The Educational Gender Gap in Latin America and the Caribbean

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Abstract[*]

This paper analyzes the evolution of gender differences in schooling attendance and attainment in Latin America and the Caribbean, for both adults who left the educational system and children in school. For individuals 21 years old and above the paper uses a cohort analysis of school attainment. The results indicate that the schooling gap has closed for the cohort born at the end of the 1960s. Since then, the gap has reversed such that within the cohort born in 1980, females have, on average, ¼ of a schooling year more than males. During the four decades of birth cohorts of our analysis (1940-1980) the gender gap in attainment has moved in favor of females at a pace of 0.27 years of schooling per decade. A decomposition exercise suggests that the changes in the schooling gap are mainly explained by the educational attainment of females at the higher levels, rather than improvements in the early years of education. An analysis of attendance and attainment among girls and boys between 6 and 18, for Bolivia, Guatemala, Mexico and Peru (the countries that have not closed the gap in adult schooling attainment) reveals noticeable gender differences, favoring boys, only among older children of the lowest income quintiles and indigenous ethnicity.

Keywords: Educational Gender Gap, School Attainment, School attendance, Marital Status, Latin America

1. Introduction

Education is fundamental to prospects for economic and social development and the end of world poverty, and nations with higher average schooling for their populations have been more successful in their development paths. Nonetheless, as important as the overall level of education in a country is its distribution among its citizens. A significant dimension in the distribution of education is that of gender, and worldwide data show that in most countries, females attain lower levels of schooling than males. In fact, the gender gap in education is higher in developing countries than in developed countries.

Strengthening girls' education opportunities is a strategic priority. The econometric evidence suggests that societies have to pay a price for gender inequality in terms of slower growth and reduced income (Dollar and Gatti, 1999). Besides generating private returns from labor market participation, women's education has strong social externalities. There is a large literature showing that higher levels of education of women contribute to reducing fertility (Schultz, 1973; Cochrane, 1979), which in turn decreases infant mortality and increases life expectancy (Behrman and Deolalikar, 1988). There is also ample evidence of the intergenerational effects of the education of mothers on the education, health and wellbeing of their children (Behrman, 1997; King et al., 1986; Schultz, 1988; Strauss and Thomas, 1995; Behrman, Duryea and Székely, 1999). In addition, there is empirical evidence for asserting that adding to a mother's schooling will have a larger beneficial effect on a child's health, schooling, and adult productivity than would adding to a father's schooling by the same amount (Schultz, 1993; King and Hill, 1993). Studies on rates of return have also documented the economic benefits of investing in females' education (Psacharopoulos, 1994; Psacharopoulos and Tzannatos, 1992).

Despite the mounting empirical evidence demonstrating the social benefits of promoting equal educational achievements for men and women, in many developing countries investments in the education of girls continues to lag behind that of boys. In Paul Schultz's words, "the objective of increasing educational opportunities for women is probably as old as the gender gap in schooling." The international community has made sustained efforts to increase girls' education in developing countries, most recently including it as the third goal of the Millennium Development Goals and as Objective 5 in the Dakar Framework for Action. UNESCO data show that girls' enrolment improved in all regions during the 1990s. Out of 153 countries for which

disaggregated data are available, 86 countries have achieved gender parity. However, only 18 of the remaining 67 have a good chance of attaining the goal by 2015. This means that globally, more than one in five girls of primary school age are not in school, compared to about one in six boys. Oceania, Western Asia and Southern Asia and Sub-Saharan Africa are the regions where the gender gap is most pronounced.

Latin America and the Caribbean (henceforth LAC) have largely succeeded in improving the education of girls and women. In contrast to the situation of Africa, Asia and the Middle East, gender parity in education, and its corresponding Millennium Development Goal, have been achieved in LAC. Furthermore, in most of the countries of the region there is a reverse gender gap in education. Women are nowadays achieving higher average years of schooling than their male counterparts, with important exceptions in the case of indigenous communities of Guatemala and Bolivia, where girls receive slightly less schooling than boys. These surprising outcomes seem to contradict the standard assumption that parents favor investing in boys' education.

Advances in the education of women undoubtedly represent one of the biggest success stories in the region. However, little is known about this important and unprecedented accomplishment in the developing world. In fact, most studies that have looked at a variety of educational outcomes in LAC have not gone beyond addressing the absence of a gender gap in the region. While Knodel and Jones (1996) stress the rapid closure of the gender gap in most of the world, suggesting that the strong emphasis on eliminating gender inequality in schooling is no longer needed, they do not specifically address the situation in LAC. Behrman, Duryea and Székely (1999) were the first to analyze schooling progress in LAC using household surveys. The authors highlight, as a striking feature, that for two-thirds of the 18 LAC countries considered the average years of schooling for females is higher than for males for the cohorts born in 1970.

One of the few efforts to look at gender differences in education in LAC is Parker and Pederzini (2000), who examine the determinants of the level of education of girls and boys in Mexico and the factors that may explain gender differences. In a recent paper commissioned by the IDB using household surveys, Marshall (2005) found that enrollment rates of 6- to 11-year-olds were lower among girls than boys in only four of 22 countries considered. The picture changes slightly for older age groups, but in the majority of the countries enrollment rates favor

girls. Turning to other performance and efficiency indicators, Marshall reports lower repetition and drop-out among girls, as well as higher promotion rates, and in most countries girls have better grade-for-age outcomes than boys

This paper analyzes the evolution of the gender gap in the average years of education in LAC countries for the cohorts born between 1940 and 1980. Using household surveys we produce an exhaustive descriptive cross-country analysis of the changes in the distribution of education by gender, by cohorts and country. This paper's attempts to answer the following questions: Are there current gender differences in attendance and attainment among 6-20 year-olds by income quintile and by ethnic characteristics? When did the gender gap in schooling close in LAC? Was it a uniform process across the region or some countries closed the gender gap earlier than others? Is the reversal of the gender gap in LAC uniformly distributed by education levels or is it mostly explained by changes among the more educated? Finally, the paper presents some preliminary results from the effects of the gender gap on the marriage market in LAC.

In spite of the importance of understanding causes and effect, determining what policies may have led to gender parity in the region lies beyond the scope of this paper. It is also important to bear in mind that gender equality in education is certainly not confined to attainment, the measure considered here.

The paper is organized as follows. After this introduction, in Section 2 we describe the data used for the empirical analysis, the RES Harmonized Household Surveys. In Section 3 we turn to the core of the paper and present gender differences in attainment by birth cohort, analyzing the evolution of the gender gap by country over time. This section ends with a decomposition of the evolution of the schooling gap by level of schooling attainment. Section 4 presents a descriptive analysis of current trends in schooling attendance and attainment of 6- to 18-year-olds by gender and income quintile for the countries in which the gender gap in schooling has not yet closed. Section 5 concludes.

2. Data

All the statistics and estimations presented in this study come from Household Surveys of 17 Latin American countries as shown in Table 1.

Table 1. Household Surveys

Country	Survey	Year
Argentina	Encuesta Permanente de Hogares (EPH)	2002
Bolivia	Encuesta de Hogares	2002
Brasil	Pesquisa Nacional por Amostra de Domicilios (PNAD)	2003
Chile	Encuesta de Caracterización Socioeconómica Nacional (CASEN)	2003
Colombia	Encuesta Continua de Hogares	2003
Costa Rica	Encuesta de Hogares de Propósitos Múltiples (EHPM)	2004
El Salvador	Encuesta de Hogares de Propósitos Múltiples (EHPM)	2002
Guatemala	Encuesta Nacional sobre Empleo e Ingresos	2002
Honduras	Encuesta Permanente de Hogares de Propósitos Múltiples	2003
Jamaica	Survey of Living Conditions	2002
México	Encuesta Nacional de Ingreso y Gastos de los Hogares (ENIGH)	2002
Nicaragua	Encuesta Nacional de Hogares sobre Medición del Nivel de Vida	2001
Panamá	Encuesta de Hogares	2003
Paraguay	Encuesta Permanente de Hogares	2003
Perú	Encuesta Nacional de Hogares sobre Medición de Niveles de Vida	2003
Uruguay	Encuesta Continua de Hogares	2003
Venezuela	Encuesta de Hogares por Muestreo	2004

These surveys have been processed and harmonized by the Research Department of the Inter-American Development Bank to facilitate cross-country comparisons. The process of harmonization involved a careful treatment of different variables of the surveys, especially among those referred to income. As household surveys vary in their coverage of sources of income, we have attempted to construct a consistent definition of household income which includes monetary income from labor and non-labor sources supplied by household members.[1] Then we constructed income quintiles from the distribution of per-capita household income specific to individual countries in which the total household income was divided by the number of household members.

For the purposes of this paper, it should be noted that a harmonization process was undertaken to standardize the variables measuring levels and years of schooling. The need for

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[1] An alternative approach would be to create a measure of income that emphasizes consistency within a county across time. This is the approach taken in the Sociometro web tool (www.iadb.org/sociometro), which has a strong inter-temporal focus. Since we are using one recent survey per country we have elected to harmonize income so that it is consistent across countries.

such harmonization is reflected in in Appendix Table A.1, which shows a variety of ways in which countries classify levels and years of schooling. In Appendix Table A.2 we provide information on the classification of the schooling systems and the specific wording of the questions asked in reference to school attendance.

As usual, each observation in each household survey has an associated expansion factor that reflects the particularities of the sampling methods involved. The expansion factor can be interpreted as the number of individuals that each particular observation represents, and hence, the sum of the expansion factors in any given survey approximates the population size of the country. In this way, pooling the observations contained in the 17 surveys, each weighted by its expansion factor, we are able to construct a sample that represents 90 percent of the population of Latin America and the Caribbean.

3. Gender Differences in Adult Attainment by Birth Cohort

This section analyzes gender differences in school attainment, measured by years successfully completed, for adults 21 years and older in the region. This section analyses gender differences in school attainment for adults (21 years and older) in the region. The measure we use is the number of approved years in the schooling system. We recognize that the range for such numbers may differ across countries simply as a result of the differences in the corresponding schooling systems. Nonetheless, by concentrating the analysis on the gender gap, such differences in the schooling systems have no impact on the analysis.
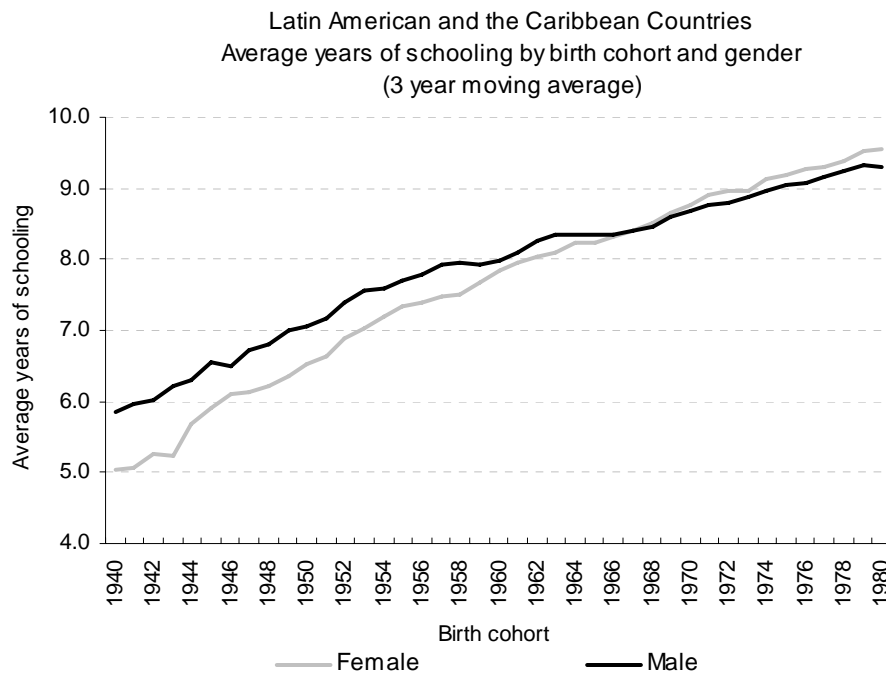
To provide a perspective on the way in which the gender schooling gap has been changing during the last decades, the analysis is done with a cohort approach. We analyze the changes in the gender schooling gap from the oldest to the youngest birth cohort in our sample, exploring the composition of such changes as well.

3.1 Evolution of the Gender Education Gap

Figure 1 shows the evolution of the average number of years of schooling completed by females and males by birth year. The data reported in the figure, as well as in the rest of the section, is computed with three-year moving averages. According to the data, females born between 1940 and 1942 attained, on average, 5 years of schooling while their male counterparts attained 5.8. The gender education gap was 0.8 years for that birth cohort. For those born between 1979 and

1981 (that is, those who were between 21 and 24 years old at the time of the surveys), the average schooling attainment for females was 9.6 years and 9.3 years for males. During this period of four decades, females' schooling attainment increased by approximately 4.6 years while males' attainment increased by 3.5 years.
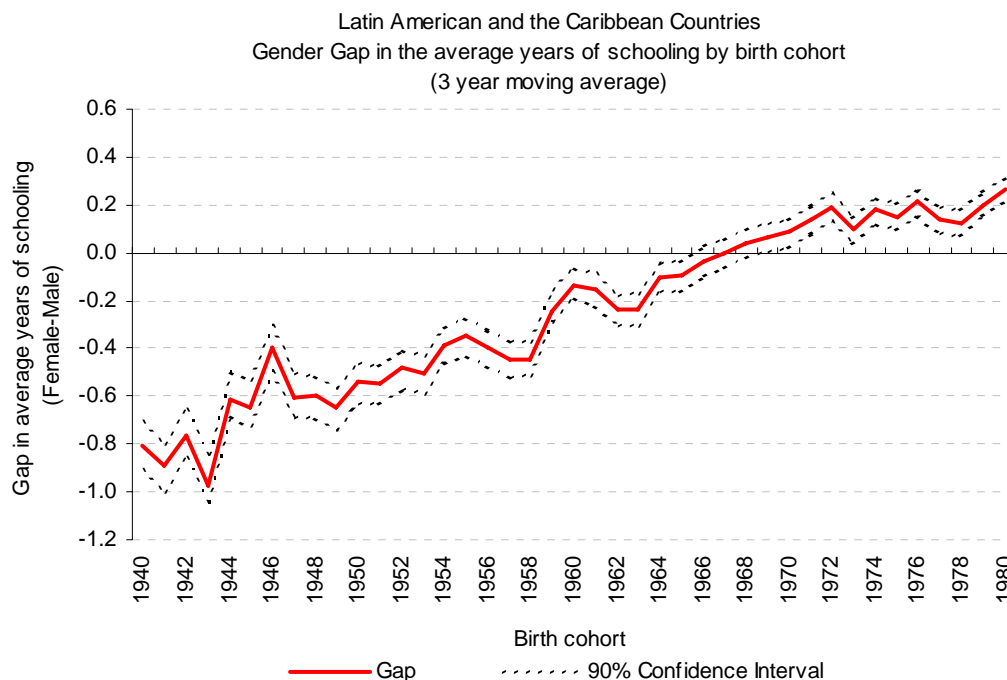
Figure 1.

Latin American and the Caribbean Countries
Average years of schooling by birth cohort and gender
(3 year moving average)

Source: Authors' calculations based on IDB Research Department Harmonized Household Surveys.

Figure 2 illustrates the evolution of the education gender gap during the period of analysis, computed as the difference between average female schooling minus average male schooling. The solid line represents the average gap and the dotted lines represent a 90 percent confidence interval. Such average moved from approximately one year in favor of males for the birth cohort 1940-1942 to almost one-quarter of a schooling year in favor of females for the birth cohort 1979-1981. For the four decades of birth cohorts covered by our data sets, on average the gender gap has been declining at a rate of approximately 0.27 years of schooling per decade. The figure also suggests that gender parity was achieved for those born around 1967.

Figure 2.

Latin American and the Caribbean Countries
Gender Gap in the average years of schooling by birth cohort
(3 year moving average)

Source: Authors' calculations based on IDB Research Department Harmonized Household Surveys.

