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# Analyzing the Dynamics of School Dropout in Upper Secondary Education in Latin America

## A Cohort Approach

*Raja Bentaouet Kattan*
*Miguel Székely*

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## Abstract

This study examines trends in school dropout at the upper secondary education level across Latin America over the past two decades, and attempts to identify factors influencing these rates. The methodology contributes to the existing literature by employing repeated cross sections of data to track the life cycle path of representative groups of individuals belonging to a birth cohort, by constructing and analyzing a synthetic data base of household survey data from 18 countries. A key finding is that while upper secondary enrollment rates increased in the region, the proportion of upper secondary age youth dropping out of school has remained persistently high, despite relatively favorable macroeconomic conditions. Furthermore, the study traces the moment in the life cycle at which the majority of dropout takes place to reveal differences between countries. Finally, to explain the trends in upper secondary dropout rates, the study examines the impact of three groups of factors: (i) shifts in the cohort size and socioeconomic composition of the population eligible for entering upper secondary education; (b) the macroeconomic environment and labor market opportunities; and (c) the returns to schooling. A series of regressions shows that an important factor that may be driving higher dropout levels has been the higher numbers of students from poor socioeconomic backgrounds reaching the upper secondary level. In addition, high returns to education have been a pull factor into the schooling system, while, especially in countries where the majority of youth dropout early (prior to upper secondary education), the data confirm an apparent substitution effect due to the opportunity cost of forgoing employment opportunities. Overall, the findings confirm the importance of policy makers' focus on upper secondary education across Latin America and suggest implications for focusing the policy agenda.


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# Analyzing the Dynamics of School Dropout in Upper Secondary Education in Latin America: A Cohort Approach

**Raja Bentaouet Kattan**

**World Bank**

**Miguel Székely**

**Center for Education and Social studies, Mexico City**

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## Introduction

Across Latin America, the greatest dropout rates in the education systems occur at upper secondary education (USE). Around one in every three youth in the region do not reach this level at all, and about 45 percent of those that enter do not graduate (Székely and Karver (2014)). These low enrollment, retention and graduation rates from USE are growing concerns. While policy makers prioritized expanding coverage of primary and lower secondary (LS) schooling during most of the 20th century, they are now turning to the USE level which, along with the issue of low quality of basic education, seems to be the major educational challenge facing the region at the outset of the 21st century.[1]

Having large numbers of adolescents out of school has important consequences. First, early dropout limits the skill sets of new generations entering the work force, which affects both current productivity levels and a country's future capacity for facing later phases of the demographic transition when dependency rates start to rise. In addition, USE age adolescents are exposed to a series of risks that are more difficult to address when populations are out of school.[2] Furthermore, during adolescence an individual's personality aspects (including planning capacity, organizational skills, and decision making capabilities, among others) are still developing, so exiting the school environment prematurely can hinder their development.[3]

Despite the importance of this issue, the literature on the causes behind the relatively low enrollment and high dropout rates in USE in Latin America is not abundant.[4] The literature often either looks at trends in dropout but not the reasons behind it, or delves into the reasons but focuses only on a single country. Related studies with an LA regional perspective include Wolff and de Moura (2000), Cabrol (2002), De Ferranti, et.al (2003), Cuadra and Moreno (2005), Reimers (2006), Behrman, et.al. (2006), Di Gropello (2006), Duryea, Lam, and Levinson (2007), Aedo and Walker (2012), Alfonso, et.al. (2012), Bassi, et.al. (2013), and Székely (2014), all of which analyze schooling trends for USE and other levels, but which do not attempt to explain the dropout phenomenon explicitly, nor the trends observed during the past decades.[5]

[1] Increased priority is apparent in the official 2021 targets in Upper Secondary attendance rates set by countries in the region (OEI (2010)), as well as UNESCO's roadmap for education reform (2005). Outside the region, this topic is also a concern, as shown by Heckman and Lafontaine (2010) and Murane (2013) for the United States.

[2] Risks related to adolescence include issues such as teenage pregnancy, addictions, exposure to violence, and crime, among others. Relevant publications addressing this include Cunningham, et al. (2008), Rodriguez (2010), World Bank (2005, 2012), Duryea, et al. (2003), Heller, et.al. (2013), and Bentaouet Kattan and Székely (2014).

[3] Duryea, et.al (2003) and Spinks (1993), among others, illustrate this clearly.

[4] There is considerable international literature on the subject. Recent work by Murane (2013), for example, analyzes the stagnation in USE graduation rates in the United States and summarizes a large number of relevant studies. The author identifies factors affecting USE school attendance ranging from the supply and quality of services, to access to economic resources, to the family environment at birth and early childhood, to risk exposure, etc.

[5] Examples of specific country studies are Blinder (1999) and McKenzie (2003) who measure economic contraction's effect on Secondary enrollment in Mexico; Schady (2004), Funkhouser (1999), and McIntyre and Pencavel (2004) that analyze similar effects for Peru, Costa Rica, and Brazil, respectively; Duryea and Arends-Kuenning (2003) examine labor market opportunities and school attendance at USE entry age in Brazil; Berlinski, et.al. (2008) analyze

This paper seeks to contribute to filling this gap. In particular, this study analyzes why, despite a favorable macroeconomic environment since the turn of the century— characterized by high real gross domestic product (GDP) growth rates, significant declines in poverty, and reductions in income inequality— the proportion of youth exiting school during USE age remains high, and seems to have become a "bottleneck" for further education expansion in Latin America.[6]

Specifically, we explore the influence of three potentially important factors that could help explain the persistently high USE dropout rates in LA: i) the socioeconomic composition of the population eligible for entering USE, ii) the macroeconomic environment, particularly employment opportunities for youth entering working age, and iii) the value placed on different education levels in the labor market as measured by the returns to schooling (which could also be a proxy to education relevance).

The methodological approach used to examine the role of these factors is to construct a synthetic panel from 234 cross sections of household survey data, from which we follow schooling trajectories of different generations of individuals observed at different points in time. These trajectories are then related to the conditions characterizing the environment during the time when school enrollment decisions were being taken, which allows for an innovative perspective compared to more traditional analysis of the dropout phenomena from snapshots of cross sections of data focusing on a particular age group over time and the context at the moment of observation. The cohort approach allows us to follow life-cycle trajectories that relate more closely to the real dynamic decisions of households and individuals.

The paper is divided into 5 sections. Section 1 presents the data and main stylized facts of USE dropout at the regional level. Section 2 examines differences in youth school trajectories at the country level. Section 3 describes the three groups of potential factors of influence described above (composition of new entrants, income and employment opportunities, and perceived returns to schooling). Section 4 presents our econometric estimates of the relation between these factors and USE school dropout. Section 5 concludes and discusses policy implications.

# 1. Data and general stylized facts

## 1.1 Data and approach followed for analyzing the dynamics of USE dropout

Several studies have documented the low attendance and graduation levels for USE in LA. The most recent of these agree that on average around the year 2010, between 64 and 68 percent of USE age adolescents attended school in the countries in the region, and graduation rates from this

pre-school attendance and future education outcomes in Uruguay; Maluccio, et.al. (2008) measure early nutrition's effect on future school performance in Guatemala; and Bentaouet Kattan and Székely (2014) examine the relation between youth risks and elements of the macroeconomic context and USE attendance in Mexico.

[6] These trends are documented by SEDLAC (2010), Levy and Schady (2013), and López Calva and Lustig (2010). Growth statistics are from the most recent World Development Indicators (WDI).

level reached between 45 and 48 percent of USE age youth.[7] These USE completion rates are well below the average for OECD countries, of around 84 percent in 2009 (see OECD (2011)). While USE attendance rates are clearly related to household and individual decisions made at USE ages, they are also a consequence of early life events that influence both the probabilities of LS completion and of accessing and completing USE.[8] This implies that in order to better understand the dynamics of USE, it is necessary to go beyond a snapshot –or even series of snapshots taken at a certain age -to more comprehensively view earlier schooling trajectories. To do so empirically, having panel data following specific individuals at stages of their life cycle during which they take USE attendance decisions, and also during previous stages would be ideal. Unfortunately, these kinds of data are not widely available in LA.[9]

An alternative approach in the literature of life cycle choices has been to use repeated cross sections of data—typically from household surveys— to track the life cycle path of representative groups of individuals belonging to a birth cohort.[10] As noted by Verbeek (2008), the main limitation of these types of data is that they follow groups of representative individuals rather than the same individual over time. When the within cohort variance of the variable under analysis is low this may be of less concern since the average will be close to what is observed in individual observations. However, when high variability is observed, the cohort average will reflect individual cases to a much lower extent. Two advantages of using repeated cross sections, however, are that they minimize attrition biases and problems of non-response that are common in true panels, and when surveys are nationally representative averaging across cohorts likely reduces idiosyncratic measurement error and heterogeneity (Attanasio & Banks, 1998).

Repeated cross sections were selected as an adequate empirical option for the present study, since in LA enough household surveys covering long time spans are available to allow us to follow a cohort from its entry to primary, at ages 5-6, until its exit from USE age (around age 18). These surveys provide information on each generation's schooling history as well as the extent of dropout specifically at USE.[11] Furthermore, as opposed to official education administrative records, such

7 See Alfonso, et.al. (2012), Bassi, et.al. (2013), and Székely (2014)

8 See Grantham-McGregor et al. (1999), Schady (2012), Case and Paxon (2008), Paxon and Schady (2007), Cunha and Heckman (2007), Cunha, etal. (2006), Heckman (2006a, 2006b, 2006c), Heckman (2007) and Heckman (2008), Vegas and Santibañez (2010), and Kundsen et al. (2004), which measure the effects of events occurring early in life on future education and other outcomes.

[9] Several countries collect panel data for labor market surveys, but typically follow individuals for a reduced time, which does not allow for the longer term perspective we require. Administrative records from education sectors are not suited for a dynamic approach since they only register information on individuals in the schooling system.

[10] This approach was proposed initially by Browning, Deaton, and Irish (1985) for analyzing other outcomes that are expected to vary throughout the life cycle, such as savings, but has been used in other contexts due to its richness. Shorrocks (1975), Moffit (1993), Deaton (1997), and Attanasio and Banks (1998) are some of the first to use this technique in the context of the analysis of savings. Recent applications to other areas include Dang, et.al. (2012), Cruces, Fields and Viollaz (2013), and Székely and Karver (2014).

[11] Two problems of this type of cohort analysis are differential mortality and migration. (i) If mortality and schooling are correlated, estimated changes in attendance rates could be upward biased – (e.g. if mortality among less educated youth is greater than among more educated individuals in the same cohort due to greater risk exposure). Deaton and Paxson (1998) and Attanasio and Hoynes (1998) attempt some corrections to similar data and argue that such effects

surveys include those who have left the education system. Finally, having enough cross sections (as is our case), permits statistical and econometric analysis of the relation between a series of factors and the variables of interest, as in Section 4.

We construct our data set using micro data from 234 cross sections available for 18 LA countries spanning from 1980 to 2012, from which schooling indicators representative of more than 96 percent of the population of the region can be constructed. Nine percent of the surveys are for 1980-1989, 31 percent for 1990-1999, and 60 percent for the 2000-2011 period. Appendix Table A.1 identifies the number of surveys and years available for each country. The surveys are representative of the total population of each country, with the exception of Argentina and Bolivia for surveys prior to the 2000s and Uruguay, where the samples are for urban areas only.

Since each country produces data in different years, formats, computing codes, questionnaires and definitions, we used the micro data to standardize relevant indicators and produce a comparable data set within countries, and across countries and years. Our homogenization process considers each country's different age requirements for attending each education level. We follow UNESCO's ICSED 1997 classification when available, which identifies the official age at which youth should be in the schooling system, by education level, and official local data elsewhere.[12] Most countries organize their education system in four different levels: pre-primary, primary, lower secondary, upper secondary, and higher education –some countries like Peru do not distinguish between lower and upper secondary.

We find that the greatest variety in arrangements is precisely for USE (Appendix Table A.2). Official USE attendance ages are from 15 to 17 in 9 of the 18 countries analyzed (Argentina, Costa Rica, Ecuador, Honduras, Mexico, Panama, Paraguay, Uruguay, and República Bolivariana de Venezuela), with a typical duration of 3 years and early graduation options in some cases. Entry is also at age 15 in Colombia and Peru, but with a shorter duration of 2 years. In Bolivia, Chile, and the Dominican Republic USE lasts 3 years, but has an earlier entry (age 14). The oldest entry ages are at 16, (in Guatemala, Nicaragua, and El Salvador), with duration of 2-3 years. Uniquely, in Brazil USE starts at age 15 but lasts 4 years. So, through our standardization process, we adjust the information to define the age at which adolescents are expected to be enrolled in USE.

The micro data also permits us to address how enrollment and graduation rates are defined. As illustrated by Heckman and Laffontaine (2007) and Murane (2013) levels and changes in these

can be significant. However, since our life cycle window of interest is relatively short and focused at early ages, we expect these effects to be small in our analysis. (ii) Differential immigration or migration associated with schooling can also introduce biases. Large inflows of low educated individuals in young cohorts can affect composition by underestimating schooling levels, and vice versa. Additionally, if migration and schooling are positively correlated, a positive composition effect will lead to over estimation of attendance and graduation. We lack historical data on migration flows to assess the magnitude of this bias, but do not expect these potential changes to affect our results significantly since our analysis focuses on relatively young ages that are less prone to migration, as well as a relatively short period of the life cycle.

[12]ICSED definitions can be found at http://www.uis.unesco.org/Education/ISCEDMappings/Pages/default.aspx.

variables can vary considerably depending for instance on how data of specific subgroups are treated. For our purposes, we are able to be totally explicit about the different definitions that are used, and we are able to use only those that are comparable across countries and over time.

### 1.2 General stylized facts emerging from the data

Our synthetic panel constructed from the household survey database illustrates the average evolution of school enrollment patterns for four different generations over time in LA, spanning a period of 15 years, from USE age entrants around 1995 to entrants around 2010 (Figure 1).[13] Based on available data, some youth are seen during their full schooling trajectory (such as the middle two lines) while some are observed during the first and last segments, respectively. Thus, the novelty of the present analysis is that it uses a dynamic approach by following the same group of individuals over time, rather than observing snapshots of different generations observed only at a particular age, as in other studies.

The first generation included (Cohort 1), was born between 1980 and 1982 and reached primary age around 1985-1987 and average USE age between 1994 and 1996. Cohort 2 is observed at USE age 5 years later between 1999 and 2001, while Cohorts 3 and 4 are observed also at 5 year intervals at USE age during 2004-2006 and 2009-2011, respectively.

