costa Rica	0.03	0.19	0.09	0.03	0.45	0.21	0.30
Dominican Republic	0.04	0.10	0.01	0.06	0.67	0.11	0.50
Ecuador	0.01	0.06	0.01	0.08	0.78	0.04	0.61
Guatemala	0.16	0.19	0.13	0.06	0.30	0.11	0.14
Honduras	0.11	0.08	0.21	0.06	0.31	0.19	0.25
Mexico	0.02	0.06	0.06	0.15	0.64	0.06	0.42
Nicaragua	0.14	0.16	0.08	0.09	0.38	0.11	0.28
Panama	0.02	0.11	0.06	0.07	0.63	0.11	0.49
Peru	0.03	0.10	0.03	0.03	0.71	0.09	0.64
Paraguay	0.06	0.15	0.08	0.09	0.57	0.05	0.48
El Salvador	0.11	0.11	0.05	0.11	0.52	0.09	0.39
Uruguay	0.02	0.11	0.07	0.09	0.56	0.16	0.28
Venezuela	0.03	0.09	0.03	0.04	0.69	0.10	0.56
United States	0.00	0.05	0.00	0.02	0.89	0.03	0.87
United States (Latin population)	0.00	0.06	0.00	0.02	0.87	0.04	0.83
Regional average	0.05	0.12	0.06	0.07	0.58	0.11	0.45
Weighted regional average	0.07	0.15	0.05	0.06	0.57	0.09	0.47

a. Age intervals vary by country according to the mandatory school legal age: columns 1–6 are based on the population from secondary school starting age to the secondary school finishing age; column 7 on the population of (secondary ending age + 1) years old. All data are nationally representative, except for Argentina, Bolivia, Ecuador, and Uruguay, which only gather data in urban areas. The regional average corresponds to a simple average of the countries in the Latin American and Caribbean sample, while the weighted regional average corresponds to a population-weighted average. The United States (Latino population) is defined as people who consider themselves Hispanics or Latino and who were born in the United States.

b. We used the 1998 household survey to compute the early 1990s values.

c. Only one household survey used.

TABLE 2C. Education Achievement in Latin America and the Caribbean: Unconditional Probabilities of Enrollment, Graduation, Dropout, and Overage in Finishing School Age[a]

	(Finishing School age + 1) to 26 years old				
Period and country	*Some primary (1)*	*Complete primary and do not assist (2)*	*Incomplete secondary and do not assist (3)*	*Incomplete secondary and assist (4)*	*Graduation rate in secondary (5)*
Early 1990s					
Argentina	0.05	0.23	0.05	0.07	0.60
Bolivia	0.12	0.04	0.22	0.07	0.54
Brazil	0.50	0.09	0.04	0.07	0.21
Chile	0.06	0.04	0.31	0.02	0.56
Colombia	0.14	0.16	0.22	0.10	0.34
Costa Rica	0.11	0.34	0.16	0.06	0.30
Dominican Republic[b]	0.18	0.08	0.33	0.05	0.33
Ecuador	0.04	0.16	0.19	0.08	0.53
Guatemala[c]	0.31	0.17	0.13	0.03	0.16
Honduras	0.24	0.31	0.10	0.05	0.19
Mexico	0.12	0.18	0.31	0.05	0.28
Nicaragua[b]	0.25	0.13	0.17	0.08	0.15
Panama	0.07	0.19	0.23	0.06	0.44
Peru	0.05	0.08	0.13	0.08	0.66
Paraguay	0.24	0.29	0.19	0.03	0.23
El Salvador[b]	0.25	0.09	0.22	0.03	0.29
Uruguay	0.03	0.15	0.34	0.07	0.41
Venezuela	0.09	0.18	0.25	0.09	0.36
United States	0.00	0.00	0.11	0.02	0.86
United States (Latin population)	0.00	0.00	0.18	0.03	0.78
Regional average	0.16	0.16	0.20	0.06	0.37
Weighted regional average	0.26	0.14	0.16	0.06	0.31
Late 2000s					
Argentina	0.03	0.09	0.17	0.05	0.65
Bolivia	0.08	0.02	0.17	0.04	0.68
Brazil	0.22	0.08	0.07	0.07	0.54
Chile	0.01	0.01	0.15	0.02	0.80
Colombia	0.07	0.09	0.17	0.06	0.60
Costa Rica	0.07	0.19	0.17	0.13	0.43
Dominican Republic	0.10	0.03	0.23	0.09	0.52
Ecuador	0.03	0.10	0.16	0.05	0.64
Guatemala	0.26	0.18	0.21	0.07	0.21
Honduras	0.18	0.29	0.11	0.08	0.28
Mexico	0.05	0.11	0.34	0.03	0.44
Nicaragua	0.18	0.12	0.20	0.06	0.37
Panama	0.04	0.12	0.23	0.04	0.55
Peru	0.05	0.06	0.11	0.04	0.72
Paraguay	0.10	0.15	0.21	0.03	0.51

(*continued*)

TABLE 2C. Education Achievement in Latin America and the Caribbean: Unconditional Probabilities of Enrollment, Graduation, Dropout, and Overage in Finishing School Age[a] (*Continued*)

	(Finishing School age + 1) to 26 years old				
Period and country	*Some primary (1)*	*Complete primary and do not assist (2)*	*Incomplete secondary and do not assist (3)*	*Incomplete secondary and assist (4)*	*Graduation rate in secondary (5)*
El Salvador	0.17	0.08	0.27	0.03	0.40
Uruguay	0.03	0.13	0.38	0.10	0.35
Venezuela	0.04	0.08	0.15	0.08	0.63
United States	0.00	0.01	0.08	0.01	0.89
United States (Latin population)	0.00	0.00	0.11	0.02	0.86
Regional average	0.10	0.11	0.19	0.06	0.52
Weighted regional average	0.12	0.09	0.17	0.06	0.54

a. Age intervals vary by country according to the mandatory school legal age: columns 1–5 are based on the population from (secondary school finishing age + 1) to 26 years old. All data are nationally representative, except for Argentina, Bolivia, Ecuador, and Uruguay, which only gather data in urban areas. The regional average corresponds to a simple average of the countries in the Latin American and Caribbean sample, while the weighted regional average corresponds to a population-weighted average. The United States (Latino population) is defined as people who consider themselves Hispanics or Latino and who were born in the United States.

b. We used the 1998 household survey to compute the early 1990s values.

c. Only one household survey used.

late 2000s.[14] We include more than one cross-section/year in each of the subperiods whenever possible to avoid small sample sizes and reduce the effect of aggregate temporary shocks. As a reference, we also provide statistics for the United States and for the Latino population born in the United States. In addition we compute a simple average and a population-weighted average for Latin America and the Caribbean.

Overall trends are positive in most indicators and in most countries.[15] In primary school, on-time enrollment increased from 79 to 89 percent (table 2a, column 1), and overage decreased from 13 to 9 percent (table 2a, column 2). Graduation rates in primary increased from 62 to 76 percent (table 2a, column 3). When the regional average is calculated weighting each country by

14. The early 1990s refer to around 1990–95, while the late 2000s refer to around 2006–10. See table A1 in the online appendix for further details (www.matiasbusso.org).

15. All variables analyzed here (such as graduation rates) have a bounded support in [0,1]. Therefore, the magnitude of improvements will tend mechanically to decline, exhibiting diminishing marginal improvements.

its population, enrollment in primary increased from 70 to 88 percent, overage decreased from 22 to 10 percent, and graduation rates increased from 51 to 73 percent. Despite the progress, educational outcomes in the region in primary schooling are still low relative to the United States or to the outcomes of Latino descendants living in the United States.

The improvement in primary schooling implies that, compared to two decades ago, more Latin American children are now able to start secondary school on time. The percentage of primary graduates that abandon school during the transition to secondary education (that is, that never enroll in secondary school) decreased (table 2b, column 3), and primary school graduates that enroll in secondary school but leave before graduating increased slightly (table 2b, column 4). This indicates that dropout in secondary school occurs later in the schooling cycle than in the early 1990s. On-time enrollment in secondary school increased from 44 to 58 percent (table 2b, column 5), and overage remained nearly unchanged (table 2b, column 6). The weighted average of on-time enrollment in secondary school increased even more, from 35 to 57 percent. Graduation rates in secondary school also improved, both among secondary-school-aged students (table 2b, column 7) and among older students (table 2c, column 5). Compared with secondary graduation rates in the United States (which rank poorly among member countries of the Organization for Economic Cooperation and Development, OECD) and among Latino descendants in the United States, Latin America is still lagging behind, although the fast growth in the last two decades helped reduce the gap.[16]

We next extend the analysis of the trends in educational outcomes for secondary schooling in four ways: we analyze the evolution of graduation rates along the last two decades and among birth cohorts; we compare conditional and unconditional rates; we analyze the timing of dropout; and we study changes in educational outcomes by gender, urban-rural areas, and income quintiles.

Increase in Graduation Rates

Our data allow for not only the comparison of educational outcomes between two points in time, but also the analysis of the evolution throughout the period. This exercise helps to clarify whether the observed changes were the result of a smooth and gradual evolution or whether there were clear breaks at some moments in time, presumably responding to specific episodes or policies.

