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Critical Choices at a Critical Age: Youth Emancipation Paths and School Attainment in Latin America

by

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Abstract

This paper discusses how young people become adults in Latin America and how that process affects educational attainment. An examination of four countries at three levels of development shows that individuals' educational attainment is closely linked to the decisions that young people make regarding adult roles, here referred to as emancipation patterns. The paper documents differences among countries in the age at which young people start working, marry and leave the educational system. Factor and hazard analyses further show how these dimensions vary according to gender and income within countries and how they affect the chances that young people will remain in the educational system.

Findings indicate that countries' development levels strongly affect the modal ages at which people become adults, hastening the process in less-developed countries and delaying it at higher stages of development. Second, within countries males and females present distinct risk factors regarding educational attainment; public roles (work) increase the risk of drop-out for men and private roles (marriage) increase this risk for women. In addition, and as expected, lower income groups are more at risk and present earlier adoption of adult values than higher income groups. The interrelation of income and gender operate differently in emancipation patterns and in how public and private adult roles affect the chances of remaining in the educational system. Consequently, in order to increase educational attainment the sequence and timing of adult role adoption have to be factored into policies.

1. Introduction

In the 1980s, studies from the World Bank—and later from the Inter-American Development Bank—made a groundbreaking observation in development research: the differences in the respective economic and social performances of South East Asia and Latin America could be traced to distinct efforts and achievements in the accumulation of human capital and the equality of its distribution. This discovery implied a major shift in development discourse, one that called for an urgent reevaluation of education policies in Latin America. The years since then have shown that bringing about such change is more easily said than done. Indeed, while access to education cannot be considered the major problem in the region, drop-out rates remain a daunting challenge, as they lead to low schooling rates and low overall educational achievement.

Indeed, compared to other regions in the world, schooling in Latin America is increasing slowly and continues to be considerably lower than in developed countries and the Southeast Asian “tigers.” In addition, “growth in the supply of the highest skills has been slow and has not been able to keep pace with demand” (Londoño and Székely, 1997).

Many Latin American countries have invested considerable economic resources in improving their educational supply, particularly in terms of school infrastructure, human and material resources, and innovative strategies for making schools more appealing to students. For the most part, however, politicians, experts and policymakers are frustrated with the small returns on these investments, as policies are simply not producing the expected outcomes. The key to this failure, though, is on the supply rather than the demand side: little is known concerning how and why the targeted population behaves as it does.

Thus, the primary focus of diagnosis and policy should go from supply to demand, or from factors endogenous to the educational system to those that are exogenous. Indeed, disappointing school performance has recently motivated international agencies such as the Inter-American Development Bank, the World Bank and the Economic Commission for Latin America and the Caribbean to sponsor studies involving non-academic factors in educational performance. What these studies clearly show is that most variance in Latin American schooling is due not to low access but to high drop-out rates.¹ Indeed, the “enrollment profiles of the poor differ across countries but fall into distinctive regional patterns: in some regions the poor reach nearly universal enrollment in first grade but then drop out in droves, leading to low attainment

(typical of South America), while in other regions the poor never enroll in school (typical of South Asia and Western/Central Africa).”² Also, and as shown in this paper, drop-out within Latin America shows clearly distinct patterns in terms of modal ages of drop-out and distance between poor and non-poor sectors and between genders.

Overall, a major shift in perspective is proposed in this paper. Human capital formation is not the product of educational supply alone, as important as this is. Rather, it should be seen as the final outcome of a set of interrelated choices made by youth that interact with the availability of services and resources that society at large offers to them. When young people get married, when and how they enter work, when they drop out of or abandon the educational system and when and how many children they have, constitute critical steps and choices that will have a long-term impact on their human capital accumulation. In turn, the signs that come from the labor market, the cultural norms and standards regulating gender behavior and the educational system itself constitute the background against which those options acquire meaning and should thus be interpreted.

To further the understanding of demand and human capital formation, three levels of efficient causes can be identified. First, there are country-specific factors that relate to the stage of the demographic transition, economic development and the reach and efforts of the educational system itself. These characteristics broadly influence the options youth have and constitute the major setting where signals, incentives and limits to choices are presented to young people.

Second, gender and income differences within countries provide an additional differentiating set of factors that influence choices among youth. Finally, the choices themselves and how they are sequenced and timed are a third set of efficient causes that help to explain demand for education, human capital formation and eventually the intra and intergenerational reproduction of poverty.

