Youth Out of School and Out of Work in Latin America

A Cohort Approach

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Abstract

This paper examines the phenomena of high rates of youth that are out of school and out of work in Latin America. The analysis pursues a dynamic approach by constructing a pseudo-panel from 234 household surveys for 18 countries in the region that allow tracing the life cycle trajectories of different cohorts over time. The trajectories are associated with a series of variables characterizing the household, community, and macro environment in which schooling and labor market participation decisions take place. The most important result obtained is that the persistently high rates of being out of school and out of work among males are

strongly associated with greater labor force participation by women, which can be generating a “crowding out” effect against men, given slow job creation rates across the region. The analysis also explores the possibility of scarring effects, and finds that higher shares of out of school and out of work youth at ages 15–20 years are associated with lower wages for the same cohorts later in life, at ages 35–40 years, for males and females. As for employment prospects, the analysis finds scarring effects only for females, with greater out of school and out of work youth shares being related to lower proportions of women in the labor market later in the life cycle.

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Youth Out of School and Out of Work in Latin America: A Cohort Approach

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Introduction

Since 2000, a growing concern has been that persistent shares of individuals in Latin America (LA), in the 15-18 and 19-24 age groups, are neither working nor in the education system. According to the estimates provided by de Hoyos, Rogers and Popova (2013), and Cárdenas, et.al. (2011), the share of youth out of school and out of work (which we abbreviate to “*Oso*” for the purposes of this paper) has oscillated between 23 and 19 percent during the 1990-2010 period, but due to population growth, the numbers in this condition increased by 2 million in the same period, reaching more than 18 million individuals by 2010.²

The fact that the proportion of *Oso* youth remained fairly stable is particularly worrisome in light of other variables reflecting improvement in the standard of living, such as the gross domestic product (GDP), which increased by more than 50 percent in real terms in the region during the same years.

Behrman et.al. (2014) propose a conceptual framework for identifying the potential decisions, restrictions, and contexts underlying these trends. They describe a model where the *Oso* youth phenomenon is determined by household and individual decisions, which are taken under a series of constraints and are influenced by the family, community, and macro environment.

The objective of this paper is to implement, to the extent possible, the aforementioned framework by focusing on the influence of community and macro factors on *Oso* youth. Since the “*Oso* youth” is an intrinsically dynamic phenomenon, we propose a cohort approach that follows groups of representative samples of individuals along a segment of their life-cycle to characterize the way in which they shift into different school, work, and *Oso* categories over time. We relate the observed transitions from school to work and to the *Oso* status to a series of variables in order to better understand why the shares of these groups have been persistent, and present estimates of the potential scarring effects of being *Oso* during youth on labor market outcomes that are observed later at older ages.

In order to perform our analysis, we exploit the time series of cross sections developed by Cárdenas et.al. (2011), updated for this paper with a set of recent household surveys, to create a synthetic

² The exact definition of “*not working*” includes all youth who declare not to be enrolled in paid labor market activity (formal or informal) during the week previous to the survey date. Those that are not currently enrolled in the formal schooling system at any level are classified as “*out of school*”. The analysis focuses on the population 15 and above, since the International Labor Organization (ILO) 1973 *Minimum Age Convention* -to which all Latin American countries have abided- sets the minimum age for admission to employment or work at age 15 (<http://www.ilo.org/global/standards/subjects-covered-by-international-labour-standards/child-labour/lang-en/index.htm>). Actually, the ILO 1999 *Worst Forms of Child Labor Convention* approved across LA childhood comprises the 0 to 18 age range and requires states to ensure access to free basic education and vocational training for all individuals belonging to this category to prevent them from working prematurely. Along the same lines the *Convention of the Rights of the Child* of 1989, which is a legally binding international instrument, specifies universally agreed standards and obligations of governments towards individuals under 18 years of age, including the access to education as a preponderant right.

panel that allows us to identify cohorts according to their year of birth, and their schooling and labor market trajectories. This permits a richer dynamic analysis as compared to other approaches in the same spirit including for instance Behrman et.al. (2006) and Cárdenas et.al. (2011), which focus on snapshots of cross sections of individuals observed at the same age during different time periods. By construction, these studies mix together different generations, which implies not observing the evolution of specific cohorts over time.

Synthetic panels have been used recently to study school to work transitions, and to identifying scarring effects from school dropout and unemployment at young ages. Our analysis is the first to our knowledge to focus on the Osow youth phenomena, and to simultaneously study the causes and consequences of the problem. Additionally, as compared to other studies which focus on individual country cases, our approach differs by pooling together synthetic panels from 18 Latin American countries covering more than two decades, which allow for a wider and more comprehensive view.

Focusing on Osow youth entails several important differences. One is that the literature on youth transitions generally considers only the school to work or school to unemployment status, where remaining in the education system and entering the labor market tend to be viewed as substitutes without considering the “Osow” status as an option. This rules out a significant population subgroup. Another difference is that the future consequences of being Osow are obviously very different to those of either working or remaining in school, as mutually exclusive decisions.

The paper is divided into five sections. Section 1 presents the data and discusses the advantages of a cohort approach. By illustrating the main stylized facts derived from our data the section also puts forward some points of reference to guide the empirical investigation. Section 2 describes Osow youth patterns and disentangles the age, cohort, and time effects underlying its dynamics. The results are used to characterize countries into three different groups depending on the patterns observed. Section 3 presents our empirical results for identifying the community and macro factors associated with the persistent levels of Osow youth for men and women in LA. Section 4 attempts the identification of future scarring effects observed later in life, based on the information on belonging to the Osow group at young ages. Section 5 concludes.

1. Data, Stylized Facts and Reference Points

This section presents the data used for our empirical analysis. We also show an illustration of its use for descriptive analysis and for deriving some general stylized facts for comparison.

Household Survey Database and the cohort approach

In all Latin American countries, a vast majority of children and youth are in school until they complete their lower Secondary education.³ Therefore, the decision making process regarding transitions into the labor market or into the Osoy status usually takes place at around age 15 - which is the official age for exiting Lower Secondary education in most countries in the region.⁴

Following the theoretical framework by Behrman et.al. (2014), at this point of the life cycle households and individuals jointly decide on the time allocation that maximizes the net present value of the future flow of indirect utility. The specific age at which this occurs and the balance of influence in the decision between the individual and the household as a unit depends on the age for attending the compulsory education levels in each country and on cultural patterns, among others. Individuals and households decide on whether those reaching the critical age continue in the education system, whether they become employed (or do both simultaneously), or if they remain in the Osoy status. The decision is influenced by the endowments accumulated so far by the relevant individual or bequeathed by parental transfers, the history of past decisions regarding time allocation, the quality of education services available, the returns to education, as well as context variables including aggregate macroeconomic conditions, sector-specific shocks, trade policy, cultural patterns, and community norms, among others. Decisions are also influenced by the extent to which households and individuals are subject to a series of constraints including the available budget, access to credit, and future expectations.

Thus, the Osoy youth phenomenon is intrinsically dynamic. To examine it empirically would ideally entail access to panel data following specific individuals over a sufficient number of years through their life cycle, and relate their observed outcomes to the variables of interest. Unfortunately, not enough of these kinds of data are available in Latin America.⁵ An alternative, followed in the literature of life cycle choices, has been to use repeated cross sections of data – which typically come from household surveys- that allow tracking the life cycle path of representative groups of individuals belonging to a birth cohort.⁶

³ As shown in Alfonso, et.al. (2012) average Primary attendance rates in LA countries are over 90 percent and reach around 80 percent for Lower Secondary education. Similar improvements have been documented recently for Latin America by Bassi, Busso, Urzúa and Muñoz (2013) for the Upper Secondary level using household survey data.

⁴Actually, Lower Secondary education attendance is compulsory for youth aged 12-15 in 16 out of 18 Latin American countries –including Argentina, Bolivia, Brazil, Chile, Costa Rica, Colombia, Ecuador, El Salvador, Guatemala, Mexico, Panamá, Paraguay, Peru, Dominican Republic, Uruguay and Venezuela- and only in Honduras and Nicaragua is Primary education still the only compulsory level (OEI (2010)). The International Labor Organization (ILO) 1973 *Minimum Age Convention* sets the minimum age for admission to employment or work at age 15, and in most countries in the world, legal employment is allowed from 15 years of age on (definitions in <http://www.ilo.org/global/standards/subjects-covered-by-international-labour-standards/child-labour/lang-en/index.htm>).

⁵ Several countries do collect panel data for labor market surveys, but they typically follow individuals for a reduced number of months, which does not allow for a longer term perspective as is required here.

⁶ 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. The basic idea is to use repeated cross sections to follow

By following each year-of-birth cohort, differences in the proportion of Osow youth across cohorts can be controlled for with context variables, while aggregate conditions across countries can be captured through standard macro variables, including variables contemplated by Behrman et.al. (2014). Furthermore, cohorts can be followed into the future to verify whether the proportion of Osow youth early on in the life cycle is associated with different patterns of labor market outcomes in the future for the same cohort.⁷

Household surveys are adequate for this kind of analysis since they incorporate information on the time uses of all individuals, including school attendance, labor market participation, both of these, or remaining Osow. Additionally, they allow for statistical and econometric analysis of the underlying causes of exclusion, since it is also possible to estimate from them variables such as the returns to education, type of employment, and many other variables directly related to the Osow condition, including the characteristics and time use of all members of the household. One issue worth noting, however, is that each country produces these data in different years, formats, computing codes, questionnaires and definitions.