The data show that 56 percent of individuals in Cohort 1 were enrolled in school at age 15, while the rate is 83 percent for Cohort 4 born 15 years later. This shows that a higher proportion of youth remain in school at USE entry age in LA during the 2010s as compared to generations entering this age around 1995. In addition, 70 percent of Cohort 4 remains in school at USE exit age 17, considerably higher than the 46 percent for Cohort 1. This reveals a considerable expansion in education coverage for adolescents across the region during these years.

When comparing transitions from LS to USE, however, the panel approach, which offers an additional view on each cohort's dynamics (equivalent to the slope of each curve), reveals little progress. Here we compare the exit rate from schooling across different ages for each generation. For Cohort 1, 72 percent were still in school at LS entry at 12-13 years of age. However, at the USE exit age of 17 only 46 percent remains. Thus, there is a decline in enrollment of 26 percentage points. For the cohort born 15 years later enrollment rates at age 12 reach 93 percent, but there is again a significant drop — at USE exit age only 70 percent remain in school, which implies a reduction of 23 points, very similar to the decline observed 15 years earlier. The primary difference is that a significantly higher proportion of youth remain in school at age 12 –with an increase of practically 20 percentage points in attendance rates. Therefore, we find little progress in reducing

[13] Since our household survey data base generates an unbalanced panel of countries and years due to differences in timing of the surveys we compute averages by interpolating values for each country between each two points in time for which there is data. The averages are not population weighted, although a very similar picture emerges when using population weights.

drop out from the schooling system during the years under analysis –in both cases, practically 1 out of every 4 youth drop out between LS entry and USE exit age.

Comparison with Cohorts 2 and 3 is also of interest. The difference in the slope between Cohort curves 1 and 2 is greater at ages 12-14, when individuals are typically expected to participate in LS, than at USE ages 15-17. This suggests that while USE enrollment rates increased between the mid-1990s and 2000, USE dropout rates also increased in this period. Similar trends are observed comparing Cohort 2 with the generation born 5 years later, although a smaller difference in slopes indicates smaller variations in dropout rates. Finally, comparing Cohorts 3 and 4 reveals increases in enrollment at all ages and a decline in dropout rates –shown by the greater upward change in the slope of the curve for Cohort 4 for ages 15-17. However, the slope of Cohorts curves 1 and 4 for the relevant 12 to 17 years of age transition remain very similar.

The focus of the present analysis is precisely on examining why, in spite of the change in enrollment levels, dropout rates from the schooling system remain between 23 and 26 percentage points when individuals transit from LS to USE, and during USE. More precisely, the objective is to understand why dropout rates at USE age actually increase. We find that dropout rates between ages 12 and 14 decline by 11 and 7 points, respectively, between Cohorts 1 and 4; dropout during the transition from LS exit to USE entry is reduced also from 5 to 3 points across the same generations; but exit rates from the schooling system for the 15-17 years age group year olds increases from 10 to 13 points between the cohorts entering this level around 1995 as compared to those reaching the same point 15 years later at around the year 2010 (Figure 1).

In Figure 2, the average enrollment rates for individuals at USE age for Cohorts 1, 2, 3 and 4 are presented –rather than the complete schooling trajectories in Figure 1. While the increase in total enrollment is still apparent, a considerable share of USE age youth enrolled in LS or primary throughout the period is also observed. Additionally, only a small decline in attendance from 27 to 25 percent for cohorts going through USE age during the mid-1990s (Cohort 1) is observed, as compared to those going through the same stage around 2010 (Cohort 4). The persistently high over-age rates might be one of the factors behind the considerable drop out observed.

Examining trajectories for males and females separately we find that, while females' school enrollment rates were below those observed for males at ages 12 to 17 for Cohort 1, in the case of Cohort 4, this is reversed (Figure 3). This is in line with the greater expansion of education coverage for females than for males in most LA countries since the end of the 1990s. As in the case of the overall population, the most salient feature is that the slope of the curves after age 12 remains similar for both cohorts for both gender groups, which confirms the stylized fact of persistently high dropout rates at USE ages during the course of 15 years. The results show slight decreases in dropout rates during LS ages and at the transition between lower and upper secondary ages as in Figure 1, but the small increases in drop out at USE cancels them out.

### 1.3 Age, cohort and time effects for secondary school enrollment

We construct 144 cohort trajectories for the 18 countries included in our data base, and each cohort is observed at different lengths during different years (depending on the surveys available). Our data base includes observations starting in 1980, so the oldest cohorts for whom a full trajectory can be followed from the first year of school age into adulthood are those born in 1974-1976. These individuals can be observed until they are about 34 to 36 years old by 2010. Cohorts born during the 9 previous years are observed first in 1980 when they are already of late primary or LS age and we can trace their education choices from the ages of 15-17 onwards.[14] The youngest cohorts in our analysis are those born between 1994 and 1996 and expected to enter primary during 2000-2002. We can follow them up to the age of attending USE around 9 years later. The cohort trajectories constructed with our data reveal that school enrollment rates decline fastest in a critical period between ages 15 and 20, where attendance rates drop from around 80 to 40 percent (Figure 4). After age 20 cohort trajectories decline more smoothly and reach levels below 10 percent at around age 25.

Figure 4 allows observing several sources of variation. The first is differences across cohorts. Such "cohort effects" reflect different structural conditions for different generations. For the cohorts that start being observed at around age 12, generations show significantly lower attendance levels of around 70 percent compared to the group with the highest rates of about 90 percent. The change in attendance levels between the school attendance trajectories in Cohorts 1, 2, 3 and 4 would belong to these types of effects, which tend to apply to all individuals in one cohort as compared to another (Figures 1 and 3).

The second is variations along the life cycle of each cohort. The declining trend in school attendance that is observed as all cohorts age is normally classified as an "age effect." The inverted "u" shape patterns in school attendance observed are a good illustration of this.

A third source of variation is "time effects," which correspond to shocks that can affect school attendance choices irrespective of an individual's age or cohort. An economic crisis or a natural disaster that alters the expected age pattern of school attendance and that affects all cohorts in a country would be examples. These effects, however, are not immediately apparent in our data.

Several authors have attempted to identify the aforementioned age, cohort, and time effects separately for analysis of the dynamics of saving over the life cycle.[15] Following Székely and Karver (2014) we adapt this approach to identify patterns of time-use choices, and in particular, school attendance trajectories among youth. The logic behind estimating age, cohort, and time effects is simpler than in the case of household savings since we are dealing with indicators that are binary rather than continuous, and that follow a very different (and less complex) underlying

[14] Cohorts born earlier will start being observed when they are already 18 years of age or more, so the information on their trajectories is beyond the scope of our analysis.

[15] See Attanasio (1993), Attanasio & Banks (1998), Attanasio (1998), and Attanasio and Székely (2001).

investment model. For example, while savings may fluctuate greatly throughout the life cycle, the decision of when to leave school usually occurs before the age of 25.[16]

Age, cohort and time effects for school enrollment at the regional level are examined in Figure 5. Estimated age effects show a steep life cycle trajectory of decline in school attendance between ages 12 and 20 (Panel A). Cohort effects show a positive trend, with each cohort of youth achieving on average higher levels of enrollment than their predecessors (Panel B). Overall time effects were found to have a value of zero (Panel C).

## 2. Patterns of attendance and dropping out in 18 LA countries

### 2.1 Magnitudes of school dropout at LS and USE ages in Latin America

We present the base information to compare the evolution during the 2000s, by focusing on individuals in Cohort 2 that were at USE age around the years 1999-2001 (born during 1984-1986) and Cohort 4 that were at USE age by 2009-2011 (born during 1994-1996) (Appendix Tables A.3 and A.4). For each country we identify the official entry and exit ages for LS and USE in order to make the relevant comparison in each case.

For instance, in Argentina, 94 percent of individuals in Cohort 2 were enrolled in school at age 12, which is the official LS entry age (Table A.3). At the official LS exit age of 14 (observed two years later) 84 percent of those in the same cohort were still enrolled, while at age 15 –the official age for entering USE- 80 percent remained in the schooling system. Two years later individuals in this cohort are observed when they are 17 years of age –which is the age for exiting USE- and according to our data, 67 percent were enrolled. By comparing the percentage at each entry and exit point we would conclude that for this Cohort, 14 percent dropped out during LS age, 13 percent exit at USE

[16] To implement the identification procedure we compute the cohort median age. Since we are interested in cell means (which represent the proportion enrolled in school) we first consider our indicator of interest as a function of cohort tendencies and an error term, which allow us to decompose the variability of a given indicator for each individual in a given year-cohort. Following Attanasio (1993) for each individual *i* with a median age *a* in cohort *c* in time *t*, we consider the following: $X_t^{aci} = \delta_t^c + \varepsilon_t^{aci}$, where δ represents cell means (in our case, the proportion of individuals enrolled in school), and ε is a random error (deviations from δ) with the assumption that $E[\varepsilon] = 0$. Cell means are adjusted by cell size, such that cohorts with more individuals are weighted appropriately and $\delta$ is estimated as a simple weighted proportion of enrollment. Having postulated a typical age profile of schooling we can consider any deviations of these indicators in the aggregate as cohort effects, since they capture differences across cohorts that cannot be accounted for by differences in age –under the assumption of equivalent time effects across cohorts. These deviations could also be considered a combination of age and time effects, since what makes a group of individuals different, other than their age, is the time period in which they are being observed. Under the assumption that the $\delta_t^c$ represent cohort means for enrollment they can be expressed as polynomials in age, year of birth (cohort) and survey year (with constant $\alpha_0$). By taking the first differences of the polynomial we arrive at an equation that can be estimated to determine the shape of the age profile. Following Attanasio (1993), rather than estimating the equation directly, we smooth the cell means (that are essentially individual line plots per cohort) by regressing these cell means on a fifth order polynomial in age, c-1 dummies for each cohort, and t-1 dummies for each survey year, the latter constrained to sum up to zero and to be orthogonal to a linear (time) trend. The smoothed profiles assume that year effects are identical across cohorts. This would imply that all trends in the means can be interpreted as being the result of age and cohorts effects.

age, while overall, there is a decline of 27 percentage points in attendance rates between LS entry and USE exit ages.

For Cohort 4, in Argentina, it can be seen that the change in the proportion enrolled between LS entry and exit ages is of 9 points —5 point less than in Cohort 2— while it is of 14 points during USE –as compared to 13 points for Cohort 2 (Table A.4). The difference between enrollment at LS entry and USE exit age is 23 percentage points. Therefore, there is an overall reduction in dropout from 27 to 23 points, all of which is explained by the lower dropout at LS ages. Table 1 summarizes the changes across cohorts based on the data in Tables A.3 and A.4 for all countries. The first column presents the change in enrollment rates for LS for Cohort 2 while the second column includes the same change for Cohort 4. The following two columns present changes in enrollment at USE age and the final columns include the full LS entry to USE exit period.

In the case of LS age, with the exception of Bolivia, there is an important decline in school dropout across the region between Cohorts 2 and 4 (Table 1, columns 1 to 3). Costa Rica stands out with the greatest decline of 18 percent. On average, for the region as a whole, dropout at LS ages declines by 8 points during this period. However, in the case of school attendance during USE age the opposite pattern is observed, since 10 countries show increases in dropout when comparing Cohorts 2 and 4 (Table 1, columns 4 to 6). Chile stands out with the largest declines in school dropout in the region, with a 22 percent lower rate for Cohort 4 than for Cohort 2. On average the differences across countries cancel out, so at the regional level there is no change.

The fact that for a majority of countries in the region dropout at USE age increased and that in only 3 out of 18 – República Bolivariana de Venezuela, the Dominican Republic and Chile- is there a significant reduction, is the main stylized fact to be explored in the following sections. As mentioned, this result is of even greater interest in light of the positive macroeconomic environment observed during these years.

Finally, we summarize dropout rates by taking enrollment at LS entry and at USE exit ages as reference –that is, the full secondary cycle (Table 1, columns 7-10). The main result is that in all countries, except Guatemala, the decline in dropout at LS cancels out the increase during USE, resulting in lower dropout rates overall. At the regional level, the reduction by 8 points at LS age combined with no change for USE age results in an overall 8 percent decline.

### 2.2 Patterns of dropout across Latin America

The information on school trajectories can be used to verify the point at which dropout during the LS-USE span takes place (Tables A.3 and A.4) by comparing school attendance rates for each cohort observed at different ages. This is of interest since the policy approach for increasing school attendance in countries where youth leave school more prematurely (say, at early LS age) is not necessarily the same as that necessary for addressing school exit at later stages when students are of working and USE age.

Our main finding is that the relative importance of dropout during LS age declined from 38 to 25 percent during the 2000s, while the relative share of USE age dropout increased from 43 to 58 percent –dropout in transition between LS and USE remained fairly stable between 17 and 19 percent. This illustrates the rise in the importance of USE dropout throughout the region and justifies recent concerns about the USE level. On average, 25 percent of all dropouts observed in the region occur during LS ages, 17 percent are observed in the transition from LS to USE age, while the largest proportion of 58 percent occurs during USE ages (Table 2).

Using the differences in the proportions of dropout at different stages as reference we divide countries into three groups by using data from Cohort 4 (cutoffs are set by identifying concentrations of countries around similar patterns) –a similar pattern emerges when using Cohort 3 as reference.

Honduras, Colombia, Peru, Guatemala, Nicaragua and Costa Rica are classified as countries with *early* dropout, since they present the largest shares of individuals that exit school during LS ages (reaching levels between 32 and 45 percent), while relatively lower proportions (of less than half) of all dropout occurs during USE age. Bolivia, El Salvador, República Bolivariana de Venezuela and Mexico are classified as countries with significant dropout in *transition* from LS to USE ages. In these cases, atypically high proportions of between one fourth and one third of all dropout occur precisely during the stage when individuals in Cohort 4 evolve from LS exit age to USE entry age –Peru also shows high proportions of dropout in transition, although the proportion observed in the initial LS stage is even greater, which is why it is classified as "early dropout." Finally, Paraguay, Brazil, Chile, Panama, Ecuador, the Dominican Republic, Argentina and Uruguay are classified in the group of countries where most of the dropout rate is observed later during USE age. In these countries of *late* dropout on average 70 percent of those exiting school do so at USE age –Bolivia also shows a high proportion of 61 percent, but it is also the country with the highest share of dropout in transition so it is classified in the second group.

By examining cohort trajectories using these classifications (in the same way as explained in Section 1), several interesting comparisons across estimate age, cohort, and time effects emerge (Figure 6). (i) In the case of age effects (Panel A), countries with early dropout generally have the lowest attendance rates at all ages, followed by those classified as having high shares of dropout in transition. Additionally, higher proportions remain in school to around age 25 in the late drop out group. (ii) With respect to cohort effects (Panel B), there is a more pronounced positive trend for countries in the early dropout group, especially for cohorts born around 1985. The same holds true for countries with high shares of dropout in transition. For late dropout countries, cohort effects are much more modest, which suggests a generational convergence in school enrollment across the region. (iii) With respect to time effects, while at the regional level these effects are not apparent (Figure 5) for the early dropout countries, there is an important negative time effect in years before 2000 (Panel C). These countries in general register lower incomes, so negative macroeconomic conditions such as those observed during the late 1980s and 1990s decades could

lead to pressing demands to reallocate resources to short term priorities, and away from longer term investments such as in human capital and schooling.