These average statistics for the LAC region hide interesting intra-regional diversity. We report in Appendix A.1 the evolution of the average years of schooling for males and females as well as the evolution of the corresponding gender education gap for each country in our sample. These graphs suggest that the largest changes in favor of females in the education gap occurred in Venezuela and Peru; on the other extreme, Jamaica and Guatemala are the countries in the sample showing almost no change in the gap.[2]

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[2] From a societal standpoint it is unclear whether big changes in gender gaps are preferable to small ones; that question goes well beyond the scope of this paper. As is shown below, our results indicate that large changes in the gender schooling gap are associated with higher levels of polarization in Venezuela, although not in Peru.

Next, we report in Figure 3 the birth cohort for which each country achieved gender parity. Six LAC countries achieved parity for those individuals born in the early 1950s, while Venezuela and Costa Rica achieved parity for those born in the mid-1950s. Three other countries closed the gap by the mid-1960s and two others by the early 1970s. Since then no other country has closed the gender gap in schooling attainment. Four countries have not yet achieved gender parity. Interestingly, these are the LAC countries with proportionally large indigenous populations (Bolivia, Guatemala, Mexico and Peru). A linear extrapolation of the rate at which the gap has been declining in these countries suggests that parity would be achieved for those born in 1984 in Peru and 1999 in Mexico. That is, the generation for which the gender parity in schooling attainment is expected in these two countries has already been born.[3] The same linear (and very simplistic) estimates suggest that parity will be achieved in Bolivia for those born in the year 2011. ivia the parity will The tendencies shown for Guatemala do not allow us to suggest an estimate for the year at which parity would materialize.

Figure 3. Closure of the Gender Gap in Average Years of Schooling by Country and Birth Cohort
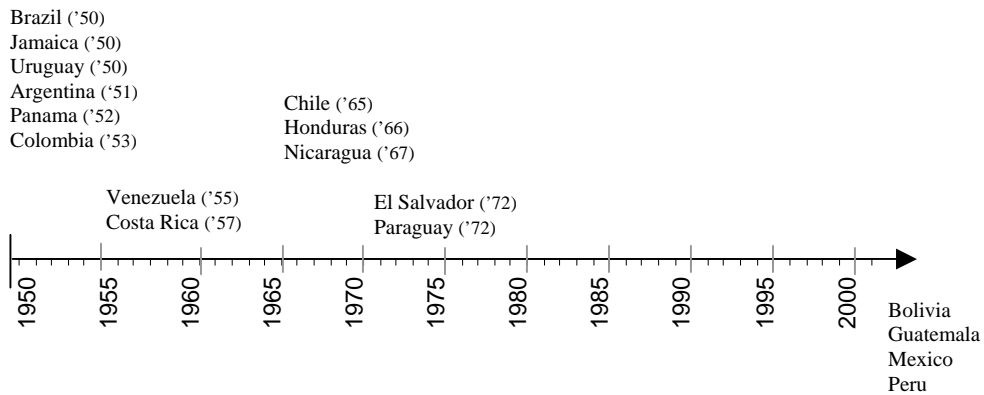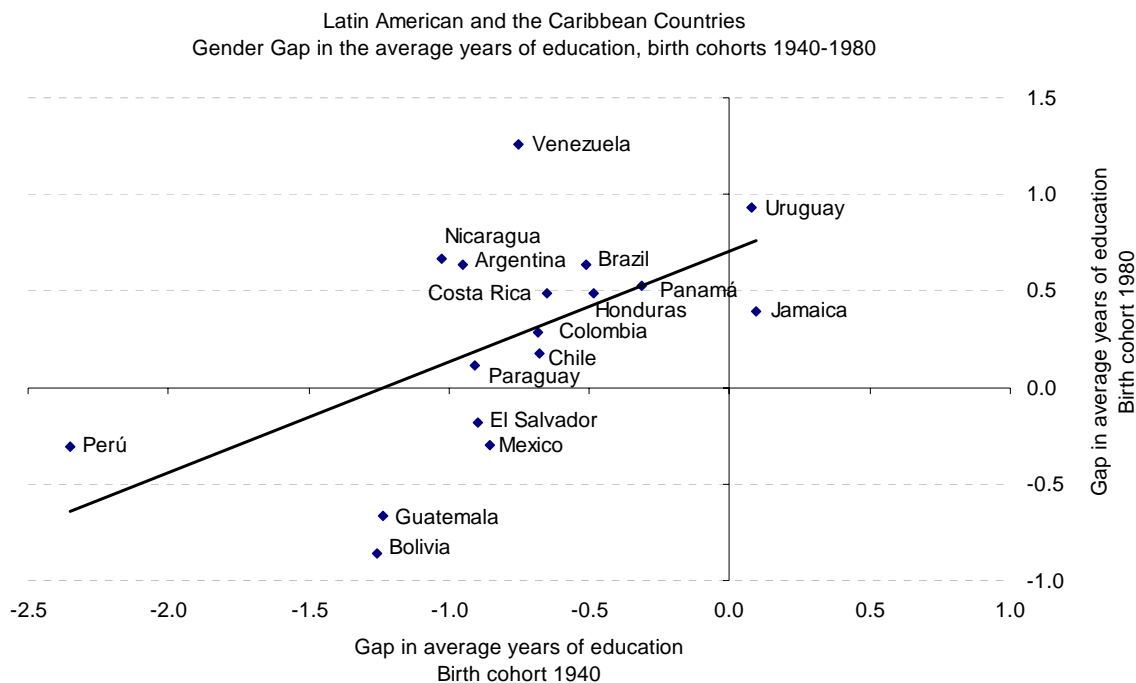

Source: Authors' calculations based on IDB Research Department Harmonized Household Surveys.

Figure 4 illustrates the gender education gaps by country for the birth cohorts of the time span of interest (1940 and 1980), country by country. The plot illustrates that Uruguay and

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[3] At this point it should be emphasized that our estimates of the gender gap in education refer only to attainment (years of completed schooling) and should not be confused with other measures of gender parity discussed in the the literature. Elsewhere in the literature gender parity is discussed as attendance by equal proportions of boys and girls at each grade level. As illustrated in the previous section, however, gaps in attendance and attainment could be substantially different.

Jamaica are the two countries in the sample where females' schooling exceeds that of males for both birth cohorts. Venezuela is the country for which changes in the gender gap were substantially greater than the regional average, while changes in Bolivia and Guatemala are furthest below the regional average. eme examples of being below the regional tendencies, on the other.

Figure 4.

Latin American and the Caribbean Countries
Gender Gap in the average years of education, birth cohorts 1940-1980

Source: Authors' calculations based on IDB Research Department Harmonized Household Surveys.

3.2 Decomposition of the Evolution of the Schooling Gap

The gender gap in schooling attainment has been declining at an approximate rate of 0.27 years of schooling per decade, and after the late 1960s the gap reversed. These are interesting changes in the average trend, but it would be even more interesting to understand in what segments of the schooling distribution those changes were more pronounced. For that purpose we propose a decomposition exercise, dividing the distribution of schooling into four components: (i) those who achieved no education and those with primary incomplete, (ii) those with primary complete and secondary incomplete, (iii) those with secondary complete and college incomplete, and (iv) those who completed college or more. The panels in Figure 5 show the percentages of population

by birth cohort and gender in Latin American and the Caribbean for the four attainment groups defined above.[4]

Females' overall advancement in education is reflected in the panels. The proportion of females with no schooling or primary incomplete declined notably and at a faster rate than that of males. The fraction with secondary complete and college incomplete increased slightly faster for females than for males. At the upper extreme of the distribution there are three periods with interesting differences. The first period, comprising the birth cohorts between 1940 and 1960, shows a growing college graduation rates for females; this was followed by a second period characterized by a relative stagnation between 1960 and 1975. A third and final period, the third period, starting around 1975, is marked by a decrease in college graduation rates (for both females and males). Nonetheless, there are good reasons to attribute such a decline to the fact that younger individuals in these cohorts could still be in the educational system.

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[4] For the reader interested in exploring the cross-country differences for the panel of graphs shown in Figure 3, we report in Appendix A.2 a country-by-country replica of these calculations.

Figure 5. Levels of Educational Attainment by Birth Cohort and Gender

Latin American and the Caribbean Countries
Percentage of population with no education and primary school incomplete by birth cohort and gender

Latin American and the Caribbean Countries
Percentage of population with primary school and secondary school incomplete by birth cohort and gender

Latin American and the Caribbean Countries
Percentage of population with secondary school and college incomplete by birth cohort and gender

Latin American and the Caribbean Countries
Percentage of population with collegre degree or more by birth cohort and gender

Source: Authors' calculations based on IDB Research Department Harmonized Household Surveys.

Motivated by the changes shown above, we now introduce a decomposition of the changes in the gender difference in the average years of schooling between the oldest and the youngest cohort in our sample. The point of departure for this calculation is point for that would be to express the expected value of the number of years of schooling for females and males in a single cohort as:

$$E\big[S^F\big] = E\big[S^F \mid L_1\big] * P^F(L_1) + E\big[S^F \mid L_2\big] * P^F(L_2) + E\big[S^F \mid L_3\big] * P^F(L_3) + E\big[S^F \mid L_4\big] * P^F(L_4)$$

$$E\left[S^{M}\right] = E\left[S^{M} \mid L_{1}\right] * P^{M}\left(L_{1}\right) + E\left[S^{M} \mid L_{2}\right] * P^{M}\left(L_{2}\right) + E\left[S^{M} \mid L_{3}\right] * P^{M}\left(L_{3}\right) + E\left[S^{M} \mid L_{4}\right] * P^{M}\left(L_{4}\right)$$

where S represents the number of years of schooling (S^{F} for females and S^{M} for males); $L_{1}, ..., L_{4}$ represent the four levels of attainment depicted above (L_{1} for no education and primary incomplete, L_{2} for primary complete and secondary incomplete, L_{3} for secondary complete and college incomplete and L_{4} for college degree or more); E stands for expected value and P for probability (as for the variable S, we distinguish the probabilities by gender: P^{F} for females from P^{M} for males). In this way, the gender education gap in any given cohort can be expressed as the sum of four differences:

$$E\left[S^{F}\right] - E\left[S^{M}\right] = \sum_{i=1}^{4}\left[E\left[S^{F} \mid L_{i}\right] * P^{F}\left(L_{i}\right) - E\left[S^{M} \mid L_{i}\right] * P^{M}\left(L_{i}\right)\right] \tag{1}$$

Each element of this sum can be interpreted as the particular contribution of each educational level to the aggregate gender gap. We compare the gender schooling gap prevailing in the 1940 birth cohort (that is, according to our three-year moving average, the cohort comprising persons born between 1939 and 1941) with the gender schooling gap in the 1980 cohort (comprising persons born between 1979 and 1981). Formally, using the operator Δ to denote the changes from the oldest cohort to the youngest, we have:

$$\Delta\left(E\left[S^{F}\right] - E\left[S^{M}\right]\right) = \sum_{i=1}^{4}\Delta\left[E\left[S^{F} \mid L_{i}\right] * P^{F}\left(L_{i}\right) - E\left[S^{M} \mid L_{i}\right] * P^{M}\left(L_{i}\right)\right] \tag{2}$$

For the LAC region, the gender education gap in the 1940 cohort is –0.81 (the negative sign denotes that it favors males) and an application of the decomposition approach delivers figures of –0.029, -0.053, -0.166 and –0.560 as the components for the corresponding four attainment levels. On the other hand, the gender education gap in the 1980 cohort is 0.27, favoring females in this case, and is decomposed as –0.012, -0.390, 0.514 and 0.159 (see Figure 6). As a result, the change in the education gap between these two extreme (oldest and youngest) cohorts, which is 0.27-(-0.81)=1.08, is decomposed as 0.017, -0.337, 0.679 and 0.719 (see Figure 7). These are the four elements of the sum expressed in equation (2). The decomposition of the

difference of education gender gaps suggests that most of the changes in the gender gap are explained by those that happened among the most educated.
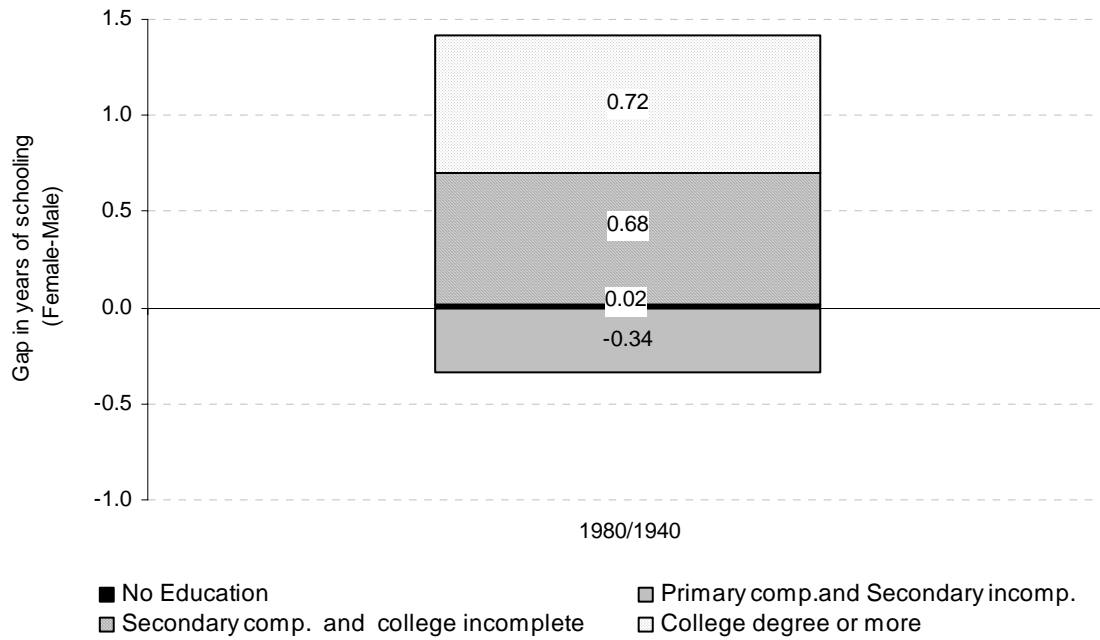
Figure 6.

Latin American and the Caribbean Countries
Decomposition of the educational gender gap by educational level
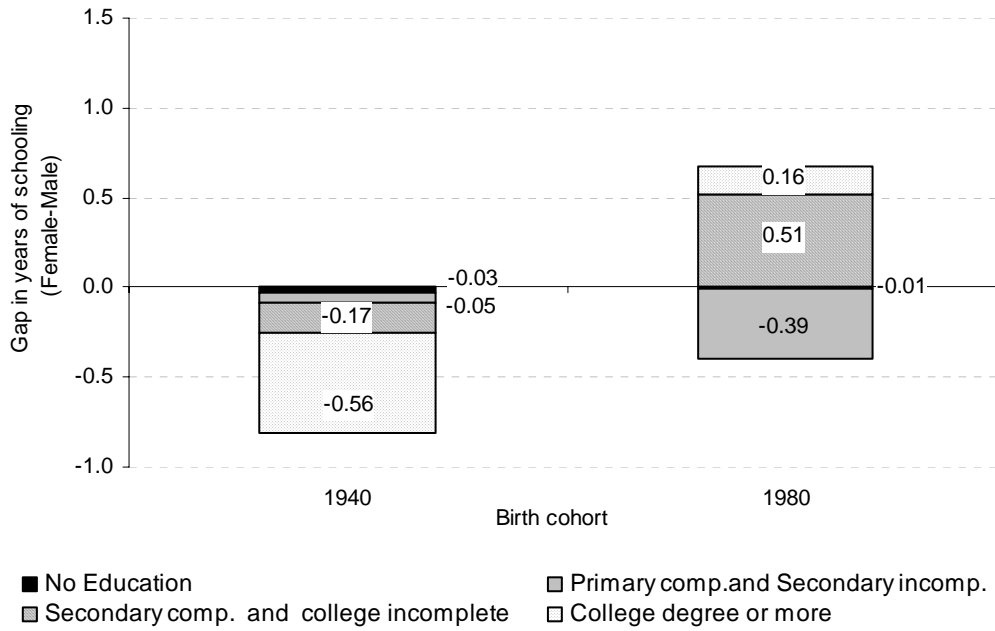
Source: Authors' calculations based on IDB Research Department Harmonized Household Surveys.