For this work we build on the household survey data bank constructed by Cardenas et.al. (2011), which includes 215 household surveys for 18 Latin American countries covering three decades since the 1980s. We include 19 additional recent surveys and standardize them using the same procedure, which leaves us with 234 cross sections. The country with the largest number of surveys is the República Bolivariana de Venezuela with 24, followed by Brazil with 17; Argentina, Honduras, Panama, Peru, and Paraguay with 15; Colombia, Costa Rica, El Salvador and Uruguay with 14; Mexico with 13; the Dominican Republic with 12; Chile and Ecuador with 10; Bolivia, Guatemala with 7; and Nicaragua with 5. Nine percent of the surveys are for 1980-1989, 31

the average behavior of the variables of interest for these groups rather than for individuals. Deaton (1997) and Attanasio and Banks (1998), are some of the first to use this technique.

⁷Since the surveys are nationally representative in a given period of time averaging across cohorts likely reduces idiosyncratic measurement error and heterogeneity (Attanasio & Banks, 1998). An additional feature is that this approach avoids to a large extent the attrition bias common to panel analysis. It should be mentioned, however, that cohort analysis of the type used for our exploration is not free from some potential problems. Two of the most common are mortality and migration which may alter the composition of some cohorts over time. In the case of mortality, if there is a correlation with the Osow youth status, it could be possible that changes in the proportion of Osow youth as estimated from household surveys are downward biased –say, if mortality among Osow youth is greater than among other youth in the same cohort due to the exposure to greater risks. Deaton and Paxson (1999) and Attanasio and Hoynes (1998) attempt some corrections to similar data and argue that the effects of mortality can be significant. Since the window of the life cycle of our interest is relatively short, we would expect these effects to be small in our case. Differential immigration or migration associated with schooling can also potentially introduce biases depending on the composition of migrants. If a country receives large flows of Osow individuals in young cohorts, the composition effect exaggerates the proportion of Osow youth, and vice versa. Additionally, and perhaps more relevant for this study, if migration is positively correlated with schooling, the composition effect will be positive, and can be considerable depending on the age pattern of migration. Unfortunately, historical data on migration flows to assess the magnitude of this bias are not available for all the countries considered in the database used here. Furthermore, migration flows can be abrupt and change drastically depending on the conditions of countries at particular points in time. In section 3 we address this issue to take it into consideration for our econometric estimates.

percent for 1990-1999, and 60 percent for the 2000-2011 period. 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. Appendix Table A.1 identifies the years which are available for each country.⁸

Since we have access to the micro data of each survey it is possible for us to standardize relevant indicators such as household structure, age, gender, economic activity, schooling level, school attendance, socioeconomic characteristics, education, income, etc. in order to produce comparable data within countries, and across countries and years.

It is important to note that the homogenization process undertaken considers that different countries have different arrangements in terms of the age for attending Primary, Lower Secondary and Upper Secondary, respectively, which is an important comparability factor for the present analysis. In this regard, we follow the ICSED 1997 classification by UNESCO when available - which identifies the official age at which youth should be in the schooling system, by education level- and official local data elsewhere.⁹ The definitions are summarized in Appendix Table A.2.

The evolution of school enrollment by using snapshots of different generations observed at school age at different years is shown in Figure 1, which uses the complete database of 234 household surveys. Panel A shows the decadal regional average proportion of individuals in the relevant age groups, attending Lower Secondary, Upper Secondary and Higher Education, respectively.¹⁰

A first feature of interest is that for the three levels, there is a growing proportion of youth in school. The shares increase from around 80 to 89 percent for Lower Secondary, from 57.5 to 70.9 for Upper Secondary, and from 20.8 to 31.6 for Higher Education. This means that if employment rates for 15-18 and 19-24 year olds had remained at least constant over time, there would have been an important reduction of more than 10 points in the share of Osow youth when transiting these ages. The relative stability in the shares of this group shown in de Hoyos et.al. (2013) and

⁸These surveys are compatible with the database in de Hoyos, et.al. (2013). However, rather than relying the data processed by SEDLAC, we use the original surveys to be able to construct additional variables used later in Section 3 in our econometric estimations. It is important to stress that the picture on the evolution of the share of Osow youth in LA by gender groups with our data is practically the same as that in de Hoyos, et.al. (2013). It is also similar to the trends presented in Cardenas, et.al. (2011) although the levels differ with respect to this study since those authors do not consider those searching for work in their calculations.

⁹ICSED definitions can be found at <http://www.uis.unesco.org/Education/ISCEDMappings/Pages/default.aspx>.

¹⁰Since our household survey database generates an unbalanced panel of countries and years due to differences in timing of the surveys we compute decadal 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.

Cardenas et.al. (2011) suggests, however, that labor market insertion for these generations declined at these ages.

A more detailed picture for the age group that is normally expected to be attending Upper Secondary education –usually between 15 to 18 years of age- is presented in Panel B in Figure 1. As can be observed, the proportion of individuals attending school in different generations increased over the period, but especially during the 2000-2011 period where shares attending school increased by 7 points. Under constant labor force insertion rates, this would have yielded a drop in the Osow youth share in the course of a decade, even greater in value than that observed in the entire 20 year period.

Stylized facts derived from cohort analysis

Although informative, these snap shots refer to the static comparisons of different generations observed at a particular age in a particular year, so strictly speaking they do not allow observing the life-cycle dynamics discussed in Behrman et.al. (2014). However, this is possible when using the same source for identifying representative groups of individuals born during the same year – or year span- and observed repeatedly in later surveys at other points in their life cycle, since the representativeness of samples is constant over time for the same country.

An example of time choices made by two different generations followed through this synthetic panel approach is presented in Figure 2. In all cases, cohorts are aggregated in three age intervals, which facilitates observing shifts during Lower and Upper Secondary, and Higher Education. The Figure includes the averages for the 18 LA countries in our database for illustration.¹¹

Take for instance the case of cohort 1 in Figure 2, which was born between 1977 and 1979, and therefore reached ages 15 to 17 between 1992 and 1994. This is the first cohort for which a trajectory can be constructed by starting at school entry age 6 (which is the average in the region). According to Panel B in Figure 1, around 58 percent of 15-17 year olds were attending Upper Secondary Education around 1980, and this is reflected in Figure 2 by a similar proportion in cohort 1 at age 15 attending school (the numbers are not identical since Figure 1 considers an average time span of 5 years in its aggregation). Figure 1, however, only presents the snapshot at this age and turns to the following cohort, while Figure 2 follows the same group from age 6 all the way into the future, including the 15-17 “window” included in Figure 1.

¹¹ The aggregation of regional averages is performed in a similar way as in Figure 1 -by interpolating values for each country between each two points in time for which there is data for constructing yearly series. The averages are not population weighted in this case either.

Figure 2 also shows that school attendance rates were only about 70 percent at age 6 for cohort 1, they remained at the same level between ages 6 and 10 and start decreasing thereafter. There is a sharp decline precisely after age 15, such that at age 18 only around 30 percent remained in school and 15 percent continued up to age 24. As can be seen, important differences are observed with respect to cohort 2 in the Figure, which includes individuals born 6 years later. First, the share attending school at age 6 increases by about 10 points to 80 percent, but then presents an increasing “hump shaped” pattern of attendance almost up to 90 percent for all individuals between ages 7 and 12. This shows that in the course of only a few years there was a significant raise in Primary school attendance of almost 20 percentage points in the region. The decline in attendance rates is observed later, at age 13 –rather than at age 10 as in cohort 1- when individuals are expected to enter Lower Secondary. At this point, attendance rates drop from around 80 percent at age 13, to about 60 percent at age 15 with sharper declines than those observed in the previous cohort. This suggests that more youth were entering Lower Secondary, but high dropout rates still prevailed at this level.

Interestingly, the distance between the two school attendance profiles in Figure 2 remains at a similar distance of about 10 percentage points thereafter, indicating that the initial boost at the Primary level for cohort 2 had a long-term effect, lasting until about age 24. Additionally, there is a clear pattern of a shift from mid-Primary to Lower Secondary as the turning points of decline in attendance rates are notably different.

Regional average shares of individuals in the same two cohorts entering the labor market at different ages are also presented in Figure 2.¹² Our data show that an important share of individuals in cohort 1 appear to enter the labor market quite early in their life cycle. Labor force participation is already approximately 25 percent at age 12; it increases to 46 percent at age 15, and reaches 60 percent at age 18. Up to age 20, a difference of between 12 and 20 percentage points is observed with respect to participation rates at the same ages for cohort 2. For cohort 2, at age 18 only around 40 percent of individuals were in the labor market. Convergence between the cohorts starts to be observed at age 20, so that by age 24 labor force participation is practically the same in both cases.

Therefore, the main difference is that the average individual in cohort 1 dropped out from school earlier while a large share acquired labor market experience by finding employment when they were younger. In contrast, those in cohort 2 have higher average education levels from remaining in the schooling system longer, but as a result reach the age of 24 with less experience due to a delayed labor market entry.

Figure 2 also shows the share in both cohorts that belong to the Osow youth group. Interestingly, when individuals cross the 15 to 22 age span, the share of Osow youth is greater for cohort 2,

¹² To simplify the discussion we consider in this group all individuals that declare to be participating in the labor market, including those that also remain in school simultaneously.

reaching a maximum of about 20 percent at 20-21 years of age. This implies that even though there is higher school attendance for this cohort, the fact that fewer individuals are able to engage in the labor market as compared to those in cohort 1 at similar ages over-compensates the educational difference.