2. A Structural and Demographic Typology of Latin American Countries

Latin America is neither South-East Asia nor homogenous. Automatic lessons can be drawn neither from other regions nor from single country experiences. Demand changes among

¹ See Filgueira (1998 and 1999), ECLAC (1997 and 1998), Londoño (1996) and Londoño and Székely (1997).

² Filmer and Pritchett (1998).

countries and within countries, as well as among gender and socioeconomic groups. In the context of a heterogeneous reality, the issue of school drop-out is in some countries primarily a combination of “supply” and “demand” issues while in others it is primarily a “demand” problem. This implies that there are no easy fixes, and that simply increasing resources will not do the job, though it certainly has to be considered. Yet, understanding how demand operates and why it fails to reach adequate levels constitutes the major challenge to providing relevant inputs for effective policy design in education. In order to understand this, the first step is to properly consider the heterogeneous structural realities in Latin America. Two factors will be introduced to approach a basic classification of Latin American countries. The first is the phase of the demographic transition, and the second is the maturity and reach of the educational system.

Demand is driven by, among other factors, demographics. In this sense, Latin America is presently undergoing what has been labeled the “golden age” or the “demographic window of opportunity.”³ Indeed, between the 1980s and the year 2050 the region will have the best combination of low dependency rates regarding both children and old age. Yet, this window of opportunity is at very different stages in Latin America. While in some countries it is closing, in other countries the window has yet to fully open. In any case, a country’s phase in the demographic transition introduces distinct challenges as well as opportunities regarding drop-out and youth choices in the transition to adult life. For instance, fertility rates, children dependency rates, and urban/rural population are all constraints and inputs that have to be considered in the struggle to increase school attendance. These factors in turn have to be combined with the accumulated effort that these countries have made in regard to the supply and reach of the educational system. The data for Latin America indicate that, in demographic terms, three different groups of countries can be identified: early transition countries, middle-of-the-road countries and countries where the transition is almost complete. The latter will eventually have to face the challenges of post-transitional societies.

³ See Duryea and Székely (1998) and Magno de Carvalho (1998).

Table 1. Demographic Stages and Educational Reach: Selected Variables

Countries	Demographic Factors			Past Educational Effort and Basic Schooling		
	Child dependency 0-14 *	% Urban Pop.	Total Fertility Rates	Adult Literacy rate	Net primary Enrollment Ratio	Net secondary Enrollment Ratio
Uruguay	41.2	90.7	2.4	97.5	90.3	83.8
Chile	47.2	84.2	2.4	95.2	90.4	80.2
Argentina	50.6	88.6	2.6	96.5	99.9	76.9
Cuba	33.1	76.7	1.9	95.9	99.9	69.9
C. Rica	61.6	50.3	2.8	95.1	91.8	55.8
Colombia	58.3	73.6	2.9	90.9	89.4	76.4
Venezuela	65.6	86.5	3.0	92.0	82.5	48.9
Brazil	56.5	79.6	2.3	84.0	97.1	65.9
Mexico	67.2	73.8	2.8	90.1	99.9	66.1
Honduras	87.3	45.0	4.3	70.7	87.5	36.0
Guatemala	88.3	39.4	4.9	66.6	73.8	34.9
Nicaragua	97.6	63.2	4.4	63.4	78.6	50.5
El Salvador	82.5	45.6	3.2	77.0	89.1	36.4
Haiti	75.5	33.0	4.4	45.8	34.2	19.4
Bolivia	80.2	62.3	4.4	83.6	97.4	40.0

Source: Magno de Carvalho (1998), United Nations Development Programme (1999).

* In 1990.

Uruguay, Chile, Argentina and Cuba are among the countries that have advanced and in some cases almost completed their demographic transition. Low fertility rates, a favorable age distribution and a predominantly urban population, combined with an extended schooling system, indicate that school drop-out problems result mainly from demand-side factors. These countries face the challenge of bridging gaps in schooling and educational attainment between different social strata and sexes, and youth choices regarding adult roles are critical in understanding why there is insufficient demand for education at the secondary level.

Colombia, Costa Rica, Venezuela, Mexico and Brazil present an intermediate situation in regard to both demographic factors and educational effort and reach (though this group is rather heterogeneous in the latter regard). Still, almost universal enrollment in the first years of school suggests that sustaining demand, rather than merely increasing the educational supply, remains the critical factor in improving educational attainment. Yet these countries, in contrast to the previous group, confront more extended patterns of early adoption of adult roles that diminish the chances of remaining in school. Early motherhood, child and adolescent labor, and in some cases earlier marriages are distributed along stratified lines but advance deeper into the middle-income sectors in these countries.