## 3. Variables related to school dropout

Most of the discussion on the economic determinants of school enrollment has evolved around the human capital investment framework developed by Becker (1975).[17] Within this framework schooling (and other human capital) investments are made until the private marginal benefit of the investment equals its private marginal cost. The marginal private benefit depends on the expected private gains (e.g., in wages/salaries in labor markets, employment possibilities, access to higher quality jobs), while the marginal private costs include both the resources required for accessing the service (including transport costs, materials, tuition, etc.) and the opportunity cost of the time devoted to schooling.[18]

In the presence of credit constraints and imperfect insurance markets the investment decision will be restricted by family preferences, characteristics, current resources, and endowments through at least two channels. One is a direct effect that acts through limiting and making access to the resources needed for financing the private costs of schooling more costly, which implies that the poorer the household, the lower the investment in the human capital of its members even in the presence of high potential returns. Another includes indirect mechanisms that alter the marginal costs and benefits, such as the higher levels of risk aversion, scarcer information on labor market opportunities and schooling returns, insufficient means for dealing with unexpected shocks, and even higher discount rates, that characterize lower income households.[19]

Additionally, family characteristics, resources and endowments will interact with the household external environment to determine the final outcome in terms of schooling investments. For instance, economic conditions may change the returns to different kinds of schooling; they can alter opportunity costs through the general wage and employment levels, and can also modify the costs of access to education through altering the price of schooling differentially across families – for instance through expanding the supply of education services- among other effects.

[17] Developments derived from Becker´s original model include Becker (1991), Behrman, Pollak and Taubman (1982, 1995), Mulligan (1997), and Bourguignon (1998), among others. Murane (2013) discusses some other developments including differences in time preferences along the life cycle, peer group influences, and other relevant elements of the environment with which teenagers interact.

[18] For this study we consider the economic costs and benefits of education, although there are broader gains and costs involved in the decision of attending school. For instance, religious beliefs and cultural patterns may influence time allocations and therefore schooling decisions and can do so with large differences by gender. Additionally, the responsiveness of institutions that run the education system to household demands for schooling can have strong effects on schooling enrollments and attainment (see Engerman, Haber and Sokoloff (1998))

[19] Other channels are that children´s genetic endowments may interact with investment decisions (see Behrman, Rosenzweig and Taubman (1994, 1996)), and through their relation with cognitive and socio emotional skills acquired at young ages (see Heckman and Cameron (1998, 2001), and Cunha and Heckman (2007, 2008)).

The focus of the present study is on verifying the influence of three groups of variables, which could help explain why in the context of a more stable and favorable environment, dropout at USE attendance age has increased in the region. We start by looking into the evolution of cohort size and cohort composition, we then turn to the evolution of income and labor market conditions, and finally we document the trends in the returns to schooling in the region.

### 3.1 Cohort size and composition

First, we focus on verifying the extent to which increased primary and lower secondary (LS) graduation rates and the influx of previously excluded low income groups generate demand pressures that current USE systems have not been able to adequately absorb.[20] If the poor are more prone to drop out from school, their increase as a share of new entrants into USE could be translated into higher dropout. In addition, the demographic shift that most LA countries have experienced since the 1990s has generated the largest numbers of youth of upper secondary age ever observed, although with decreasing trends in recent years.[21]

In fact, as shown in IDB (2000) Latin America's accelerated demographic transition by the mid-20th century resulted in declining population dependency rates since the 1970s. The resultant shifts in the age structure could have affected school enrollment through various channels. On one hand, the reduction in the share of the 0-14 age group (considered economically dependent on working age adults) means more available resources per child. This in turn might increase LS enrollment and completion rates through an income effect, which would augment the number of individuals eligible (and the demand) for USE services.[22] On the other, the transition also implies shifts in the relative weight of the population at the USE ages of 15 to 17/18. Increases in the relative weight of this group would impose additional pressure on USE services, and vice versa. [23]

[20] According to the most recent WDI data, LA has universal primary school attendance, with completion levels close to 90 percent, and LS attendance over 90 percent. Alfonso, et.al. (2012) use household survey data and estimate similar attendance rates. Improvements in the region have been documented recently by Bassi, Busso, and Muñoz (2013). LS education has become compulsory throughout the region for youth aged 12-14 -with the exceptions of Honduras and Nicaragua, where Primary education is still the only compulsory level. In some cases, USE is also compulsory by law, including Argentina, Brazil, Chile, Mexico, Peru, Uruguay, and República Bolivariana de Venezuela (See OEI (2010)).

[21] This is documented in Behrman, Duryea and Székely (2006).

[22] As shown by Berlinski, Galiani and Manacorda (2008) greater enrollment rates even earlier in Preschool can have subsequent and growing effects on enrollment in LS and USE and on permanence in the education system.

[23] An additional trend accompanying the demographic transition in LA is urbanization, which may affect the incentives to invest in human capital through 1) shifting value of child labor in the move from agricultural activities on family farms to production structures associated with urbanization (in the latter the opportunity cost in terms of foregone labor activity to attend school declines), 2) lower typical costs of providing schooling in urban than rural areas, 3) higher typical expected returns to education in urban areas. As such, urbanization is expected to be positively associated with higher enrollment and attainment. Similarly improvements in health and nutrition may have impacts, as they can extend life expectancies, improve cognitive capacities and increase potential years of labor market participation, which in turn increase the returns to investments in schooling (see for instance Maluccio, et.al. (2006)). Thus, such improvements are expected to be associated with improvements in schooling attainment.

According to the most recent data available (from United Nations Population Statistics (2014)), up to the mid-1980s there is a bulge of historically large shares of the population in primary and LS ages (between about 6 and 15 years of age), which is followed by a similar bulge in the 15-20 age group –that includes USE ages- 10 years later (Figure 7). The 1990s and 2000s experienced declining weights in both groups, and after 2005, the faster declining trend in the 10-14 age group leads to a convergence pattern with similar proportions of about 10 percent of the total population being included in both groups.

The share of individuals that complete primary increases constantly from the 1960s to 2000, where it reaches more than 95 percent, and remains relatively stable thereafter (right panel, Figure 7).[24] The pattern for the share in each cohort attending LS is similar for 1960-1995, but accelerates considerably to the extent that by 2013 almost 90 percent of individuals in the cohorts of reference reach the LS level –as compared to only 60 percent by 1990. The net effect of the reducing share of 10-14 and 15-20 year old individuals and the increasing proportion completing primary is a considerable increase in the number of new USE age youth with the academic requirements for accessing LS (by around 17 million for the region between 1995 and 2010) and therefore, an increase in the potential demand for USE (lower panel, Figure 7).

As for results by country, in all but Brazil, Guatemala and Panama, a decline in the number of new entrants into the primary completion category reflects the large improvement in primary completion during the 1990s (Table A.5). The largest declines in additional entrants are observed in Chile and Uruguay, two of the countries in the later stages of the demographic transition in the region (the third column in the table displays the difference between the absolute number of additional individuals that completed primary schooling between 1990 and 2000 in the relevant age bracket, and the absolute number during 2000-2010).

For the 15-20 age group, which includes most of the USE age population in all countries, the number of potential USE entrants between the 1990-2000 and 2000-2010 periods increased for all countries. This implies that the reduced size of each new cohort entering USE age was compensated by the increases in the proportion with primary completion and LS attendance during these years, with the subsequent increase in the potential demand for USE services.

Another important shift is the composition of the population in the schooling system. If income and human capital investment are positively correlated, increases in the population attending school will most likely result in the entry of the lower income groups previously excluded. The

[24] These data were computed directly from the available household surveys. To obtain a wide time frame we exploit the fact that schooling normally takes place before age 25 and that the micro data identifies the year of birth of all individuals in each survey. For instance, for estimating Primary completion rates during the 1960s, we use household surveys close to the year 1995and identify individuals who are 45 years of age at that point, and who were therefore born around 1950. These individuals were going through Primary and LS ages during the 1960s, so we identify those that declare an education level equivalent or higher to complete Primary, as well as those that reached LS. The share of these individuals in relation to the total population of their cohort provides an estimate of the share belonging to both groups. The same is done for subsequent cohorts, using subsequent surveys.

composition effect influences overall school dropout rates by increasing the proportion of youth that are exposed to risks related to adolescence and unexpected income shocks, and that live in households with fewer means to address them. Furthermore, as explained by Murane (2013), lower incomes are usually associated with higher rates of time preference, and therefore, lower incentives to invest in longer term ventures such as the accumulation of human capital.

The analysis of household survey data confirms that the share of individuals in the bottom four deciles attending LS increased in many countries since 1990. At the regional level 31, 40, and 52 percent of individuals of LS age in these deciles attended LS around 1990, 2000 and 2010, which implies a substantial expansion of access (Table 4).[25] These trends suggest that there was a considerable expansion in the demand for USE services by lower income youth from 2000-2010. The extent to which these changes affect USE dropout will depend on education systems' capacity for absorbing larger groups of more vulnerable populations over time.

As shown by di Gropello (2006), the average cost per student in LA at the secondary level is 41 percent higher than the cost per student in primary, so the absorption capacity will depend on the extent to which countries are able to expand, or shift resources across schooling levels in favor of expanding USE, and on additional financing available for increasing service supply.[26] For example, one short term response can be to expand supply by increasing class sizes and using existing infrastructure. While this can initially enable higher enrollment, larger class sizes can be one of the influences reducing school quality and impact the expected returns to education, which can eventually reduce USE completion rates.[27] Thus, in the medium and longer run the capacity of USE to absorb the growing demand will also depend on the extent to which services can be expanded and adapted to new entrants' characteristics, which is a question to verify empirically.[28]

### 3.2 Macroeconomic and labor market environment

Two aspects of the region's macroeconomic environment that are also likely to influence school attendance decisions at USE ages are the greater income growth rates and higher economic stability during the 2000s. On one hand, higher income and wage levels would be expected to increase

[25]We report averages for the 3 years before and after 1990, 2000 and 2010 respectively since the availability of data differs by country. Table 4 uses household survey data to document this by reporting the share of individuals belonging to households in the bottom four deciles of the income distribution in each country and year, that are of LS age and that actually attended LS.

[26] The political economy aspects financing the expansion of USE in this context are examined by Poterba (1998).

[27] There is some controversy about the importance of class sizes (e.g., Hanuschek (1995), Kremer (1995), Hanuschek and Woessmann (2010) ). Two papers with evidence on the negative effect of class size on attainment are Angrist and Lavy (1999) and Krueger (1999). Lazear (1999) argues about why in equilibrium students may be selected so that true inverse effects of class size on student achievement are difficult to discern.

[28]Bassi, Busso, and Muñoz (2013) argue that increased public spending in education in LA led to a considerable expansion in services and coverage responsible to a large extent for the greater school enrollment in the region. They find that increased demand for education from higher LS graduation rates was absorbed by the expansion in the supply of USE services. Di Gropello (2006) estimates that the average magnitude of resources in LA and Asian countries that is needed for addressing greater USE demand currently is around 1.9 points of GDP, illustrating the magnitude of the challenge faced by the countries in the region.

household resources for investing in human capital, leading to greater school enrollment (a positive *income* effect). On the other, the same factor can generate incentives for leaving school before completing USE by increasing the opportunity cost for youth of staying in school (a *substitution* effect).

Economic growth rates after 2004 reach around 5 percent, compared to levels of around 3 percent during the 1990s –the only exception is the year 2009, which experienced negative growth in line with most of the countries in the world (Figure 8).[29] Assuming that schooling is a "normal" good, the higher household resources in the 2000s due to better macro conditions would be expected to lessen the capital market restriction and increase schooling investments in general, with an expected positive effect on enrollment through an income effect.[30] The countries with the largest differences in income growth across decades are Peru and Ecuador, with increases in the 2000s of 2.7 and 2.4 points above rates in the 1990s, followed by Panama, Colombia, Brazil and Paraguay, all with rates above 1.5 points (Appendix A.7). The income effect would thus be expected to be greater in these cases. At the other extreme, Chile and El Salvador register lower growth rates during the 2000s –of 2.5 and 2.3 points, respectively, while in Mexico and Guatemala a similar pattern is observed with differences of about 1 point. In these cases, the income effect would be expected to reduce school enrollment.

The panel also shows that the stability of the growth rate is higher during the 2000s especially after the year 2004 –the only exception is the aforementioned sharp contraction in 2009. The yearly inflation rate is also included in the first panel of Figure 8 as a measure of the stability of the macro environment with similar patterns of considerably higher inflation during the 1990s compared to the 2000s –again with the exception of 2008. With the exceptions of the Dominican Republic and República Bolivariana de Venezuela, inflation rates are lower in the 2000s than in the 1990s, with the largest declines in Colombia, Ecuador, Honduras, Mexico, and Uruguay (Table A.7).

In a world with costless credit and insurance markets, larger instability and unexpected shocks are not likely to affect long-term investments in schooling. However, in the presence of these constraints, individuals may have to reallocate resources to absorb instability, which effectively increases the private marginal costs of schooling. If households are risk adverse and find restrictions to insure, greater uncertainty due to macro fluctuations reduces their private marginal benefits in utility terms. When physical capital assets can be used as a buffer, individuals may be able to protect long-term investments in schooling. But in their absence, the reallocation of household resources may lead to reduced schooling investment. If reductions or interruptions in schooling affect subsequent attainment, even temporary shocks can have long lasting effects. This may be the case because age is vital in the schooling process—as a child ages the opportunity cost

[29] The first panel in Figure 8 shows the average LA yearly per capita real GDP growth rate between 1990 and the year 2012. GDP and inflation data in Figure 8 are from the ECLAC data base accessible at http://estadisticas.cepal.org/cepalstat. The information on wages, employment and formal sector participation are from our household survey data base.