At age 22, both shares converge and remain at similar levels thereafter –with slightly larger shares of Osow youth in cohort 1 due to the convergence in labor market participation, and the remaining higher schooling attendance for those belonging to cohort 2. Another important feature is the prevailing rate of Osow individuals into adulthood until the age of 33, which stands at approximately 25 percent, when they are last observed in our data. Cohort 2 is only observed until age 27 but suggests a similar trend.

Figure 3 presents a comparison between regional averages for cohort 2 and the cohort born 10 years later in 1993-1995, which is labeled cohort 3. Cohort 3 was 15-17 years of age in 2010, so it refers to practically the last observation of shares of Osow youth in Cárdenas et.al. (2011) and de Hoyos et.al. (2013).

As can be seen, the trend of increased school attendance continued for these generations although the difference between the curves for the two cohorts (2 and 3) is smaller in this case in spite of the larger time span in the comparison with respect to Figure 2. Apart from illustrating that almost universal coverage of the schooling system in LA had been achieved for cohort 3, the data also show that Lower Secondary no longer seems to be a particular inflection point in attendance. In fact, the distance between the two curves is very similar throughout –with a slightly greater difference during the Primary schooling years- which suggests that what is observed at ages 15 to 18 is not necessarily related to contemporaneous events, but is rather the consequence of an upward generational shift in access to education pertaining all ages. Consequently, this is an example of the advantages of a dynamic view that allows observing trends prior to age 15.

The dynamics of labor force participation along the life cycle presented in Figure 3 are particularly revealing. According to our results, as opposed to the comparison between cohorts 1 and 2, in this case, the difference in labor force participation between cohorts 2 and 3 is much smaller and actually of lower value than the difference in education attendance. In this case, the greater school attendance in cohort 3 over compensates for the lower labor force participation with respect to cohort 2 –as opposed to Figure 2 where labor force participation rates were the main differences between cohorts 1 and 2- but the difference is rather small.

Continuing with the trend already observed between cohorts 1 and 2, the younger cohort remains in school longer, but fewer individuals are able to engage into the labor market. We are only able to observe cohort 3 up to age 18, so it is not possible to verify if there is full convergence at some point later.

The result in terms of the shares of Osow youth is seen at the bottom of Figure 3. There is a slight reduction in the share of individuals belonging to this group in cohort 3, but the difference is of about 2 to 3 points, which is smaller compared to the difference observed between cohorts 1 and 2. Had labor force participation rates in cohort 3 continued at the level observed for cohort 2 during the same ages, the share of Osow youth would have declined, and the magnitude would be equivalent to the increase in school attendance.

The average regional data for cohorts 2 and 3 divided by gender are shown in Figures 4 and 5. This is an important distinction because as discussed in Behrman, et.al. (2014) and as shown in de Hoyos, et.al. (2013) the factors driving time allocation decisions can be very different for women and men.

One feature that emerges from these results is that the differences between cohorts 2 and 3 in school attendance rates for both groups are very similar. There is a differential of about 5 percentage points from age 12 and older that remains until age 18 when cohort 3 is last observed. This corroborates the generational shift documented in Figure 3, and shows that not only did access to education increase, but it did so apparently with gender equality during the 10 years between the years of both cohorts.

However, large differences are observed in labor market participation rates across several dimensions. The first is that the proportion of males in the labor market is significantly higher for both cohorts. The second, and perhaps most important, is that the trend of lower participation in younger cohorts is observed to a larger extent for males. As shown in Figure 5, there is a gap between cohorts 2 and 3, with the younger generation showing proportions of 4 points less in labor market insertion from ages 12 to 18. Figure 4 presents the data for women, and illustrates that while labor force participation is also smaller initially for cohort 3 as compared to cohort 2, the difference is much lower and is inexistent at age 18.

The differences in labor force participation rates have direct consequences for the proportion of Osow youth in both groups. While for men there is only a small reduction—which is derived from the combination from more individuals in school, but fewer in the labor market at ages 15 to 18—for women there is a more significant decline of about 10 percentage points in the share of Osow youth, derived from increases in school attendance and small variations in labor force participation. Age 18 is a good example for the dynamics in this group. As can be seen, the share of Osow youth at this particular age is about 10 points lower in cohort 3 as compared to cohort 2, and the full difference is explained by higher school attendance in cohort 3 since female labor force participation rates are the same.

In general, the descriptive data shows that the main driving force behind the persistently high shares of Osow youth in the region is labor market insertion. Clearly, education coverage has been increasing over time, but the fact that fewer individuals participate in the labor market translates into consistently higher shares of Osow youth. There is a difference, however, in the patterns

observed by gender, since education expansion combined with somewhat more stable labor force insertion has translated into a declining share of Osow youth for females. Nevertheless, since participation rates for women continue to be considerably lower as compared to males –about 50 percent lower according to the results in Figures 4 and 5 for cohort 3- the impact of this decline in the total share of Osow youth is ameliorated.

Points of reference for empirical investigation

The conceptual framework by Behrman et.al. (2014) sets the time allocation issue as a choice between the four states shown in the previous figures, which is subject to liquidity constraints, imperfect information about the future, and high marginal propensities to consume, and that is taken under certain family, community and macro contexts that affect household decisions. In order to illustrate what these decisions would be in a situation of more unrestricted choices, Figure 6 presents the average cohort dynamics for the population in the richest 10 percent of the household distribution of income in the 18 LA countries in our database. This is only a reference point with the intention of showing what the preferred trajectories could be when economic circumstances allow for decisions to be taken more freely.¹³ We take as reference the cohort born during 1983-1985 to be able to view the full trajectory up to adulthood.

The first apparent difference with respect to the average patterns for the same cohort in Figures 2 and 3, is that at all ages, individuals in the richest 10 percent of the population show significantly higher school attendance rates throughout the period of the life cycle under observation. Specifically, a majority of individuals actually remain in school until age 20. In fact, attendance rates are 20 percent higher in the richest households as compared to the average all the way from ages 15 to 22. This suggests that under lower budgetary constraints and a less restrictive environment, households in general prefer to continue investing in schooling.

Similarly, labor force participation rates are relatively low –below 40 percent- until age 18, and increase sharply thereafter. For this cohort, the share of individuals at school and in the labor market is equalized at age 20. As can be observed, this intersection occurs earlier for the average individual in the population in cohort 2 and even earlier –at age 16- for cohort 1 (see Figure 2).

¹³ This is only for general illustrative purposes, since it should be borne in mind that as opposed to the data presented in Figures 2 to 5, the composition of cohorts when divided by income as in Figure 6 is likely to vary over time due to socioeconomic mobility. However, since income inequality levels are high and economic mobility rates are low in the region, perhaps the composition effects are not necessarily big enough so as to totally blur the picture. Two additional caveats are that the aggregation of data from the 18 countries in our sample is subject to the fact that the richest 10 percent in a relatively poorer country could be equivalent in terms of socioeconomic status to middle deciles in richer countries, and that the differences across income groups might not only reflect socioeconomic status but also differences in ability, motivation, expectations, etc.

The consequence is that Osow youth rates remain below 5 percent until age 15 and remain below 8 percent thereafter. This is an interesting result that shows that even in a more favorable context, some individuals may decide to remain in the Osow status (presumably) by choice.

If Figure 6 were actually the image of the life-cycle trajectory of cohort 2 under a scenario of lower restrictions, the conclusion would be that in general, Latin American households prefer to continue investing in the education of the majority of their school age members until around age 20, after which the majority enters to the labor market, with labor force participation rates of more than 80 percent at age 24 and almost 90 percent at age 27. About 8 percent choose to remain Osow through these ages. If this were the case, the Osow youth phenomena would not necessarily be of concern due, on the one hand, to its magnitude, and on the other, to its causes.

As a result, following the conceptual framework, deviations from what is observed in Figure 6 would be due to constraints that households face in their decision making process –including the budgetary constraint preponderantly- and due to the implications of the family, community, and macro environment. Section 3 below explores some of these factors empirically.

2. Out of School and Out of Work Youth Patterns

As shown in the figures above, each cohort has its own trajectory over the life cycle. Since our household survey database includes observations starting in 1980, the oldest cohorts for which a full trajectory can be followed from the first year of school age into adulthood are those born in 1974-1976, which are expected to enter the schooling system precisely in 1980-1982. These individuals can be observed subsequently until they are about 34 to 36 years old by 2010. All cohorts born during the 9 previous years will be observed first in 1980 when they are already in late Primary or Lower Secondary age. For these individuals it will be possible to trace time use choices between continuing in school, entering the labor market, or the Osow status, starting at the ages from 15-17 until reaching between 34 to 45 years of age, which is well into the typical labor force participation years. Cohorts born earlier will start being observed when they are already 18 years of age or older, so their time choices –especially for those born before 1960- will be most likely restricted to the work or Osow options.

On the other hand, the youngest cohorts that are included in our analysis are those born between 1994 and 1996, and that are expected to enter Primary education during the years 2000-2002. These cohorts can be followed during their school trajectory up to the age of attending Upper Secondary education around 9 years later, so it is likely that the majority will not yet have been confronted with the decision of entering the labor market or the Osow status. All cohorts born

earlier will already be of working age when observed for the last time by 2010, and will presumably be able to allocate their time to any of the three options.

Given the availability of data, we are able to construct 144 cohort trajectories covering the period of the life cycle of interest for the 18 countries included in our database (we exclude cohorts that we do not observe in the critical ages of interest and those for which only one observation in such period is observed). Depending on the surveys available in each case, each cohort is observed at spells of different lengths during different years.