16. On graduation rates in the United States, see Murnane (2013).

Figure 1 presents the evolution of primary (panel a) and secondary (panel b) graduation rates since the early 1990s, in terms of both the regional average (weighted and unweighted) and the individual trends for each country in our sample. Although unconditional graduation rates in primary and secondary school show continuous progress over the two decades, their growth accelerates in the late 1990s. This growth was more pronounced in larger countries like Brazil and Mexico, as evident in the steeper trend of the average rates weighted by population size. The same pattern is observed when the average graduation rate is disaggregated by subregion, namely, the Southern Cone (Argentina, Brazil, Chile, Paraguay, and Uruguay), the Andean countries (Bolivia, Colombia, Ecuador, Peru, and Venezuela), and Central America, Mexico, and the Caribbean (Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, and Panama). The three groups show a faster increase in secondary school graduation rates after the late 1990s (figure 2).[17]

Finally, our data show a convergence in graduation rates between countries that started the analyzed period at different levels. Figure 3 shows the graduation rate in secondary schooling for three groups of countries according to where they started in the early 1990s.[18] Between the mid-1990s and early 2000s, countries with the lowest graduation rate in secondary schooling showed the greatest improvements, nearly catching up with the counties in the middle group. The trends of the three groups behave similarly thereafter.[19]

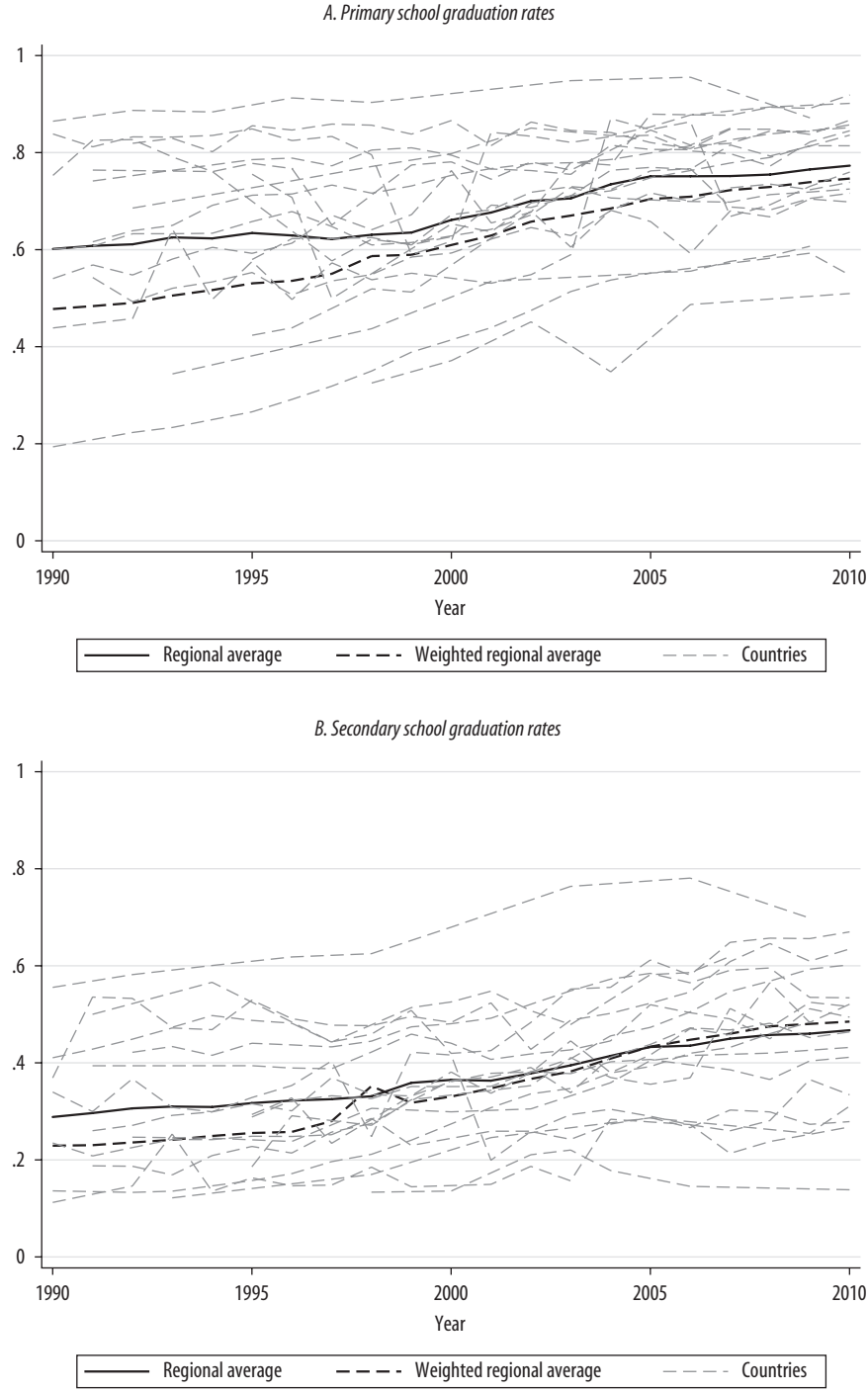
To explore longer-term trends, we look at how graduation rates changed by birth cohorts. Figure 4 presents the probability of graduating from primary and secondary schooling for each cohort born since the early twentieth century. The probabilities were calculated as the proportion of graduates in each schooling level among those individuals in our sample who were born in the same year (from 1905 to 1983). Despite the heterogeneity between the rates observed in each country, the data show that graduation rates increased continuously for most countries over the period 1930–80. With only a few exceptions among the earliest cohorts, each cohort achieved higher graduation rates

17. In the Andean countries, the break in the trend appears later, in the early 2000s.

18. The criterion followed was grouping countries with secondary graduation rates below 20 percent in group 1, countries with secondary graduation rates between 20 percent and 35 percent in group 2, and countries with secondary graduation rates above 35 percent in group 3.

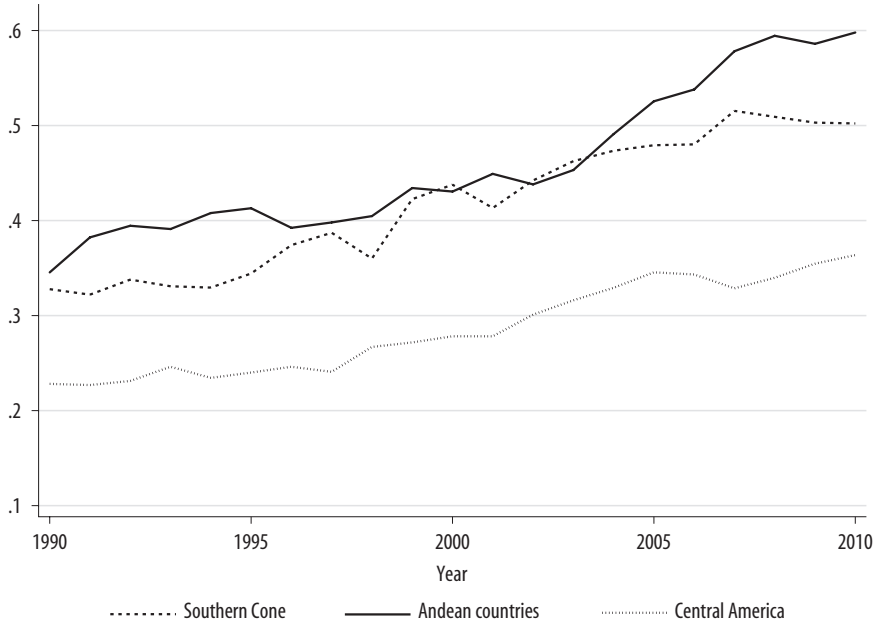
19. Similar patterns are observed in terms of primary graduation rates, both among subregions and among countries grouped by the initial level of their graduation rates (see figure A1 in the online appendix).

FIGURE 1. Graduation Rate Trends: Average for Latin America and the Caribbean[a]



a. Graduation rates are computed on the population aged (secondary ending age + 1) years. The regional average reports the simple average between the countries; the weighted average is computed by weighting the average by the countries' population. For the years in which no data are available, we computed the mean between the latest and the next available values. If the missing value was not in between two available years, then we replaced it by the nearest year.

FIGURE 2. Secondary School Graduation Trends, by Subregion[a]



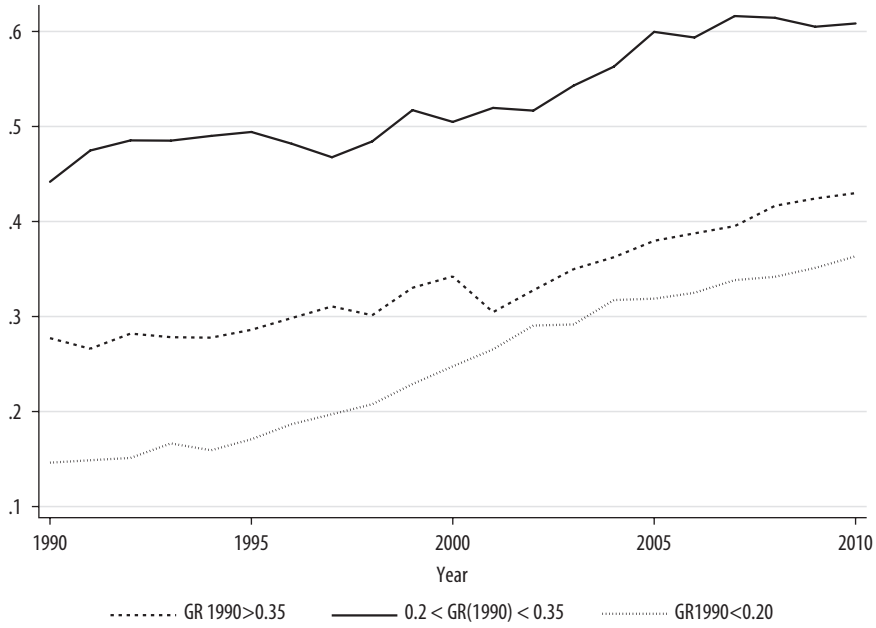
a. Graduation rates are computed on the population aged (secondary ending age + 1) years. For the years in which no data are available, we computed the mean between the latest and the next available values. If the missing value was not in between two available years, then we replaced it by the nearest year. The values reported are the simple average of the countries in the subsamples. The Southern Cone includes Argentina, Brazil, Chile, Paraguay, and Uruguay. Andean countries include Bolivia, Colombia, Ecuador, Peru, and Venezuela. Central America includes Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, and Panama.

than its predecessors. On average, cohorts born between 1940 and 1960 and later cohorts born between 1970 and 1983 show the largest improvements.