Figure 7.

Latin American and the Caribbean Countries
Decomposition of the change in the educational gender gap

Source: Authors' calculations based on IDB Research Department Harmonized Household Surveys.

A country-by-country decomposition of the change in the gap is reported below in Table 2 and Figure 8. The results reveal some interesting differences across countries. For most countries, the components of the third and fourth level are the two most important elements of the decomposition (as is the case for the LAC region overall). For Bolivia and Peru, the second-level component (primary complete and secondary incomplete) is noticeable and positive, in contrast to nine other countries where that component is negative. For Bolivia, Honduras, Mexico and El Salvador the first-level component (no education and primary incomplete) largely explains the changes in the gap favoring females. The figure also suggests a story of polarization in many countries, most remarkably in Argentina and Venezuela. For these countries we observe large positive changes in the gap in the higher levels of schooling attainment along with noticeable negative changes in the lower levels of attainment. Low-educated women are falling behind the low educated men even as women are surpassing men at the higher levels of educational attainment.

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Table 2. Decomposition of Changes in the Educational Gender Gap by Educational Level, Birth Cohorts 1940-1980

Country	Educational Gender Gap			Decomposition of the change in the educational gender gap by educational level			
	1940	1980	Change 1980-1940	No Education Primary inc.	Primary comp. Secondary inc.	Secondary comp. College inc.	College comp. or more
Argentina	-0.95	0.64	1.59	-0.11	-0.73	1.66	0.76
Bolivia	-1.26	-0.86	0.40	0.42	0.61	-0.27	-0.36
Brasil	-0.51	0.64	1.15	-0.03	-0.62	0.87	0.92
Chile	-0.68	0.18	0.85	0.02	-0.37	0.23	0.98
Colombia	-0.68	0.29	0.97	-0.06	-0.05	1.20	-0.12
Costa Rica	-0.65	0.49	1.14	-0.23	-0.13	0.49	1.02
Guatemala	-1.24	-0.67	0.57	0.07	-0.21	0.22	0.49
Honduras	-0.49	0.49	0.98	0.13	0.02	0.07	0.76
Jamaica	0.09	0.39	0.30	-0.01	-0.82	1.04	0.09
Mexico	-0.86	-0.30	0.56	0.18	-0.27	0.03	0.61
Nicaragua	-1.03	0.67	1.70	-0.01	0.06	1.36	0.27
Panama	-0.32	0.52	0.84	-0.04	-0.85	0.60	1.13
Peru	-2.35	-0.31	2.04	0.08	0.43	0.43	1.10
Paraguay	-0.91	0.12	1.02	-0.05	0.03	0.16	0.88
El Salvador	-0.90	-0.18	0.71	0.30	-0.04	-0.11	0.56
Uruguay	0.08	0.93	0.85	-0.03	-0.69	1.53	0.05
Venezuela	-0.75	1.26	2.01	-0.26	-0.36	1.44	1.19
LAC	-0.81	0.27	1.08	0.02	-0.34	0.68	0.72

Source: Own calculations based on IDB Research Department Harmonized Household Surveys.

Figure 8.
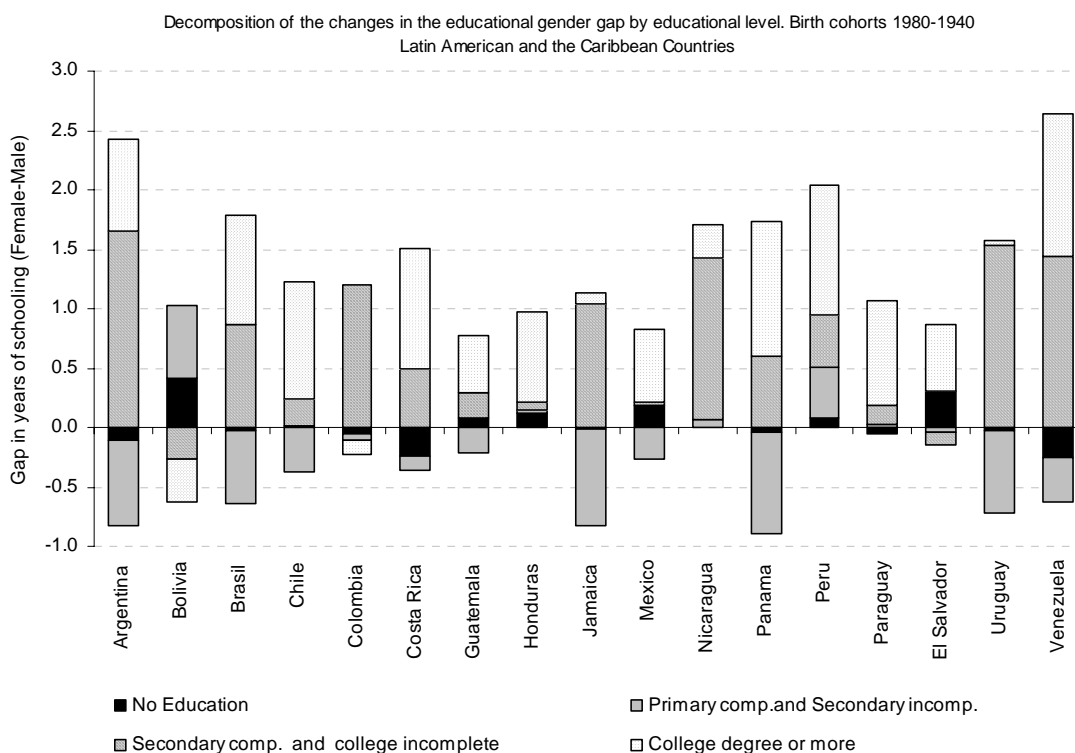
Decomposition of the changes in the educational gender gap by educational level. Birth cohorts 1980-1940
Latin American and the Caribbean Countries

Source: Authors' calculations based on IDB Research Department Harmonized Household Surveys.

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Returning to equation (1) we can explore further the way in which the changes average differences in years of schooling happened for the birth cohorts under analysis. After adding and subtracting the element $E[S^M \mid L_i] * P^F(L_i)$ in the right-hand side of equation (1), it can also be expressed as:

$$E[S^F] - E[S^M] = \sum_{i=1}^{4} \left[\left[E[S^F \mid L_i] - E[S^M \mid L_i]\right] * P^F(L_i) + E[S^M \mid L_i] * \left[P^F(L_i) - P^M(L_i)\right]\right]$$

or equivalently:

$$E[S^F] - E[S^M] = \sum_{i=1}^{4} \left[E[S^F \mid L_i] - E[S^M \mid L_i]\right] * P^F(L_i) + \sum_{i=1}^{4} E[S^M \mid L_i] * \left[P^F(L_i) - P^M(L_i)\right] \quad (3)$$

which can be interpreted as the sum of four elements that account for gender differences in the expected number of years of schooling within each attainment level (weighted by the probability distribution of females across levels) and the sum of other four elements that account for gender differences in the probabilities of being within each attainment level (weighted by the expected numbers of years of schooling of males for each level). As we did with equation (2) we can express the cohort-differences of these components. The results are summarized in Figure 9. The figure shows that most of the changes in schooling attainment between cohorts happened in terms of the probabilities of achieving the aforementioned levels than in terms of the number of completed years of schooling within each level. The former accounts for 0.87 years of schooling while the latter accounts for 0.22. In other words, almost four-fifths of the change in the schooling gender gap is explained by changes in the gender differences in the probabilities of achieving higher education levels. Among the changes in probabilities, those at the secondary complete and college complete levels are predominant.

Figure 9.
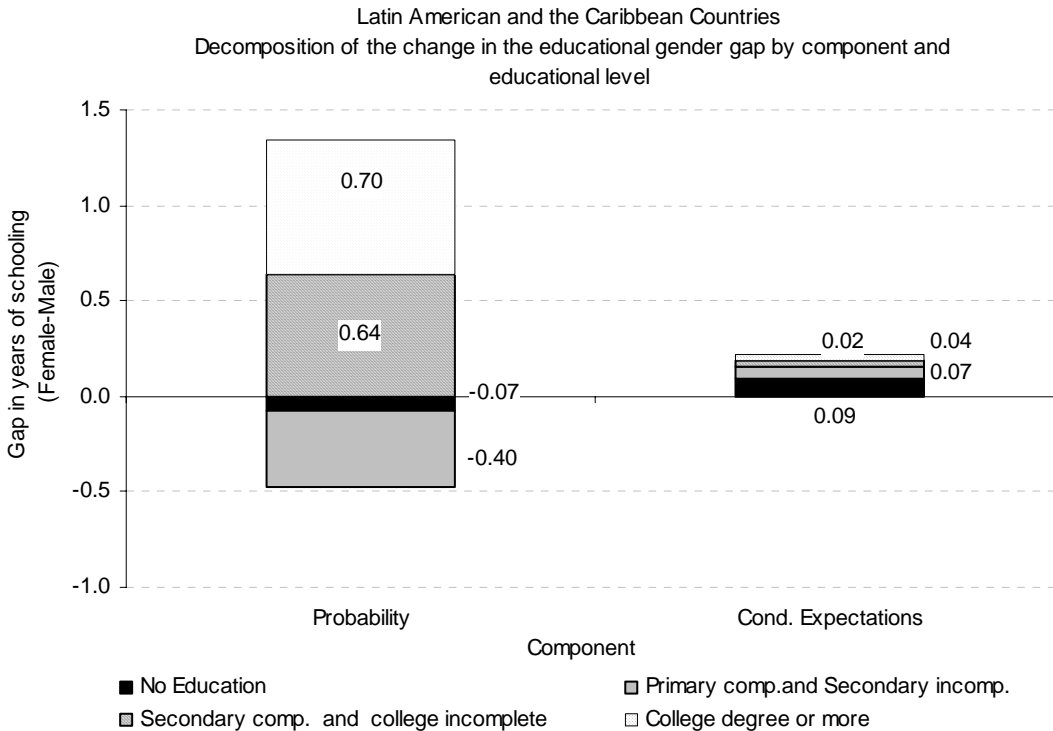
Latin American and the Caribbean Countries
Decomposition of the change in the educational gender gap by component and
educational level

Source: Own calculations based on IDB Research Department Harmonized Household Surveys.

A country-by-country description of the decomposition of changes-in-probabilities vs. changes-in-expectations is reported below in Figure 10. For the present purpose we report only the aggregate changes-in-probabilities component (four elements) and the aggregate changes-in-expectations (four components as well). The results show that the component due to the changes in probabilities of level attainment dominates the other component in most countries, as is the case with the Latin American aggregate reported above. There are nonetheless two interesting exceptions to that pattern: Bolivia and Guatemala. Also interesting is that Guatemala is the only country displaying a negative change in gender differences in probabilities of level attainment. Apparently, this is the only country in the region where males completed primary, secondary and college at a faster-growing rate than females. On the other hand, Guatemala is the country for which the changes-in-expectations component is the highest in the region, followed by Peru and Nicaragua. These figures provide a sense of how changes in the gender schooling gap have varied across countries.

Figure 10.
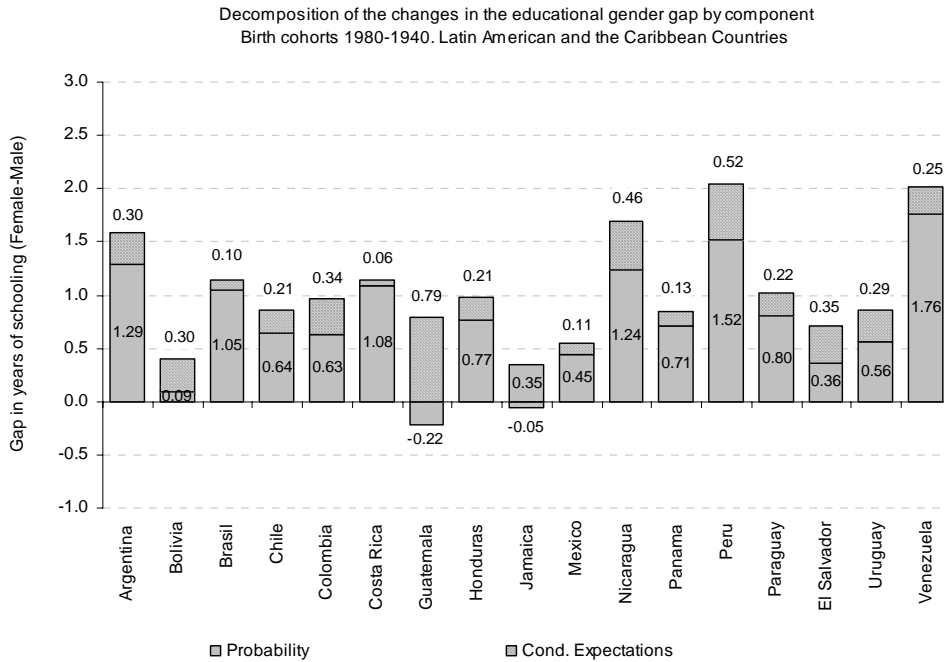
Decomposition of the changes in the educational gender gap by component
Birth cohorts 1980-1940. Latin American and the Caribbean Countries

Source: Authors' calculations based on IDB Research Department Harmonized Household Surveys.

4. Gender Differences in Attendance and Attainment Among Children of School Age

While the main focus of this study is to explore gender differences in completed average years of schooling across generations, it is instructive to explore the situation of those who are still of school age in the countries where the gender schooling gap has not yet been closed: Bolivia, Guatemala, Mexico and Peru. Of particular interest is the role of household income in schooling decisions, given that household economic constraints represent an important barrier to girls' schooling. At young ages it is possible to examine how both attendance and attainment vary by family income level, which cannot be done in the analysis of adult attainment. To avoid problems with the causality relationship between income generation and schooling, when computing family income we exclude monetary labor income generated by children.

Figure 11 presents population-weighted age-specific school attendance profiles for 6 to 18- year olds in Bolivia, Guatemala, Mexico and Peru by gender and per capita household income quintiles. To simplify the figure we display three income groups: individuals from the lowest 20 percent of the per capita household income distribution, from the middle 20 percent,

and from the highest 20 percent. The estimates for attendance rates for children ages 8-11 in the region are above 95 percent, leaving little room for variation across gender or income group. According to this profile, significant differences in attendance by gender are not found before age 12. At older ages there is a slight tendency for boys from the lowest income quintile to have higher attendance rates than girls from the same income group, while the opposite happens at the highest income quintile.

Figure 11.
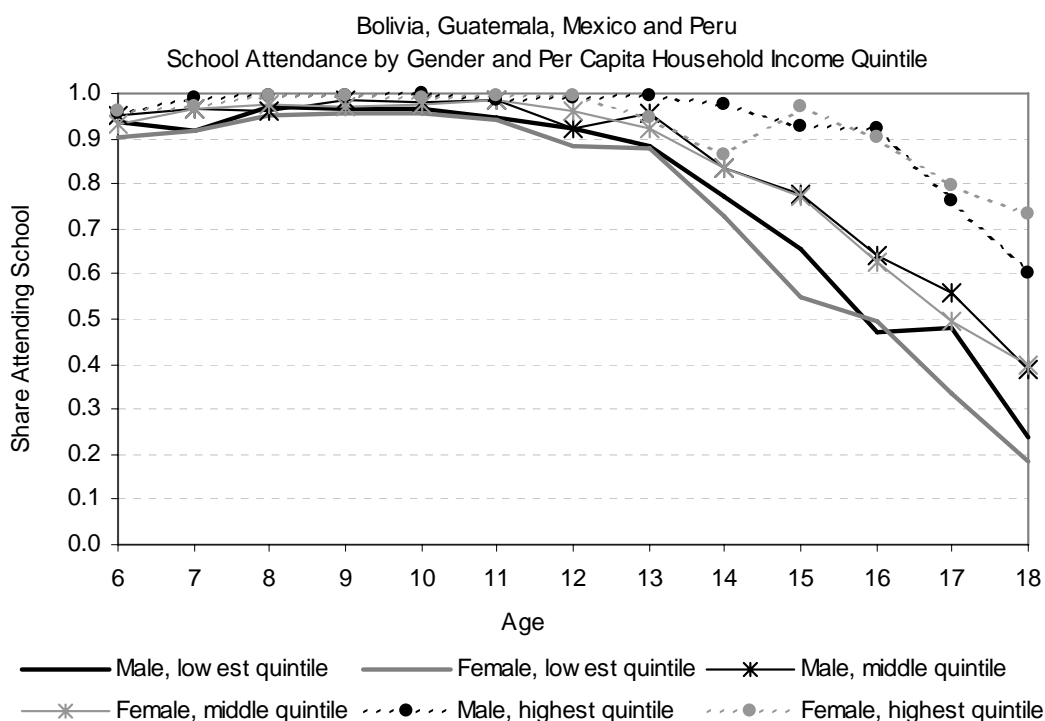
Bolivia, Guatemala, Mexico and Peru
School Attendance by Gender and Per Capita Household Income Quintile

Source: Authors' calculations based on IDB Research Department Harmonized Household Surveys.