Figure 7 plots all the cohort trajectories constructed with our data starting at age 12 and up to age 40. As can be observed, the critical turning point in life cycle trajectories in Latin America seems to be age 20. Panel A shows that precisely at age 20, between 25 and 40 percent of individuals – depending on the cohort observed- remain in the schooling system; a sharp decline is observed before this point, with smoother reductions thereafter. At the same age, around 50 percent is already in the labor market as shown in Panel B –with little variation across cohorts; this results from sharp increases in the previous years and a more stable continuous increase at older ages. In the case of the Osow group, it is interesting to observe continuous increases up to age 20 in Panel C, reaching between 25 to 30 percent and a stable trajectory after this point, with a somewhat decreasing trend to 20 percent by age 40.

Therefore, it seems that while intensive shifts take place between the three types of time use between ages 12 and 20, smoother transitions are observed thereafter, and mostly between the school and work options. According to our data, by age 25 about 68 percent of Latin Americans are in the labor market, around 10 to 15 percent remain in school at this age, and between 25 and 30 percent remain in the Osow group.¹⁴ After age 25 there is relative stability in the three groups with only slight variations tending to small reductions in the share of individuals in the education system, small increases in labor force participation, and slight declines in the Osow group.

The inclusion of the series of trajectories in Figure 7 allows us to observe that there are several sources of variation. The first, that is perhaps most evident in Panel A, is that there are differences across cohorts. As can be seen, for the cohorts that start being observed when they are around age 12, one particular group shows significantly lower attendance levels of around 70 percent as compared to the group with the highest rates of about 90 percent –which belongs to the youngest cohorts. Similar differences were shown in Figure 2, and are normally labeled as a “cohort effect” reflecting different structural conditions for different generations. The change in level between the

¹⁴ The classification of individuals working includes those working and in school at the same time, while the category of in-school also includes those in school and working simultaneously, so Panels A and B in the Figure add up to more than 100 percent. Also, it should be noted that here we plot only school attendance, so it is possible that individuals are still in school but not necessarily attending the level or grade that would be expected given their age.

two school attendance trajectories in Figures 2 and 3 would belong to these types of effects that tend to apply to all individuals in one cohort as compared to another.

The second is that there are variations along the life cycle of each cohort. The declining trend in school attendance along with the increasing trend in labor market participation that is observed as all cohorts age, are normally classified as “age effects”. The inverted “u” shape pattern in school attendance observed in Figures 2 and 3 are a good illustration of this.

A third source of variation are “time effects,” which correspond to shocks that occur in a particular year, and that can affect the choice of time use irrespective of the age or cohort to which each individual belongs. 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 good examples of this. These effects, however, are not immediately apparent in our data. The following subsection explains the procedure for identifying each of these effects separately.

Identifying age, cohort and time effects

In the context of the analysis of the dynamics of savings over the life cycle, several authors have attempted the identification of the aforementioned age, cohort, and time effects separately.¹⁵ We follow a similar approach here and apply it to our database. In line with the results in Figure 7 we part from the assumption that school attendance drops gradually beginning at the age of 12 (the average starting age for lower secondary schooling), and employment follows the inverse trend. While the trajectories of enrollment and employment have been hypothesized and tested, this is not the case for the Osow youth phenomenon.

As compared with the literature on household saving where this methodology has been used more extensively, the logic behind the model for estimating age, cohort, and time effects is simpler in our context, since we are dealing with indicators that are binary rather than continuous, and that follow a very different (and less complex) underlying investment model. For example, while savings may fluctuate quite a bit throughout the life cycle –whether to react to exogenous shocks or to change in investment strategies –the decision of when to leave school and enter the labor force typically only occurs at a critical age as discussed in Behrman, et.al. (2014) and predominantly before the age of 25 as observed in Figure 7. Also, in our case there is more hysteresis since the decision on time use at any point depends on the history of previous decisions.

¹⁵ Some examples are Attanasio (1993), Attanasio & Banks (1998), Attanasio (1998), and Attanasio and Székely (2001).

For implementing the procedure, since our focus is on examining the life cycle from 12 to 40 years of age, we drop all observations with a *median* age below 12 or greater than 40 in any given survey year t , and define the median age in any given survey year t as:

$$(1) \text{ Age} = t - c$$

where c is the median year of birth of each cohort. Since the cohort definition is homogenous across countries, the median age for a given cohort will always be the same in a given survey year t . Once we define cell means (which represent the proportion employed, enrolled in school, or Osow for a given cohort in a given year), we plot these against the median age for each cohort and survey year.

Given the definition of each cohort in t , the composition and size of each cell (for each country) can be defined theoretically as:

$$(2) \quad \sum_{c=1}^c c \sum_{t=0}^T t$$

However, since not every cohort exists in every survey year (given our median age restrictions), the real cell size is smaller. Since we are interested in cell means, 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:

$$(3) \quad X_t^{aci} = \delta_t^c + \varepsilon_t^{aci}$$

where δ represents cell means (in our case, the proportion of enrollment, employment, or Osow individuals), and ε is a random error (deviations from δ) with the assumption that $E[\varepsilon] = 0$ and known variance σ^2 ; $\varepsilon N(\cdot)$.¹⁶ As in related studies, in our estimation methodology, cell means are adjusted by cell size, such that cohorts with more individuals (within a given country) are weighted appropriately. Since our indicators (X 's) are binary (and thus not censored) and not restricted over the age profile we are considering, we can estimate the δ as simple weighted proportions of enrollment, employment, and Osow status.¹⁷

¹⁶ We make this assumption since we use OLS rather than maximum likelihood estimation methods.

¹⁷ While theoretically, we should be able to capture enrollment and employment data for all individuals between 12 and 40, in a few cases (eg. Venezuela between 1998-2008) some surveys restrict the education or employment modules to smaller age ranges. Where this is the case, we interpolate from previous/subsequent surveys.

While (3) captures an average trajectory over time (with a minimal amount of noise), it alone does not allow disentangling age, cohort, and time effects. Since we do not observe a given cohort over its entire life cycle (or at the very least, from the age of 12 through the age of 40), having postulated a typical age profile of schooling and employment (which is well documented in the literature), 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 δ_t^c represent cohort means for enrollment, employment, or Osow status, these means can be expressed as polynomials in age, year of birth (cohort) and survey year (with constant α_0):¹⁸

$$(4) \quad \delta_t^c = \alpha_0 + \hat{\alpha}_1 a + \alpha_2 a^2 + \alpha_3 a^3 + \alpha_1 a + \hat{\beta}_1 t + \beta_2 t^2 + \beta_3 t^3 + \hat{\gamma}_1 c + \gamma_2 c^2 + \gamma_3 c^3 + \epsilon_t^c$$

by substituting the coefficients on the linear terms we have:

$$(5) \quad \delta_t^c = \alpha_0 + \alpha_1 a + \alpha_2 a^2 + \alpha_3 a^3 + \beta_2 t^2 + \beta_3 t^3 + \gamma_1 c + \gamma_2 c^2 + \gamma_3 c^3 + \epsilon_t^c$$

where $\alpha_1 = \hat{\alpha}_1 + \hat{\beta}_1$ and $\gamma_1 = \hat{\gamma}_1 + \hat{\beta}_1$.

By taking the first differences of (5), we arrive at an equation that can be estimated to determine the shape of the age profile.

$$(6) \quad \Delta \delta_t^c = \alpha_1 + \alpha_2 \Delta a^2 + \alpha_3 \Delta a^3 + \beta_2 \Delta t^2 + \beta_3 \Delta t^3 + \epsilon_t^c$$

While it is possible to estimate (5) and (6) with additional variables to account for within-cohort heterogeneity (within each cohort-year cell), we estimate the model without controls. Doing so could potentially lead to biased estimates of our dependent variable of interest (the cell means, δ), but we assume that this heterogeneity would not greatly affect the shape of our age profile for enrollment, employment, or the Osow status.

We can plausibly estimate (6) using Ordinary Least Squares (OLS). Following Attanasio (1993), rather than estimating (6) above 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 (see below). That is, we estimate the following equation at the cohort-year level for each country:

¹⁸ Without making assumptions about the structure of the δ_t^c we cannot identify age, cohort, or time effects since the input variables are linearly dependent upon one another.

$$(7) \quad \delta_t^c = \alpha_1 a + \alpha_2 a^2 + \alpha_3 a^3 + \alpha_4 a^4 + \alpha_5 a^5 + \gamma C + \beta \tau + \varepsilon_t^c$$

where C represents a vector of $c-1$ dummies (γ a vector of coefficients) and τ represents a vector of $k-1$ constrained survey year dummies (where we exclude the most recent year) with its corresponding vector of coefficients β (where k represents the total number of survey years available per country). Since the interpretation on the constant (α_0) is ambiguous in (6), we estimate effects without it so we can plausibly identify the shape, but not the position, of the age profile. The specific modification of each survey year (t) dummy can be explained arithmetically by:

$$(8) \quad \tau_t = ((t - t_T) - (\frac{t_{dist}}{2} * t_{T-1}))$$

for each year t where the sub-index T represents the most recent survey year available and $dist$ is the “distance” in years between year t and the most recent year (t_T), which we divide by two. The smoothed profiles, assume that time 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 (e.g. time effects are identical across cohorts).