Table 3 shows the changes over 1990–2000 in secondary school educational outcomes following the definitions described in table 1. Both conditional and unconditional enrollment in secondary schooling increased in almost all countries in the period analyzed. On average, the unconditional enrollment rate increased 15 percentage points, and the conditional enrollment rate increased 8 percentage points, which indicates that part of the higher unconditional enrollment occurred among individuals that never enrolled in secondary school.

The increase in the weighted average enrollment rates was even higher, at 23 percentage points. The trend is largely explained by Brazil, which recorded the greatest improvement in our sample (34 percentage points). The Dominican Republic showed the second-highest increase in enrollment

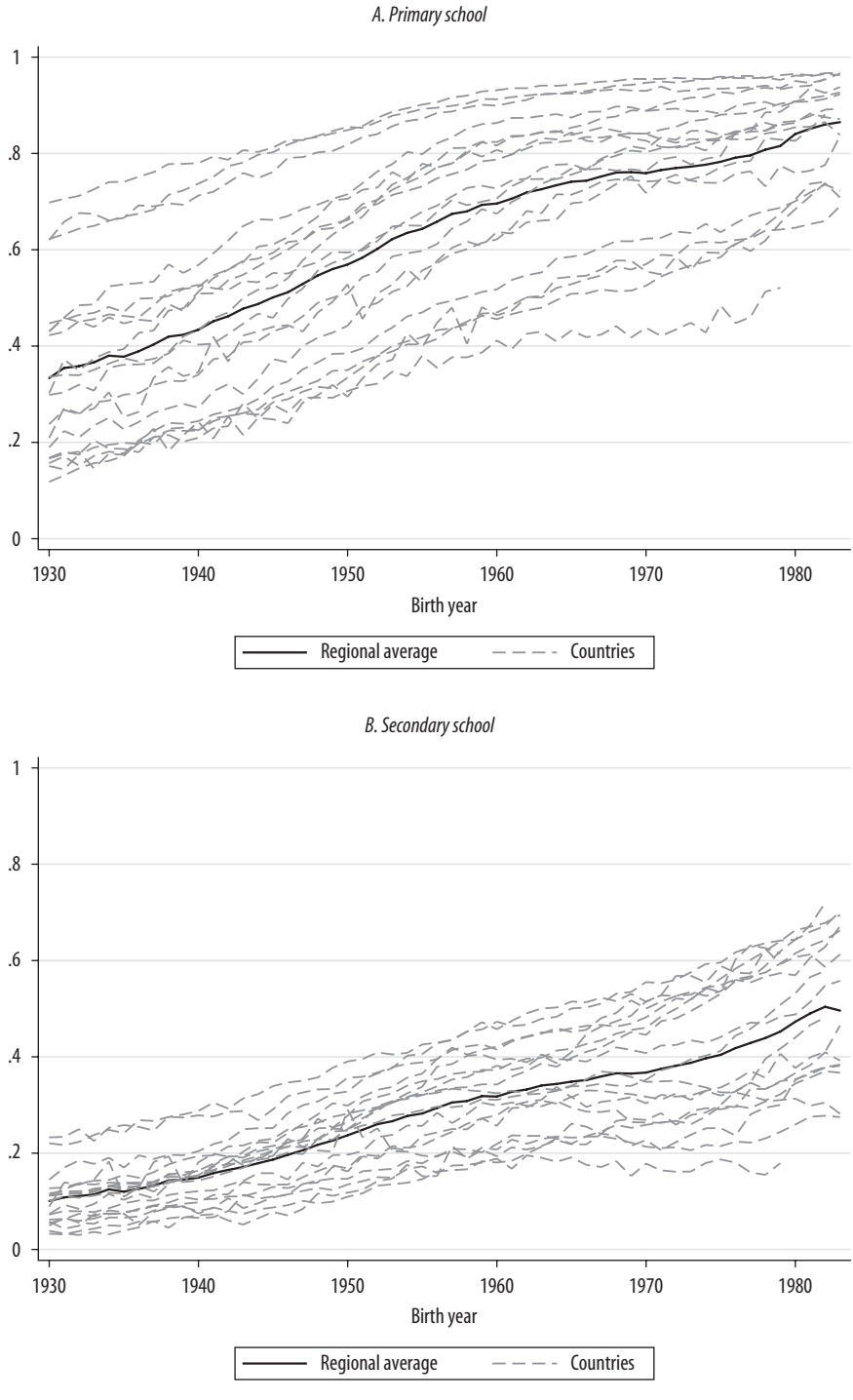
FIGURE 3. Secondary School Graduation Trends, by Starting Graduation Rate[a]



a. Graduation rates are computed on the population aged (secondary ending age + 1) years. For the years in which no data are available, we computed the mean between the latest and the next available values. If the missing value was not in between two available years, then we replaced it by the nearest year. The values reported are the simple average of the countries in the subsamples. The group with GR(1990) > 0.35 includes Argentina, Bolivia, Chile, Ecuador, Panama, and Peru. The group with 0.35 < GR(1990) > 0.2 includes Costa Rica, Dominican Republic, El Salvador, Mexico, Uruguay, and Venezuela. Finally, the group with GR(1990) < 0.2 includes Brazil, Colombia, Guatemala, Honduras, Nicaragua, and Paraguay.

(30 percentage points in the unconditional rate and 31 percentage points in the conditional rate). In both cases, the unconditional enrollment rate started at relatively low levels in the early 1990s (below the Latin American average). In Brazil, however, most of the change happened in primary school, as indicated by the smaller increase in the conditional enrollment rate relative to the unconditional enrollment rate. Peru, Bolivia, and Uruguay showed the smallest increase in enrollment in the sample, but all of them started from relatively high levels in the 1990s (compared with the Latin American average). The increase in enrollment in secondary schooling was greater than the change in the United States and the change among the Latino descendants in the United States. This was expected, as we are analyzing a bounded indicator and the United States was already relatively high at the beginning of the period.

FIGURE 4. Probability of Graduating Conditional on Birth Year[a]



a. Values reported correspond to the percentage of people with complete primary or secondary school in each cohort. The cohorts were identified by appending all the household surveys and computing the individual's birth year. The regional average is the simplearithmetic mean among the eighteen Latin American and Caribbean countries in the sample.

TABLE 3. Change in Secondary School Enrollment and Graduation Rates, 1990–2000[a]

	Enrollment		*Graduation*	
Country	*Unconditional (1)*	*Conditional (2)*	*Unconditional (3)*	*Conditional (4)*
Argentina	0.09	0.07	0.14	0.06
Bolivia	0.06	0.02	0.15	0.13
Brazil	0.34	0.05	0.31	0.15
Chile	0.08	0.07	0.16	0.15
Colombia	0.19	0.09	0.27	0.26
Costa Rica	0.19	0.17	0.07	–0.02
Dominican Republic	0.30	0.31	0.21	0.19
Ecuador	0.18	0.07	0.15	0.01
El Salvador	0.13	0.03	0.10	0.04
Guatemala	0.15	0.09	0.01	–0.14
Honduras	0.20	0.13	0.09	–0.02
Mexico	0.19	0.10	0.18	0.11
Nicaragua	0.18	–0.01	0.16	0.14
Panama	0.09	0.08	0.10	0.05
Peru	0.00	–0.01	0.10	0.12
Paraguay	0.26	0.16	0.30	0.23
Uruguay	0.04	0.05	–0.06	–0.09
Venezuela	0.18	0.08	0.28	0.24
United States	0.01	0.03	0.05	0.07
United States (Latino population)	0.00	0.04	0.10	0.14
Regional average	0.15	0.08	0.15	0.09
Weighted regional average	0.23	0.08	0.23	0.15

a. Computations are based on the population from the secondary school starting age to the secondary school finishing age. Enrollment and graduation rates (both conditional and unconditional) are computed following the definitions shown in table 1. The figures for the early 1990s are computed for 1990–95 and the late 2000s for 2005–10. Changes by country express the late 2000s rate minus the early 1990s rate.

Unconditional high school graduation rates also increased in all countries. On average, the unconditional graduation rate in secondary schooling increased 15 percentage points. The weighted average graduation rate increased 23 percentage points, mainly driven by Brazil, which again showed the greatest increase (31 percentage points). Paraguay, Venezuela, and Colombia followed with increases of 30, 28, and 27 percentage points, respectively. Uruguay was the only country in our sample where secondary graduation rates deteriorated, and Guatemala remained almost unchanged. The progress in the region in terms of secondary school graduation was higher than in the United States and among Latino descendants in the United States, which is noteworthy since the United States was recovering from a very weak period. Nevertheless, the level of the high school graduation rate in the United States is still

significantly higher than in Latin America, which clearly limits the potential progress in this bounded indicator.