[30] Evidence on positive association between income and school achievement in Hanushek and Woessmann (2010).

of not working generally increases. In addition, children behind their peers in grade achievement may become discouraged and drop out. Also, high transaction costs of entering and exiting schooling may preclude or delay re-entry of dropouts. Therefore, the more stable macro environment would be expected to positively affect school enrollment.[31]

With respect to the labor market, there are at least two direct channels through which conditions could influence school enrollment decisions. First, relevant wage levels can cause two types of reactions: i) if the reference wage for USE age youth –the wages to which close age groups have access- increases, so do the opportunity costs of remaining in school and incentives for substituting school time for paid work (negatively affecting school attendance), and ii) higher wages also imply greater household resources, which have a positive income effect on enrollment. The size of both effects in the same household will depend on characteristics and preferences shaped by their socioeconomic status, cultural patterns, expected probabilities of graduation, etc.[32] Second, the probability of accessing the prevalent market wage will depend on employment opportunities. In a tight labor market with high unemployment and low employment generation, the opportunity cost of remaining in school will be lower, leading to smaller substitution and income effects. Similarly, more stable or higher quality jobs will increase the opportunity cost of remaining in school, but can also make income effects stronger, with an ambiguous final effect.

According to the data from our household surveys, higher average wages, greater employment, and greater levels of formality that are associated with higher quality jobs prevailed on average in LA during the 2000s compared with the 1990s. The evolution of real mean wages for 25 to 45 year old individuals –which can be taken as a relevant comparison group for USE age individuals- across the region reveals that increases were much higher in the 2000s, when annual growth rates of close to 2 percent were observed, as compared to the 1990s, with increases of about 0.4 percent yearly (Figure 8). In Argentina, Chile, Colombia and the Dominican Republic, increases in the wage rate were particularly high; Bolivia, Brazil, El Salvador and Guatemala are the four countries where average wages declined over time (Table A.8). [33]

Furthermore, employment rates among 25 to 45 year olds in the region increased steadily –with a minor fall in 2004- and faster towards the last part of the 2000s. Thus, in general, the probability of having access to higher labor market remunerations for relatively young age groups increased (Figure 8). Argentina, Mexico, Nicaragua, and Uruguay are the countries with greater increases in effective access to the labor market (Table A.8). Especially after 2005, higher wages, greater

[31] For shocks effects on schooling investment due to liquidity constraints and absence of insurance see Chiu (1998), Duryea, Lam and Levinson (2007), Flug, et. al. (1996), Jacoby and Skoufias (1997), (2009), Mendoza (2009), Ramesh (2009), Mehrotra (2009), Keane (2009), Friedman and Levinsohn (2002), and Shang and Wu (2003),

[32] Duryea and Arends-Kuenning (2003) for instance, find that in Brazil substitution effects prevailed for 14-16 year olds when labor market conditions improved, resulting in higher school dropout. Edmonds, et.al. (2010), however find in India that income effects prevailed during the period of trade liberalization, due to the relation between increased household resources and higher school enrollment.

[33] Data on wages are from household survey data set, adjusted for purchasing power parity at constant 1995 prices. Data on employment also obtained from household surveys.

employment probabilities and access to better quality jobs (as measured by the level of formality), converged (Figure 8). Employment in the formal sector of the economy had been declining in the region from 1990 to 2005, but increased by about 5 points thereafter. Country data reveal that, with the exceptions of Bolivia, El Salvador, Mexico and Uruguay, formal employment increased throughout the 2000s (Table A.8). The extent to which this combination of labor market factors generates substitution and income effects will be addressed in Section 4.

### 3.3 Returns to education

The macroeconomic environment and labor market conditions discussed above are expected to affect household schooling investment decisions mostly through the short run substitution effect related to the opportunity cost of time. In contrast, returns to education may also affect enrollment, but are linked to more structural factors such as the quality of education and the long run rewards to graduating from different schooling levels. Returns to education are normally regarded as a measure of the extent to which the labor market values different types of skills at different times.[34] In this case we expect that higher perceived long-term returns would be associated with higher current school enrollment rates, and vice versa. If education is perceived of low quality or relevance in terms of generating lower future labor market rewards, the marginal benefit of schooling investment will be lower, with consequent higher dropout.

It is important to stress, however, that the returns to education do not only reflect school quality, and the same type of education can be subject to higher or lower rewards, depending on context. In particular, factor endowments determine production structures and therefore the demand for different skill types, which can alter the returns to education, and thus the incentives to invest in it. Substantial natural resources, for example, have been commonly thought to lead to production structures in which returns to broad education are limited, while the returns to some forms of specialized technical education (e.g., mining engineering) may be high. Furthermore, as noted by Spilimbergo, Londoño and Székely (1999), the rewards to education are affected not only by the scarcity or abundance of factors of production in each country, but also by the extent to which each country is exposed to international trade. For example, if a country opens up to trade there will be more incentives to acquire education because trade openness generally involves more rapid changes in technology and in capital, which may have positive effects on the returns to education (e.g. Rosenzweig (1990), and Foster and Rosenzweig (2004)).

Recent qualitative evidence suggests that education's perceived relevance is in fact strongly related to USE demand decisions among youth in the region. According to self-reported survey data on school dropout by adolescents in 8 LA countries, the first cause of school exit for 33 percent of youth that reach LS and USE age is "lack of interest in attending" –which can be interpreted as being related to perceived lack of relevance and future low returns to schooling (Alfonso et.al.

[34] As discussed by Murane (2013), the schooling's value can change through channels including higher productivity, exogenous economic factors, but also changing value of school credentials related to socioeconomic status, etc.

(2012)). In 6 out of the 8 countries in the study, the category of "lack of interest" shows the highest proportions, and even in the two countries where economic reasons present larger shares (Guatemala and Paraguay) "lack of interest" remains one of the main explanations. Bentaouet Kattan and Székely (2014) report similar results for Mexico, where 44 percent of USE dropouts are related to "lack of interest in school due to low relevance."[35]

We estimate the yearly returns to schooling in LA from our household survey data set (Figure 9).[36] We find that the returns to USE and to Higher Education relative to Primary schooling in the region have followed an inverted "U" shape trend, increasing continuously between the early 1990s and the year 2000, and declining slightly thereafter.[37] This suggests that in line with the aforementioned qualitative data, the incentives for USE age youth to invest in graduating from USE or higher education, although positive are decreasing and therefore, might be generating lower incentives to remain in school. In 13 out of the 18 countries analyzed, the returns to USE relative to primary were lower in years around 2010 as compared with years around 2000 (Table A.9).

Potentially, the effect on enrollment from declining relative rewards to USE could be compensated by increasing rewards to higher education, since graduating from USE is a prerequisite to achieve this level. However, as shown by the country data, in 11 out of the 18 countries under analysis the returns to higher education relative to primary schooling also declined. These shifts could reinforce the incentives for dropping out of school prematurely.

## 4. Factors associated with school dropout across generations in LA

The objective of this section is to verify empirically the magnitude and direction of the different forces documented in the prior section, to the extent possible. We exploit the same synthetic panel of household survey data, from which we follow cohort trajectories over time and link with data on variables representing the environment in which school enrollment decisions were made.

We start from the basic idea that the relation between the share of youth enrolled in school and the factors that determine it can be expressed as:

[35] This perceived lack of USE relevance is in line with a growing literature. See Pritchett and Borghans, (2014), Banerji (2013), Almeida, et.al. (2012), Bassi, et.al. (2012), Wang (2012), Willingham (2010), De Ferranti, et.al (2003), Manpower (2010), OECD (2014), and McKinsey (2012), Manacorda (2013) and Jensen (2010).

[36] Returns are estimated from standard Mincer regressions that control for sample selectivity bias through the Heckman correction.

[37] Authors such as Manacorda, Sánchez Páramo and Schady (2010) document increased returns to skills in LA during the 1980s and 1990s, with declining premiums during the 2000s. Bassi, Busso and Nuñez (2013), Aedo and Walker (2012) and Gasparini, et.al. (2011) also document similar trends. Explanations for the schooling premium decline include the increased supply of workers with more years of schooling, inclusion of lower ability workers with greater education in the labor force (which is consistent with increased inclusion in schooling of relatively poorer individuals), lower education quality caused by a rapid expansion of the LS system and by the inability of education structures to adapt to labor market needs, and the reduction in the relative demand for higher skills in LA due to the increased demand and prices for commodities in world markets, which are unskilled labor intensive.

$$(1) \quad Y_{cjt} = f(D_{jt}, M_{jt}, L_{jt}, R_{jt})$$

Y represents the outcome of interest for each cohort c in country j at time t (the proportion of enrolled youth), which is a function of demographic (D), macroeconomic (M), labor market (L) factors and of the returns to schooling (R). Equation (1) can be modified as a function of lagged variables, such that we wish to evaluate Y in time t and μ, η, γ and δ in t-n, where the lag could be the length of the cohort or a longer period. Our estimation is thus:

$$(2) \quad Y_{cjt} = \alpha_0 + \beta_1 D_{jt} + \beta_2 M_{jt} + \beta_3 L_{jt} + \beta_4 R_{jt} + \varepsilon_{cjt}$$

where for notational simplification $\beta_i$ represents kx1 parameters of interest, and $D_{jt}$, $M_{jt,}$, $L_{jt}$ and $R_{jt}$ represent vectors of demographic, macroeconomic, labor market, and education returns at the country-year level, respectively, and ε is the error term with $E(\varepsilon_{cjt}| D_{jt}, M_{jt}, L_{jt}, R_{jt}) = E(\varepsilon_{cjt}) = 0$.

Since our interest is on identifying the variables associated with changes in school enrollment (E) decisions along the life cycle, the outcome of interest is:

$$(3) \quad \Delta E_{cjt} = E_{cjt} - E_{c-1,j,t-1}$$

That is, our dependent variable is equal to the absolute change in the proportion of youth enrolled in cohort c in time t compared to the proportion in the same cohort at the previous age bracket in *t*-1, so:

$$(4) \quad \Delta E_{ct} = \alpha_0 + \beta_1 \Delta D_{jt} + \beta_2 \Delta M_{jt} + \beta_3 \Delta L_{jt} + \beta_4 \Delta R_{jt} + \varepsilon_{cjt}$$

where Δ presents the absolute change and $\Delta D_{jt} = D_{jt} - D_{j,t1}$ and so on. Specifically, for all variables we follow each cohort in its transit from USE entry to USE exit ages in each country. The typical pattern, as explained above, corresponds to cohorts evolving from the 12-14 to the 15-17 age bracket, although the specific ages are adjusted to match the official LS and USE ages in each country (as defined in Appendix Table A2). This allows examination of the dynamics of school enrollments for each cohort in a similar way as it occurs along the life cycle.

To verify the influence of demographic, macroeconomic, labor market factors and schooling returns, over the share of individuals in a given cohort dropping out of school at critical ages we estimate equation (4) by pooling all cohort trajectories for all countries and survey years in our data base. Thus, the dependent variable is the change in the share of individuals enrolled in school in each cohort at each spell –depending on the country and year of each survey- and this is linked with a series of independent variables obtained from different sources for the same time period.

To account for differences in cohort sizes over time, we consider the fertility rate at each cohort's year of birth, which is unchanged through the life cycle. To account for cohort composition effects we compute the proportion of individuals in the lower 40 percent of the income distribution (summarized in Table 4) that attended LS at the official LS age in each cohort. To avoid endogeneity with the dependent variable -which includes the same cohort of reference in its measurement- we instrument this variable by using the lagged value of the same variable, which refers to an earlier cohort. For the macroeconomic environment, we use the growth rate of GDP per capita and the inflation rate, from the World Development Indicators.

The rest of the variables are obtained directly from our household survey database. To characterize labor market dynamics we compute the average wage and the proportion of individuals that are employed under a remunerated activity, for individuals in the 25-45 age brackets in each country and year. These age groups are always above the USE ages considered in the dependent variable and so can be considered as exogenous. Returns to schooling are estimated for the population aged 25-55 in each case, which also avoids potential endogeneity.

Our base estimates are obtained through panel difference in difference regressions with Huber-corrected robust standard errors and country-year dummies, so our results control for time variant and invariant country characteristics and for non-observable cohort characteristics simultaneously. All regressions are performed for the total population and for males and females separately. All in all, we observe 226 episodes of change in the pooled data of the 18 countries over the decades between the early 1980s and 2012. We test with a series of specifications and report the models to verify the stability and consistency in the coefficient estimates.

### 4.1 Base results

Table 3 presents the base regression for our analysis by introducing each group of variables parsimoniously. The first estimation shows a negative and statistically significant relationship between changes in school enrollment shares at USE ages for each cohort, and cohort size as measured by the fertility rate in the cohort's birth year. Similarly, as expected, there is a negative and significant relationship with changes in the (instrumented) share of LS enrolled individuals belonging to the poorest 40 percent in the income distribution, and changes in USE enrollment.

The second estimation incorporates the variables measuring economic growth and macroeconomic stability. According to our results, the relation between changes in enrollment and GDP per capita growth is positive, but not statistically significant. However, there is a strong negative and significant association with the inflation rate which suggests that USE enrollment declines when instability in the economic environment increases, as would be expected.

The third estimation incorporates labor market variables characterized by the average wage and employment levels for the population in the 25-45 age brackets in each year. Interestingly the coefficient for the wage and employment variables are positive and statistically significant, which

suggest that the positive income effect on USE enrollment derived from these variables prevails over the potential negative substitution effects. [38]

Finally the fourth regression includes returns to USE and to Higher Education (HE) relative to Primary as calculated for the 25-55 age range. The sign of both coefficients is positive, as expected -with increasing returns leading to higher USE enrollment- but while statistical significance is high for returns to USE, it is only marginally different from zero for HE.

An additional interesting feature from our estimates is the high stability in the magnitude and significance of the coefficients across the different regressions. The R-squared in the last regression considering all variables is of about 23 percent, which indicates that the variables in question account for about one fifth of the explanation for the changes in enrollment over time.

We further find interesting differences between the 1990s and 2000s. With respect to demographic and population composition effects, the fertility rate's negative coefficient is leading to higher enrollment shares (because of the secular decline in fertility) and so is relieving some of the demand pressure over USE services from increased LS graduation rates. However, the composition effect of increasing shares of relatively poorer youth accessing schooling is pressuring dropout rates upward. As for the economic environment, different sources converge for increasing permanence of youth in the schooling system at USE ages, including greater economic stability, higher wages, and more employment opportunities, all of which are apparently allowing for increased human capital investments through an income effect. A counteracting factor has been that the returns to schooling (especially to USE) have been declining. Since there is a positive relationship with enrollment from these variables, the decline would be expected to generate incentives for exiting the schooling system. The same applies to the returns to HE, although with an effect that is smaller in magnitude.