Regional Out of School and Out of Work Youth patterns

By estimating (7) above we can plot the predicted values of our indicators using age, cohort, and time against the median age, cohort, and survey year (respectively) to separately identify the age, cohort, and time profiles for enrollment, employment, and the Osow status. We can also estimate age and time effects isolated from cohort effects by dropping the $c-1$ cohort dummies from (7). We smooth out the profiles to obtain a single curve with the age, cohort, and time effects on the y-axis and the median age, cohort, and survey year on the x-axis. Our interest is in the effect on each indicator across age or cohort, or over time, and we group our sample of 18 countries by the relative magnitude and trajectory of these effects, basing our initial groupings on the established age profiles.¹⁹

Figure 8 presents our estimated age effects for school attendance, employment, and Osow status. As before, while there is a clear trade-off between the first two time uses, the trend for Osow youth is of an increase up to age 20 after which there is stability and a somewhat declining trend between ages 30 and 40, which suggests relatively high persistence across the life cycle. These trends were already apparent in Figure 7 but they are now presented net of cohort and time effects.

¹⁹ When we consider regional and group averages, and interpolate values for each year from 1980-2012, we artificially smooth already smoothed profiles using diagonal smoothing (the smoothing method is lowess). The regional profiles can only be smoothed so much since we have a full set of effects for each available cohort from 1980-2012, so for illustrative purposes we model the plot even more to assure a smooth line.

The estimated cohort effects, which are particularly revealing for our analysis, are plotted in Figure 9.²⁰ These effects are not readily apparent from Figure 7 since they are confounded by age and time effects and differences across counties. As can be seen in Panel A, there is a clear positive cohort effect for school attendance showing continuous progress in the expansion of education access in the region across generations. Interestingly, however, this is not the case for the employment trends in Panel B. According to our estimates, there is a slight inverted “u” shape pattern with a mildly increasing positive trend in access to the labor market for cohorts born between 1965 and 1980 -which entered working age between 1983 and 1998- and a slightly declining trend for cohorts born later and entering the labor market during the end of the 1990s and the early 2000s.

The combination of growing school attendance with (slight) increases in labor market insertion for cohorts born before 1980, reinforced each other and lead to a decline in the proportion of Osow youth across cohorts up to that point (Panel C). However, after the turning point in employment levels for cohorts born after 1980, the expansion in the share of individuals allocating time to education was counterbalanced to some extent by the lower rates of labor market insertion, resulting in a practically flat (with a slight negative slope) trend in the share of Osow youth. This lead to the persistent levels identified in Cárdenas et.al. (2011) and de Hoyos et.al. (2013).

Differences across Latin America

So far we have used the results from country level data to illustrate regional patterns across Latin America, from which some stylized facts have been derived. However, as shown in Bentaouet and Székely (2014) there are important differences in school enrollment patterns across the region. In particular, these authors classify countries in three groups, which are relevant for our analysis. The first group including Guatemala, Honduras, Nicaragua, El Salvador and the Dominican Republic is labelled of “*early dropout*”, since they are characterized by high dropout rates from the schooling system between ages 12 and 15, when the average LA youth is transiting through Lower Secondary. The second group is labelled of drop out “*in transition*” to Upper Secondary (US), and is characterized by a large reduction in enrollment in the transit between Lower and Upper Secondary. Costa Rica, Ecuador, Paraguay, Mexico, Colombia, Peru and Bolivia are included in this group. Finally Panama, Brazil, Uruguay, Argentina, Venezuela, and Chile are classified as of “*late dropout*” because reductions in enrollment occur more frequently during the course of Upper Secondary education.

These differences are relevant for the study of the Osow youth phenomenon, since they imply that the origins of this problem could vary across countries. For instance, in the first group of early dropout the Osow condition observed later along the life cycle will likely be associated with events

²⁰Time effects are not presented graphically since they are estimated to be close to zero for all three time uses.

that occur earlier, and perhaps even long before reaching the 15-17 age range, so policies to address it would need to focus on preventive measures at younger ages. For those characterized by dropout in transition, to focus might be primarily in interventions increasing retention between Lower and Upper Secondary, while for the third group, which includes mostly individuals that drop out at legal working age, it might be necessary to stress policies to facilitate labor market insertion.

In order to explore the heterogeneity across LA along these same lines, we estimate age, cohort, and time effects for each of the three groups defined by Bentaouet and Székely (2014) separately. Figure 10 presents our results. Panels A, B and C include the estimated age effects for the share of Osow youth and shows that while for the three groups of countries there is an initial increase up to age 20 as in the case of the regional averages in Figure 8, there is a turning point with reductions thereafter only in countries where education dropout occurs late or in transit. This suggests that when school dropout is observed at earlier ages, the likelihood of labor market insertion is lower, which leads to persistently high shares of Osow individuals. On the contrary, when dropout occurs later on average the fact that individuals leave the education system with more schooling might facilitate their employment prospects with a consequent decline in the share of youth in the Osow status later along the life cycle.

The cohort effects in the lower panels also show interesting differences. While in countries with early dropout our estimates show an increasing generational trend in the share of Osow youth, the contrary is the case for those that experience late dropout, and especially for those characterized by dropout in transition from Lower to Upper Secondary. In these last two groups there seems to be a secular reducing trend across generations.

In sum, due to the age and cohort patterns observed, it seems that the Osow youth phenomena is of greater concern in countries with early dropout. In contrast, in the other two, both age patterns and the generational shifts seem to be acting in the direction of reducing the share of this group in the future.

3. Factors Associated with Out of School and Out of Work Youth

Several questions arise from the evidence presented so far. Perhaps the most puzzling issue is that in spite of the educational expansion in the region across generations and of the schooling dropout occurring on average later in the life cycle, the share of Osow youth remains persistent. If as suggested by the trajectories in Figure 6 for the richest sectors of the population in a context of fewer restrictions, Latin Americans choose to enter the labor market after school age, the straightforward question is why this does not occur.

Several hypotheses seem plausible. Perhaps the most straightforward is the rate of job creation has remained low and does not allow for the incorporation of the new generations even though education levels keep growing. This, in turn, can be due to different circumstances. One among several possibilities could be that due to technological progress there is lower demand for labor in the production processes; another is that female labor force participation rates are increasing (as shown in Figure 4) due to multiple factors at a faster pace than the rate of job creation, and this has resulted in faster growth of labor supply that has crowded young men out of the labor market; an alternative explanation is that the 2008-2009 financial crisis that lead to a slowdown in economic activity reduced the demand for labor in recent years; yet another possibility is that churning has become longer lasting and more intensive in recent generations –perhaps because information and labor intermediation services are less effective- and this has retarded their labor market insertion.

From another view point, it is also possible that even though young generations are staying in school longer, the quality of education is deficient and does not meet labor market needs, which means that youth end up with more years of schooling, but the schooling acquired is not relevant and becomes a restriction for labor market insertion.²¹ Similarly, it might also be the case that youth are exposed to greater risks when leaving the education system –including for example teen pregnancy, exposure to addictions, violence, etc.- that makes it more difficult to transit to the labor market.

This section explores some of these hypothesis based on data availability. As noted by Behrman, et.al. (2014), the dynamics of Osow youth are determined by a series of elements which can be categorized as personal/family, community, and macro factors. Here we focus on the community and macro factors, for which the cohort approach presents the particular advantage of allowing for a truly dynamic analysis. In what follows we present our empirical strategy, we review related studies, and present our central results. Since we exploit the variability of the share of Osow youth for each cohort along the life cycle, the analysis is equivalent to explaining the age and time effects identified in the previous section.

Empirical Strategy

We start from the basic assumption that the relationship between the share of Osow youth and the factors that determine it can be expressed as:

²¹There is in fact a growing literature documenting this type of mismatch in Latin America and other regions in the world including Almeida, et.al. (2012), Bassi, et.al. (2012), Heckman, et.al. (2006), and Wang (2012), among others. Manpower (2010) and McKinsey (2012) provide some measures of the magnitude of the gap between the supply and demand for skills in several countries, including some in Latin America.

$$(9) \quad Y_{cjt} = f(\gamma_{jt}, \delta_{jt})$$

Y represents our outcome of interest for each cohort c in country j at time t (the proportion of Osow youth), which, following the conceptual framework in Behrman, et.al. (2014) is a function of γ , which includes community level factors (e.g., the poverty rate, inequality, female labor participation, the pupil-teacher-ratio for primary schooling, returns to education, etc.) and δ , which represent macroeconomic factors (e.g., trade patterns, income per capita, inflation, etc.). Equation (9) can be modified as a function of lagged variables, such that we wish to evaluate Y in time t and γ and δ in $t-n$, where the lag could be the length of the cohort or a longer period. Our estimation is thus:

$$(10) \quad Y_{cjt} = \alpha_0 + \beta \gamma_{jt} + \pi \delta_{jt} + \varepsilon_{cjt}$$

where for notational simplification β and π represent rx1 parameters of interest, respectively, and γ_{jt} and δ_{jt} represent a vector of community level and macroeconomic level factors at the country-year level, respectively, and ε is the error term with $E(\varepsilon_{cjt} | \gamma_{jt}, \delta_{jt}) = E(\varepsilon_{cjt}) = 0$.