Conditional graduation rates also increased, measured by both the simple average and the weighted average. This shows that the greater proportion of secondary school graduates responds not only to having more youths in school, but also to a greater efficiency of the education systems to prevent early dropout. Colombia shows the highest increase in the conditional graduation rate, while Guatemala and Uruguay show significant decreases in this indicator. In the case of Guatemala, as in Costa Rica and Honduras, which also experienced a decrease (although smaller) in the conditional graduation rate in secondary schooling, the slightly higher proportion of secondary school graduates (unconditional rate) is associated with greater enrollment, as we explain in more detail in the following section.[20]

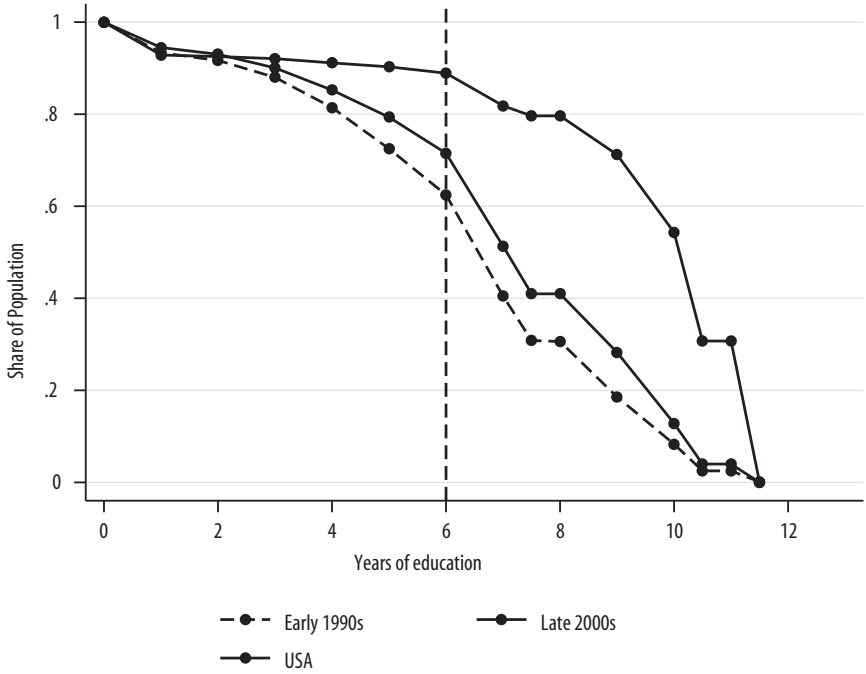
Later Dropout

The fact that both conditional and unconditional graduation rates improved, on average, while overage decreased, indicates that dropping out might be occurring less in primary school and that students might be staying longer in the education system. Understanding at what stage of the schooling cycle students have the highest probability of dropping out has important implications for identifying the causes of school abandonment and for designing effective policies to prevent it.

Figure 5 presents the probability of completing a certain number of years of education, conditional on not having graduated from secondary school. The figure shows the average for Latin America in the two time periods and for the United States in the late 2000s. The curve for the late 2000s for the region is above the curve for the early 1990s, which shows that students now stay longer in school or that dropout happens later in the school cycle. The part of the curve between zero and six years of education is flatter for the late 2000s than for the early 1990s, indicating that a larger fraction of students (that did not complete secondary schooling) completed at least six years of

20. Dropout and overage rates (both conditional and unconditional, as defined in table 1) were also estimated. The information is presented in table A2 in the online appendix. Results are also positive, showing a decrease in both dropout and overage rates, on average, in the region (measured by conditional and unconditional rates, with the exception of the conditional overage rate, which remained unchanged). Changes were more significant measured by the weighted average for the region. In these two indicators, Latin America again showed better progress (reduction in this case) than the United States in the period under analysis.

FIGURE 5. Timing of Dropout[a]

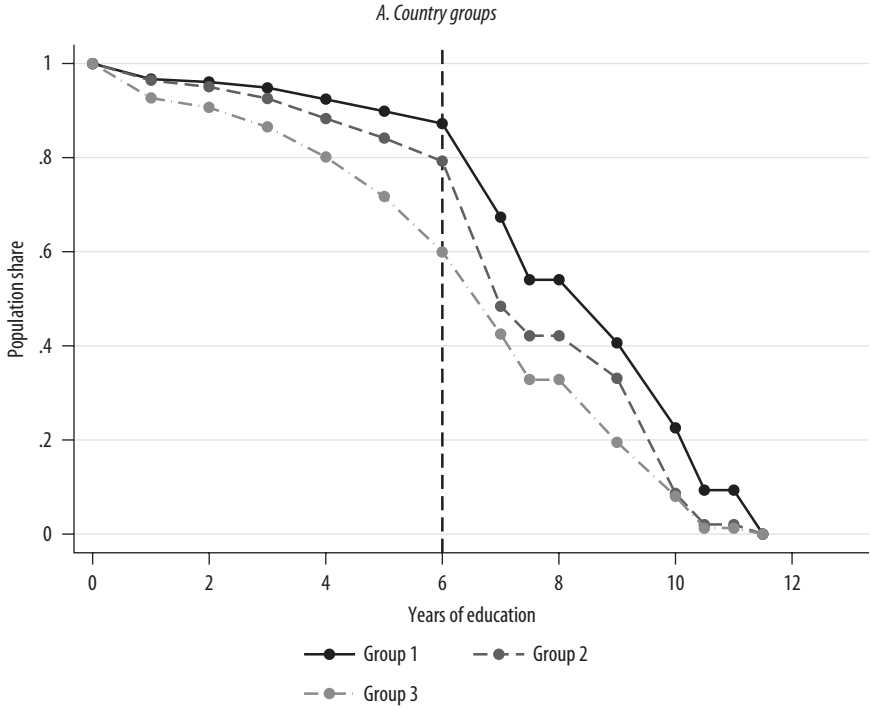


a. The figure shows the probability of achieving *y* years of education (conditional on not having finished secondary school and not being enrolled). Values are computed as the percentage of the population with *y* years of education, using only the population with no secondary school and that is not currently attending school. The trend for the early 1990s is computed for years 1990–95 and the late 2000s for 2005–10. Countries are divided by the percentage of people dropping out by the sixth year of education.

education. The curve for the United States shows that dropout occurs almost entirely in high school, especially during the last two years of high school.

Figure 6 again distinguishes the three groups of countries. As shown in panel A, most dropouts in Group 1 (Argentina, Chile, Ecuador, Panama, Uruguay, and Venezuela) occurred during secondary school (particularly in early secondary). Only 12 percent of students that dropped out of school in these countries did so during primary or in the transition to secondary school in the late 2000s. However, this is not the case in the other countries, where a larger proportion of dropouts leaves the school system in late primary or in the transition between primary and secondary school. In Group 2 (Costa Rica, Mexico, and Peru), almost one-third of the dropouts happen in the transition to secondary school, and in Group 3 (Bolivia, Brazil, Colombia, Dominican

FIGURE 6. Timing of Dropout, by Country Group and Individual Countries[a]



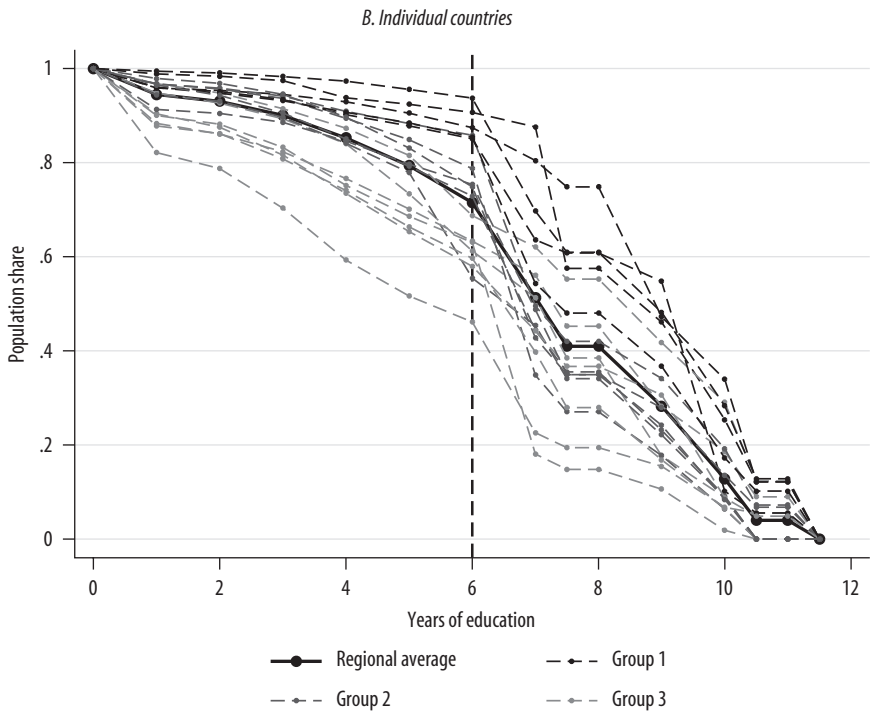
Republic, Guatemala, Honduras, Nicaragua, Paraguay, and El Salvador), around 40 percent of dropouts happen in primary school. Panel B shows that these patterns hide significant country-level variation.[21]

Persistent Gender, Regional, and Income Achievement Gaps within Countries

Table 4 shows the average gap in secondary school graduation rates for different groups of people (by gender, region, or income). Latin American women, for example, achieve a higher graduation rate than men, and that gap has increased over the last two decades (from 5 percentage points to 8 percentage

21. Table A3 in the online appendix presents further details that complement and expand the results presented in figures 5 and 6.