Finally, Guatemala, Nicaragua, Honduras, Bolivia, El Salvador and the extreme case of Haiti are in most cases at an early stage in their demographic transition. They still present deficits in the reach of the schooling system that must be confronted, especially in rural areas, in order to increase enrollment and attendance.

On the demand side, these countries present the most complex scenario. There is a large rural population, and youth enter into work with their family or in rural labor markets early in life. In this setting high fertility rates and early motherhood constitute strong and extended deterrents to enrolling or, more typically, remaining in school. Furthermore, the low educational climate in many households, suggested by high illiteracy levels, further inhibits educational demand.

These three different types of countries confront distinct challenges and have different opportunities if they want to advance in regard to schooling and educational attainment. Yet what is common to all three is that demand and not merely supply has to be understood in order to increase educational attainment. While demographics and educational reach provide a useful first step in understanding how demand is formed, the emancipation paths of adolescents and youth represent a second and more critical step in capturing demand formation.

3. Understanding Critical Choices as Path-Dependent and Interrelated Options: The Idea of Emancipation Paths

Behavior behind decisions to drop out of the educational system does not correspond to the typical utility maximization of goods but, instead, to choices between options more or less exclusive or incompatible. Therefore the limits of individual educational investment cannot be examined, independently from preferences regarding other goods, as a derivative from the point where marginal private benefits equal the private marginal cost of the investment. Additionally, decisions are neither made with perfect information nor return benefits that take place at a single point in time. Educational investment typically corresponds to benefits that follow a “deferred gratification pattern.”

The educational behavior of youth ought to be considered as a specific component of the more general process of emancipation she or he is undergoing. During this stage there are four important transformations in his or her life, which can be sketched in terms of four dichotomies

concerning role changes: studies or not; incorporation into the labor market or not; marriage or not; and parenthood or not.

Whenever youth choices regarding marriage, work or education are addressed, a commonplace is to stress the importance of education because of the major consequences these choices have on young people's future lives. In effect, very thorough studies have considered the impact of years of schooling on future earnings, childbearing on employment opportunities, and labor market participation on savings, culture and integration, among other possibilities.⁴ Fewer studies have concentrated on the interrelationship between these different choices in the shorter term. Or, in other words, how do childbearing, work, remaining in the formal educational system and marriage interact as adolescents become young people and eventually adults?

Certainly, it seems both theoretically sound and intuitively obvious not to consider these choices as independent from one another. They are not independent in a double sense. First and foremost, they are path-dependent, because a given option in any of these dimensions affects the chances of being able to act upon other dimensions. Having a child affects the chances of immediate employment, and working limits the possibilities of continuing and adequately performing in the educational system. Even more obvious, marrying or engaging in stable consensual unions increases the chances of childbearing. But these choices are not independent from one another in an even more important and individual sense. People, including young people, weigh these choices as cost-opportunity issues and evaluate the trade-offs between them. Furthermore, and drifting away from a rational choice perspective, people attach different symbolic and identity values to these choices as they relate to one another. Young women in poor and disadvantaged settings, for example, have children early not only as a result of irrational behavior, incomplete information or lack of family planning tools, but also because among the different adult statuses available to them this is the easiest to achieve and the least dependent upon other people. This in turn will strongly limit and curtail the achievement of additional adult statuses and the completion of youth roles (i.e., education). Here both rational and non-rational behavior operates as a function of available statuses, the differential value attached to those statuses and control over the means of achieving them. This idea of non-independent critical choices is here termed emancipation paths. The advantage of such a

⁴ See White, Foner and Waring (1988) and Clausen (1986).

perspective is that it incorporates time and interaction in time as a strategy for understanding youth choices.

4. Stylized Facts on Work, Family and Education of Youth in Selected Cases: A Descriptive and Exploratory Exercise

a. Purpose and Methodology

Four countries have been selected for this study, and three variables have been considered as the major dimensions of emancipation paths of youth.⁵ The patterns of family formation, work and education are analyzed for Uruguay, Chile, Venezuela and Honduras for adolescents and young people between 12 and 29 years. These findings are then combined with factor analyses for each country, which introduce emancipation variables and household and individual background variables for four groups within each country: men of high and low income and women of high and low income.