Since our interest is on identifying the variables associated with changes in time use decisions along the life cycle, the outcome of interest is:

$$(11) \quad \Delta Y_{cjt} = Y_{cjt} - Y_{c,j,t-1}$$

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

$$(12) \quad \Delta Y_{ct} = \alpha_0 + \beta \Delta \gamma_{jt} + \pi \Delta \delta_{jt} + \varepsilon_{cjt}$$

where Δ presents the absolute change and $\Delta \gamma_{jt} = \gamma_{jt} - \gamma_{j,t-1}$ & $\Delta \delta_{jt} = \delta_{jt} - \delta_{j,t-1}$. Thus, equation (12) is equivalent to estimating a relationship under fixed cohort effects that leaves age and time effects as the sources of variability.

The influence of community and macro level factors on youth outcomes

As explained by Behrman et.al. (2014), supply-side factors at the community level have to do with the provision of services, such as urban infrastructure, health, education, security, the rule of law and other elements that mediate between the individual and his or her close environment. Deficiencies in the provision and quality of these services may increase the probability of early dropout and limited labor market opportunities which may result in higher shares of Osow youth. For instance, the lack of high school education services at the local level may considerably increase

the cost of enrolling in school for youth populations, increasing the risk of dropout. Similarly, low education quality may be a deterrent to school enrollment. Other key services are the availability of health and youth services, community infrastructure and services, the school physical environment, and access to technology that can facilitate alternative education options.

On the demand side, there are cultural patterns, elements of community organization (which, among other issues determine the “accepted” role of women), and the conditions of the local labor market that can be important for making the decision to enrolling in school, remaining in the system, or dropping out. Particularly, the local job opportunities and the demand for skills can be major determinants of the decision to enter or exit the education system by altering the opportunity cost of attending.

There is a large strand of literature exploring the relationship between educational outcomes and employment insertion at young ages, and these types of community level factors. However, our approach differs in two important ways; the first is that we follow a cohort approach, and the second is that we focus on Osow youth, which by definition is the residual of the education and/or employment status. In particular, many studies have focused on the community and school environment and school quality as a determinant of early dropout,²² while the labor market literature focuses on a variety of issues including churning practices, labor market regulation, and labor market conditions, among others.²³

On the other hand, the macro-aggregate level refers to those elements in the general environment and institutions that affect individuals but that are not influenced directly by the behavior of each individual. They include elements that are exogenous and that affect large groups of society. On the supply side, they include elements from education policy (including, for instance, the availability of scholarships or other elements of support to reduce the private costs of education to students) to the macroeconomic conditions of the country, economic volatility, inequality of opportunity, global cultural patterns, economic shocks, and credit availability in the economy. All of these affect the extent to which high quality education services can be offered to the population.

One of the most explored issues is the implications of shocks for education and labor market insertion decisions. Since the opportunity cost of investing time in the schooling system increases with age, the normal household reaction to an unexpected economic shock tends to be to shift the use of time for younger members from education to labor market activities due to a negative

²² Some examples are Sanders and Rivers (1996), Jordan, et.al. (1997), Rivkin, et.al. (2005), Jung (2005), OECD (2005), Hanushek, et.al. (2005), Hanushek and Woessman (2007), Dynarski (2011), Jacob and Wilder (2010), Barber and Moushed (2008), Karakus, et.al. (2010), and Jackson (2010), among others. A recent case analyzing community factors more widely is Harding, et.al. (2010), who argue that in order to characterize them adequately, a set of variables including the access to health services, the proximity to jobs, local measures of violence, neighborhood resources such as childcare services, cultural factors and the existence of social networks, should be taken into account.

²³ Bagby and Cunninham (2007), Bozik (2009) Cunningham and Bustos (2011), World Bank (2007), Dell’Aglia, et.al. (2007), Cunningham and Correia (2003), Moreno (2011), are among the many examples of this literature.

income effect. However, if the shock also results in lower wages, the implication can be a substitution towards school enrollment through a substitution effect due to a reduction in the opportunity cost of remaining in educational activities.²⁴ In the end, the balance between income and substitution effects is an empirical matter.

Yet another element closely linked to the availability of education and labor market opportunities is the demographic transition. Generations that are greater in number may exacerbate competition for jobs or for high quality education, and inherently exclude larger sectors or the population in atypically large generations.²⁵

On the demand side, critical factors include the economic returns to education, opportunities in the labor market, the global demand for different kinds of skills, sector growth patterns, and labor legislation that defines the conditions in which economic activity takes place, among others. The perceived returns to education play a critical role as they provide information on how the labor market rewards and values human resources of different types. For instance, relatively low returns to upper Secondary education relative to primary or lower Secondary may deter adolescents from investing more years in school as opposed to entering the labor market directly, precisely when they are aware of the differential returns. However, low returns to upper Secondary combined with higher returns to tertiary education may have the opposite effect. Similarly, higher returns to upper Secondary may motivate adolescents to complete this level.

Empirical results: Out of School and Out of Work Youth, community and macro factors

In order to verify the influence of community and macro factors over the share of Osow youth, we estimate equation (12) by pooling all cohort trajectories for all countries and survey years. The dependent variable is the change in the share of Osow youth for each cohort at each spell – depending on the country and year of each household survey- and this is linked with independent variables from two types of sources. A first set is computed directly from the same household surveys, from which the cohort trajectories are derived -including the returns to different levels of schooling, and labor force participation. The second set is defined using the World Development

²⁴ There is a large number of studies documenting the effects of economic shocks on school dropout at these critical ages, including the Ferreira and Schady (2009), Patel (2009), Mendoza (2009), Ramesh (2009), Mehrotra (2009), Keane (2009), Friedman and Levinsohn (2002), and Shang and Wu (2003), among many others. Duryea, Lam, and Levinson (2007) find evidence of the negative effects of shocks on educational and labor market outcomes in Brazil.

²⁵ Newhouse and Wolff (2013) analyze this empirically with a database of 83 developing countries and conclude that youth born in smaller cohorts are more likely to find jobs earlier, and they also tend to have access to more productive jobs. This effect, however, fades away over time.

Indicators database (2013 edition) for identifying country-level variables that cannot be computed directly from the surveys.

Since the estimation is performed in a first difference setting with Huber-corrected robust standard errors and year dummies, our results control for cohort time-invariant characteristics. All regressions are performed separately for males and females. We test with a series of specifications and report the model that shows more stability and consistency in the coefficient estimates.

Table 1 presents the relationship between the changes in the share of Osow youth in each cohort of females at the stage when they shift between ages 12-14 to ages 15-17, from ages 15-17 to 18-20, from 18-20 to 21-23, and from 21-23 to 24-26 years of age, respectively (all independent variables refer to changes during the respective years of observation). In this way, we are able to trace the dynamics of the association between the change in the share of Osow youth over the life cycle of each specific cohort, and the set of variables characterizing changes in community and macro factors that occur in the respective country exactly during the same time that the cohort age shift occurs.

The first variable included is the share of the population that resides in rural areas at each point of observation (from the World Development Indicators database). Since upper Secondary services are generally more easily available in urban areas, we would expect that the larger the share of the population in rural settings, the larger the proportion of adolescents that do not have direct access to the education services when transiting from Lower to Upper Secondary school, and the group more likely to drop out. Since employability is normally low at these ages, this would presumably be associated with an increase in the proportion of individuals in the Osow youth group.

According to our results, this variable is in fact positive and highly significant for the transition at the younger ages from 12-14 to the 15-17 range. However, for age shifts thereafter, although the coefficients are still positive, they lose their statistical significance. This is consistent with the interpretation that access to educational services is critical for taking the time allocation decision when individuals are at the age of transiting from Lower to Upper Secondary schooling.

A second community level variable is the proportion of children classified as malnourished in each country and year, which is taken, on the one hand, as an indicator of the proportion of the population with low incomes –and thus, low capacity for financing schooling- and also of the relative number of children with adverse conditions for achieving a normal level of academic performance, which presumably affects their transition through the education cycle. Our results show that the association with the change in the share in Osow youth is of the expected positive sign –increases in malnutrition correspond to greater shares of Osow youth- but the coefficient is not statistically significant in any of the age transitions observed for females.

The third set of variables we consider are the returns to Higher and Upper Secondary schooling, which are calculated directly from our household survey database. The returns are estimated only for the population of prime age between 35 and 55 years of age and therefore do not include the

age brackets considered in the dependent variable. These variables incorporate information on several issues. On the one hand, from the point of view of individual decisions, the higher the returns, the greater the incentives youth would be expected to have for remaining in the education system. On the other, in terms of labor market dynamics, higher returns could be reflecting either greater education quality –which presumably translates into greater labor productivity- or the relative scarcity of skills. Both forces would thus be expected to act in the same direction of reducing the share of Osow youth.

Surprisingly, the coefficients for the variable measuring changes in the returns in Higher Education is positive for the first two age transitions although it is not statistically significant. For transitions after age 18, the coefficient is of the expected negative sign but is not significant either.

In the case of the returns to Upper Secondary schooling, we observe the expected negative sign with a statistically significant effect at the age shifts that correspond precisely to the stage at which decisions of enrolling into Upper Secondary education occur. After this point, the association continues to be negative, but is no longer significant.

To characterize the dynamics of the labor market, we test for various specifications, from which we identify the share of females and males between 35 and 55 years of age that are in the labor force (with respect to all individuals in the same age group) as the most stable and consistent variables. It must be noted that this is different from measuring labor force participation, which also includes the unemployed that are actively seeking employment. The variable considered is thus closer to a measure of the availability of job opportunities.²⁶ An increase in the share of the population aged 35 to 55 that are employed is therefore interpreted as a sign of greater opportunities available in the labor market, and vice versa. We would expect a negative association with changes in the proportion of Osow youth reflecting that an expansion in available jobs would increase the opportunity cost of remaining Osow.