FIGURE 6. Timing of Dropout, by Country Group and Individual Countries[a] (*Continued*)



a. The figure shows the probability of achieving *y* years of education (conditional on not having finished secondary school and not being enrolled). Values are computed as the percentage of the population with *y* years of education, using only the population with no secondary school and that is not currently attending school. Countries are divided by the percentage of people dropping out by the sixth year of education. The countries are grouped according to the share of the population that dropped out, where group 1 dropped less than 20% of people, group 2 dropped between 20 and 30%, and group 3 dropped more than 30%. Country group 1 includes Argentina, Chile, Ecuador, Panama, Uruguay, and Venezuela. Country group 2 includes Costa Rica, Mexico, and Peru. Country group 3 includes Bolivia, Brazil, Colombia, Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua, and Paraguay.

points measured by the unconditional graduation rate; and 4 percentage points to 7 percentage points measured by the conditional graduation rate). The increase in the gender gap in graduation rates is observed in most countries in our sample (exceptions are Argentina, Colombia, Ecuador, El Salvador, and Peru) and for both the weighted and unweighted regional average. These results contrast with those for the United States, where the gap was reduced 2 percentage points, on average, and 1 percentage point among the Latino population. Except for the last few years (after 2005), when there seems to be an increase in the gap because graduation among men stagnated, the trends

TABLE 4. Change in Secondary School Graduation Gaps[a]

	Female-male		*Urban-rural*		*Quntile 5-quintile 1*	
Region or country	*Unconditional [1]*	*Conditional [2]*	*Unconditional [3]*	*Conditional [4]*	*Unconditional [5]*	*Conditional [6]*
Regional average, early 1990s	0.05	0.04	0.24	0.21	0.29	0.24
Regional average, late 2000s	0.08	0.07	0.24	0.19	0.35	0.30
Change in regional average	0.04	0.04	0.00	–0.02	0.06	0.06
Change in weighted regional average	0.04	0.01	0.05	0.00	0.11	0.08
Change by country						
Argentina	–0.05	–0.10	—	—	0.01	0.05
Bolivia	0.01	–0.02	—	—	0.08	0.14
Brazil	0.08	0.02	0.13	0.00	0.24	0.11
Chile	0.05	0.07	–0.27	–0.25	–0.03	0.01
Colombia	–0.01	–0.04	0.12	0.12	0.19	0.18
Costa Rica	0.03	0.00	–0.14	–0.16	0.09	0.14
Dominican Republic	0.17	0.17	–0.05	–0.11	–0.09	–0.17
Ecuador	–0.03	–0.04	—	—	0.17	0.18
El Salvador	–0.01	–0.03	–0.04	–0.03	0.06	0.09
Guatemala	0.06	0.17	–0.06	0.03	0.02	0.11
Honduras	0.05	0.07	0.08	0.07	0.16	0.21
Mexico	0.02	–0.01	–0.02	0.02	–0.01	0.03
Nicaragua	0.13	0.26	0.10	0.03	–0.03	–0.22
Panama	0.01	0.02	0.08	0.07	0.05	0.10
Peru	–0.03	–0.06	–0.01	–0.06	0.12	0.12
Paraguay	0.08	0.07	0.09	0.01	–0.04	–0.11
Uruguay	0.07	0.09	—	—	0.15	0.20
Venezuela	0.03	0.02	—	—	–0.11	–0.06
United States	–0.02	–0.02	–0.06	–0.06	–0.03	–0.05
United States (Latino population)	–0.01	–0.01	–0.03	–0.04	–0.08	–0.11

a. Computations are based on the population from secondary school starting age to the secondary school finishing age. Graduation rates (both conditional and unconditional) are computed following the definitions shown in table 1. The figures for the early 1990s are computed for years 1990–95 and the late 2000s for 2005–10. Changes by country express the 2010 rate minus the 1990 rate. Rural-urban and male-female are identified by data provided in each survey. Income quintiles are constructed using household wages from primary and secondary activities.

observed for men and women are almost parallel, with women graduating in higher (and relatively more stable) proportions than men.[22]

Schools in rural areas show considerably lower graduation rates than schools in urban areas, and that gap remained almost constant (or decreased slightly). When the regional average is computed using population weights, the gap in the unconditional graduation rate shows an increase of 5 percentage points, mainly driven by Brazil and Colombia. Although the average for the region shows little or no improvement, five countries in our sample (Chile, Costa Rica, Dominican Republic, Peru, and El Salvador) reduced the urban-rural gap in graduation rates over the last two decades. The United States also shows improvement in this indicator, reducing the gap between rural and urban areas by around 6 percentage points (and 3 percentage points among Latino descendants).

The secondary school graduation gap between populations in different income quintiles also shows little improvement. Students from the highest income quintile have an unconditional secondary school graduation rate that is 35 percentage points higher than students from the lowest income quintile (and 30 percentage points higher in terms of the conditional rate). This gap increased around 6 percentage points after the early 1990s (both the conditional and unconditional rates). On the one hand, graduation among students from the richest families increased steadily after the early 1990s and accelerated in the early 2000s. On the other hand, graduation among students from the poorest families remained stagnant until the mid-2000s and only started growing thereafter.[23]

Most countries recorded an increase in the graduation gap between income quintiles. In Brazil, for example, where remarkable improvements were made in terms of enrollment and graduation rates, the graduation gap between the highest- and lowest-income students increased by 24 percentage points, indicating that the benefits mainly affected the richest groups. The gap in the conditional graduation rate also increased, but to a lesser extent (11 percentage points), which shows that the education system in Brazil has been somewhat more efficient in preventing dropouts among high- and low-income students once enrolled in secondary school, but quite inefficient in attracting students

22. Results are shown in figure A2 in the online appendix. The appendix includes the same analysis for primary school graduation rates, comparing their evolution by gender, regional area, and income level (figures A3 and A4). Results are similar to those observed in secondary schooling.

23. See figure A4 in the online appendix.

from lower-income families to the secondary education system (at least relative to the changes observed among students from higher-income families). The Dominican Republic, Nicaragua, Paraguay, and Venezuela were able to reduce the graduation gap among income quintiles (in both conditional and unconditional graduation rates). In the same period, the graduation gap between the highest and lowest income quintile in the United States was reduced, both on average and among Latino descendants.

Explanations

We start by decomposing the change in secondary school graduation rates in multiple components that can shed light onto what part of the education system contributed more to the positive trend. Then we assess whether changes in the incentives to study provided by the labor market or the introduction of certain policies are correlated with those changes.

Graduation Rate Decomposition

The probability of graduating from secondary school on time can be expressed as the product of the conditional and unconditional probabilities defined in table 1. That is,

$$P\left(G_s\right) = P\left(G_s \middle| E_s\right) \times P\left(E_s \middle| G_p\right) \times P\left(G_p \middle| E_p\right) \times P\left(E_p\right),$$

where $P(\cdot)$ is a probability function, G_j denotes the event of graduation from school level $j = \{\text{primary } (p) \text{ or secondary } (s)\}$, and E_j denotes the event of enrollment. Following Heckman and LaFontaine, we can decompose the change in secondary school graduation rate, $\Delta P(Gs)$, into the following components:[24]

$$\Delta P\left(G_s\right) = T_1 \Delta P\left(G_s \middle| E_s\right) + T_2 \Delta P\left(E_s \middle| G_p\right) + T_3 \Delta P\left(G_p \middle| E_p\right) + T_4 \Delta P\left(E_p\right) + T_5.$$

Table 5 shows the result of this decomposition. The first column shows the total change in secondary school graduation rate, while columns 2 to 6 show each of the five terms in the decomposition.

24. Following Heckman and LaFontaine (2010). $T_1 = P(E_s \mid G_p)\, P(G_p \mid E_p)\, P(E_p)$, $T_2 = P(G_s \mid E_s)\, P(G_p \mid E_p)\, P(E_p)$, $T_3 = P(G_s \mid E_s)\, P(E_s \mid G_p)\, P(E_p)$, $T_4 = P(G_s \mid E_s)\, P(E_s \mid G_p)\, P(G_p \mid E_p)$, and $T_5 = F[G_j, E_j]$, $F(.)$ comprise a cross-product function composed of the sum of all the possible combinations of probabilities and changes. For computations, levels are fixed at those of the first year in the sample.

TABLE 5. Changes in Graduation Rates in Latin America and the Caribbean: Conditional Probabilities[a]

	Secondary school age					
Country	$\Delta P(Gs)$ *(1)*	Δ *due to* $P(Gs \mid Es)$ *(2)*	Δ *due to* $P(Es \mid Gp)$ *(3)*	Δ *due to* $P(Gp \mid Ep)$ *(4)*	Δ *due to* $P(Ep)\mid$ *(5)*	Δ *due to interactions (6)*
Argentina	0.14	0.04	0.06	0.02	0.00	0.01
Bolivia	0.12	0.09	0.00	0.02	0.00	0.01
Brazil	0.31	0.03	0.01	0.18	0.01	0.08
Chile	0.16	0.13	0.01	0.01	0.00	0.00
Colombia	0.27	0.15	0.02	0.04	0.00	0.06
Costa Rica	0.07	−0.01	0.05	0.03	0.00	0.00
Dominican Republic	0.21	0.14	0.02	0.02	0.00	0.02
Ecuador	0.15	0.01	0.05	0.08	0.00	0.01
El Salvador	0.10	0.02	0.01	0.05	0.02	0.01
Guatemala	0.01	−0.04	0.02	0.03	0.02	−0.01
Honduras	0.10	−0.01	0.04	0.04	0.01	0.01
Mexico	0.18	0.07	0.03	0.04	0.01	0.03
Nicaragua	0.16	0.05	0.00	0.04	0.03	0.04
Panama	0.10	0.04	0.04	0.01	0.00	0.01
Peru	0.10	0.10	0.00	0.01	0.00	0.00
Paraguay	0.29	0.09	0.05	0.07	0.00	0.09
Uruguay	−0.06	−0.07	0.01	0.00	0.00	0.00
Venezuela	0.28	0.16	0.02	0.05	0.00	0.04
United States	0.05	0.08	0.00	−0.03	0.00	0.00
United States (Latino population)	0.10	0.12	0.00	−0.01	0.00	0.00
Regional average	0.15	0.06	0.03	0.04	0.01	0.02
Weighted regional average	0.22	0.07	0.02	0.08	0.01	0.05

a. Columns express the terms in the decomposition of $\Delta P(Gs)$. Column 1 shows the change in the secondary graduation rate between early 1990s and late 2000s. Column 2 is equal to $[\Delta P(Gs \mid Es)*P(Es \mid Gp)*P(Gp \mid Ep)*P(Ep)]$. Column 3 is equal to $[P(Gs \mid Es)*\Delta P(Es \mid Gp)*P(Gp \mid Ep)*P(Ep)]$. Column 4 is equal to $[P(Gs \mid Es)*P(Es \mid Gp)*\Delta P(Gp \mid Ep)*P(Ep)]$. Column 5 is equal to $[P(Gs \mid Es)*P(Es \mid Gp)*P(Gp \mid Ep)*\Delta P(Ep)]$. Column 6 is equal to the sum of the rest of the terms in the decomposition. Columns 1–6 use the population from the secondary school starting age to the secondary school finishing age.