We now turn to the (censored) profiles of school attainment, defined as the number of years completed in the schooling system.[5] The results suggest no gender differences in attainment for the middle and highest income quintiles but offer slight evidence of a gender gap in favor of males in the lowest quintile (see Figure 12). In any case, the most striking differences

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[5] This measure of attainment should not be confused with a measurement of number of years spent in the schooling system. In that sense, the measure we use is "net of repetition."

in school attendance and attainment observed in Figure 11 and Figure 12 occurred across income groups rather than gender.

Figure 12.
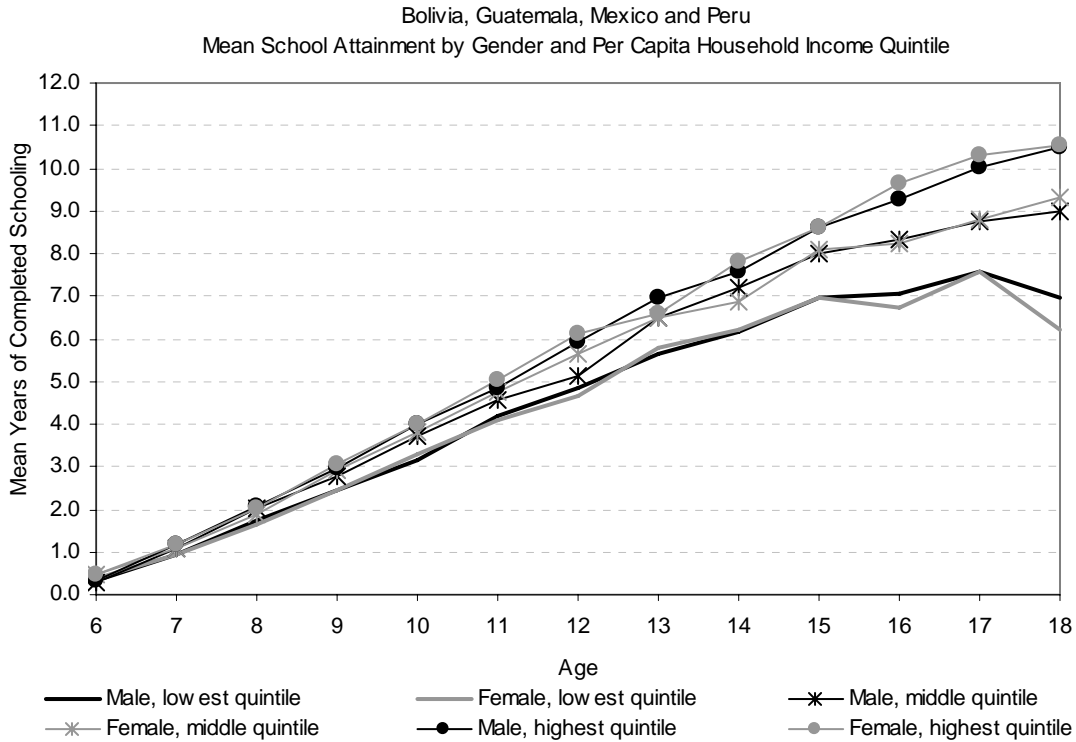
Bolivia, Guatemala, Mexico and Peru
Mean School Attainment by Gender and Per Capita Household Income Quintile

Source: Authors' calculations based on IDB Research Department Harmonized Household Surveys.

Finally, we explore the relationship between ethnicity and schooling outcomes among a smaller set of countries. Bolivia, Guatemala and Peru include questions in their household surveys which permit the construction of a proxy for indigenous ethnicity. In Bolivia and Peru the indigenous classification is based on a question about an individual's "mother tongue," while in Guatemala the survey inquires about self-identification with indigenous peoples.[6]

Figure B.1 in the Appendix shows how attendance profiles vary by gender and ethnicity in these three countries, and Figure B.2 presents age-specific schooling attainment by gender and ethnicity. As shown in Figure A.1, attendance rates in Figure A.1 for Peru are above 90 percent

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[6] In Bolivia the question is "¿Cuál es el idioma o lengua en el que aprendió a hablar en su niñez?" In Peru the question is "¿Cuál es la lengua materna que habla?" and in Guatemala the question is "¿Se considera usted perteneciente a alguno de los siguientes pueblos indígenas del país?".

from age 6 to 13 for all groups. There is quite a bit of noise, however, in the data for ages 14-18, with an unclear pattern in attendance rates for indigenous males and females. At ages 19 and 20 it becomes clear, though, that indigenous males and females attend school at much lower rates than their non-indigenous peers. While non-indigenous females display similar schooling attainment to their male peers, as shown in Figure B.2, indigenous females lag behind their male peers by approximately two full years of schooling.

The situation is less encouraging in Bolivia and Guatemala, where the indigenous display clear lags in school attendance both at early ages and in later teen years. At age 6 indigenous girls and boys in Bolivia are 12-15 percentage points less likely to attend school than non-indigenous children. Although boys and girls have similar profiles from ages 7-13, attendance rates for indigenous girls start to depart at age 9, with a faster decline after age 13. The attendance profile for indigenous girls is dominated by that of indigenous males, who attend school at much lower rates than non-indigenous males and females. Patterns in Guatemala are not as clear, with noisier data reflecting a much smaller sample. Nonetheless, indigenous girls do not attend school at the same rates as their non-indigenous peers.

Profiles of school attainment in Bolivia and Guatemala are similar to the patterns observed in Peru. Non-indigenous males and females have similar outcomes, followed by indigenous males and lastly by indigenous females. The differences are greatest after ages 13-15. Although there are some common features in the patterns of schooling attainment by gender and ethnicity among the three countries, there is a striking difference in the levels of attainment. At age 15 indigenous girls in Peru have achieved 7.1 years of schooling and girls in Bolivia have achieved 6.1 years; in Guatemala, however, indigenous girls of the same age have completed 4.6 years of schooling.

5. Conclusions

In this paper we have explored several gender differences in education, splitting the analysis into two age groups. On the one hand, among the younger group we were able to perform an analysis by household per-capita income quintile. We found the most noticeable gender differences in attendance among those in the lowest income quintile. Interestingly these differences are such that boys attend schools at a higher proportion than females, but they nonetheless display lower attainment (number of approved years). This apparently puzzling result is consistent with a story

of higher repetition rates among boys than among girls. We also explore the relationship between ethnicity and schooling outcomes in Bolivia, Guatemala and Peru. In these three countries, non-indigenous males and females have similar educational outcomes. However, indigenous teenaged girls lag behind the attainment of their male indigenous peers.

On the other hand, for the older group of individuals (born between 1940 and 1980) we performed a cohort analysis. We found that the gender schooling gap has changed at a fast pace during the last four decades. For the oldest cohort in our data the gender gap in schooling attainment was almost 0.8 years, favoring males. For the youngest cohort the gap changed to a state in favor of females by almost one fourth of a schooling year. During this period the gender gap in attainment changed at a pace of 0.27 years of schooling per decade, favoring females.

One of the plausible implications of these changes in the gender education gap has to do with changes in marriage markets. It has been already extensively documented that individuals are delaying marriage decisions across the world, and Latin Americans are no exception. It would be important to understand to what extent this is the result of changes in females' females' schooling compared to that of males and to what extent there are other forces driving these trends.

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Appendix A

Figure A.1

Argentina 2002
Average years of schooling by birth cohort and gender

Chile 2003
Average years of schooling by birth cohort and gender

Bolivia 2002
Average years of schooling by birth cohort and gender

Colombia 2003
Average years of schooling by birth cohort and gender

Brasil 2003
Average years of schooling by birth cohort and gender

Costa Rica 2004
Average years of schooling by birth cohort and gender

Guatemala 2002
Average years of schooling by birth cohort and gender
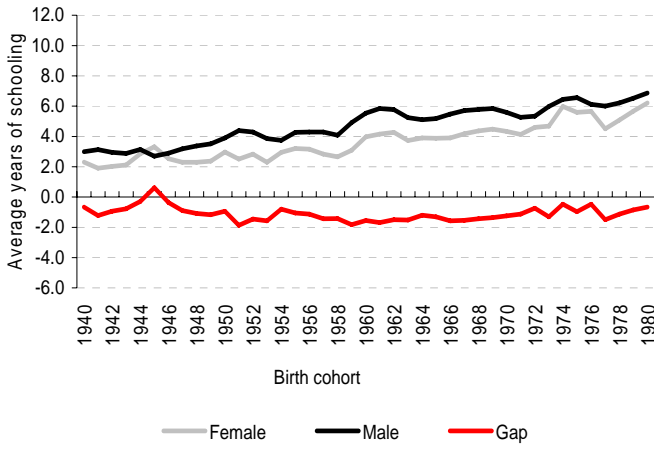
Mexico 2002
Average years of schooling by birth cohort and gender
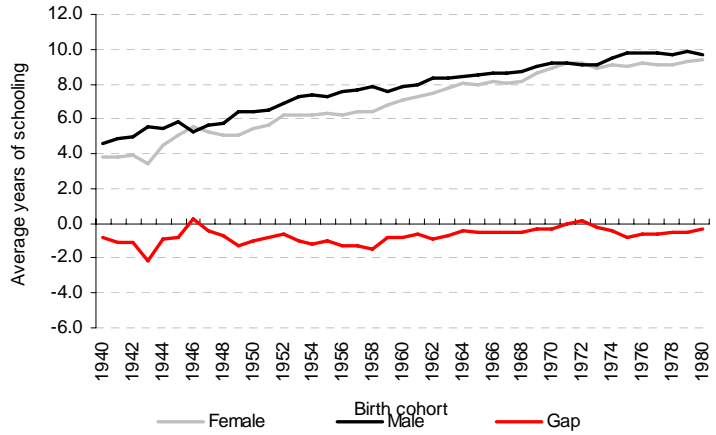
Honduras 2003
Average years of schooling by birth cohort and gender
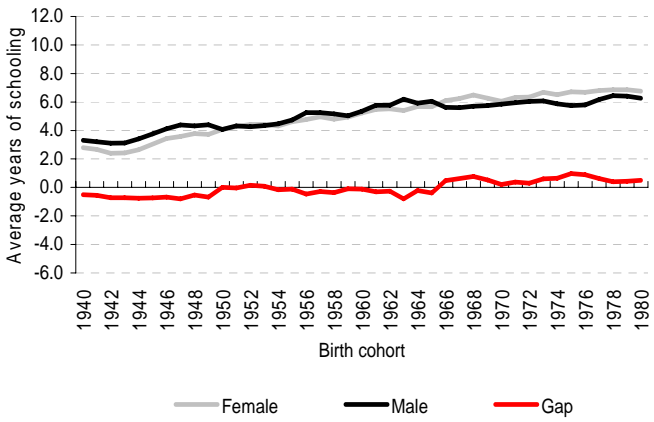
Nicaragua 2001
Average years of schooling by birth cohort and gender
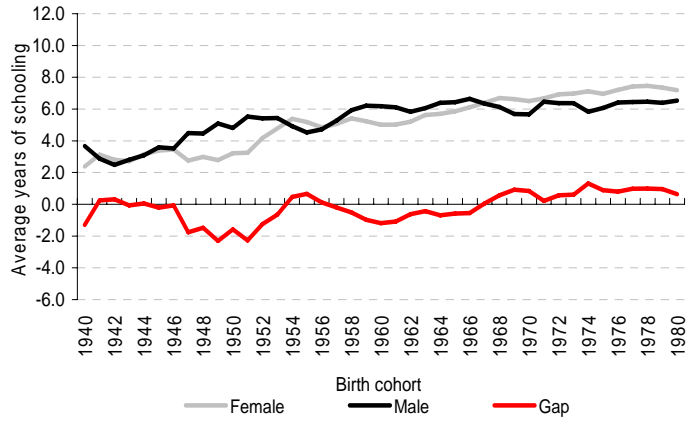
Jamaica 2002
Average years of schooling by birth cohort and gender

Panama 2003
Average years of schooling by birth cohort and gender

29

Peru 2003
Average years of schooling by birth cohort and gender

Uruguay 2003
Average years of schooling by birth cohort and gender

Paraguay 2003
Average years of schooling by birth cohort and gender

Venezuela 2004
Average years of schooling by birth cohort and gender

El Salvador 2002
Average years of schooling by birth cohort and gender

Figure A.2

Argentina 2002
Percentage of population with no education and primary school incomplete by birth cohort and gender

Argentina 2002
Percentage of population with primary school and secondary school incomplete by birth cohort and gender

Argentina 2002
Percentage of population with secondary school and college incomplete by birth cohort and gender

Argentina 2002
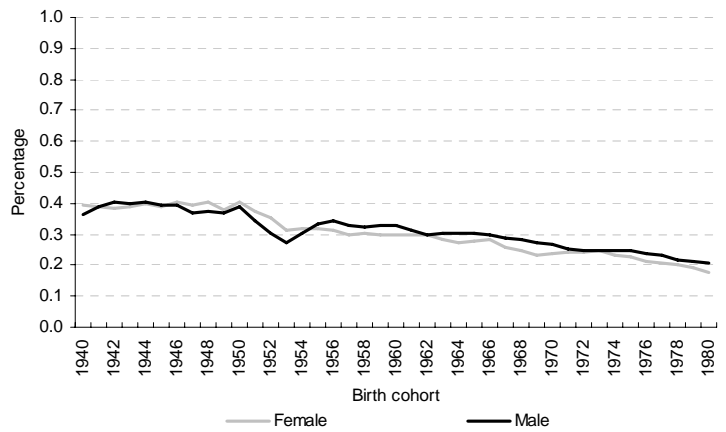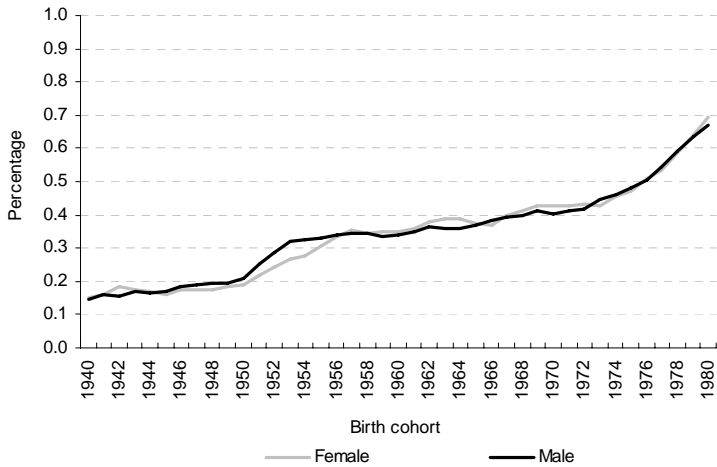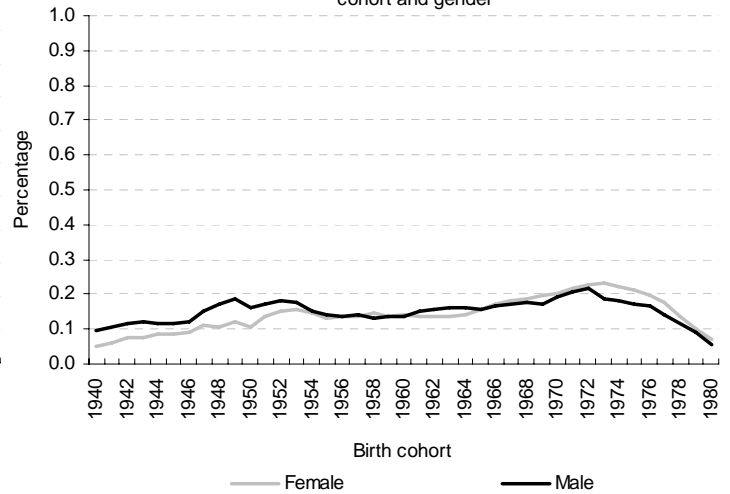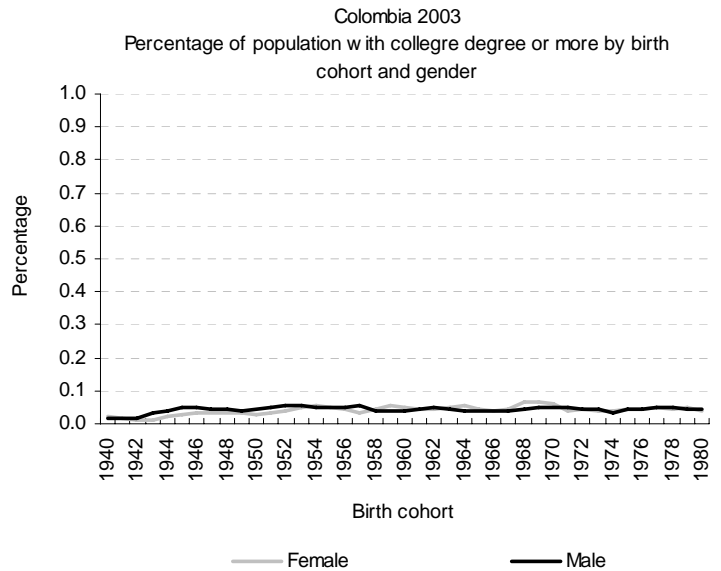Percentage of population with collegre degree or more by birth cohort and gender