To test for the robustness of using differences in differences as a method of estimation, we conduct three alternative estimates. The first, (regression (6) in Table 4) is a fixed effects OLS regression that instruments the share of individuals in the poorest 40 percent attending LS as before, and imposes less structure than in the previous estimations. The results lead to similar conclusions with the sign and statistical significance of all coefficients being similar to those in regression (5) –the only apparent difference is that the relationship between school enrollment and GDP per capita is negative, although non-significant. The second is a random effects estimation that also leads to the same general conclusions –the only difference with respect to the base specification is that the coefficient for the returns to HE is not statistically significant. Finally, regression (8) replicates regression (5), but following Moffitt (1993) and Verbeek (2005) it also includes cohort dummies

[38] In this specification and those following we also tested the inclusion of the share of participants in the formal sector of the economy as an independent variable. The coefficient is not statistically significant in practically any of the estimations. We therefore do not include it explicitly in the remaining of the analysis. We conclude that the level of wage remunerations rather than the type of employment, is what influences school enrollment decisions.

to account for possible composition differences across cohorts that arise because our data is from household surveys that include samples of individuals –which implies a cohort-age cell error that deviates from the true cohort-age means, and which could vary, among other things due to changes in sample size across surveys. The central result is the high stability of the coefficient estimates. The only exception is the relation between USE dropout and HE returns, which in this case are also positive but highly statistically significant.

### 4.2 Estimations for different samples

We explore differences across males and females by using regression (5) as a main point of reference (Table 5). For both genders, respectively, we estimate the base regression by using the same independent variables as in Table 3, while the independent variable refers to only one gender at a time. In a separate regression, we use gender specific dependent variables and also gender specific independent variables for wages, employment, and the returns to schooling.

The most notable result is that most of the conclusions obtained from regression (5) remain for both genders, with two main differences arising between the estimations. The first is that the coefficient for wages is not significant for female USE age enrollment, while in the case of males these remain as statistically significant influences. Employment levels however, have a positive and statistically significant effect throughout, which suggests that it is labor opportunities rather than labor market remuneration levels which lead females to stay longer in the schooling system.

The second difference has to do with the returns to HE, where the coefficients in the case of females are highly significant when using the general returns as reference, but not when the gender specific HE rewards are considered. In contrast in both regressions the returns to USE are highly associated with female school enrollment. Another element of interest is that for males, most variables become of higher significance when using gender (male) specific indicators, which suggests that for males, specific gender related conditions are of more significance than changes in the labor market at large, as opposed to females.

Finally, we estimate our base regression separating countries into early, transition and late dropout as per the classification suggested in Section 2 (Table 6). We find an interesting difference across estimations in the relation with average wages and employment shares. Specifically, the coefficients for these variables are negative and statistically significant for countries with early dropout, which suggests for this category –which mostly includes low income countries with the exception of Colombia- substitution effects related to the opportunity cost of attending school can supersede the size of the income effects in terms of the incentives provided by the labor market for remaining in school. This in turn is consistent with generally having higher marginal propensities to consume at lower incomes, which lead to preferring current rather than future consumption. Other less significant differences are that the coefficients for changes in the returns to HE and for the share of poor individuals accessing LS are only marginally significant in the cases of late drop out and dropout in transition, respectively.

## 5. Conclusions and implications

Dropout at the USE level has been an issue of increasing concern to Latin America during the past decade due to its vast economic and social implications. This study implements a synthetic cohort approach made possible by pooling data from 234 household surveys for the region to trace schooling trajectories over the life cycle of different generations over time and document an apparently puzzling fact— that, in spite of increasing overall school enrollment rates across the region and a much more favorable macroeconomic and labor market environment during the 21st century, dropout rates at USE ages have not only remained at high levels after about 20 years, but have even increased markedly in several countries.

The present study reveals that while dropout rates in lower secondary age and in transition to USE declined in the region during the past 15 years, USE dropout rates increased. The latest data show that USE is the segment of the education system where higher dropout rates are observed. Countries with particularly large increases of dropout at USE ages include Ecuador, Guatemala, Honduras, Mexico, Nicaragua and Peru, all with increases above 6 percentage points.

By looking at the differences in the specific moment in the life cycle when dropout takes place, we classify countries in three broad categories: early dropout, dropout in transition to USE, and late dropout. The classification can be useful to direct policy efforts to different segments. For countries with high early dropout, interventions that enhance school enrollment at lower secondary are still necessary in order to increase the number of USE entrants. For the second group, policies focused on supporting youth when they shift between LS and USE would be a priority, while for the third group, programs and actions to increase retention at USE would be central –since higher rates of permanence at LS and transition to USE are already achieved.[39]

Apart from documenting the aforementioned stylized facts, we present an exploration of the possible causes of stable –and increasing in some cases- dropout at USE ages in the region, by focusing on three groups of potentially important factors. The first is the increasing demographic pressure on USE services arising from higher proportions of youth completing LS, and particularly, greater shares of lower income youth joining the education sector and obtaining the academic requirements for entering USE. According to our estimates these increasing shares have in fact been significantly associated with higher USE age dropout across the region. The result is robust to different estimation techniques, and it applies to males and females separately, as well as to the three country categories.

[39] As shown by Bentaouet Kattan and Székely (2014) there may also be high within country variability in the patterns for school dropout, so these approaches may apply also to different regions within any given country independently from its classification in the three aforementioned groups.

The interpretation of this result is that with the expansion of education services, more individuals that are subject to higher vulnerability and risks, due to the relatively unfavorable socioeconomic context to which they have been exposed, increased the ranks of the student population across the region at a time when schools were not equipped with the capacities and instruments to address their particular needs. This may have become a "push" factor away from the education system for these groups. Apart from the need to expand education supply, the implication is that policies directed to enhancing schools' capabilities for receiving and retaining youth from more vulnerable backgrounds and diverse needs from early ages would need to be part of an overall strategy to reduce USE age dropout –ranging from teacher training to enhanced early childhood development strategies. Another direct implication is the need to integrate mechanisms for addressing diversity in second chance programs intended to reinsert youth into school.

The second group of factors is related to the economic environment, and specifically, greater GDP growth rates and macroeconomic stability, both of which would be expected to promote more investments in human capital by households. We find in our different estimations that while the rate of growth of GDP is not significantly associated with changes in dropout rates, the sharp decline in inflation rates across the region is strongly linked to higher retention in the education system. Overall this has not resulted in declines in USE dropout due to other factors interacting simultaneously such as the aforementioned increasing proportion of relatively poorer youth accessing USE services. In fact, it could be argued that had the economic environment not been more stable, school dropout at USE ages would be even larger during the 2000s.

Although macroeconomic conditions are beyond education policy, this result also has implications for devising strategies for reducing dropout at USE age in LA. Specifically, it points to the utility of smoothing mechanisms –such as scholarships, short term loans, or access to the financial system- for student populations that might be exposed to shocks, volatility or risks. In relevant countries, guaranteeing that education systems can respond to specific local or even family circumstances for facing emerging unexpected shocks where it is needed is desirable and can be an important element of support for avoiding further dropout in the future –perhaps through the link with social protection mechanisms already in place in most countries.

The third group of variables includes elements characterizing the labor market, which can be a "pull factor" into the schooling system when wages and employment imply increasing family income and investment capacities, but that can also become a "push factor" by increasing the opportunity cost of remaining in school and therefore generating incentives to exit prematurely. Overall we find that positive "pull factors" associated with an income effect tend to prevail across the region, and mostly so for males –for females the effect of increasing employment opportunities seems to be greater than the wage level effect. However, when estimating for the three groups of countries separately, we find that in early dropout countries, the substitution effect of "pulling" youth away from school when wages and employment opportunities arise prevails. Since the early dropout group is composed mainly by low income countries, this can be taken as a sign that substitution effects become more important at lower income levels.

These results suggest that supporting family capacities for financing schooling investments at USE ages is critical. The fact that the income effect prevails over possible substitution effects when incomes increase indicates that in general, families tend to privilege investment in human capital when they are able to do so. Interventions such as scholarships or income transfers based on school attendance would be a logical policy response, although our results help qualify this interpretation by establishing that such support has to be enough to build family´s investment capacities but also to compensate for the opportunity cost of remaining in school rather than engaging in the labor market. Fine tuning scholarship programs to guarantee that the income support granted is enough for addressing both issues would seem to be a critical issue.[40]

Additionally, we analyze the link with the returns to HE and USE as independent variables, which are measures of the extent to which the productive sector values formal schooling completion. As expected, we find that the returns to USE are positively and strongly associated to school enrollment at the relevant USE ages, although in the case of HE the picture is more mixed, with estimates varying in their statistical significance across estimation methods, gender and country groups. One interpretation is that USE age individuals may perceive that enrollment into HE is uncertain, so the market's value of USE graduation generally influences their decisions more strongly. HE returns, however, are only a significant element in some cases.

The policy implication derived from this result is that relevance –the effectiveness of education systems for equipping youth with human capital that is valued by the labor market for engaging in the productive sector- is critical for increasing school enrollment at USE ages. If USE graduation is signaled as of high economic value our estimates suggest that LA youth respond by continuing in the schooling system longer. Therefore, even if returns to schooling are determined by many factors, the capacity of the education sector to adapt to emerging circumstances and needs seems to be central to influencing the decision of 21st century youth across the region.

In sum, this paper documents that there are solid grounds for policy makers' concerns around USE across Latin America and for placing USE at the center of the policy agenda. We have also presented some information about areas where schooling systems can intervene to overcome the limited progress in increasing school enrollment at critical USE ages. Complementing this evidence with more country-specific analysis is needed for fine-tuning policy strategies for addressing this emerging challenge. Additionally, the relationship with other key variables, such as the quality of education services as measured by their capacity for improving learning outcomes, is one of the avenues where more evidence is needed for identifying strategies to improve LA´s education performance and development prospects.

[40] A large literature confirms the positive effect of conditional cash transfers on retention in the education system (although predominantly at the Primary and LS levels). Summaries are compiled by Fiszbein and Schady (2009), and Fiszbein, Schady and Ferreira (2009), among others. Much less evidence is available for USE.

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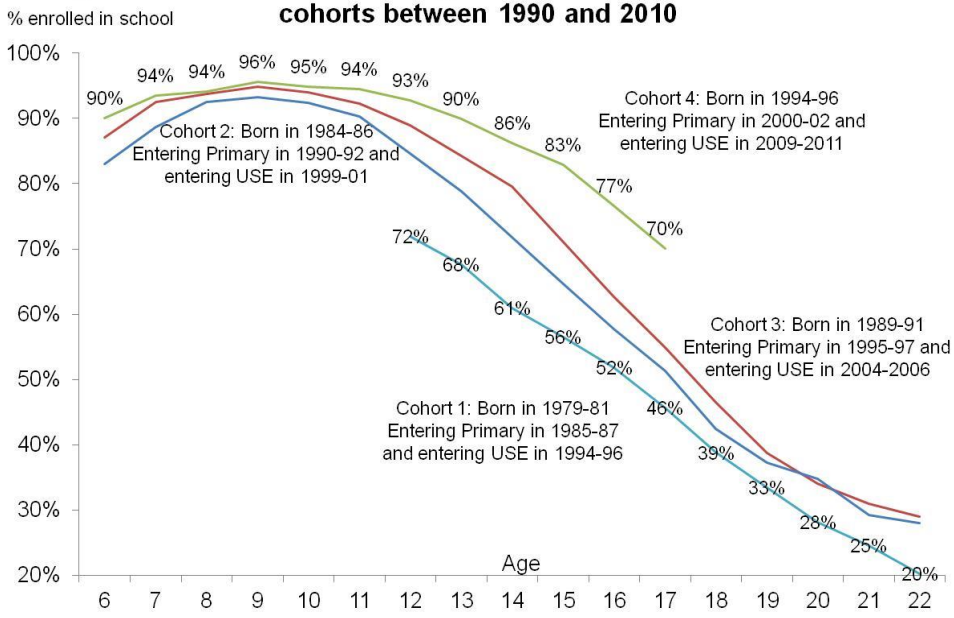
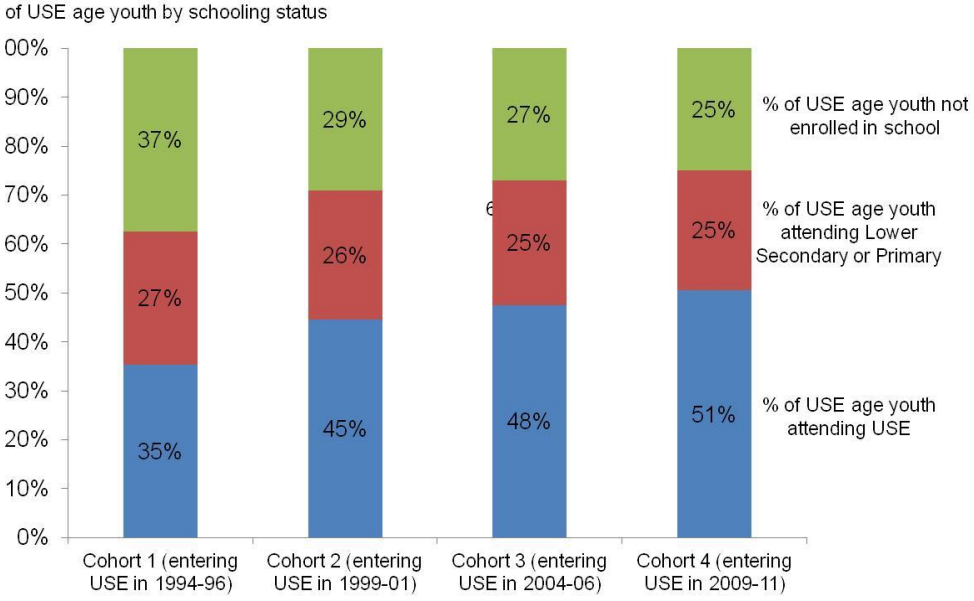
**Figure 1: Evolution of schooling enrollment of three Latin American cohorts between 1990 and 2010**



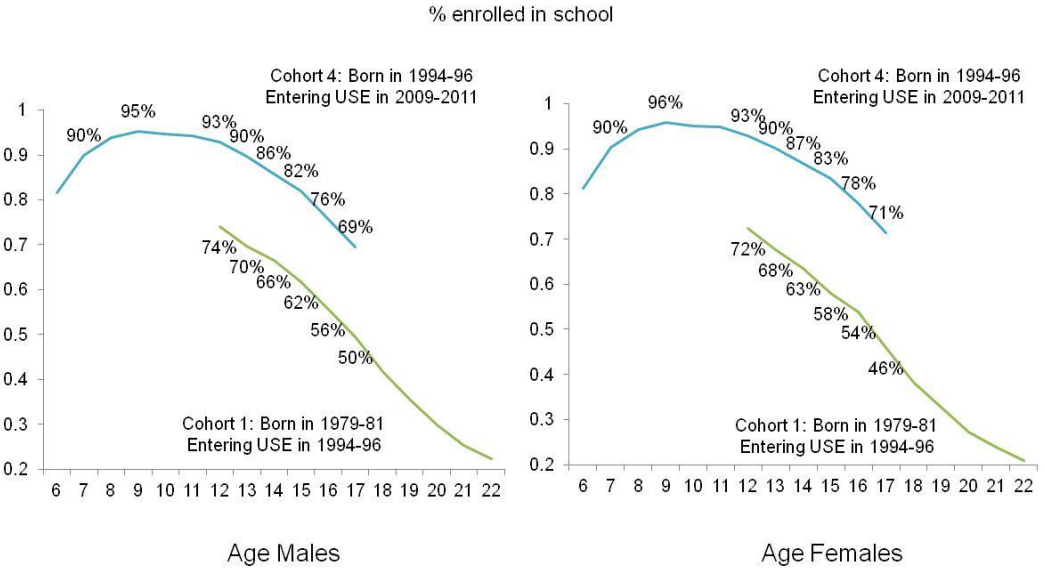

Source: Author´s calculations using household survey data.