The table reveals two key trends. First, more students are now eligible to attend secondary school. The increased enrollment rate in primary schools partly explains the increase over the last two decades in the secondary school graduation rate (as shown in columns 4 and 5 of the table). On average, improvements in primary school explain 35 percent of the increase in graduation from secondary school (5 out of 15 percentage points). This pattern holds for most countries including Brazil, Costa Rica, Ecuador, El Salvador, Honduras, Mexico, and Nicaragua. Indeed, countries with the largest increases in their secondary school graduation rate (for example, Brazil, Colombia, or Venezuela) also show the greatest increases in primary school graduation

rates, and countries with the lowest increases in secondary school graduation rates (Uruguay or Chile) show the same patterns in primary education. In other words, achieving the first milestone in primary school necessarily led more students to be ready for secondary education, producing a cascade effect in secondary school.

Second, the efficacy of secondary schools in the region increased on two dimensions: capturing and graduating their students. As column 3 of table 5 shows, about 17 percent (3 out of 15 percentage points) of the improvement in secondary school graduation is explained by the fact that secondary schools in the region are able to capture a larger proportion of students that finish primary school. This phenomenon is particularly important in Argentina, Costa Rica, and Ecuador. More importantly, however, secondary schools have become more effective at retaining and graduating students. Column 2 of the table shows that this factor explains, on average, 38 percent (6 out of 15 percentage points) of the change in secondary school graduation rates. In Chile and Peru, increased efficacy explains more than 80 percent of the increase in their secondary school graduation rates. On the other end of the spectrum, Costa Rica and Ecuador show a decline in the capacity to keep students in school.

Labor Market Incentives

Several studies analyze the causal impact of both observed and perceived positive returns to education on enrollment and graduation. For instance, Foster and Rosenszweig use an exogenous technical change in India, which led to higher primary school returns that, in turn, resulted in higher levels of schooling.[25] Jensen provides labor market opportunities for women in randomly selected rural Indian villages and concludes that increased labor access has positive effects on schooling.[26] Additional studies find that if the returns for unskilled labor (workers with less than completed secondary school education) increase, then the students have more incentives to drop out.[27]

Perceived returns also seem to matter. Jensen conducts a survey experiment on eighth grade students in the Dominican Republic and finds that students who randomly receive information about higher returns to education

25. Foster and Rosenszweig (1996).

26. Jensen (2012).

27. Foster and Rosenszweig (2004); Black, McKinnish, and Sanders (2005); Edmonds, Pavcnik, and Topalova (2010).

complete 0.20–0.35 more years of schooling.[28] Eckstein and Wolpin estimate a structural model of high school attendance and work decisions.[29] They conclude that students who drop out of high school are the less motivated and have lower expectations about the rewards of education. Dinkelman and Martínez find a causal relationship between providing children with information about college financial aid and secondary school enrollment in Chile.[30] In this case, students decided to study because they perceived a concrete possibility of enrolling in tertiary education, and this encouraged them to graduate from secondary school.

We exploit the longitudinal structure of our data to study whether groups that faced better incentives from the labor market experienced higher graduation rates. We construct groups (g) of people according to their income quintiles, gender, and whether they live in rural or urban areas.[31] We assume the following data-generating process:

$$GR^{s}_{gct} = \alpha + \theta_1 U_{gct} + \theta_2 W_{gct} + \mu_{ct} + \varepsilon_{gct},$$

where GR^{s}_{gct} is the rate of on-time secondary school graduation rate among people who are close to the graduation age (seventeen to eighteen years old) in group g, in country c, in year t. These individuals are not yet in the labor market. When making the decision about whether to finish secondary school, they observe the labor market performance of similar individuals (that is, in the same group g) in terms of their unemployment and wages earned. The variable U_{gct} is the unemployment rate of individuals in group g, but who are older. We consider the unemployment rates of four sets of reference workers (and its average): people aged nineteen to twenty-six years who have completed secondary school; aged nineteen to twenty-six years who have completed tertiary school; aged twenty-seven to fifty-five years with complete secondary school; and aged twenty-seven to fifty-five years with complete tertiary school.[32] Similarly, we computed the Mincerian wage returns for those four sets of workers

28. Jensen (2010).

29. Eckstein and Wolpin (1999).

30. Dinkelman and Martínez (2014).

31. A group is, for instance, all females living in a household whose per capita income is in the first quintile and which is located in rural areas of country j in year t. Because some cells are small, we discard groups with fewer than twenty average annual observations. We linearly interpolate the values for those years in which we do not have individual level data.

32. Strictly speaking, this refers to students who are (legal secondary school graduation age + 1) years old.

and its average (W_{gct}). In the model, we include country-year fixed effects (μ_{ct}), and ε_{gct} is the error term.

If students who are currently in secondary school decide to stay in school rather than dropping out before graduation, they are likely to increase the unemployment and reduce the wages of the reference individuals. Therefore, the ordinary least squares (OLS) estimate of θ_1 is biased toward finding a negative correlation, and that of θ_2 is biased towards finding a positive correlation. To ameliorate this problem, we instrument the unemployment rate and the wage returns with their lagged values (U_{gct-2}, W_{gct-2}). We cannot establish causality with our data and with this empirical strategy, as there are omitted factors that could jointly affect the graduation and labor market outcomes of these groups. The best we can do is to establish an indicative correlation (or lack thereof). We cluster our standard errors at the country level.

Table 6 presents the results. The first column shows the results using average unemployment and wage returns across the three reference groups, while columns 2 to 5 show the results using one reference group at a time. We find a positive relation between labor market returns and secondary school graduation, while the correlation between the unemployment rate and graduation is negative, but not statistically significant, for some of the reference groups. In other words, groups that faced better labor market outcomes for secondary school graduates tend to have a higher graduation rate, which is consistent with the conjecture that the labor market provides incentives to stay in school.[33]

Public Policies

In the last two decades, countries have introduced a number of public policies that could have affected the incentives for students to stay in school. These policies affect both the demand for schooling, including conditional cash transfer (CCT) programs and changes to the mandatory years of education, and the supply of schooling, including increases in government spending per student, the decentralization of the school system to state or local governments, and the introduction of two cycles in secondary school.[34]

33. Gasparini and others (2011) show that the average returns to secondary education fell over the last two decades. In the 2000s, there was a reversal in the increase in the returns to tertiary education, as previously identified in the literature (Manacorda, Sánchez-Páramo, and Schady, 2010). They argue that there was a reversal in labor demand in the 2000s, partially due to a boom in commodity prices that favored the unskilled (non-tertiary-educated) workforce.

34. The data and descriptive tables of these policies are available in the online appendix (tables A4 and A5).

TABLE 6. Graduation Rates and Labor Market Outcomes[a]

		Reference group: 19–26		*Reference group: 27–55*	
	Average reference group	*Secondary school graduates*	*Tertiary school graduates*	*Secondary school graduates*	*Tertiary school graduates*
Explanatory variable	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*
Returns	0.351***	0.024	0.195***	0.186***	0.259***
	(0.000)	(0.660)	(0.001)	(0.000)	(0.000)
Unemployment	–0.080	0.015	–0.120*	–0.131*	–0.107**
	(0.318)	(0.921)	(0.057)	(0.055)	(0.039)
Constant	0.405***	0.523***	0.480***	0.483***	0.394***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Summary statistic					
No. observations	5,505	5,505	5,501	5,505	5,501
R squared	0.457	0.408	0.391	0.436	0.438
Country-year fixed effects	Yes	Yes	Yes	Yes	Yes

*Statistically significant at the 10 percent level.
**Statistically significant at the 5 percent level.
***Statistically significant at the 1 percent level.

a. The dependent variable is the graduation rate for individuals that are (final graduation age + 1) years old in a cell defined as the intersection of country, year, gender, income quintile, and rural/urban. Wage return refers to the standard Mincerian return to education adjusted by age. Column 1 uses the averages between columns 2–5. Column 2 uses the returns to the secondary school education in the group of 19–26 year olds and the unemployment rate of people with incomplete secondary school in the same age range. Column 3 uses the returns to tertiary school education in the group of 19–26 year olds and the unemployment rate of people with complete secondary school in the group of 27–55 year olds. Column 4 uses the returns to the secondary school education in the group of 27–55 year olds and the unemployment rate of people with complete tertiary school in the same age range. Finally, column 5 uses the returns to tertiary school education in the group of 27–55 year olds and the unemployment rate of people with complete tertiary school in the same age range. The regressors were instrumented by the variable values lagged one period. The only control is a dummy variable for imputation data. All estimations include country-year fixed effects, and standard errors clustered at the country level. *P* values are reported in parentheses.

Not all countries introduced these policies simultaneously. Cross-country and time-series variation can be exploited to estimate correlations between these policies and secondary school graduation rates. We assume the following data-generating process:

$$\Delta GR^{s}_{ct} = \gamma + \delta_1 \mathbf{P}_{ct} + \delta_2 \mathbf{X}_{ct} + \upsilon_c + \xi_{ct},$$

where ΔGR^{s}_{ct} is the annual change in the (on-time) secondary school graduation rate, $\mathbf{P}_{ct}$ is a vector of policy variables, $\mathbf{X}_{ct}$ is a vector of control variables, υ_c are country fixed effects, and ξ_{ct} is the error term. Our standard errors are clustered by country, allowing for arbitrary time correlations in the error terms within each country.