Bolivia 2002
Percentage of population with no education and primary school incomplete by birth cohort and gender

Bolivia 2002
Percentage of population with primary school and secondary school incomplete by birth cohort and gender
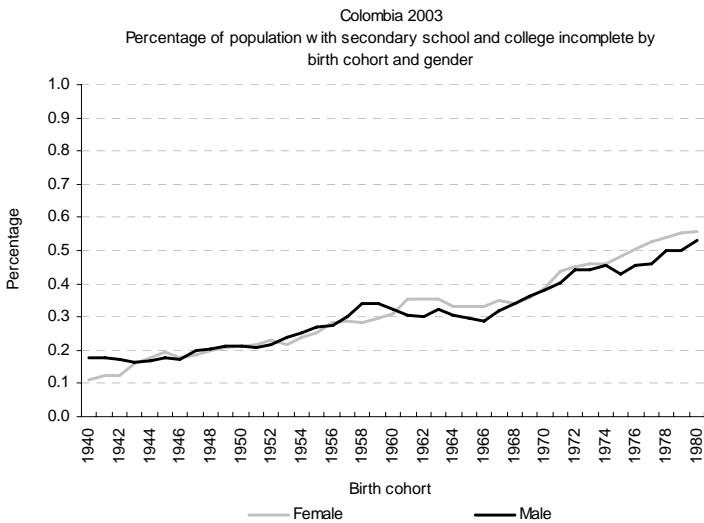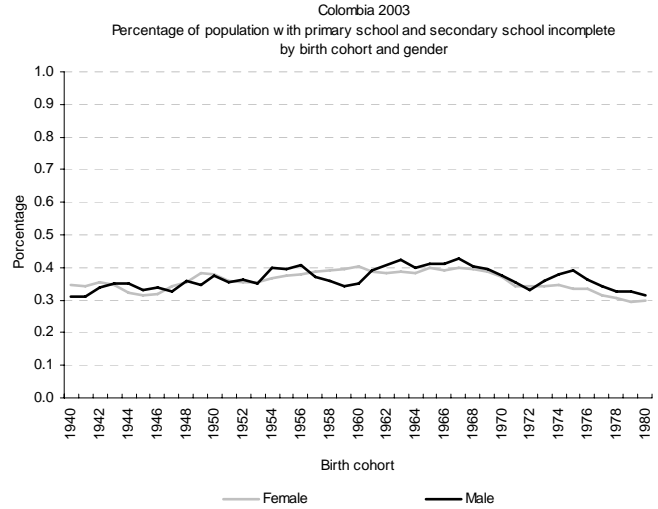

Bolivia 2002
Percentage of population with secondary school and college incomplete by birth cohort and gender

Bolivia 2002
Percentage of population with collegre degree or more by birth cohort and gender

Brazil 2003
Percentage of population w ith no education and primary school incomplete
by birth cohort and gender

Brazil 2003
Percentage of population w ith primary school and secondary school incomplete
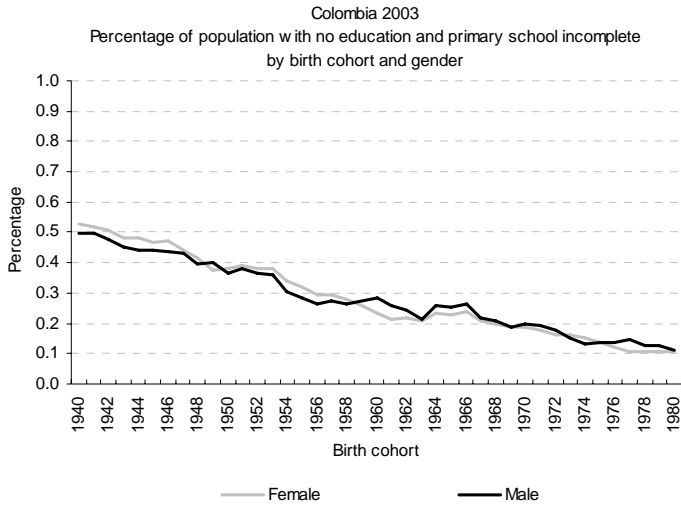by birth cohort and gender

Brazil 2003
Percentage of population w ith secondary school and college incomplete by
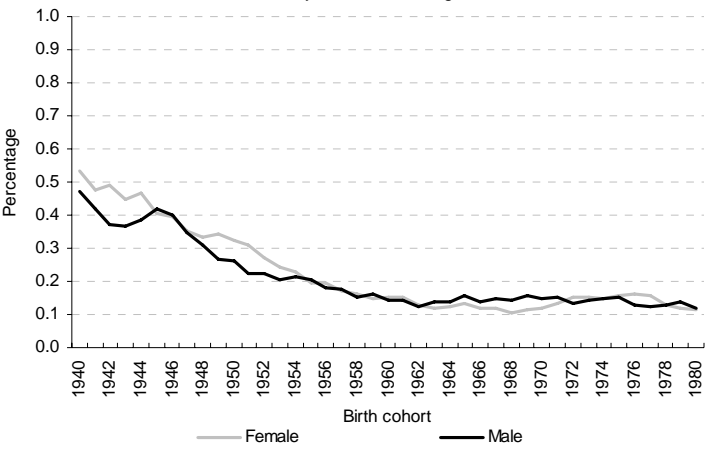birth cohort and gender

Brazil 2003
Percentage of population w ith collegre degree or more by birth
cohort and gender

Chile 2003
Percentage of population with no education and primary school incomplete by birth cohort and gender

Chile 2003
Percentage of population with primary school and secondary school incomplete by birth cohort and gender

Chile 2003
Percentage of population with secondary school and college incomplete by birth cohort and gender

Chile 2003
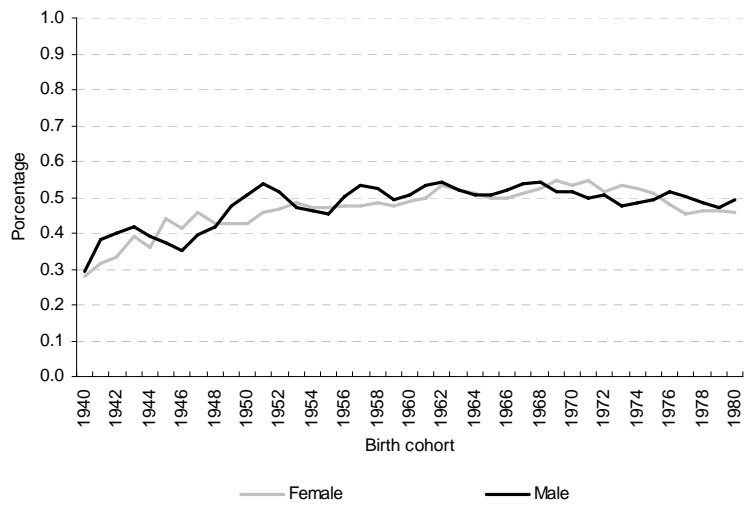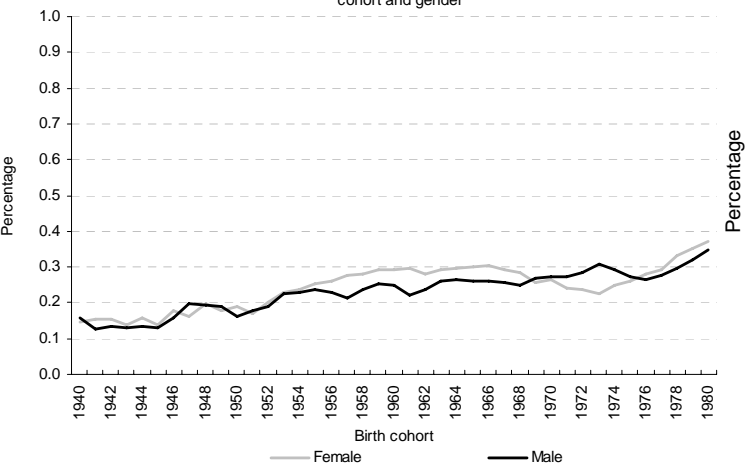#### Percentage of population with collegre degree or more by birth cohort and gender

34

Colombia 2003
Percentage of population with no education and primary school incomplete by birth cohort and gender

Percentage

1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0

1940 1942 1944 1946 1948 1950 1952 1954 1956 1958 1960 1962 1964 1966 1968 1970 1972 1974 1976 1978 1980

Birth cohort

—— Female —— Male

Colombia 2003
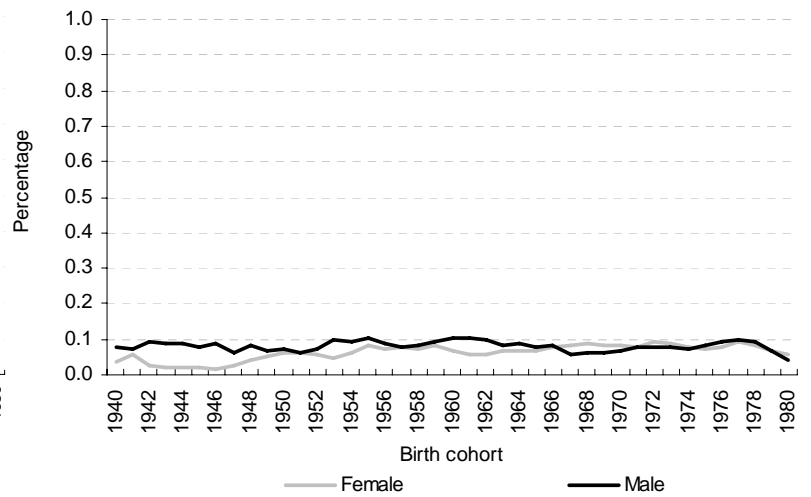Percentage of population with primary school and secondary school incomplete by birth cohort and gender

Percentage

1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
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0.0

1940 1942 1944 1946 1948 1950 1952 1954 1956 1958 1960 1962 1964 1966 1968 1970 1972 1974 1976 1978 1980

Birth cohort

—— Female —— Male

Colombia 2003
Percentage of population with secondary school and college incomplete by birth cohort and gender

Percentage

1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0

1940 1942 1944 1946 1948 1950 1952 1954 1956 1958 1960 1962 1964 1966 1968 1970 1972 1974 1976 1978 1980

Birth cohort

—— Female —— Male

Colombia 2003
Percentage of population with collegre degree or more by birth cohort and gender

Percentage

1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0

1940 1942 1944 1946 1948 1950 1952 1954 1956 1958 1960 1962 1964 1966 1968 1970 1972 1974 1976 1978 1980

Birth cohort

—— Female —— Male

35

Costa Rica 2004
Percentage of population with no education and primary school incomplete by birth cohort and gender