**Figure 2: Distribution of USE age youth by schooling status for cohorts entering USE in the 1990s, 2000s and 2010s in LA**



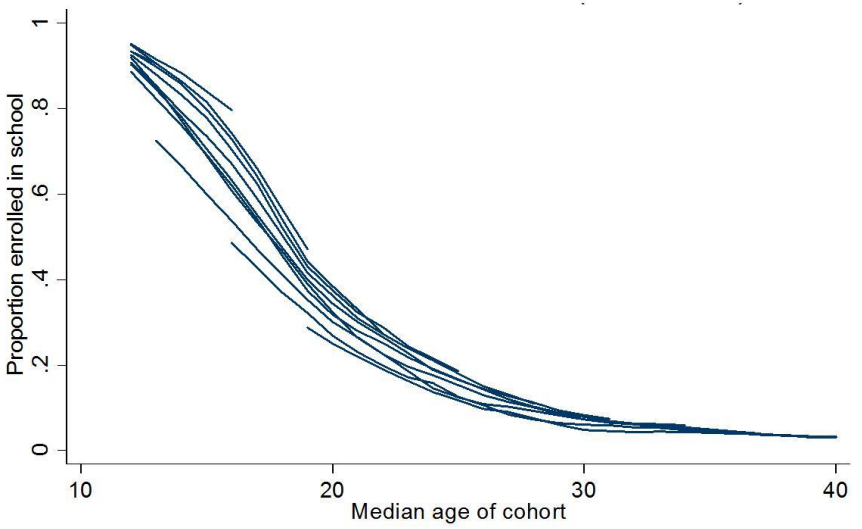

Source: Author´s calculations using household survey data

**Figure 3: Evolution of schooling enrollment of two Latin American cohorts of males and females between 1990 and 2010**



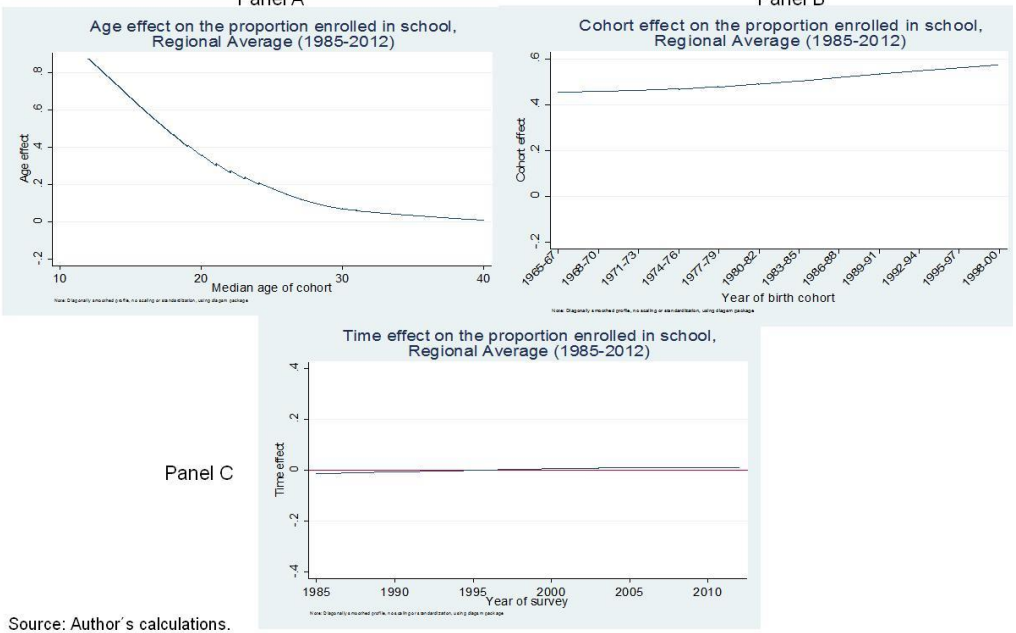

Source: Author´s calculations using household survey data.

**Figure 4: Proportion enrolled in school by age & cohort, all cohorts for Latin America (1985-2012)**



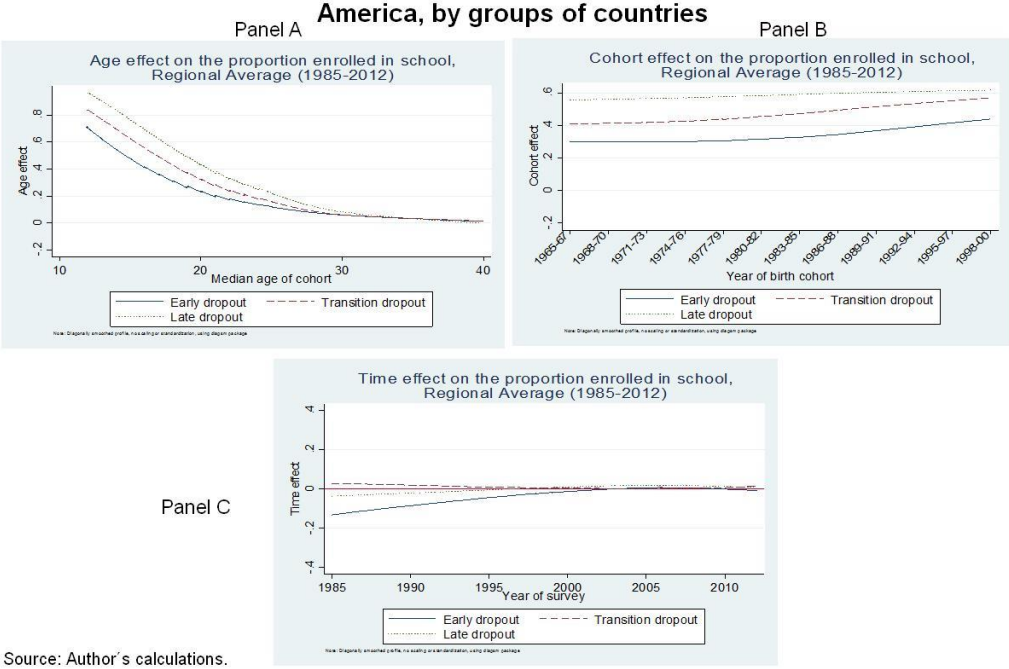

Source: Author´s calculations.

## Figure 5: Estimated age, cohort and time effects for school enrollment in Latin America



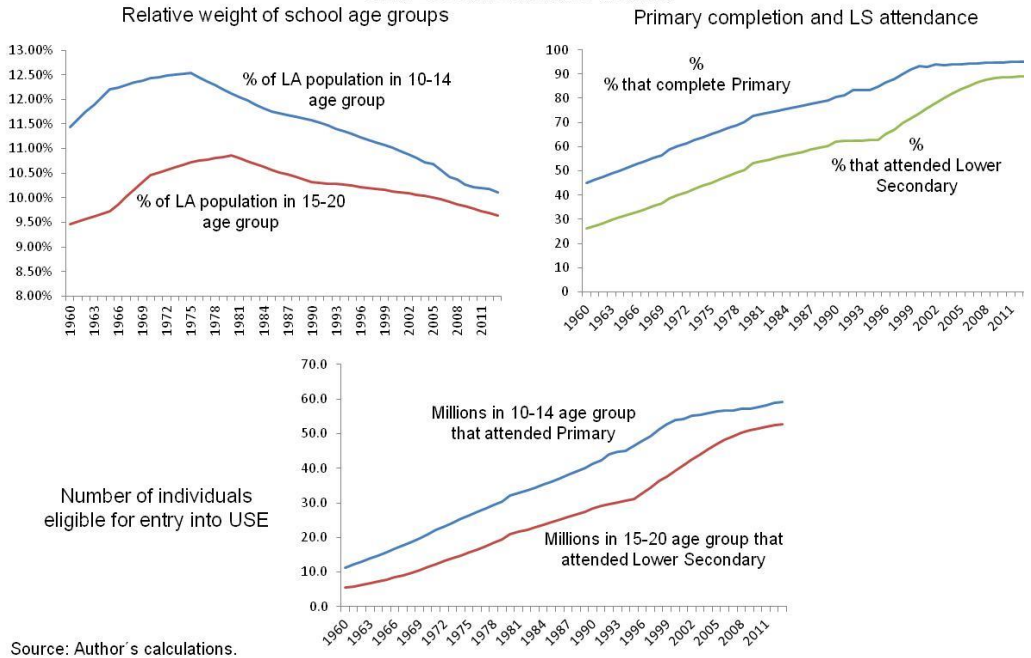

Source: Author´s calculations.

## Figure 6: Estimated age, cohort and time effects for school enrollment in Latin America, by groups of countries



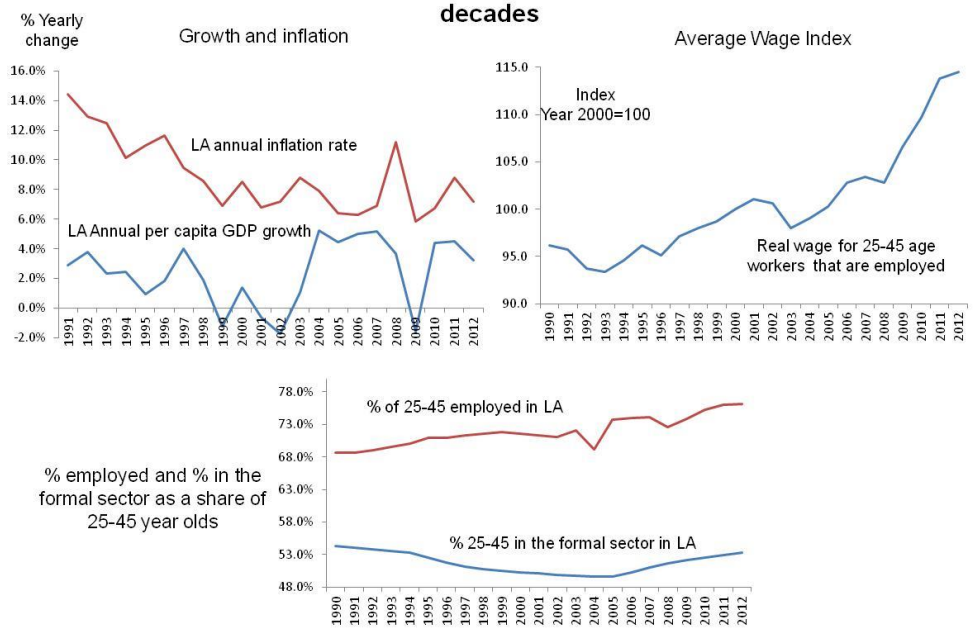

Source: Author´s calculations.

## Figure 7: Potential demand for USE services in LA from demographic and Primary and LS enrollment trends



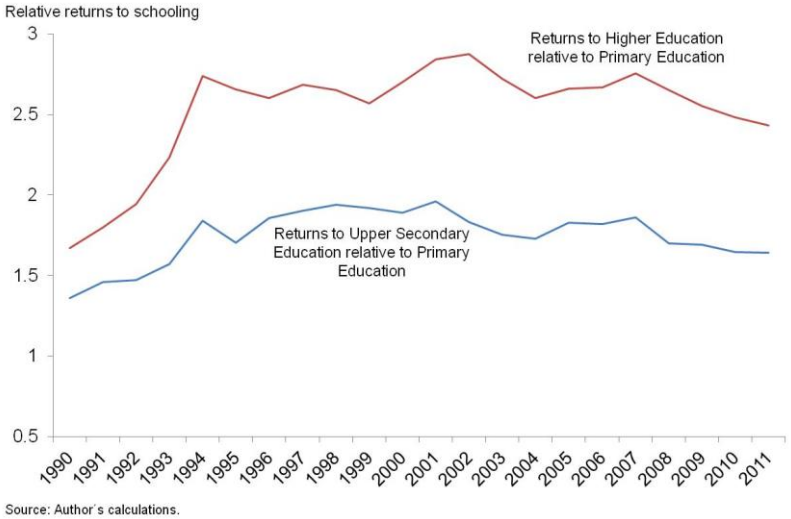

Source: Author´s calculations.

## Figure 8: Economic and Labor Market environment in LA in the 1990s and 2000s decades




Source: Author´s calculations.

**Figure 9: Returns to education in LA 1990-2011**




Source: Author´s calculations.

**Table 1. Changes in drop out rates between Cohort 2 (entered USE age during 1999-2001) and Cohort 4 (entered USE age in 2009-2011)**

| Country | % Dropout during LS Age | | | % Dropout during USE Age | | | % Dropout btwn LS entry & USE exit | | |
|---|---|---|---|---|---|---|---|---|---|
| | Cohort 2 | Cohort 4 | Change | Cohort 2 | Cohort 4 | Change | Cohort 2 | Cohort 4 | Change |
| Argentina | 14% | 9% | -6% | 13% | 14% | 1% | 27% | 23% | -4% |
| Bolivia | 6% | 11% | 4% | 17% | 17% | 0% | 24% | 28% | 4% |
| Brasil | 13% | 7% | -6% | 27% | 31% | 4% | 41% | 38% | -3% |
| Chile | 7% | 1% | -5% | 26% | 5% | -22% | 33% | 6% | -27% |
| Colombia | 24% | 10% | -14% | 12% | 8% | -4% | 35% | 18% | -17% |
| Costa Rica | 28% | 10% | -18% | 10% | 10% | 0% | 38% | 19% | -18% |
| Dominican R | 11% | 6% | -5% | 18% | 9% | -8% | 28% | 15% | -13% |
| Ecuador | 24% | 13% | -11% | 18% | 28% | 10% | 41% | 41% | -1% |
| Guatemala | 26% | 23% | -4% | 7% | 18% | 11% | 33% | 41% | 8% |
| Honduras | 32% | 26% | -6% | 9% | 15% | 6% | 41% | 41% | 0% |
| México | 31% | 21% | -11% | 10% | 18% | 8% | 41% | 39% | -2% |
| Nicaragua | 20% | 14% | -6% | 12% | 19% | 7% | 32% | 32% | 1% |
| Panamá | 7% | 3% | -4% | 7% | 8% | 1% | 14% | 12% | -2% |
| Perú | 26% | 16% | -10% | 1% | 8% | 7% | 27% | 24% | -3% |
| Paraguay | 21% | 4% | -17% | 27% | 23% | -4% | 48% | 27% | -21% |
| El Salvador | 21% | 14% | -7% | 19% | 15% | -4% | 40% | 29% | -11% |
| Uruguay | 20% | 14% | -7% | 16% | 19% | 3% | 37% | 32% | -4% |
| Venezuela | 25% | 11% | -15% | 21% | 14% | -7% | 46% | 24% | -22% |
| Average | 20% | 12% | -8% | 15% | 15% | 0% | 35% | 27% | -8% |

Source: Author´s calculations from household survey data.