The vector $\mathbf{P}_{ct}$ includes a dummy variable that indicates whether country *c* has introduced a conditional cash transfer (CCT) program in year *t,* the

log of education expenditure over GDP, a dummy variable that indicates whether the country decentralized its school system, a dummy variable that measures whether the country extended the compulsory years of schooling, and a dummy variable for whether the country changed its secondary school from one five-year cycle to two three-year cycles (lower and upper/high/preparatory school). The vector $\mathbf{X}_{gct}$ includes several control variables: the annual change in (on-time) primary school graduation rates, dummies for changes in questionnaires, and interpolation dummies. The results are presented in table 7.

The region has seen an expansion of CCT programs over the last twenty years. These programs transfer cash to families and require in exchange that children are enrolled in and attend school. We find that overall, the effect of CCTs was small, but the programs do seem to have increased graduation rates among students who live in poor households and in rural areas. This is expected, since CCTs typically target poor households with children, and many programs started in rural areas first. Many studies analyze the impact of CCTs on schooling. Fiszbein and Schady review this literature and find that "virtually every [CCT] program that has had a credible evaluation has found a positive effect on school enrollment."[35] The impacts on enrollment reported in their study range from 0.5 to 12.8 percentage points.[36]

In Latin America, education is predominantly provided via publicly administered schools. About 75 percent of students in the region attend public schools that do not charge tuition for families and, depending on the country, are instead financed with tax revenue by the central, state, or municipal government.[37] Spending per student increased more than GDP per capita in most countries, in both primary and secondary school. Argentina and Brazil are notable examples, with a 37 and 66 percent change, respectively. This increase in relative spending basically took the ratio of education spending to GDP to levels observed in countries with the highest performance in international student assessments. The higher expenditure translated into an expansion of

35. Fiszbein and Schady (2009, pp. 129).

36. There is, however, large heterogeneity. Impacts are larger for populations with lower baseline enrollment and for students transitioning from primary to secondary school (as opposed to students in primary or secondary school).

37. The most notable exception to this financing scheme is Chile, which has a voucher system that provides subsidies to families who can (at least potentially) choose among public or private schools.

TABLE 7. Change in Secondary School Graduation Rates[a]

			Income		Geographic		Gender	
	Overall		Q1	Q5	Rural	Urban	Male	Female
Explanatory variable	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Public education expenditure/ GDP (percent)	0.001							
	(0.778)							
1 (after introduction of CCT)	0.003	0.005	0.017*	0.000	0.009**	0.002	0.006	0.005
	(0.523)	(0.204)	(0.050)	(0.980)	(0.015)	(0.677)	(0.256)	(0.235)
1 (after increase in years of compulsory duration)	0.002	0.007	0.004	0.002	0.015***	0.007	0.003	0.009*
	(0.742)	(0.126)	(0.582)	(0.938)	(0.000)	(0.282)	(0.440)	(0.084)
1 (after education decentralization)	0.016***	0.015***	0.013**	0.001	0.005	0.016***	0.012	0.019*
	(0.009)	(0.003)	(0.048)	(0.872)	(0.384)	(0.001)	(0.115)	(0.052)
1 (after introduction of two cycles in secondary school)	0.009*	0.009**	0.014***	0.021**	−0.001	0.013**	0.008*	0.011*
	(0.082)	(0.013)	(0.006)	(0.025)	(0.889)	(0.018)	(0.088)	(0.068)
Constant	0.056***	0.064***	0.027	0.046	0.056***	0.058**	0.058***	0.063***
	(0.002)	(0.001)	(0.278)	(0.392)	(0.000)	(0.028)	(0.004)	(0.001)
Summary statistic								
No. observations	278	360	360	360	260	320	360	360
R squared	0.084	0.096	0.063	0.115	0.319	0.102	0.063	0.086
Country fixed effects	X	X	X	X	X	X	X	X
Control variables	X	X	X	X	X	X	X	X

*Statistically significant at the 10 percent level.
**Statistically significant at the 5 percent level.
***Statistically significant at the 1 percent level.

a. The dependent variable is the annual change in secondary school graduation rates. Column 1 includes the graduation rate for the overall sample. Columns 2 and 3 use the graduation rate of the first and fifth income quintiles as the dependent variable, respectively. Columns 4 and 5 use the graduation rate of the rural and urban populations as the dependent variable, respectively. Columns 6 and 7 use the graduation rate of males and females as the dependent variable, respectively. The controls in all the columns are a dummy variable for imputation data, the duration of compulsory education, and a set of dummy variables for countries' year changes in the surveys. All estimations include country-year fixed effects, and standard errors clustered at the country level. *P* values are reported in parentheses.

the number of public and private schools.[38] At the same time, the student-teacher ratio declined about 6 percent over the last decade.[39] The trend does not, however, appear to be correlated with graduation rates in the region.[40]

Many Latin American countries implemented changes in their education systems in 1990–2010. First, there have been changes in the mandatory years of education. Several countries changed the mandatory entry age for primary school or the mandatory finishing age of secondary school. Chile was the only country in Latin America to increase the number of mandatory years of education in the 1990s, while Argentina, Brazil, and Uruguay did so in the 2000s. Argentina, Nicaragua, and Uruguay increased the age at which mandatory education finishes in the 2000s, while the Dominican Republic and Paraguay decreased the entry age for primary education from seven to six years old in the 1990s. These changes in the mandatory years of education seem to have had a small overall impact affecting only rural areas and female students.

Second, some countries decentralized the organization of their education systems. Argentina, Brazil, and Chile have had a decentralized school organization since before 1990, with either states or municipalities having the primary responsibility for the organization of their schools. Other countries, like Colombia, Mexico, and Nicaragua, implemented some decentralization reform during the period under analysis. We find that these reforms are associated with increases in graduation rates, especially for students that live in poor and urban households.

Third, most countries in our samples switched in the late 1990s and early 2000s from a secondary school organized around one five-year cycle of five years to a system of two three-year cycles (lower secondary and high school). These changes are also associated with higher graduation rates.

38. In many countries, private schools are heavily subsidized from either the demand side (Chile) or the supply side (Argentina). This system of subsidies helps explain why an increase in public spending can lead to an increase in private school enrollment. Although this holds for most countries, there are a few exceptions. Costa Rica and Bolivia, for instance, have experienced large expansions of their public school systems, accompanied by contractions of the private provision of education, while Chile and Uruguay have seen the opposite (the private sector expanding and the public sector declining).

39. This decline is observed in most countries. In levels, though, the student-teacher ratio in the region doubles that of top countries and also shows great heterogeneity, ranging from twelve students per teacher in Argentina to thirty-one in Nicaragua.

40. We only use this variable in column 2 because the data are available for a subset of the countries/years in the sample.

Challenges: Glass Half Empty

A secondary school diploma is an essential requirement for entering today's highly competitive labor market. Although the region experienced important improvements in educational outcomes during the last two decades, fueled by both labor market incentives and policy changes, it still faces big challenges in order to catch up with developed economies. Graduation rates are still low when compared with more developed regions; there are large educational achievement gaps within countries; and Latin American students rank in the lowest percentiles of international tests such as PISA.

Low and Heterogeneous Graduation Rates

Secondary school graduation rates in most developed countries are above 70 percent. Table 8 presents educational outcome statistics for the late 2000s. Latin America still records a low secondary school graduation rate: only 45 percent of the secondary-school-aged students actually graduate on time, and among those that start secondary school, only 60 percent finish. Chile is probably the only country with graduation rates that are currently similar to more developed economies. In most other countries, graduation rates are much lower. Fewer than one in three students graduate on time in Costa Rica, Guatemala, Honduras, Nicaragua, and Uruguay.

Problems start early on in primary school and in the transition to lower secondary school. On average, only 69 percent of secondary-school-aged children and about 85 percent of children who finished primary school are enrolled in secondary school. In other words, a first challenge for Latin American countries is to improve educational outcomes in primary school, mainly by reducing overage, and to capture a larger proportion of students that do finish primary school but never make it to secondary. This is true for most countries, but it is especially important for Guatemala, Nicaragua, and Honduras.

Second, dropout and overage rates among those that enroll in secondary school (that is, conditional rates) are relatively high: 15 and 13 percent, respectively. About one in three students who starts secondary school does not graduate on time. Thus, a second challenge for the region is to improve graduation and on-time grade promotion among those who do start secondary school. Needless to say, promotion and graduation require learning, so it is important to identify interventions that help struggling students keep up with their peers.