Costa Rica 2004
Percentage of population with primary school and secondary school incomplete by birth cohort and gender
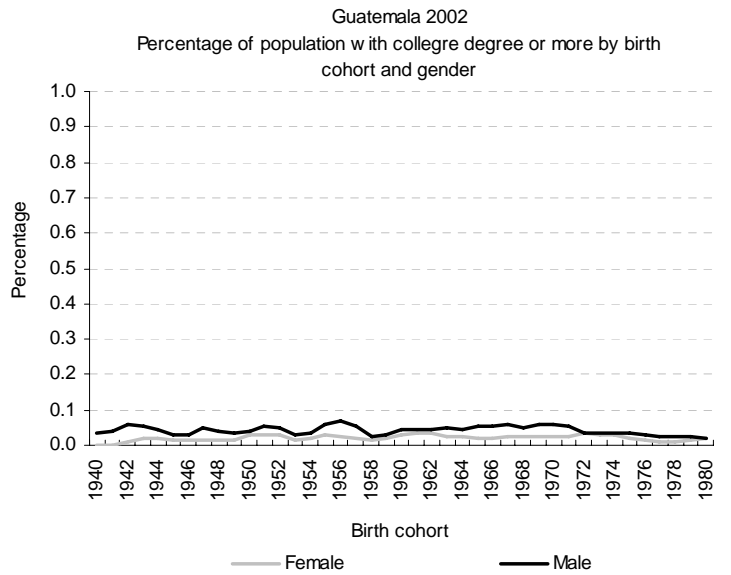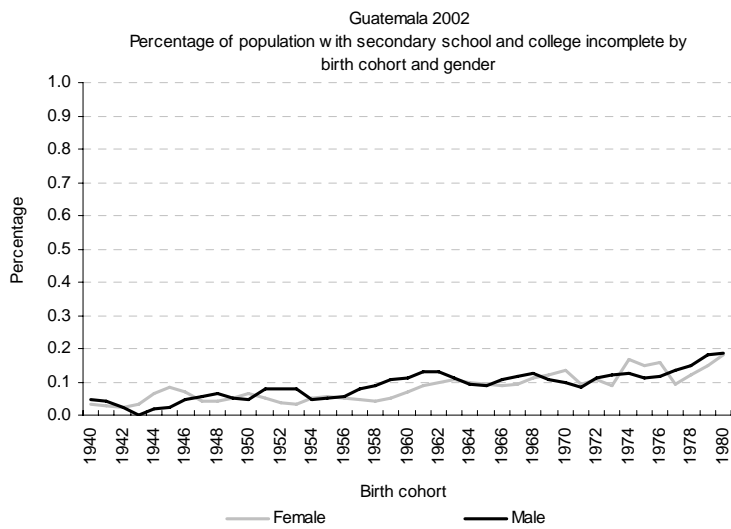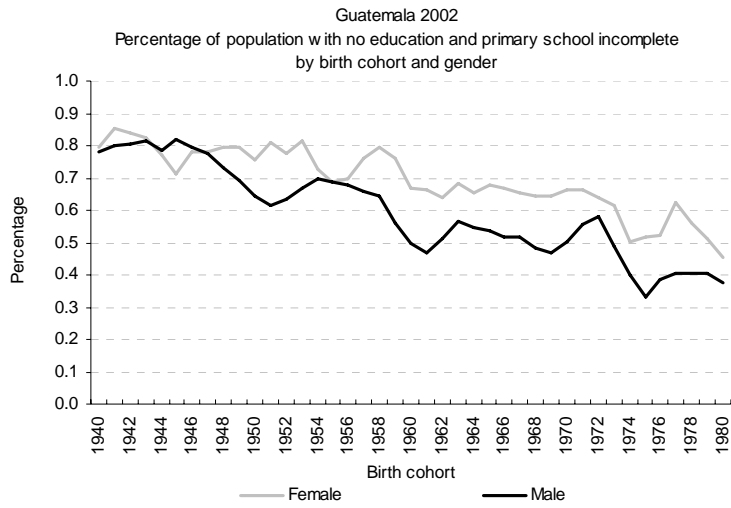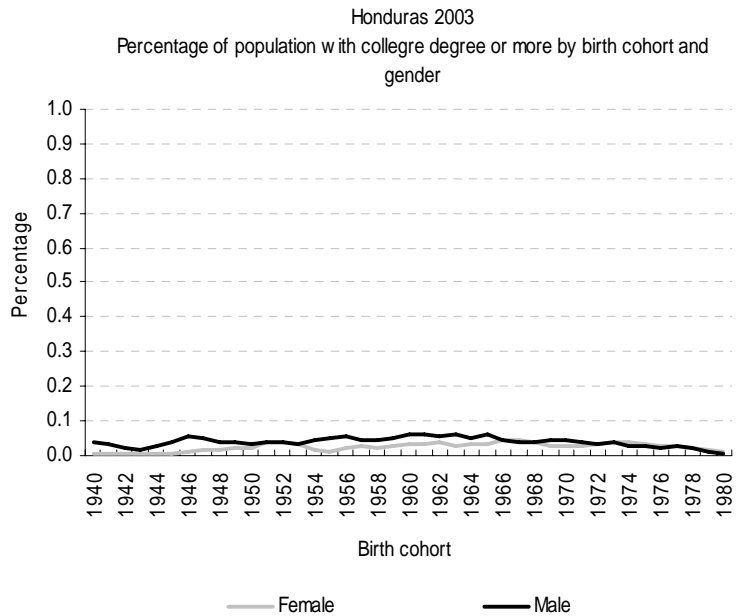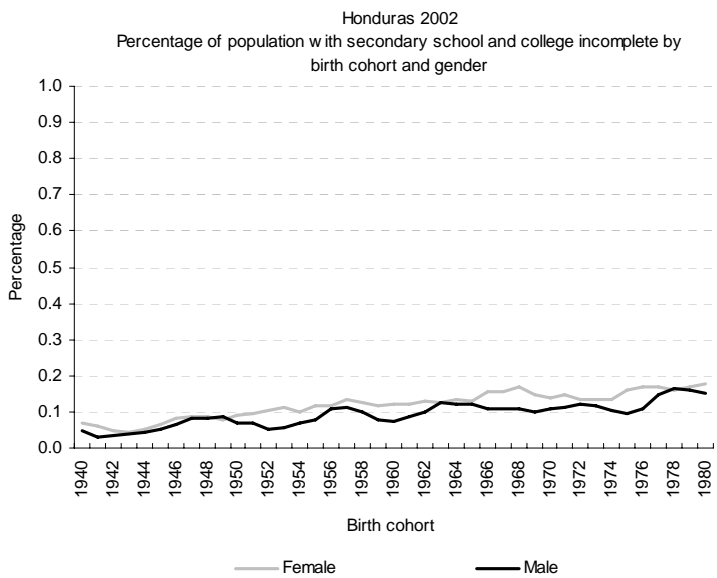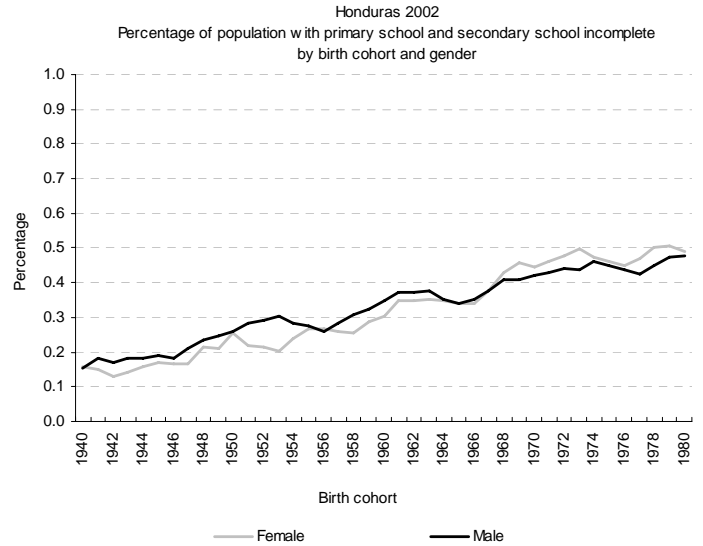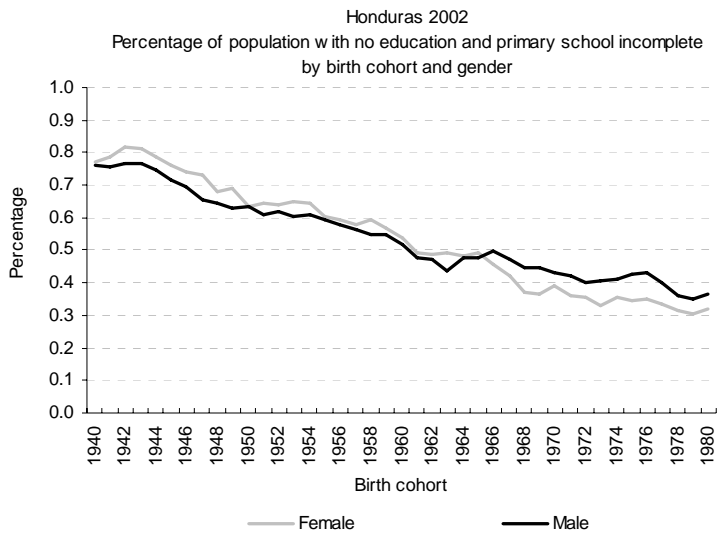

Costa Rica 2004
Percentage of population with secondary school and college incomplete by birth cohort and gender

Costa Rica 2004
Percentage of population with collegre degree or more by birth cohort and gender

Guatemala 2002
Percentage of population with no education and primary school incomplete by birth cohort and gender

Guatemala 2002
Percentage of population with primary school and secondary school incomplete by birth cohort and gender

Guatemala 2002
Percentage of population with secondary school and college incomplete by birth cohort and gender
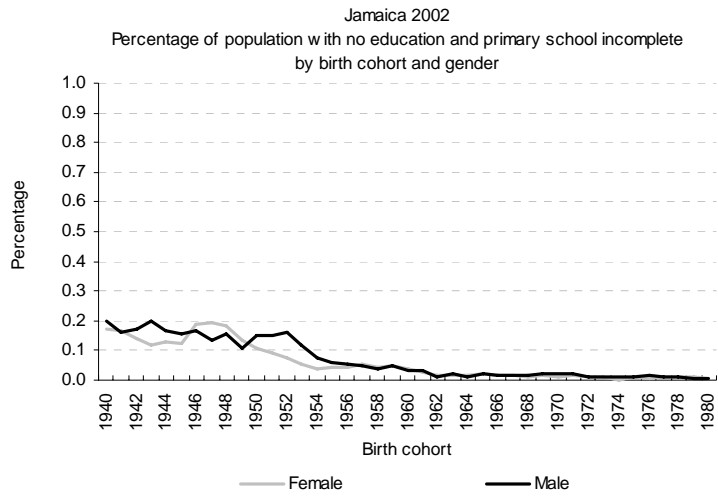

Guatemala 2002
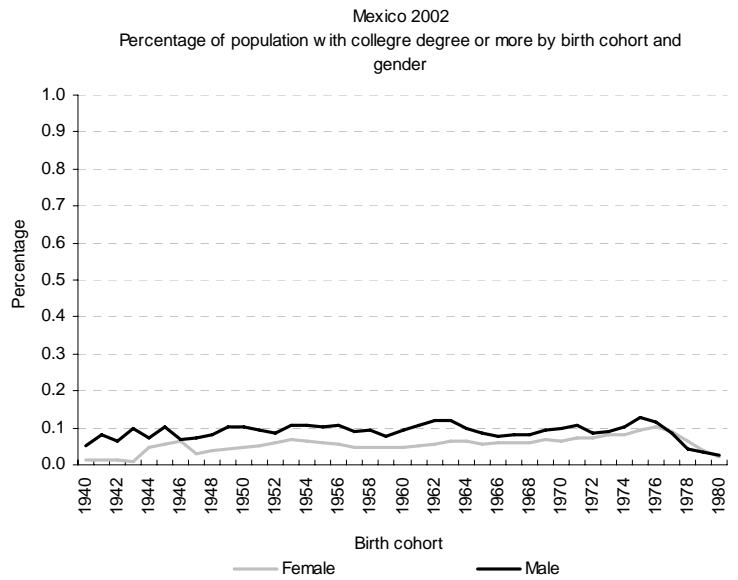### Percentage of population with collegre degree or more by birth cohort and gender

37

Honduras 2002
Percentage of population with no education and primary school incomplete by birth cohort and gender

Honduras 2002
Percentage of population with primary school and secondary school incomplete by birth cohort and gender

Honduras 2002
Percentage of population with secondary school and college incomplete by birth cohort and gender
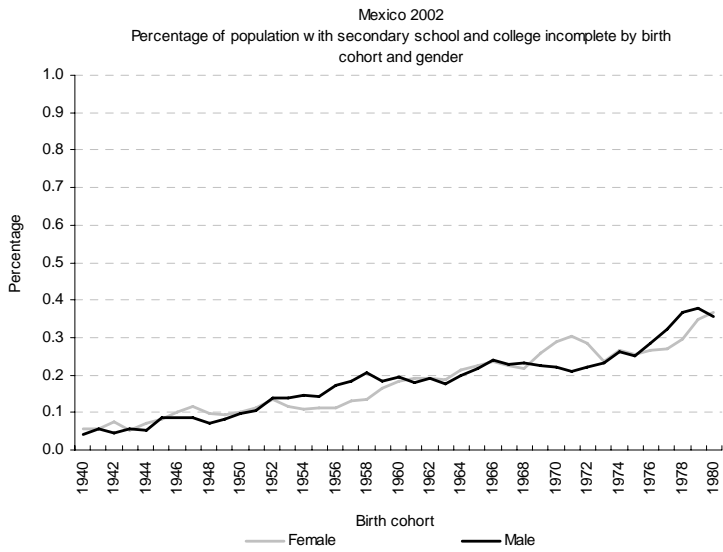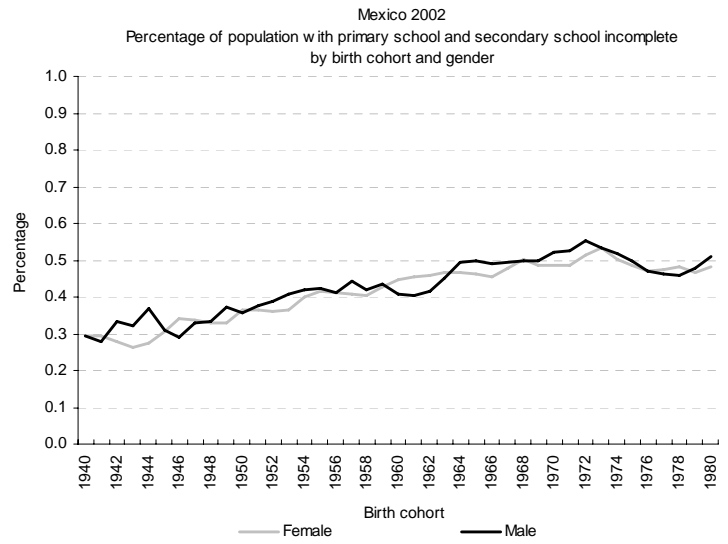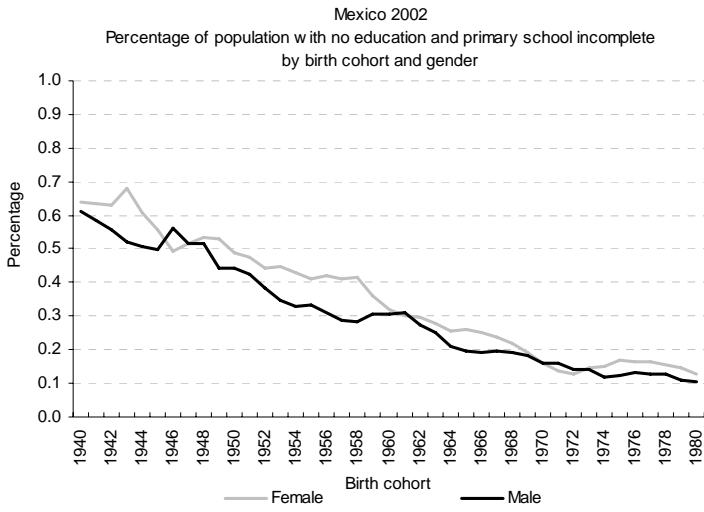

Honduras 2003
Percentage of population with collegre degree or more by birth cohort and gender

Jamaica 2002
Percentage of population with no education and primary school incomplete by birth cohort and gender

Jamaica 2002
Percentage of population with primary school and secondary school incomplete by birth cohort and gender

Jamaica 2002
Percentage of population with secondary school and college incomplete by birth cohort and gender

Jamaica 2002
Percentage of population with collegre degree or more by birth cohort and gender

39

Mexico 2002

Percentage of population with no education and primary school incomplete by birth cohort and gender

Mexico 2002

Percentage of population with primary school and secondary school incomplete by birth cohort and gender

Mexico 2002

Percentage of population with secondary school and college incomplete by birth cohort and gender