**Table 2**
Proportion of dropout that occurs at different segments of
Schooling trajectories in Latin America
(Cohort 4 going through USE age in 2009-2011)

| Country | % of Dropout during LS | % of Dropout in transition from LS to USE | % of Dropout during USE |
|---|---|---|---|
| Honduras | 45% | 18% | 37% |
| Colombia | 41% | 16% | 43% |
| Peru | 39% | 27% | 34% |
| Guatemala | 36% | 20% | 44% |
| Nicaragua | 33% | 9% | 58% |
| Costa Rica | 32% | 18% | 50% |
| Bolivia | 5% | 34% | 61% |
| El Salvador | 23% | 26% | 51% |
| Venezuela | 19% | 25% | 56% |
| Mexico | 29% | 24% | 47% |
| Paraguay | 0% | 15% | 85% |
| Brasil | 10% | 8% | 82% |
| Chile | 21% | 3% | 76% |
| Panama | 14% | 15% | 71% |
| Ecuador | 21% | 11% | 68% |
| Dominican R. | 26% | 12% | 62% |
| Argentina | 22% | 16% | 61% |
| Uruguay | 27% | 15% | 58% |
| LAC average Cohort 4 | 25% | 17% | 58% |
| LAC average Cohort 2 | 38% | 19% | 43% |

Source: Author´s calculations from household survey data.

## Table 3

Relation between changes in share of individuals enrolled in school at USE ages and context variables (Estimation in differences in differences; full LA sample)

| Variable | (1) Demographic Variables | (2) Macro Environment | (3) Labor Market | (4) Returns to Schooling | (5) Base Regression |
|---|---|---|---|---|---|
| Cohort fertility rate at year of birth | -0.033 *** | -0.028 *** | -0.015 * | -0.015 ** | -0.015 ** |
| | (0.005) | (0.006) | (0.008) | (0.007) | (0.007) |
| IV % of youth in poorest 40% that attend LS | -0.09 *** | -0.100* *** | -0.089 *** | -0.092 *** | -0.092 *** |
| | (0.019) | (0.025) | (0.026) | (0.026) | (0.030) |
| PPP adjusted per capita GDP | | 0.026 | -0.062 | -0.079 | -0.079 |
| | | (0.055) | (0.066) | (0.074) | (0.074) |
| Inflation rate | | -0.001 *** | -0.001 *** | -0.001 *** | -0.001 *** |
| | | (0.000) | (0.000) | (0.000) | (0.000) |
| Real average wage (population 25-45) | | | 0.111 ** | 0.113 ** | 0.113 ** |
| | | | (0.048) | (0.049) | (0.049) |
| Employment rate (population 25-45) | | | 0.15 *** | 0.165 ** | 0.165 ** |
| | | | (0.039) | (0.071) | (0.071) |
| Returns to Higher Education (pop. 25-55) | | | | 0.009 * | 0.008 * |
| | | | | (0.005) | (0.005) |
| Returns to USE (population 25-55) | | | | 0.012 ** | 0.013 ** |
| | | | | (0.006) | (0.006) |
| Constant | -0.050*** | -0.067*** | -0.113*** | -0.110*** | -0.110*** |
| | (0.018) | (0.022) | (0.027) | (0.026) | (0.026) |
| Observations | 216 | 216 | 216 | 216 | 216 |
| R-squared | 0.139 | 0.125 | 0.193 | 0.197 | 0.236 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

## Table 4

Relation between changes in share of individuals enrolled in school at USE ages and context variables (Estimation with Fixed, Random Effects, and Cohort Dummies; full LA sample)

| Variable | (6) Fixed Effects | (7) Random Effects | (8) Cohort Dummies |
|---|---|---|---|
| Cohort fertility rate at year of birth | -0.032 *** | -0.035 *** | -0.034 *** |
| | (0.010) | (0.010) | (0.009) |
| IV % of youth in poorest 40% that attend LS | -0.084 *** | -0.052 ** | -0.05 *** |
| | (0.039) | (0.024) | (0.026) |
| PPP adjusted per capita GDP | -0.011 | 0.0187 | 0.017 |
| | (0.034) | (0.057) | (0.049) |
| Inflation rate | -0.00001 ** | -0.00001 *** | -0.00001 *** |
| | (0.000) | (0.000) | (0.000) |
| Real average wage (population 25-45) | 0.101 *** | 0.09 ** | 0.011 * |
| | (0.026) | (0.043) | (0.059) |
| Employment rate (population 25-45) | 0.216 ** | 0.189 *** | 0.195 *** |
| | (0.114) | (0.059) | (0.074) |
| Returns to Higher Education (pop. 25-55) | 0.011 * | 0.014 | 0.015 *** |
| | (0.006) | (0.009) | (0.007) |
| Returns to USE (population 25-55) | 0.015 *** | 0.012 *** | 0.013 *** |
| | (0.005) | (0.006) | (0.005) |
| Constant | -0.165 *** | -0.035 *** | -0.035 *** |
| | (0.340) | (0.034) | (0.034) |
| Observations | 216 | 206 | 216 |
| R-squared | 0.218 | 0.223 | 236 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

## Table 5

Relation between changes in school enrollment at USE ages and context variables
(Differences in Differences for males and females)

| | (9) | (10) | (11) | (12) |
|---|---|---|---|---|
| | Males | | Females | |
| Variable | Base Regression | Female Variables | Base Regression | Male Variables |
| Cohort fertility rate at year of birth | -0.014 * | -0.052 *** | -0.022 *** | -0.043 *** |
| | (0.008) | (0.007) | (0.008) | (0.006) |
| IV % of youth in poorest 40% that attend LS | -0.051 ** | -0.068 *** | -0.070 *** | -0.060 *** |
| | (0.026) | (0.029) | (0.030) | (0.024) |
| PPP adjusted per capita GDP | -0.051 | -0.023 | -0.054 | 0.014 |
| | (0.080) | (0.078) | (0.079) | (0.075) |
| Inflation rate | -0.00001 *** | -0.00001 *** | -0.00001 *** | -0.00001 *** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| Real average wage (population 25-45) | 0.091 * | 0.132 *** | 0.087 | 0.01 * |
| | (0.053) | (0.066) | (0.053) | (0.005) |
| Employment rate (population 25-45) | 0.126 ** | 0.115 *** | 0.16 ** | 0.135 ** |
| | (0.070) | (0.046) | (0.078) | (0.065) |
| Returns to Higher Education (pop. 25-55) | 0.006 * | 0.019 *** | 0.018 *** | 0.009 |
| | (0.015) | (0.009) | (0.007) | (0.008) |
| Returns to USE (population 25-55) | 0.022 *** | 0.025 *** | 0.027 *** | -0.019 ** |
| | (0.006) | (0.009) | (0.007) | (0.009) |
| Constant | -0.148 *** | -0.001 *** | -0.081 *** | -0.018 |
| | (0.029) | (0.028) | (0.028) | (0.024) |
| Observations | 216 | 216 | 216 | 216 |
| R-squared | 0.147 | 0.237 | 0.187 | 0.236 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

## Table 6

Relation between changes in school enrollment at USE ages and context variables
By groups of countries according to USE age dropout patterns

| | (13) | (14) | (15) |
|---|---|---|---|
| Variable | Early Dropout | Transition Dropout | Late Dropout |
| Cohort fertility rate at year of birth | -0.042 *** | -0.081 *** | -0.034 ** |
| | (0.008) | (0.015) | (0.014) |
| IV % of youth in poorest 40% that attend LS | -0.177 ** | -0.102 * | -0.131 ** |
| | (0.074) | (0.071) | (0.069) |
| PPP adjusted per capita GDP | 0.132 | 0.493 | -0.252 *** |
| | (0.126) | (0.313) | (0.071) |
| Inflation rate | -0.0001 *** | -0.001 | -0.0001 *** |
| | (0.000) | (0.003) | (0.000) |
| Real average wage (population 25-45) | -0.041 * | 0.122 *** | 0.147 *** |
| | (0.022) | (0.030) | (0.038) |
| Employment rate (population 25-45) | -0.077 * | 0.051 *** | 0.059 *** |
| | (0.044) | (0.005) | (0.026) |
| Returns to Higher Education (pop. 25-55) | 0.022 ** | 0.087 *** | 0.058 * |
| | (0.010) | (0.019) | (0.032) |
| Returns to USE (population 25-55) | 0.032 ** | 0.073 *** | 0.068 *** |
| | (0.013) | (0.022) | (0.039) |
| Constant | -0.034 *** | -0.518 *** | -0.028 |
| | (0.037) | (0.058) | (0.046) |
| Observations | 68 | 45 | 103 |
| R-squared | 0.2185 | 0.299 | 0.208 |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

**Table A.1**

| Country | Years for which household survey is available | | | | | | | | | | | | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Venezuela | 1981 | 1982 | 1983 | 1985 | 1986 | 1988 | 1989 | 1990 | 1992 | 1993 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2003 | 2004 | 2006 | 2007 | | 21 |
| Brasil | 1981 | 1983 | 1986 | 1988 | 1992 | 1993 | 1995 | 1996 | 1997 | 1998 | 1999 | 2001 | 2002 | 2003 | 2004 | 2008 | 2009 | | | | | | 17 |
| Argentina | 1980 | 1996 | 1998 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | | | | | | | | 15 |
| Honduras | 1989 | 1992 | 1996 | 1997 | 1998 | 1999 | 2001 | 2002 | 2003 | 2005 | 2007 | 2008 | 2009 | 2010 | 2011 | | | | | | | | 15 |
| Panamá | 1991 | 1995 | 1996 | 1997 | 1998 | 1999 | 2001 | 2002 | 2003 | 2004 | 2006 | 2007 | 2008 | 2009 | 2010 | | | | | | | | 15 |
| Peru | 1985 | 1991 | 1994 | 1996 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2008 | 2009 | 2010 | 2011 | | | | | | | | 15 |
| Paraguay | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2002 | 2003 | 2004 | 2008 | 2009 | 2010 | 2011 | | | | | | | | 15 |
| Colombia | 1980 | 1986 | 1989 | 1996 | 1997 | 1998 | 1999 | 2000 | 2003 | 2006 | 2007 | 2008 | 2009 | 2010 | | | | | | | | | 14 |
| Costa Rica | 1987 | 1989 | 1991 | 1993 | 1995 | 1997 | 1998 | 2000 | 2001 | 2002 | 2003 | 2004 | 2009 | 2010 | | | | | | | | | 14 |
| El Salvador | 1989 | 1992 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2007 | 2008 | | | | | | | | | 14 |
| Uruguay | 1989 | 1992 | 1995 | 1997 | 1998 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2010 | 2011 | | | | | | | | | 14 |
| México | 1984 | 1989 | 1992 | 1994 | 1996 | 1998 | 2000 | 2002 | 2004 | 2005 | 2006 | 2008 | 2010 | | | | | | | | | | 13 |
| Dominican Rep | 1995 | 1996 | 1997 | 2000 | 2001 | 2002 | 2003 | 2004 | 2007 | 2009 | 2010 | 2011 | | | | | | | | | | | 12 |
| Chile | 1987 | 1990 | 1992 | 1994 | 1996 | 1998 | 2000 | 2003 | 2006 | 2009 | | | | | | | | | | | | | 10 |
| Ecuador | 1995 | 1998 | 2000 | 2001 | 2003 | 2004 | 2008 | 2009 | 2010 | 2011 | | | | | | | | | | | | | 10 |
| Bolivia | 1995 | 1996 | 1997 | 1999 | 2001 | 2002 | 2008 | | | | | | | | | | | | | | | | 7 |
| Guatemala | 1998 | 2000 | 2004 | 2006 | 2009 | 2010 | 2011 | | | | | | | | | | | | | | | | 7 |
| Nicaragua | 1993 | 1998 | 2001 | 2005 | 2009 | 2010 | | | | | | | | | | | | | | | | | 6 |

Source: Extended data bank of household surveys.

**Table A.2 Official age for attending different schooling levels**

| Country | Pre-school | Primary | Lower Secondary | Upper Secondary |
|---|---|---|---|---|
| Argentina | 3-5 | 6-11 | 12-14 | 15-17 |
| Bolivia | 4-5 | 6-11 | 12-13 | 14-17 |
| Brazil | 4-6 | 7-10 | 11-14 | 15-18 |
| Chile | 3-5 | 6-11 | 12-13 | 14-17 |
| Colombia | 3-5 | 6-10 | 11-14 | 15-16 |
| Costa Rica | 5 | 6-11 | 12-14 | 15-17 |
| D. Republic | 3-5 | 6-11 | 12-13 | 14-17 |
| Ecuador | 4-5 | 6-11 | 12-14 | 15-17 |
| Guatemala | 3-6 | 7-12 | 13-15 | 16-18 |
| Honduras | 3-5 | 6-11 | 12-14 | 15-16/17 |
| Mexico | 3-5/6 | 6-11 | 12-14 | 15-16/17 |
| Nicaragua | 4-6 | 7-12 | 13-15 | 16-17/18 |
| Panama | 4-5 | 6-11 | 12-14 | 15-17 |
| Peru | 3-5 | 6-11 | 12-14 | 15-16 |
| Paraguay | 4-5 | 6-11 | 12-14 | 15-17 |
| El Salvador | 4-6 | 7-12 | 13-15 | 16-18 |
| Uruguay | 3-5 | 6-11 | 12-14 | 15-17 |
| Venezuela | 3-5 | 6-11 | 12-14 | 15-16/17 |

Source: ICSED 1997, UNESCO, and country level official data for Costa Rica, Ecuador, and El Salvador.