This variable is computed separately for males and females. Even though both would be expected to reflect the extent of job availability, in the case of males –given the higher labor force participation rates –the variable is more straightforwardly considered a measure of changes in labor market opportunities due to the economic environment. However, in the case of females, apart from capturing these same influences, the variable is also highly likely to reflect attitudes towards women in society including cultural and religious beliefs, discrimination, and others. For females, these aspects can have multiple consequences including additional incentives for enrolling in school earlier in life to be able to reap the benefits in the future, as well as more positive attitudes towards future labor force participation.

As can be seen in Table 1, our results are quite strong and consistent for this indicator. Our estimates show the expected negative association between the change in the share of males in the

²⁶ This approach is similar to the work by Bozick (2009) who relates schooling and labor market trajectories to local unemployment rates.

labor force and changes in the proportion of Osow youth females, for all age shifts. For the female employment independent variable, the same pattern is observed although the coefficient is not statistically significant for the earlier age shifts.

As for the macro environment, our estimates include the level of per capita GDP adjusted for purchasing power parity, the inflation rate, and trade flows as a share of GDP (all from the World Development Indicators).²⁷ The GDP variable is introduced to capture general shifts in the level of wealth in the country, with two probable effects. On the one hand, increases in resource availability would be expected to permit for greater human capital investments, with a consequent decline in the share of Osow youth due to increased school enrollment—which is an income effect. On the other, greater resource availability could also entail higher incomes in the labor market, which augment the opportunity cost of remaining in school and raise the incentives of shifting into the labor market—a substitution effect. In terms of Osow youth, however, both scenarios would be expected to lead to a shift towards lower proportions.

The inflation rate is introduced to characterize the level of stability in the economy. For this variable we would expect a positive association driven from the fact that higher instability leads to income fluctuations at the household level that could generate negative income effects over school attendance combined with tighter labor market conditions, and also through the effects that abrupt changes in the price level could have on the expected future returns to education.

In the case of trade flows, the interest lies in the fact that most of the countries in our sample engaged in an intensive process of trade liberalization in the late 1980s and early 1990s, which includes the period of our analysis. We expect that countries that introduced market-oriented reforms would experience a significant reallocation of factors of production, triggering changes in relative prices and productivity. Since Latin American countries are generally classified as relative middle to low-skilled labor, rather than skill labor intensive, greater trade would be expected to enhance the demand for middle or unskilled labor intensive goods. If such goods use human resources with higher levels of education, the incentives to remain in the schooling system and finish at least upper Secondary would be expected to be greater, with an association with lower shares of Osow youth.

As shown in Table 1, according to our results, these variables characterizing the macro environment seem to have only a minor influence in the shifts in the size of Osow youth groups for females when transiting from the 12-15 to the 24-26 ages along their life cycle (these effects are net of the influence through economic growth, for which we have controlled). The only statistically significant coefficients identified are those for changes in trade flows for the earlier

²⁷ In earlier specifications we considered other variables such as the real exchange rate and average wage rates; however, these variables are dropped due to the high collinearity with the trade openness and GDP per capita variables, respectively.

age transitions from 12 to 14 and 15 to 17 years of age, where increases in the independent variable are associated with declining shares of female Osow youth. The effect however, fades away as cohorts become older.

Lastly, we introduce the fertility rate observed at the year of birth, which in the same spirit of Newhouse and Wolff (2013) intends to capture the potential effects of “higher competition” from larger cohort sizes for accessing educational services at younger ages, and accruing to job opportunities after school age. The data is taken from the United Nations Population Statistics. Apart from our interest in the relationship with changes in the size of the Osow youth group, the inclusion of this variable allows controlling for the mortality and migration effects that might be inherent in the cohort trajectories constructed from our household survey data.

According to our estimates, there is in fact a positive and significant association between cohort size (as approximated by the fertility rate at the year of birth), and the share of females belonging to the Osow youth group. However, even though the coefficient remains positive, it loses significance after cohorts reach 18 years of age, which could be an indication that greater cohort sizes are more relevant for educational access than for their effects on labor market competition.

An interesting result to observe from these sets of estimations is that the R-squared of the model is relatively high, and increasing with the age group considered. The statistic reaches a value of 0.60 for the transition from ages 21-23 to 24-26, which suggests higher explanatory power for the stages of the life cycle where Osow youth shares remain relatively stable (as can be seen in Figure 8).

Table 2 presents the results for cohorts of males. As in the case of females, we find the expected positive association between changes in the share of Osow youth and changes in the share of rural populations across the life cycle until cohorts reach 20 years of age. However, the effect for males continues to be significant in later ages, which is not the case for females. The relation between changes in the share of malnourished children and the size of the Osow youth group is also of the expected positive sign, but as compared to the case of females, the association is statistically significant during the early stages of the life cycle, indicating that males tend to be more vulnerable to becoming Osow due to household poverty.

As for the returns to education, we find similar results of a non-statistically significant relation between the size of the Osow youth groups and the economic rewards of acquiring Upper Secondary or Higher Education. However, for males we do identify a significant effect of increases in the returns to higher education related to significant declines in the share of Osow youth between ages 21-23 and 24-16, which could be interpreted as a consequence of increased incentives for remaining in the school system at these ages.

Perhaps the most important result is the one observed for the relationship with male and female employment rates. For the share of males in the labor market, we find the expected strong and significant negative sign indicating that greater job opportunities lead to reductions in the share of

male Osow youth over time. However, a positive sign is observed for the relationship with female employment. Our interpretation is that increased female employment may have a “crowding out” effect for males in the labor market either by introducing greater competition for a limited number of jobs, or by downward pressing wage rates due to greater labor supply. That is, given that there are a limited number of jobs being created, increases in female participation lead to more limited employment prospects for males, which in turn, increases the share of Osow youth among this group.

This result is consistent with the descriptive evidence presented in Figures 4 and 5, which showed that for recent cohorts the conditions for labor market entry for males have been tighter, leading to patterns of later and lower entry, as compared to females in the same cohorts for which employment levels seem to increase earlier in the life cycle, and are of higher levels than for previous cohorts.

Moreover, these results might provide a plausible explanation for the persistent levels of overall Osow youth in Latin America documented by Cárdenas et.al. (2011) and de Hoyos et.al. (2013). Specifically, our results suggest that in the context of expanding education and low employment generation, the share of female Osow youth has been declining due to greater job market opportunities for this group –related to economic and non-economic factors- with consequent declines in employment opportunities for males, which generate persistently high shares of Osow youth for this gender group.²⁸

As for the macro variables included, there are similarities with respect to the negative and non-significant associations between GDP and inflation levels shown in Table 1, with the only difference being a significant effect of GDP per capita growth on the shares of male Osow youth transiting between ages 21-13 to ages 24-16. As for the trade variable, we also find negative associations as in the case of females, although the effects for males continue to be statistically significant at all ages –while they fade away for females after age 20.

Cohort size effects are also similar for females and males, although with a longer lasting significant positive effect of larger cohorts being associated with greater shares of Osow youth all the way to ages 23 for males.

As in the case of females, it is also interesting to note that the R-square for all models is quite high, and increasing along the life cycle of cohorts, reaching values of over 0.85 for the 21-23 to 24-16 age transitions.

²⁸ The results and interpretation are consistent with other studies including Acemoglu, et.al. (2004) and Juhn and Kim (1999), who show that the expansion of opportunities for females had negative effects on different dimensions of male employment at different stages, in the United States.).

4. Possible Future Consequences of Out of School and Out of Work Youth: The Presence of Scarring Effects

This final section explores whether being Osow at youth can have consequences for future labor market prospects in the income and the employability dimensions.

The related issue of whether higher unemployment or underemployment levels among the youth can have long lasting effects in labor market trajectories, has been widely analyzed using panel or pseudo panel data in the literature. A recent reference is Cruces, et.al. (2013), who use cohort data for Brazil with the same approach as here, and find that levels of informality at young ages are related to higher unemployment rates and lower wages at later stages of the life cycle, although the effects tend to fade away over time. Other examples of evidence of negative implications of youth unemployment on future employability and/or wage levels are Cockx and Picchio (2011), Fairlie and Kletzer (2003), Gregg and Tominey (2005), Gregory and Jukes (2001), Jacobson et al. (1993), Neumark (2002), and Nilsen and Reiso (2011).²⁹

As for education, a large number of studies on its determinants and consequences for future outcomes are also available. Some examples using panel data are Hanushek, et.al. (2011), who examine the relationship between early education choices and future labor market outcomes using retrospective data to emulate a panel approach, and find considerable implications in terms of employability. Torche (2012) follows a cohort approach to identify the effect of economic shocks on schooling outcomes using synthetic panels for Brazil, Chile and Mexico, and uses smoothing techniques similar to those in Section 2 above for estimating time effects in the data. Through a descriptive approach, the author argues that cohorts exposed to negative economic conditions during school age have in general lower future education levels than other generations. Dynarski, Hyman and Whitmore (2011) use panel data and also find effects of school conditions to which cohorts are exposed during childhood on future college enrollment and graduation. Jacob and Wilder (2010) examine the effects of educational expectations during childhood on future attainment and also find positive effects using panel data, while as mentioned before, Boznick (2009) finds that community environments can have significant implications for time use choices and future labor market outcomes.