Mexico 2002

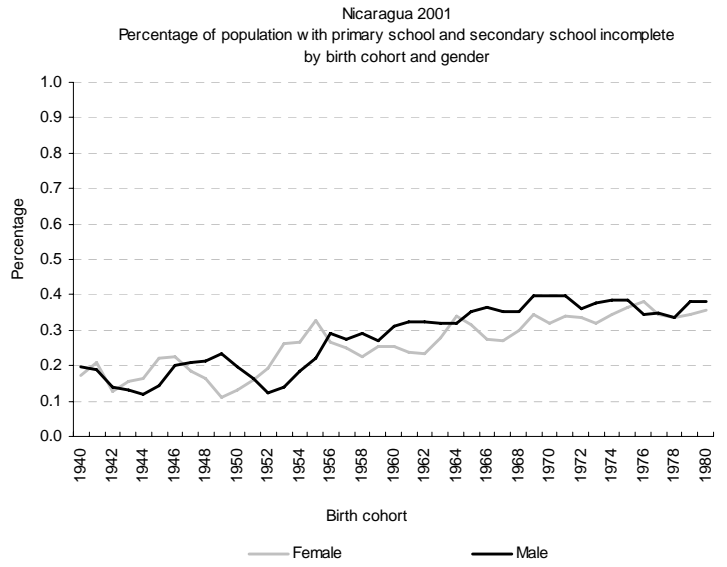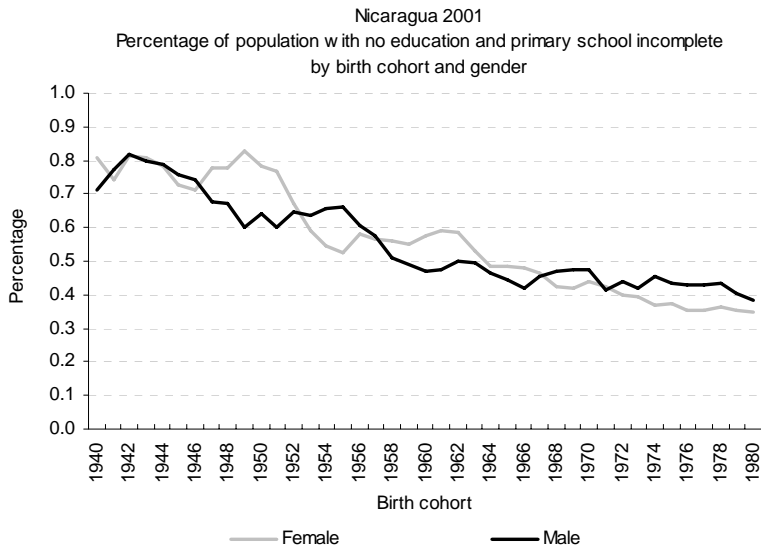Percentage of population with collegre degree or more by birth cohort and gender
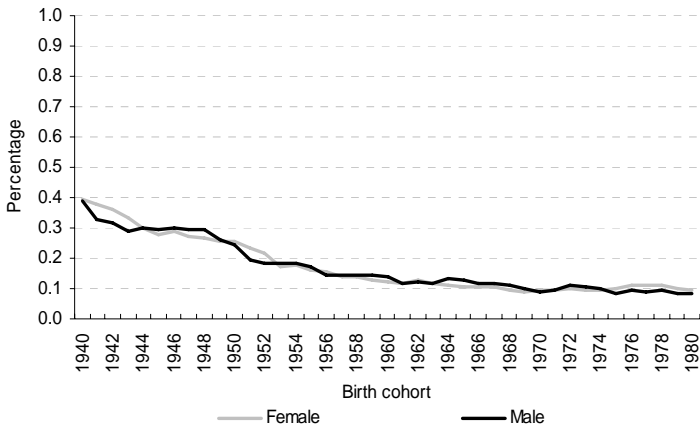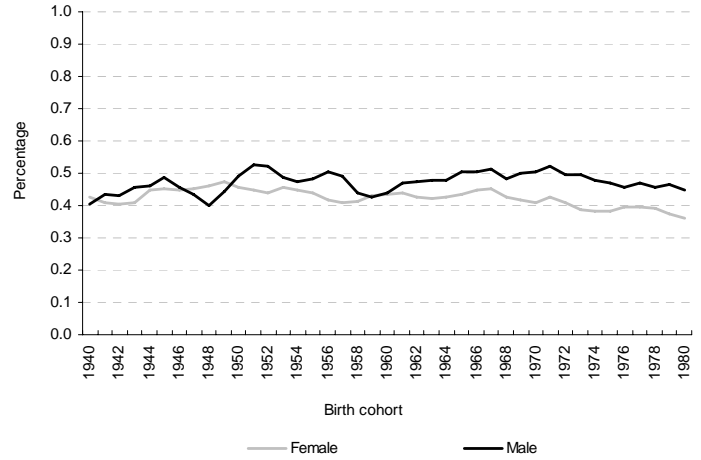

40

Nicaragua 2001
Percentage of population with no education and primary school incomplete by birth cohort and gender

Nicaragua 2001
Percentage of population with primary school and secondary school incomplete by birth cohort and gender

Nicaragua 2001
Percentage of population with secondary school and college incomplete by birth cohort and gender

Nicaragua 2001
Percentage of population with collegre degree or more by birth cohort and gender

41

Panama 2003
Percentage of population with no education and primary school incomplete by birth cohort and gender
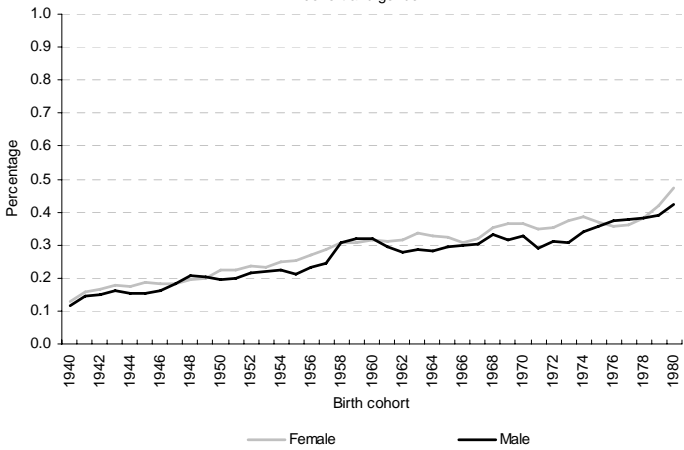

Panama 2003
Percentage of population with primary school and secondary school incomplete by birth cohort and gender
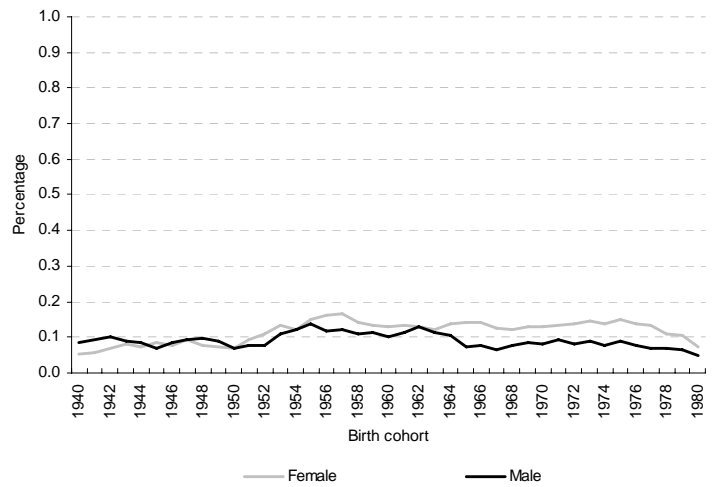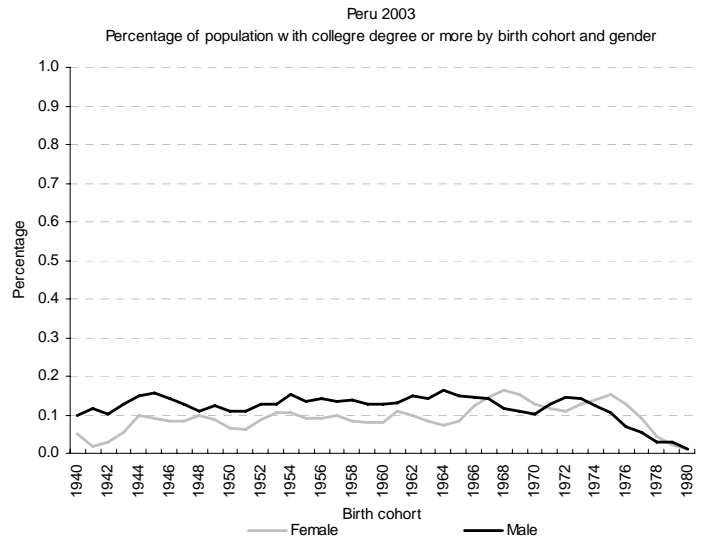

Panama 2003
Percentage of population with secondary school and college incomplete by birth cohort and gender

Panama 2003
Percentage of population with collegre degree or more by birth cohort and gender

Peru 2003
Percentage of population with no education and primary school incomplete by birth cohort and gender

Female — Male

Peru 2003
Percentage of population with primary school and secondary school incomplete by birth cohort and gender

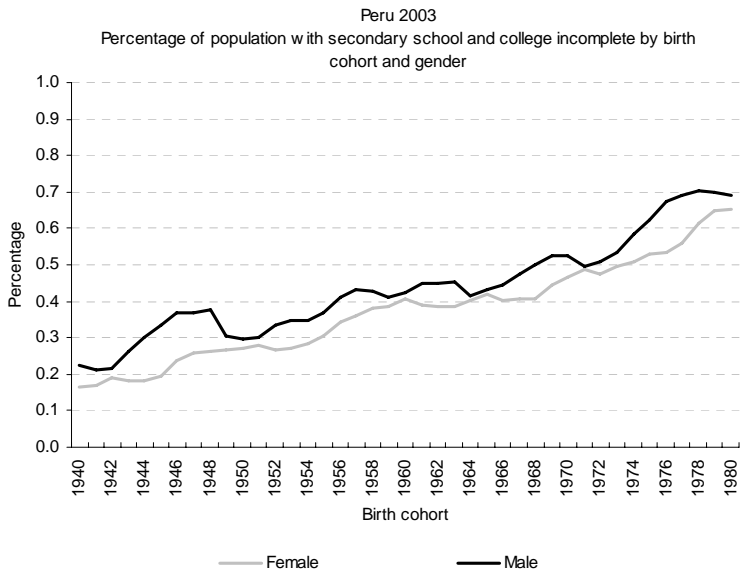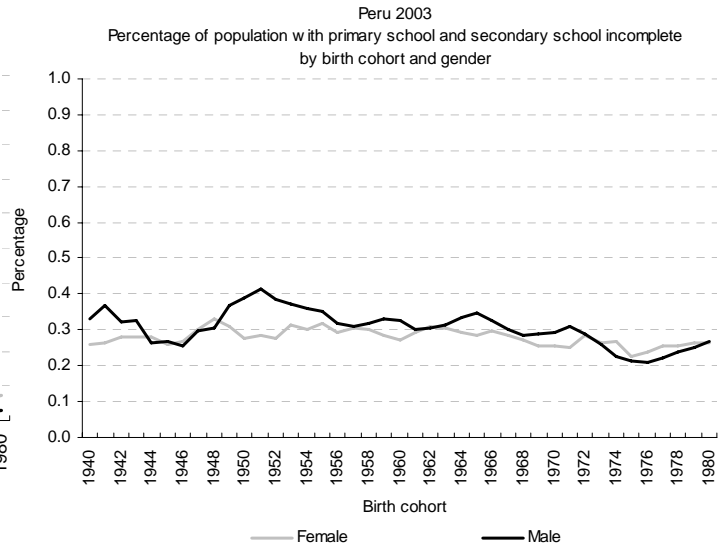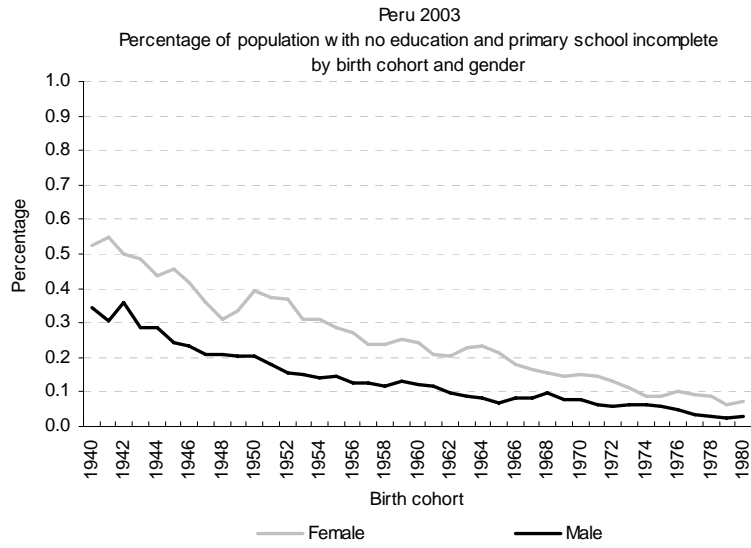Female — Male

Peru 2003
Percentage of population with secondary school and college incomplete by birth cohort and gender

Female — Male

Peru 2003
Percentage of population with collegre degree or more by birth cohort and gender

Female — Male

43

Paraguay 2003
Percentage of population with no education and primary school incomplete by birth cohort and gender

Paraguay 2003
Percentage of population with primary school and secondary school incomplete by birth cohort and gender

Paraguay 2003
Percentage of population with secondary school and college incomplete by birth cohort and gender

Paraguay 2003
Percentage of population with collegre degree or more by birth cohort and gender

44

El Salvador 2002
Percentage of population with no education and primary school incomplete by birth cohort and gender

El Salvador 2002
Percentage of population with primary school and secondary school incomplete by birth cohort and gender

El Salvador 2002
Percentage of population with secondary school and college incomplete by birth cohort and gender
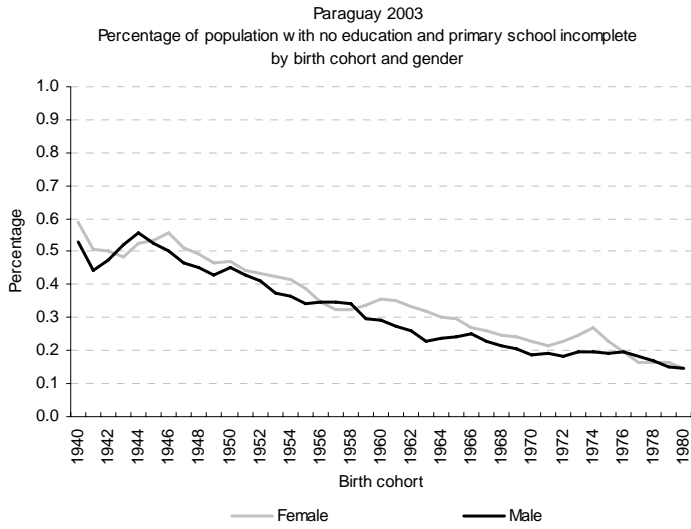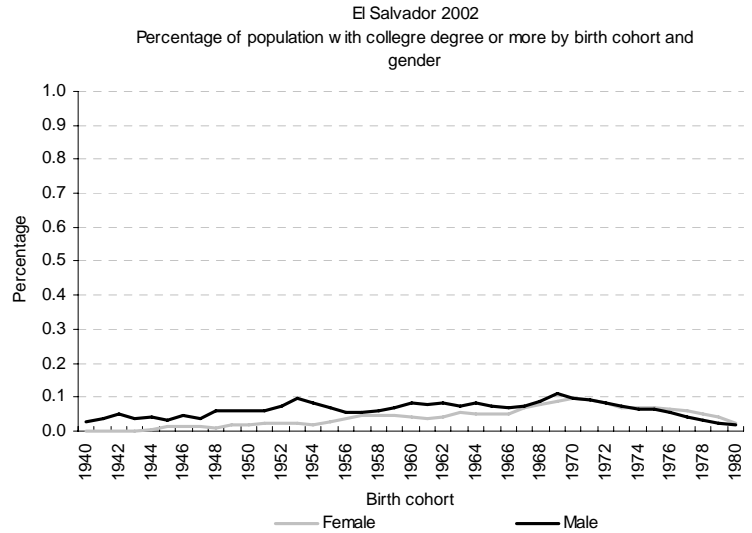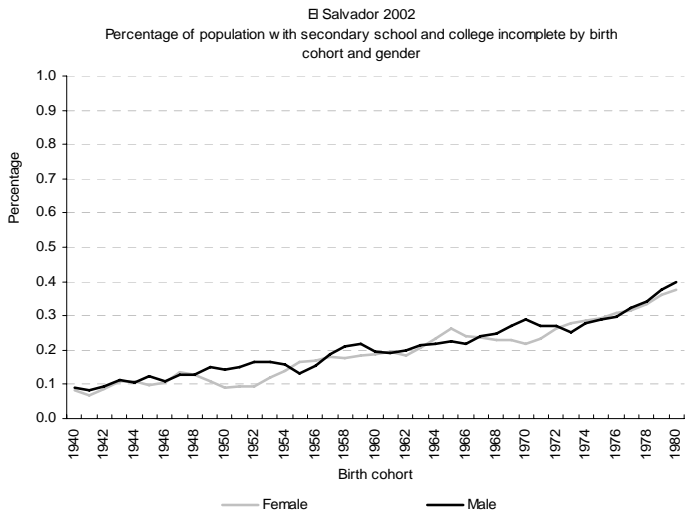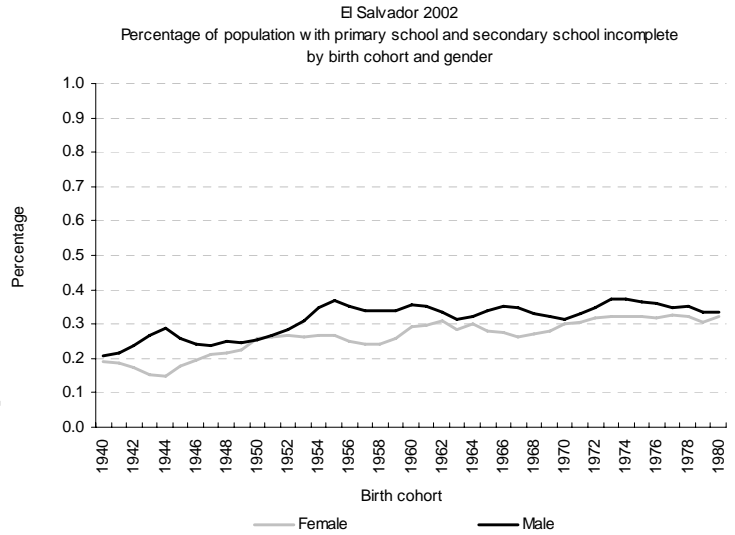