**Table A.3** School enrollment rate for individuals belonging to Cohort 2 (entering USE age in 1999-2001

| Country | Year at which cohort is observed in ages 11 to 18 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 11 years of age in 1995 | 12 years of age in 1996 | 13 years of age in 1997 | 14 years of age in 1998 | 15 years of age in 1999 | 16 years of age in 2000 | 17 years of age in 2001 | 18 years of age in 2002 |
| Argentina | 97% | 94% | 86% | 84% | 80% | 74% | 67% | |
| Bolivia | 92% | 87% | 81% | 80% | 77% | 74% | 63% | |
| Brasil | 90% | 87% | 84% | 81% | 76% | 69% | 59% | 49% |
| Chile | 98% | 96% | 94% | 89% | 84% | 74% | 63% | |
| Colombia | 90% | 80% | 78% | 75% | 66% | 55% | 44% | |
| Costa Rica | 92% | 85% | 73% | 62% | 57% | 53% | 47% | |
| Dominican R | 85% | 77% | 72% | 66% | 61% | 54% | 49% | |
| Ecuador | 80% | 74% | 69% | 62% | 50% | 42% | 33% | |
| Guatemala | 80% | 70% | 60% | 50% | 37% | 34% | 31% | 27% |
| Honduras | 83% | 71% | 56% | 46% | 39% | 33% | 30% | |
| México | 89% | 82% | 75% | 63% | 51% | 46% | 41% | |
| Nicaragua | 76% | 69% | 62% | 55% | 49% | 43% | 37% | 31% |
| Panamá | 97% | 98% | 96% | 93% | 91% | 88% | 84% | |
| Perú | 95% | 82% | 81% | 66% | 56% | 55% | 46% | |
| Paraguay | 96% | 92% | 88% | 79% | 71% | 57% | 45% | |
| El Salvador | 96% | 96% | 93% | 87% | 80% | 72% | 65% | 54% |
| Uruguay | 94% | 91% | 84% | 78% | 71% | 62% | 54% | |
| Venezuela | 94% | 92% | 87% | 77% | 67% | 54% | 46% | |
| Average | 90% | 85% | 79% | 72% | 65% | 58% | 50% | 40% |

Source: Author´s calculations from household survey data.

Entry age for Lower Secondary. Entry age for Upper Secondary.

Exit age for Upper Secondary.

**Table A.4** School enrollment rate for individuals belonging to Cohort 4 (entering USE age in 2009-2011

| Country | Year at which cohort is observed in ages 11 to 18 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 11 years of age in 2005 | 12 years of age in 2006 | 13 years of age in 2007 | 14 years of age in 2008 | 15 years of age in 2009 | 16 years of age in 2010 | 17 years of age in 2011 | 18 years of age in 2012 |
| Argentina | 99% | 99% | 97% | 94% | 90% | 87% | 76% | |
| Bolivia | 99% | 98% | 96% | 87% | 81% | 76% | 70% | |
| Brasil | 98% | 98% | 96% | 94% | 92% | 81% | 70% | 60% |
| Chile | 99% | 99% | 98% | 98% | 96% | 94% | 93% | |
| Colombia | 96% | 91% | 92% | 89% | 86% | 78% | 64% | |
| Costa Rica | 99% | 95% | 93% | 89% | 86% | 79% | 76% | |
| Dominican R | 95% | 91% | 87% | 86% | 89% | 85% | 76% | |
| Ecuador | 93% | 89% | 84% | 80% | 76% | 71% | 48% | |
| Guatemala | 88% | 87% | 80% | 72% | 65% | 57% | 47% | 39% |
| Honduras | 92% | 87% | 77% | 68% | 61% | 53% | 46% | |
| México | 97% | 96% | 90% | 85% | 75% | 66% | 57% | |
| Nicaragua | 91% | 83% | 75% | 67% | 64% | 61% | 59% | 43% |
| Panamá | 97% | 98% | 98% | 96% | 94% | 90% | 86% | |
| Perú | 96% | 95% | 91% | 86% | 79% | 71% | 70% | |
| Paraguay | 76% | 77% | 77% | 77% | 73% | 63% | 51% | |
| El Salvador | 98% | 98% | 98% | 96% | 91% | 84% | 76% | 69% |
| Uruguay | 98% | 98% | 94% | 89% | 84% | 76% | 65% | |
| Venezuela | 98% | 97% | 95% | 92% | 86% | 78% | 73% | |
| Average LA | 95% | 93% | 90% | 86% | 82% | 75% | 67% | |

Source: Author´s calculations from household survey data.

Entry age for Lower Secondary. Entry age for Upper Secondary.

Exit age for Upper Secondary.

**Table A.5** Change in the number of individuals that become eligible for attending USE by decade in LA

| Country | Additional 10-14 year olds attending Primary (Thousands) | | | Additional 15-20 year olds completing LS (Thousands) | | |
|---|---|---|---|---|---|---|
| | 1990-2000 | 2000-2010 | % change | 1990-2000 | 2000-2010 | % change |
| Argentina | 56.8 | 31.9 | -44% | 491,476 | 506,841 | 3% |
| Bolivia | 229.6 | 213.4 | -7% | 124,717 | 274,616 | 120% |
| Brazil | 3,004.00 | 3,335.80 | 11% | 2,624,332 | 4,077,337 | 55% |
| Chile | 438.3 | -123.8 | -128% | 115,903 | 187,962 | 62% |
| Colombia | 839.8 | 361 | -57% | 513,760 | 683,548 | 33% |
| Costa Rica | 100.9 | 18.3 | -82% | 104,205 | 125,244 | 20% |
| Dominican R | 175.3 | 164.2 | -6% | 81,503 | 250,604 | 207% |
| Ecuador | 323.3 | 123.5 | -62% | 135,364 | 405,016 | 199% |
| El Salvador | 187.8 | 111.7 | -41% | 36,318 | 140,825 | 288% |
| Guatemala | 182.1 | 576.8 | 217% | 144,663 | 395,137 | 173% |
| Honduras | 245.9 | 156.4 | -36% | 82,789 | 209,960 | 154% |
| Mexico | 1,673.80 | 827.9 | -51% | 1,027,214 | 1,853,930 | 80% |
| Nicaragua | 110.6 | 104.2 | -6% | 63,298 | 91,664 | 45% |
| Panama | 23.2 | 36.9 | 59% | 35,458 | 38,969 | 10% |
| Paraguay | 232.7 | 58.4 | -75% | 125,185 | 160,500 | 28% |
| Peru | 484.9 | 73.9 | -85% | 330,838 | 485,568 | 47% |
| Uruguay | -9.2 | -0.6 | -93% | 10,799 | 22,718 | 110% |
| Venezuela | 426.6 | 340.6 | -20% | 295,794 | 690,144 | 133% |
| Total LA | 8,726 | 6,411 | -27% | 6,343,618 | 10,600,581 | 67% |

Source: Author´s calculations.

**Table A.6 Share of LS age individuals belonging to hhs in bottom 40 % of distribution that complete LS**

| Country | Share of LS Age Youth completing LS | | | Difference | |
|---|---|---|---|---|---|
| | 1990s | 2000s | 2010s | 1990-2000 | 2000-2010 |
| Argentina | 67% | 68% | 70% | 2% | 2% |
| Bolivia | 27% | 40% | 53% | 14% | 13% |
| Brasil | 27% | 50% | 58% | 23% | 8% |
| Chile | 44% | 51% | 71% | 7% | 20% |
| Colombia | 42% | 45% | 61% | 3% | 16% |
| CostaRica | 31% | 34% | 49% | 3% | 15% |
| Dominican R | 20% | 27% | 46% | 7% | 19% |
| Ecuador | 34% | 43% | 75% | 8% | 32% |
| El Salvador | 19% | 27% | 39% | 8% | 12% |
| Guatemala | 10% | 14% | 23% | 3% | 10% |
| Honduras | 10% | 22% | 29% | 12% | 7% |
| Mexico | 36% | 54% | 71% | 19% | 17% |
| Nicaragua | 12% | 20% | 28% | 8% | 8% |
| Panama | 42% | 54% | 60% | 12% | 6% |
| Paraguay | 36% | 36% | 50% | 0% | 13% |
| Peru | 35% | 38% | 41% | 3% | 3% |
| Uruguay | 29% | 46% | 51% | 17% | 5% |
| Venezuela | 46% | 58% | 66% | 11% | 9% |
| Average LA | 31% | 40% | 52% | 9% | 12% |

Source: Author´s calculations.

**Table A.7. Annual GDP per capita growth and inflation rate in LA, 1990s-2000s**

| Country | Annual GDP per capita Growth Rate | | Average Inflation Rate | |
|---|---|---|---|---|
| | 1900-2000 | 2000-2010 | 1900-2000 | 2000-2010 |
| Argentina | 2.9% | 3.60% | 27% | 14% |
| Bolivia | 1.4% | 2.00% | 13% | 5% |
| Brasil | 0.9% | 2.50% | 9% | 8% |
| Chile | 5.4% | 2.90% | 13% | 3% |
| Colombia | 0.8% | 2.60% | 47% | 7% |
| Costa Rica | 2.7% | 2.60% | 31% | 15% |
| Dominican R | 4.6% | 4.10% | 15% | 19% |
| Ecuador | -0.1% | 2.30% | 51% | 11% |
| El Salvador | 3.7% | 1.40% | 10% | 4% |
| Guatemala | 1.7% | 0.80% | 18% | 8% |
| Honduras | 0.8% | 2.10% | 39% | 10% |
| Mexico | 1.6% | 0.60% | 40% | 5% |
| Nicaragua | 1.2% | 1.70% | 19% | 11% |
| Panama | 3.0% | 4.90% | 1% | 3% |
| Paraguay | 0.0% | 1.50% | 23% | 10% |
| Peru | 2.2% | 4.90% | 14% | 2% |
| Uruguay | 2.4% | 3.30% | 45% | 12% |
| Venezuela | 0.0% | 1.30% | 18% | 59% |
| Latin Americ | 2.0% | 2.5% | 24.1% | 11.5% |

Source: Calculations from ECLAC indicators system (http://estadisticas.cepal.org/cepalstat)

**Table A.8 Indicators of the Labor Market environment in LA 1990s-2010s**

| Country | % of 25-45 year olds who are employed | | | % of 25-45 year olds who have formal employment | | | Average wage of employed 25-45 age group | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1990s | 2000s | 2010s | 1990s | 2000s | 2010s | 1990s | 2000s | 2010s |
| Argentina | 70% | 68% | 76% | 56% | 57% | 61% | 96 | 98.8 | 175.9 |
| Bolivia | 70% | 78% | 82% | 41% | 41% | 41% | 95.8 | 101.5 | 91.6 |
| Brasil | 72% | 72% | 77% | 55% | 54% | 61% | 97 | 98.7 | 94.6 |
| Chile | 63% | 73% | 73% | 63% | 68% | 72% | 97.3 | 100.1 | 121.7 |
| Colombia | 70% | 71% | 73% | | | 40% | 99.5 | 98.7 | 114.3 |
| Costa Rica | 65% | 70% | 72% | 64% | 60% | 64% | 101.7 | 100.1 | 113.2 |
| Dominican R | 78% | 76% | 75% | | 46% | 49% | 103.9 | 96.1 | 152.1 |
| Ecuador | 70% | 71% | 73% | 45% | 44% | 45% | 91.1 | 105.6 | 124.1 |
| El Salvador | 68% | 71% | 71% | 49% | 53% | 44% | 92.8 | 97.6 | 86.4 |
| Guatemala | 64% | 69% | 72% | 47% | 55% | 55% | 92.8 | 98.9 | 90.9 |
| Honduras | 61% | 69% | 72% | 50% | 48% | 51% | | | |
| Mexico | 60% | 68% | 74% | 57% | 58% | 55% | 97.8 | 100.1 | 117.5 |
| Nicaragua | 64% | 68% | 75% | 51% | 42% | 57% | 98.8 | 100.3 | 107 |
| Panama | 74% | 73% | 76% | 68% | 65% | 67% | 103.1 | 101.5 | 99.6 |
| Paraguay | 76% | 75% | 79% | 45% | 41% | 45% | 103.7 | 100 | 106.3 |
| Peru | 66% | 68% | 70% | 60% | 37% | 42% | 108.3 | 99.5 | 110.8 |
| Uruguay | 77% | 77% | 83% | 64% | 65% | 63% | 112 | 100.3 | 102.5 |
| Venezuela | 68% | 70% | 74% | 61% | 46% | 49% | 133.2 | 101 | 75.2 |
| Latin Americ | 69% | 72% | 75% | 55% | 52% | 53% | 101.5 | 99.9 | 110.8 |

Source: Calculations from ECLAC indicators system (http://estadisticas.cepal.org/cepalstat)

**Table A.9 Average returns to schooling in Latin America during 1990-2010**

| | Returns to Secondary relative to Primary | | | Returns to Higher Educ. relative to Primary | | |
|---|---|---|---|---|---|---|
| Country | 1990s | 2000 | 2010 | 1990s | 2000 | 2010 |
| Argentina | 0.66 | 1.58 | 1.37 | 0.92 | 2.38 | 2.08 |
| Bolivia | 1.27 | 1.83 | 1.65 | 2.1 | 2.23 | 2.05 |
| Brasil | 1.83 | 1.81 | 1.74 | 2.71 | 2.73 | 2.82 |
| Chile | 1.81 | 1.93 | 1.42 | 2.15 | 2.34 | 2.17 |
| Colombia | 2.3 | 2.69 | 2.86 | 2.58 | 2.35 | 2.98 |
| Costa Rica | 1.89 | 2 | 1.96 | 2.85 | 3.16 | 2.54 |
| Ecuador | 2.57 | 2.05 | 1.67 | 2.77 | 2.27 | 2.61 |
| El Salvador | 1.62 | 1.7 | 1.97 | 2.08 | 2.15 | 2.8 |
| Guatemala | 1.98 | 2.25 | 1.56 | 2.3 | 2.8 | 2.45 |
| Honduras | 2.06 | 1.78 | 1.76 | 2.45 | 2.94 | 2.36 |
| México | 2.26 | 2.19 | 2.57 | 2.29 | 2.2 | 2.5 |
| Nicaragua | 1.83 | 1.88 | 1.89 | 2.45 | 2.58 | 2.57 |
| Panamá | 2.27 | 2.27 | 1.85 | 2.76 | 2.47 | 2.62 |
| Paraguay | 1.82 | 1.69 | 1.54 | 1.88 | 2.47 | 2.23 |
| Peru | 1.3 | 2.14 | 1.68 | 1.53 | 2.58 | 2.33 |
| R. Dominicar | 1.77 | 1.79 | 1.75 | 2.63 | 2.68 | 2.59 |
| Uruguay | 1.7 | 1.52 | 1.15 | 2.7 | 2.7 | 1.67 |
| Venezuela | 1.7 | 1.7 | 1.94 | 2.46 | 2.63 | 2.75 |
| Average LAC | 1.81 | 1.93 | 1.8 | 2.31 | 2.54 | 2.45 |

Source: Author´s calculations