Following Cruces et al. (2013), the empirical model we estimate is:

$$(13) \quad Y_{it} = \alpha_0 + \alpha_1 X_{it-20} + \beta p_{it} + v_{it} + \tau_t + \varepsilon_{it}$$

where Y is the log of income or employment status of cohort i at time t , X is the share in the Osow youth status for the same cohort observed 20 years earlier, p is a vector of cohort characteristics,

²⁹ A related literature measures the effects of economic shocks on unemployment and other variables and finds persistent significant effects on various dimensions over time. Some examples are Bell and Blanchflower (2011), Giuliano and Spilimbergo (2014), Greg and Tominey (2005), Kahn (2009), and Oreopolus (2004).

v is a cohort fixed effect that is time-invariant, and τ is a time effect. We estimate two labor market indicators of interest –the log hourly wage and the employment status –for the population between 35 and 40 years of age. The estimation with our pooled data also includes cohort fixed effects with which the coefficient α_1 represents the scarring effect of the Osow youth status at early stages in the life cycle on future labor market outcomes. Following McKenzie (2004), since cohort sizes are quite large, we estimate equation (13) by OLS including cohort fixed effects, and since the independent variable for log wages is only computed for employed individuals, we do not expect significant biases from sample selection.

Table 3 summarizes our results for the female and male estimates, respectively, by presenting the coefficient of interest.³⁰ As can be seen, in the case of wages we find evidence of strong scarring effects of higher proportions of individuals in the Osow youth group at 15-20 years of age, being associated with lower wages both, for males and for females, later in the life cycle at ages 35-40. For employment levels, significant scarring effects from being Osow at ages 15-20 are also observed in the case of females, although not for males.

Thus, our results support the view that the prevalence of the Osow youth problem is of interest for reasons that have to do with contemporary concerns including the exposure to risks, and lower productivity due to loss of human capital acquired through education and experience, but there are also grounds for worries about future effects over labor market outcomes.

5. Conclusions

This paper examines the Osow youth phenomenon through a dynamic approach by constructing a household survey database that allows tracing the life cycle trajectories of different cohorts over time. By following life-cycle trajectories of synthetic cohorts we are able to identify whether what is observed in other studies at snapshots during the 15-18 or 19-24 age spells are due to contemporaneous factors, or if they are also associated to dynamics at previous ages including for instance early school dropout, and whether the status of Osow youth remains or not thereafter. Furthermore, we estimate the influence of some of the variables associated with being Osow, as well as possible effects observed through labor market outcomes at later stages of the life cycle.

By smoothing out the age, time, and cohort effects inherent in life cycle profiles we find that for Latin Americans there is an average pattern of life cycle trajectories of high school attendance early from ages 6 to 12, with a considerable drop that starts smoothing out at age 20. Similarly, there is a trend of increased labor force participation from early ages and up to the same turning point observed when cohorts are 20 years old, with continuous increases thereafter that start smoothing out before age 30. Given that the drop in school dropout is faster than the rate of labor

³⁰ Coefficients for the control variables are omitted for clarity in exposition.

market insertion, the share of Osow youth also increases until about age 20, after which it remains stable with a small decline when cohorts reach around 35 years of age.

There are, however, important differences. By viewing the evolution of life cycle patterns for males and females separately we observe that for females, the drop in school attendance is counterbalanced largely by greater labor market insertion, which is not the case for males. This results in a declining proportion of Osow youth observed only for females.

Another important difference is that age and cohort effects vary by groups of countries. For countries with early school dropout, we observe increases along the life cycle in the share of Osow youth with a stabilization around age 25, while for countries with dropout during transition between Lower and Upper Secondary and with late dropout, there is an “inverted u” shape age trend with increases up to age 20 and declines thereafter. The main difference, however, is that while for the last two groups a negative cohort effect of reducing Osow youth proportions is identified, for the first cohort effects show a positive sign, indicating that there is a generational trend towards increasing the relative importance of this group.

The country group differences lead to a variety of interventions, with preventive measures to avoid school dropout being more relevant in the first group, policies that support the transition between Lower and Upper Secondary being priority in the second, and labor market insertion interventions being especially relevant in the third.

As for the variables associated with the persistent Osow youth proportions, we also find important gender differences. One of them is that household poverty is significantly associated with higher shares of Osow youth at ages 12-20 for males, while the effect is not significant for females. The access to educational services as approximated by the share of population living in rural areas seems to be relevant for both groups, although with longer lasting effects up to age 20 for males – as opposed to being significant for females only up through ages 15 to 17.

Perhaps the most important result is the one that refers to the relationship between the size of the Osow youth group and labor market opportunities. On the one hand, we find that a larger share of males employed in the 35-55 age group is related to smaller sizes of the Osow youth groups from 12 up to 26 years of age for males and females -which is interpreted as a sign that more jobs increase the opportunity cost of being Osow and therefore reduce the incentives for belonging to this group. However, on the other hand, when the employment rates for females in the 35-55 age group is considered as independent variable, the sign of the relation differs. In the case of females we find the expected negative relationship between this variable and the share of Osow youth, which is interpreted as evidence of the influence that greater labor opportunities due to economic and non-economic factors have on women’s time use choices. In contrast, in the case of males there is a positive relationship. Our interpretation is that greater labor force participation by women can be “crowding out” men from the labor market at young ages given slow job creation rates. As

a consequence, the size of the male Osow youth group has remained stable, and with this, total Osow youth shares have remained persistent.

Finally, we explore the possibility of scarring effects, and find that in fact, higher shares of Osow youth at ages 15-20 are associated with lower wages for the same cohorts later in life in the 35-40 age brackets, both for males and for females. As for employment prospects, we find scarring effects only for females –with greater Osow youth shares being related to lower proportions of women in the labor market later in the life cycle.

Our results therefore suggest that apart from the current concerns for the Osow youth phenomenon, there are additional reasons for addressing this issue in order to avoid long lasting consequences for the future.

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Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

Figure 6

Figure 7

Figure 8

Figure 9

Figure 10

Table 1

Differences in Differences estimations for cohorts of females				
Independent variable	Dependent Variable: change in the % of Osow youth across age groups in the same cohort			
	Age 12-14 to Age 15-17	Age 15-17 to Age 18-20	Age 18-20 to Age 21-23	Age 21-23 to Age 24-26
% of population in rural areas	0.0087***	0.0045	-0.0118	-.0049
% of malnourished children	0.0005	.0010	0.0003	.0017
Returns to Higher Education for 30-55 year olds	0.0048	0.0063	-0.0045	-.0009
Returns to Upper Secondary for 30-55 year olds	-0.1519**	-0.0108	-0.0062	-0.0003
% of 30-55 year old females in the labor force	-0.1209	-0.2727***	-0.3495***	-.3986***
% of 30-55 year old males in the labor force	-0.3141***	-0.2459***	-0.1772**	-.2650***
Country GDP Per capita growth rate	0.01945***	0.0872	-0.0256	-.0267
Inflation rate in the country	-0.0009	-0.0067	-0.0039	-0.0017
Trade as a share of DGP	-0.0005*	-0.0013**	-0.0004	-0.0009
Fertility rate at year of birth of cohort	0.0301**	0.0731***	0.0109	0.0088
Constant	0.1088	0.0137	0.021	0.0108
Observations	201	201	201	201
R-squared	0.233	0.349	0.503	0.63

Source: Author's calculations. *p<0.10, **p<0.05, ***p<0.01

Table 2

Differences in Differences estimations for cohorts of males				
Independent variable	Dependent Variable: change in the % of Osow youth across age groups in the same cohort			
	Age 12-14 to	Age 15-17 to	Age 18-20 to	Age 21-23 to
	Age 15-17	Age 18-20	Age 21-23	Age 24-26
% of population in rural areas	0.0177***	0.0139***	0.0031	0.0066*
% of malnourished children	0.0031*	0.0062**	0.0013	0.0018
Returns to Higher Education for 30-55 year olds	-0.0007	0.0032	-0.0014	-0.0098***
Returns to Upper Secondary for 30-55 year olds	-0.0015	-0.0046	-0.0024	-0.0115
% of 30-55 year old females in the labor force	0.0956	0.0087*	0.2504***	0.0843**
% of 30-55 year old males in the labor force	-0.3889***	-0.4748***	-0.7666***	-7682***
Country GDP Per capita growth rate	-0.1139	0.0321	-0.0441	-0.0617***
Inflation rate in the country	-0.0054	-0.0036	0.01127	0.0026
Trade as a share of GDP	-0.0006***	-0.0013***	-0.0002*	-0.0004**
Fertility rate at year of birth of cohort	0.0391**	0.3921*	0.0224***	0.0076
Constant	0.08	.879	-0.0128	-0.0072
Observations	201	201	201	201
R-squared	0.39	0.384	0.799	0.856

Source: Author's calculations. *p<0.10, **p<0.05, ***p<0.01

Table 3

Estimation of scarring effects of Being Out of School and Out of Work at young ages on labor market outcomes at ages 35-40				
Independent variable	Dependent Variable: wages at 35-40		Dependent Variable: employment at 35-40	
	Effect for Females	Effect for Males	Effect for Females	Effect for Males
% of Osow youth of same cohort 20 years earlier at 25-20 years of age	-0.0302***	-0.0773***	-0.0041***	-0.0007
Observations	78	78	78	78
R-squared	0.1961	0.1972	0.3424	0.22

Source: Author's calculations. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Appendix

Table A.1

Country	Years for which household survey is availble																				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 Dominican Rep.	1984	1989	1992	1994	1996	1998	2000	2002	2004	2005	2006	2008	2010									13
	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.