A double purpose guides this exercise. The first is to present some basic curves that show “cohort mortality” along the three emancipatory dimensions. An initial approach to the question of emancipation paths consists of plotting cohort survival lines between 12 and 29 years for each dimension or variables in each country. Each line of the graphs represents the percentage of people by yearly cohort that adopt “adult values” or abandon “youth values.” In other words, they represent the percentage of all youth for each age who work, have formed a new family and have left the educational system. This allows for a basic country comparison as to when young people adopt adult values and for a more nuanced comparison as to how these adult roles are sequenced or superimposed in time, as countries differ as to the modal ages in which young people leave the educational system, marry and enter the labor market. Furthermore, in some countries the curves of these different dimensions are convergent as they move to older cohorts, while in others they diverge or remain parallel.

Second, factor analyses serve another subset of purposes. First and foremost, if choices regarding the adoption of adult roles are an interrelated and interdependent set of choices that covary with time, then that should become clear in the factor analyses. In other words, age and emancipatory variables should cluster together in one factor or have important weights in one

⁵ While it would be extremely useful to add to this dimensions that of parenthood, the data for the different countries does not allow the adequate identification of mothers and offspring, much less so for fathers and offspring.

factor. This would not mean that background household and individual variables are not associated with emancipation dimensions, but simply that such an association is weaker than that among time and emancipation variables and within emancipation variables.

b. Some Notes on Factor Analysis

Factor Analysis is an analytical model for determining the number and nature of the underlying variables (factors) among large numbers of measures. More succinctly, factor analysis is a method for determining k underlying variables from n sets of measures, k being less than n . It may also be called a method for extracting common factor variance from sets of measures.⁶

In multivariate analysis, the sources of variance in a variable can be expressed as:

$$V_t = V_{co} + V_{sp} + V_e$$

where V_t = total variance of a variable; V_{co} = common factor variance, or the variance that two or more variables share in common; V_{sp} = specific variance, or the variance of the variable that is not shared with any other variable; and V_e = error variance.

If the common factor variance V_{co} were broken down into two sources of variance, V_A and V_B , where V_A might be drop-out and V_B single-married, then,

$$V_{co} = V_A + V_B$$

This is reasonable if the sums of squares of factor loadings (correlation) of any variable are considered:

$$hi^2 = ai^2 + bi^2 + ci^2 \dots\dots\dots + ki^2$$

where $ai^2, bi^2 \dots\dots\dots$ are the squares of the factor loadings of variable i , and hi^2 is the communality of variable i . But $hi^2 = V_{co}$. Therefore $V(A) = a^2$ and $V(B) = b^2$ and the theoretical equation is tied to real factor analytic operations.

But there may of course be more than two factors. The generalized equation is:

$$V_{co} = V_A + V_B + \dots\dots\dots V_K$$

⁶ Extracted from Kerlinger (1966).

Substituting in the former equation obtains:

$$V_t = V_A + V_B + \dots + V_K + V_{sp} + V_e$$

Dividing by V_t shows a proportional representation:

$$V_t / V_t = 1 = \overbrace{V_A / V_t + V_B / V_t + \dots + V_K / V_t + V_{sp} / V_t + V_e / V_t}^{h^2} \underbrace{\hspace{10em}}_{r_{tt}}$$

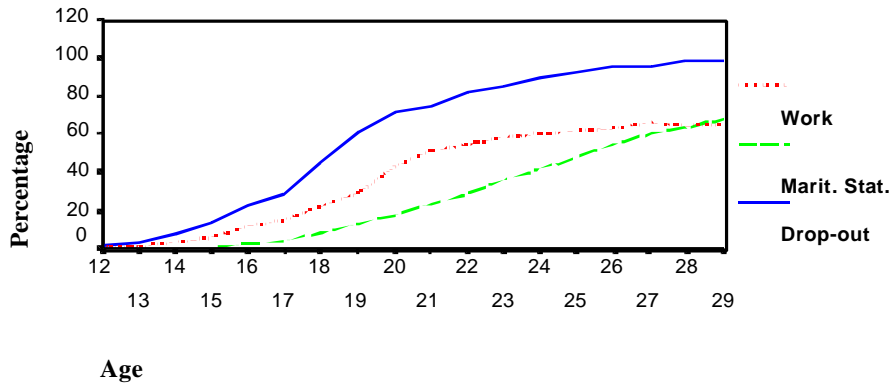
h^2 is the proportion of the total variance that is common factor variance. r_{tt} is the proportion of the total variance that is reliable variance.