El Salvador 2002
Percentage of population with collegre degree or more by birth cohort and gender

Ururguay 2003
Percentage of population with no education and primary school incomplete by birth cohort and gender

Uruguay 2003
Percentage of population with primary school and secondary school incomplete by birth cohort and gender

Uruguay 2003
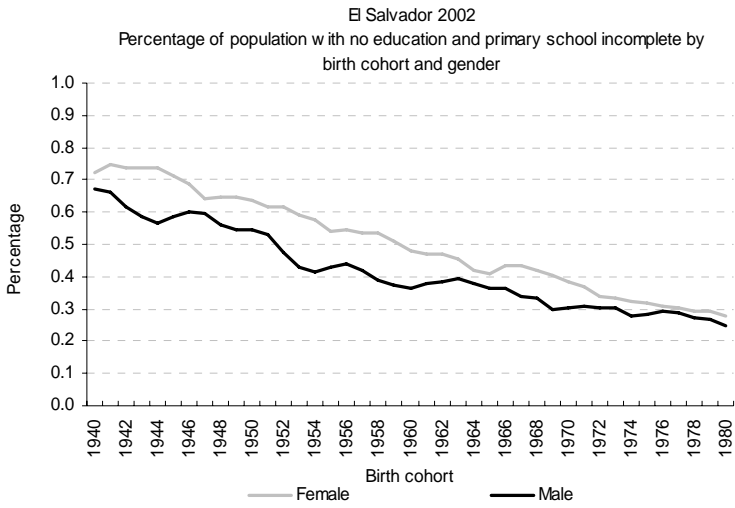Percentage of population with secondary school and college incomplete by birth cohort and gender

Uruguay 2003
Percentage of population with collegre degree or more by birth cohort and gender

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Venezuela 2004
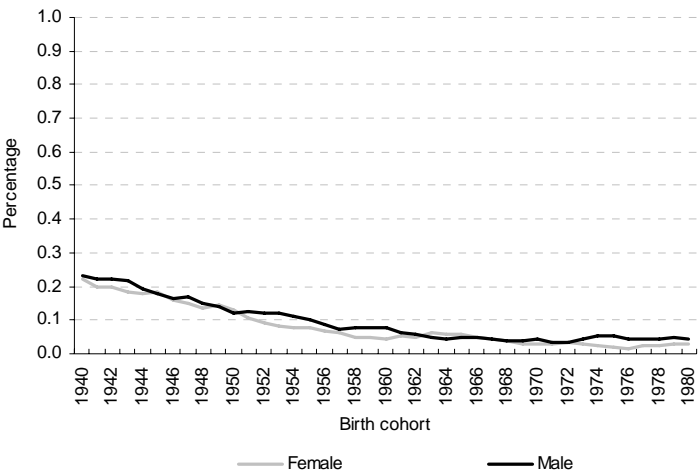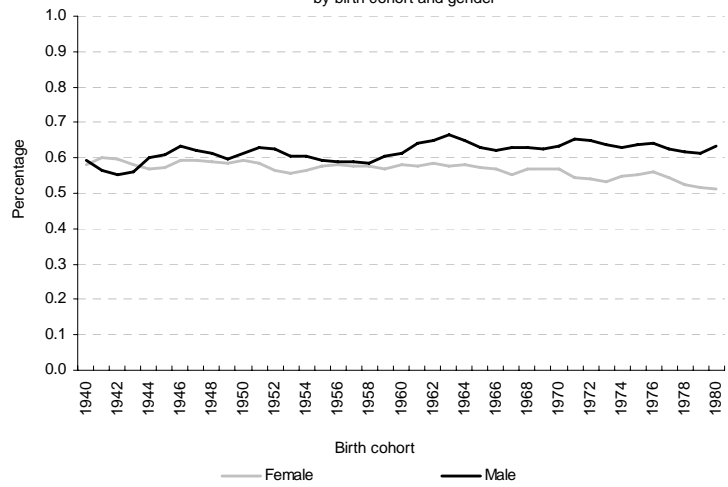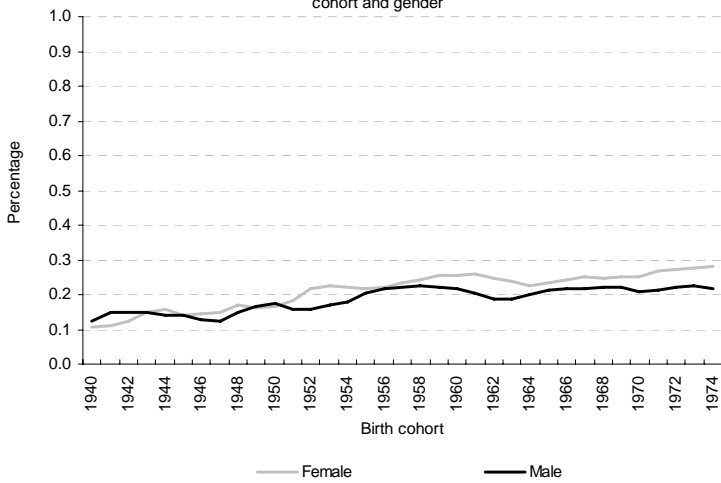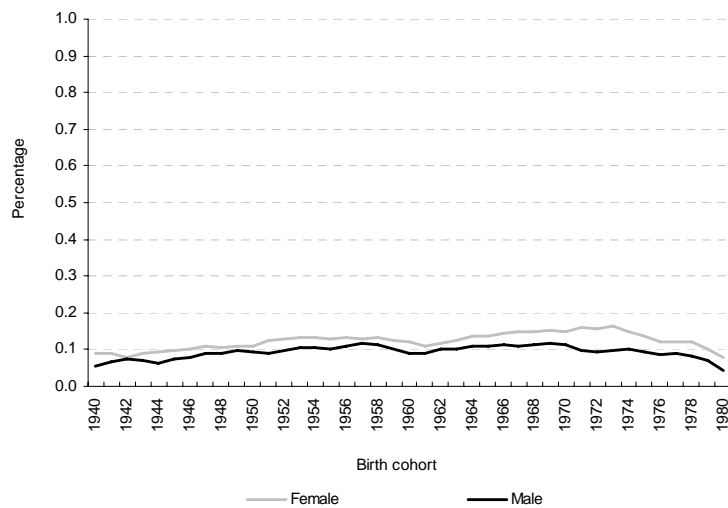### Percentage of population with no education and primary school incomplete by birth cohort and gender

Percentage (y-axis) vs Birth cohort (x-axis, 1940–1980). Legend: Female, Male.

Venezuela 2004
Percentage of population with primary school and secondary school incomplete by birth cohort and gender

Percentage (y-axis) vs Birth cohort (x-axis, 1940–1980). Legend: Female, Male.

Venezuela 2004
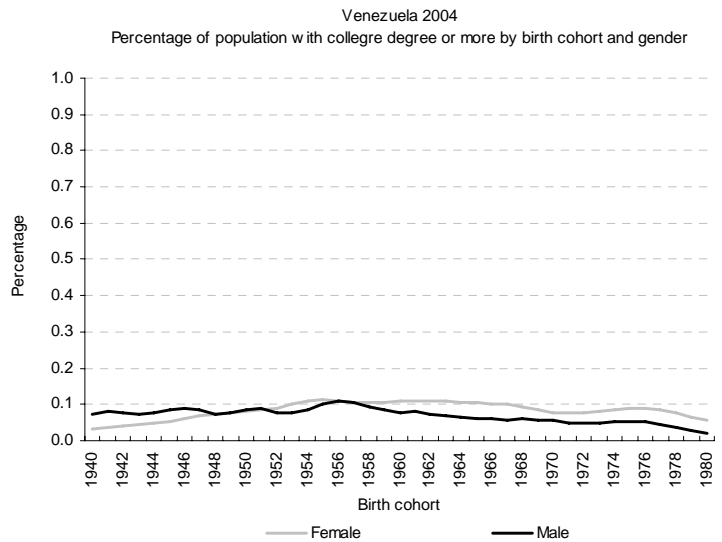### Percentage of population with secondary school and college incomplete by birth cohort and gender

Percentage (y-axis) vs Birth cohort (x-axis, 1940–1980). Legend: Female, Male.

Venezuela 2004
Percentage of population with collegre degree or more by birth cohort and gender

Percentage (y-axis) vs Birth cohort (x-axis, 1940–1980). Legend: Female, Male.

Appendix B

B.1 Classification of Schooling by Country

We use the reported level and highest grade completed within each level to create the measure of completed years of schooling. Only grades which were successfully completed are included in this measure. Individuals are also classified according to seven mutually exclusive levels of schooling, each with a corresponding dummy variable, classified as follows:

- *No Education*: Individuals who have completed 0 years of primary school. Includes individuals who may have attended first grade but never passed.
- *Primary incomplete*: Individuals who have at least one year of completed schooling but did not complete the primary level
- *Primary complete*: Individuals who have completed the last year of primary education
- *Secondary incomplete:* Individuals who have completed at least one year of secondary education but did not complete the last year of secondary education
- *Secondary complete:* Individuals who have completed the last year of secondary education
- *University incomplete*: Individuals who have completed at least one year of post-secondary education but have not completed 4 or 5 years of post-secondary education. Includes individuals who have completed degree courses of 2-3 years.
- *University complete*: Individuals who completed at least 4 or 5 years of post-secondary education depending on the country.

Many countries have introduced educational reforms in recent years regarding the definition of the number of years comprising primary education. We do not necessarily use the most current classification system of schooling as reported by UNESCO but in most cases prefer more traditional schooling classifications. As this paper examines temporal evolution in schooling outcomes starting with cohorts born in the 1940s, we start with classifications that are a better match with the decisions faced by these cohorts and thus can better measure changes over time, especially at low levels of schooling.

As opposed to the information provided by the surveys for primary and secondary schools, tthe information provided with respect to tertiary education is usually insufficient to specify degree completion. In the interest of comparing similar post-secondary outcomes over time we have defined university complete as the successful completion of 4 or 5 years of tertiary schooling, depending on heaping observed in the data. The duration of the levels of schooling for each country can be seen in the table below.

Table B.1. Duration of Levels of Schooling

Country	Primary	Secondary	Tertiary
Argentina	7	5	5
Bolivia	5	7	4
Brazil	4	7	4
Chile	8	4	5
Colombia	5	6	5
Costa Rica	6	5	5
Dominican Republic	8	4	4 or 5
Ecuador	6	6	4 or 5
El Salvador	6	6	4 or 5
Guatemala	6	6	5
Honduras	6	6	5
Mexico	6	6	5
Nicaragua	6	5	5
Panama	6	6	5
Peru	6	5	5
Paraguay	6	6	5
Uruguay	6	6	4
Venezuela	6	5	5

Table B.2. Specific Questions on School Attendance in Latin American and the Caribbean Household Surveys

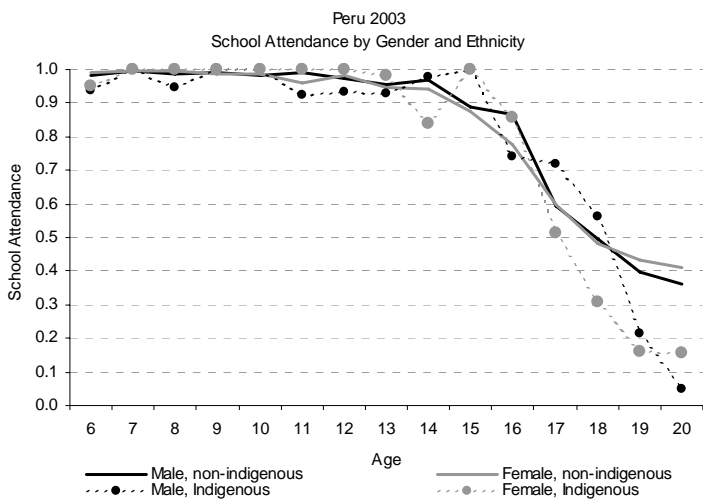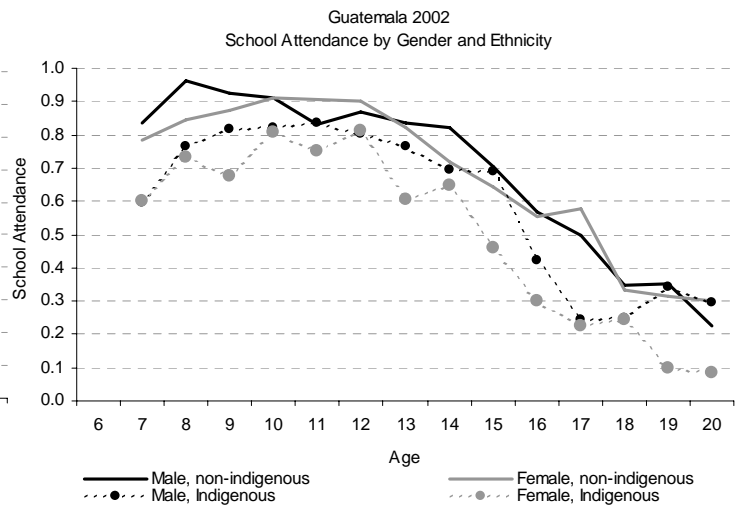| Country	Question
Argentina	Asiste o asistio a la escuela?
Bolivia	Durante este año, ¿Se inscribió o matriculó en algún curso o grado de educación escolar o superior?
Brazil	…..Frecuenta escola ou creche?
Chile	¿Asiste actualmente a algún establecimiento educacional, jardin infantil, sala cuna u otro programa preescolar no convencional?
Colombia	Actualmente….estudia? (asiste actaulmente a colegio, universidad o escuela)
Costa Rica	¿Asiste a...… ...preparatoria? ...escuela? ...colegio? ...parauniversitaria? ...universidad? ...enseñanza especial? ...educación abierta (para presentar exámenes ante el MEP)? ...No asiste
Guatemala	¿Asiste actualmente al ciclo escolar del 2002?
Honduras	Asiste actualmente a algun centro educativo?
Jamaica	What type of school is … attending this academic year?
Mexico	Asistencia a un centro educativo formal/Asistencia a un centro educativo tecnico Actualmente va a la... preprimaria… primaria… secundaria… preparatoria… profesional o postgrado
Nicaragua	Se matriculo en el presente ano escolar en el sistema educativo formal?
Panama	¿Asiste a la escuela actualmente?
Peru	Asiste … a algun centro educativo o estudia algo actualmente?
Paraguay	¿Asiste ... Actualmente a una institución de enseñanza formal?
El Salvador	Estudia Actualmente o asiste a un centro maternal?
Uruguay	Asistencia a establecimento de enseñanza
Venezuela	Asistencia a un centro de educación

Figure B.1

Bolivia 2002
School Attendance by Gender and Ethnicity

Guatemala 2002
School Attendance by Gender and Ethnicity

Peru 2003
School Attendance by Gender and Ethnicity

—— Male, non-indigenous   —— Female, non-indigenous
···●··· Male, Indigenous   ···●··· Female, Indigenous

Figure B.2

Bolivia 2002
Mean School Attainment by Gender and Ethnicity

Guatemala 2002
Mean School Attainment by Gender and Ethnicity

Peru 2003
School Attainment by Gender and Ethnicity