Table 9 shows gaps in graduation rates. Differences in graduation rates are typically larger by income than by location (urban-rural gap), and the

TABLE 8. Secondary School Educational Outcomes: Late 2000s[a]

	Enrollment		*Graduation*		*Dropout*		*Overage*	
Country	*Unconditional (1)*	*Conditional (2)*	*Unconditional (3)*	*Conditional (4)*	*Unconditional (5)*	*Conditional (6)*	*Unconditional (7)*	*Conditional (8)*
Argentina	0.77	0.88	0.56	0.67	0.22	0.12	0.11	0.12
Bolivia	0.82	0.94	0.60	0.69	0.17	0.06	0.09	0.10
Brazil	0.55	0.90	0.45	0.78	0.43	0.10	0.09	0.11
Chile	0.87	0.94	0.74	0.80	0.13	0.06	0.08	0.08
Colombia	0.73	0.90	0.47	0.59	0.25	0.10	0.17	0.20
Costa Rica	0.66	0.85	0.30	0.44	0.34	0.15	0.22	0.27
Dominican Republic	0.78	0.92	0.50	0.60	0.21	0.08	0.12	0.13
Ecuador	0.83	0.90	0.61	0.67	0.17	0.10	0.05	0.05
El Salvador	0.60	0.79	0.39	0.55	0.37	0.21	0.11	0.11
Guatemala	0.41	0.68	0.14	0.30	0.54	0.32	0.16	0.18
Honduras	0.50	0.65	0.25	0.45	0.46	0.35	0.23	0.24
Mexico	0.70	0.77	0.42	0.50	0.29	0.23	0.07	0.07
Nicaragua	0.49	0.74	0.28	0.49	0.47	0.26	0.15	0.16
Panama	0.73	0.85	0.49	0.61	0.26	0.15	0.12	0.12
Peru	0.80	0.92	0.64	0.78	0.20	0.08	0.09	0.10
Paraguay	0.62	0.79	0.48	0.68	0.37	0.21	0.06	0.06
Uruguay	0.72	0.82	0.28	0.35	0.28	0.18	0.16	0.18
Venezuela	0.80	0.92	0.56	0.67	0.19	0.08	0.12	0.12
United States	0.92	0.97	0.87	0.92	0.08	0.03	0.03	0.03
United States (Latino population)	0.91	0.97	0.83	0.88	0.09	0.03	0.04	0.04
Regional average	0.69	0.85	0.45	0.60	0.30	0.15	0.12	0.13
Weighted regional average	0.66	0.86	0.47	0.65	0.33	0.14	0.10	0.11

a. Computations are based on the population from the secondary school starting age to the secondary school finishing age. Enrollment, graduation, dropout, and overage rates (both conditional and unconditional) are computed following the definitions shown in table 1. The figures for the late 2000s are computed for 2005–10.

TABLE 9. Graduation Gap in Late 2000s[a]

	Female-male		*Urban-rural*		*Quintile 5-quintile 1*	
Country	*Unconditional (1)*	*Conditional (2)*	*Unconditional (3)*	*Conditional (4)*	*Unconditional (5)*	*Conditional (6)*
Argentina	0.12	0.10	—	—	0.26	0.20
Bolivia	–0.02	–0.02	—	—	0.31	0.32
Brazil	0.13	0.06	0.27	0.19	0.54	0.34
Chile	0.06	0.05	0.11	0.11	0.27	0.25
Colombia	0.07	0.05	0.32	0.29	0.44	0.39
Costa Rica	0.08	0.07	0.12	0.09	0.26	0.24
Dominican Republic	0.18	0.15	0.18	0.15	0.35	0.30
Ecuador	0.05	0.05	—	—	0.35	0.32
El Salvador	0.04	0.04	0.30	0.27	0.42	0.38
Guatemala	0.03	0.08	0.15	0.15	0.31	0.36
Honduras	0.07	0.06	0.26	0.20	0.45	0.42
Mexico	0.07	0.06	0.18	0.15	0.27	0.22
Nicaragua	0.10	0.10	0.26	0.19	0.30	0.27
Panama	0.13	0.13	0.28	0.20	0.43	0.34
Peru	0.03	0.04	0.35	0.26	0.46	0.35
Paraguay	0.08	0.06	0.32	0.29	0.36	0.25
Uruguay	0.13	0.13	—	—	0.38	0.35
Venezuela	0.14	0.11	—	—	0.12	0.08
United States	0.04	0.04	0.01	0.01	0.15	0.12
United States (Latino population)	0.05	0.04	0.01	0.00	0.18	0.15
Regional average	0.08	0.07	0.24	0.19	0.35	0.30
Weighted regional average	0.10	0.06	0.25	0.19	0.40	0.30

a. Computations are based on the population from the secondary school starting age to the secondary school finishing age. Enrollment, graduation, dropout, and overage rates (both conditional and unconditional) are computed following the definitions shown in table 1. Rural-urban and male-female are identified by data provided in each survey. Income quintiles are constructed using household wages from primary and secondary activities.

latter are larger than the gender gaps. Females have 8 percent higher graduation rates than males, on average. This is a large gap considering that the average graduation rate is 45 percent. This gap is relatively homogeneous in the region, with Argentina, Brazil, Dominican Republic, Panama, Uruguay, and Venezuela presenting larger gender gaps. The urban-rural graduation gap is much more significant: individuals living in urban areas have 24 percent higher graduation rates than those living in rural areas. Regional gaps are larger in Colombia, Paraguay, and Peru. Finally, children living in households in the fifth (highest) income quintile have 35 percent higher graduation rates than those living in households in the first (lowest) income quintile.[41]

Low Quality of Education

As has been largely documented,[42] students in Latin America perform very poorly on international standardized tests. An example of this was the region's performance in the 2009 PISA. Eight Latin American countries took the test. Table 10 shows the results for 2000 and 2009 and presents gender, regional, and income gaps for 2009. The results correspond to each country's average score on math, reading, and science, and the values are standardized to have a mean of 500 (which is the mean for the OECD countries) and a standard deviation of 100. Chile and Uruguay had the highest scores in the region, while Panama and Peru had the lowest. However, Latin American countries' scores were well below the OECD average and in the lower third of all the participating countries.[43] Not even high-income students' performance was close to the OECD standards. In addition to the overall bad results, there are also big gaps within countries: males performed slightly worse than females, students in rural schools worse than those in urban schools, and poor students worse than relatively rich students.

Hanushek and Woessmann argue that the low quality of education in Latin America is a fundamental factor for explaining why the region has underperformed in terms of growth relative to countries that were similar or poorer in 1960: "In simplest terms, while Latin America has had reasonable school

41. Cruces, Domench, and Gasparini (2012) also find evidence of big income gaps in years of education, school enrollment, wage-skill differential, public social expenditure, school segregation, school achievement, and other issues.

42. See, for example, Bassi and others (2012); Levy and Schady (2013).

43. Bassi and others (2012).

TABLE 10. PISA Results[a]

	Overall		Gender (2009)		Regional (2009)		Income (2009)	
Country	2000[b] (1)	2009 (2)	Female (3)	Male (4)	Rural[c] (5)	Urban (6)	Quintile 1 (7)	Quintile 5 (8)
Argentina	400.7	395.7	400.9	389.7	376.9	421.4	350.0	442.8
Brazil	401.7	401.0	402.5	399.3	390.0	413.5	371.3	435.7
Chile	403.0	439.3	438.0	440.6	422.2	449.9	414.4	478.0
Colombia	381.0	398.6	391.6	406.3	381.8	417.2	362.4	441.2
Mexico	410.3	419.9	420.7	419.1	397.9	446.5	391.2	455.9
Panama	—	368.8	373.7	363.8	347.0	416.7	334.6	406.4
Peru	317.3	368.1	368.1	368.0	336.3	420.2	310.3	429.5
Uruguay	431.0	426.6	431.4	421.2	412.0	445.5	392.6	461.7
United States	498.7	496.4	494.8	497.9	500.4	490.1	461.8	525.2
Regional average	392.1	402.2	403.4	401.0	383.0	428.9	365.9	443.9
Weighted regional average	392.7	404.4	404.9	403.8	387.6	425.0	371.4	443.1

a. The reported values are the average of the math, science, and reading scores. The average score for the OECD in 2000 was 500, and in 2009 it was 498. Scores were calculated using the final student weights of the PISA database.

b. In Colombia, 2006 was used instead of 2000; in Uruguay, 2003 was used as 2000 values. For Panama, the first available PISA test is in 2009, so no earlier value is presented.

c. The rural variable does not exist in the PISA database, so we constructed it using the size of the village and the number of nearby schools.

attainment, the skills of students remain comparatively very poor."[44] Educational policy seems to have emphasized increasing access to education rather than increasing the quality of education. Moreover, secondary school education not only is of low quality, but also provides a set of skills that are not necessarily those demanded by the labor market.[45] Indeed, increasing the quality and pertinence of education can also be a strategy for increasing graduation rates by making school more attractive to students who will find it useful when they enter the labor market or choose to continue studying.

Conclusion

In this paper, we document the main patterns in secondary school graduation and dropout in Latin America for 1990–2010. We find that enrollment and graduation rates increased in that period, while dropout decreased. We provide several explanations for these patterns: countries have implemented

44. Hanushek and Woessmann (2012).
45. Bassi and others (2012).

policies to help students stay in school, and returns to secondary education increased over the 1990s, providing economic incentives to stay in school. Despite these positive changes, graduation rates are still low, and there are important inequalities of opportunities observed across income quintiles, gender, and regions within countries. In addition, the quality of education is low in the region. It is likely that that higher coverage and low quality are related, since the marginal student is probably more disadvantaged than students who are already in school. This poses new challenges to secondary schools that increasingly have to work with students of more heterogeneous backgrounds and who also are more likely to drop out. These challenges should be addressed if graduation rates are to continue increasing in the region. Identifying patterns, their explanations, and the main challenges constitutes a first step in that direction.

Providing policy advice on how to improve educational outcomes in the next decade is beyond the scope of this paper. Several recent meta-analyses discuss evidence-based education interventions aimed at decreasing dropout and improving learning. Furthermore, some early-identification and intervention systems have been identified to help middle-grade schools combat student disengagement and thereby increase graduation rates in the United States.[46] Other experiences in developing nations aim to get children into school and keep them there.[47] Finally, an immense number of pilot programs and interventions have been launched to improve learning in developing countries. McEwan identifies 110 school-based treatments to affect language and mathematics test scores.[48] He finds that nutritional treatments, treatments that provide information to parents or students, and treatments that improve school management and supervision had small effects. The largest effects came from treatments with instructional materials, teacher training, instructional technology, smaller classes, smaller learning groups within classes, and student and teacher performance incentives. Finally, an important supply side constraint faced by the region seems to be the teachers. Levy and Schady argue that quality of teachers in the region is relatively low.[49] Mizala and Ñopo show that teachers earned lower wages compared to other professions within the same country and also have fewer human capital requirements.[50]

46. Balfanz, Herzog, and MacIver (2007).
47. Petrosino and others (2012).
48. McEwan (2013).
49. Levy and Schady (2013).
50. Mizala and Ñopo (2012).

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