Given a set of variables, Factor Analysis serves to detect clusters of variables with high correlations among themselves and low correlations with variables of other clusters. The clusters are defined by the structure of factors. Finally, figures in the Factorial Matrix are the loading or correlations between variables and factors. These correlations indicate the relative weight of the variables in the factors and make it possible to interpret the meaning of the factors. In the present work, Principal Component was the method of extraction of factors and rotation was made through the Varimax Method. As is usual, the factorial matrix in the tables includes only the factors that contribute most to explaining the proportion of the total variance of the original correlation matrix.

c. Cohort Country Emancipation Patterns and Factor Analysis

As can be seen in all four graphs, in percentage terms the curves present the expected precedence of role changes. The largest area is always defined by school drop-out, followed by work and then by family formation or marriage. This does not mean, of course, that all individuals follow this path, but simply that it predominates at the aggregate level.

Figure 1. Emancipation Patterns: Drop-Out, Work and Marital Status, Chile



Lines correspond to the % that assumes adult values.

Chile represents a case in which emancipation occurs relatively late for all of the dimensions considered. Roughly 80 percent of youth who are 15 years of age study, 90 percent do not work and almost 100 percent have not married. A sharp increase in school non-attendance can be seen in the next cohorts, reaching almost 50 percent of the population at 18 years and 90 percent by age 24. Employment follows a similar pattern, even though the curves between drop-out and work show an increasingly divergent pattern, with employment lagging behind school drop-out. Marriage follows a linear pattern of increase between the ages of 15 and 29, converging towards employment at the end of the age distribution.

This basic data indicates a pattern that fits the general impression of Chilean society, given its demographics and its pattern of inequality. In short, Chile is a country with strong stratification and differentiation patterns along income and gender, but with basic integrative mechanisms among those different groups. This could explain, on the one hand, the good performance in education until 18 years of age and the sharp decline in school attendance thereafter. Yet, with the data at hand, it is not possible to move further or to see how well this hypothesis confronts reality. Survival analysis and hazard analyses will make it possible to test this hypothesis more adequately.

Table 2. Factor Analysis for Chile*

<i>Upper Income Group</i>	MEN		WOMEN		
	Factor 1	Factor 2	Factor 1	Factor 2	
Education attendance	-.861		-.867		
Age	.786	(-.457)	.885		
Work	.870		.647		
Marital Status	.632		.627		
Years of Education		-.608	.587	(-.410)	
Number of children in household		.731		.727	
Type of household		.611		.676	
<i>Lower Income Group</i>					
	MEN		WOMEN		
	Factor 1	Factor 2	Factor 1	Factor 2	Factor 3
Education attendance	-.871		-.869		
Age	.888		.851		
Work	.855			.600	(.360)
Marital Status	.704		.854		
Years of Education	(.308)	(-.370)		.800	
Number of children in household		.725		(-.355)	.688
Type of household		.731			.770

Rotation Method: Varimax with Kaiser Normalization

Loadings of less than .300 are not shown; parentheses indicate shared loadings between factors.

Source: Based on special tabulations from Household Surveys, IADB, 1999.

On the other hand, gender differences might be behind the pattern of school drop-out and work. In other words, women who leave school tend to adopt the “private adult role” of marriage and eventually childbearing, rather than the public role of work. Furthermore, one could expect that this pattern of emancipation in women to be formed along stratification lines. Thus, women of higher socioeconomic status would move towards work, while women lower in the stratification system gear towards household responsibilities. If this is indeed the case, then the way in which emancipation and background variables cluster together should be different for men and women. Through In this sense factor analyses provide strong supporting evidence, even though hazard analyses will again be needed in order to test this interpretation.

As can be seen from Table 2, a first factor is formed for men that encompasses time (age) and the typical and basic emancipation dimensions (drop-out, marital status and work), while the second factor groups the two socioeconomic and household background variables.⁷ But when

⁷ Type of household assumes two values: 1 = unipersonal and nuclear families, and 2 = extended and composed. According to the conventional definition, a nuclear family is composed of a couple, a couple with children or a monoparental family (father or mother only with children). Extended families are nuclear families plus one or more relatives. Composed families are the kind of households where both parental and non-parental relations are present.

women are considered, in the lower-income group education attainment, rather than time and other emancipation options, is linked to work. The coefficient signs further indicate that the higher the socioeconomic status of women, the more likely they will work.

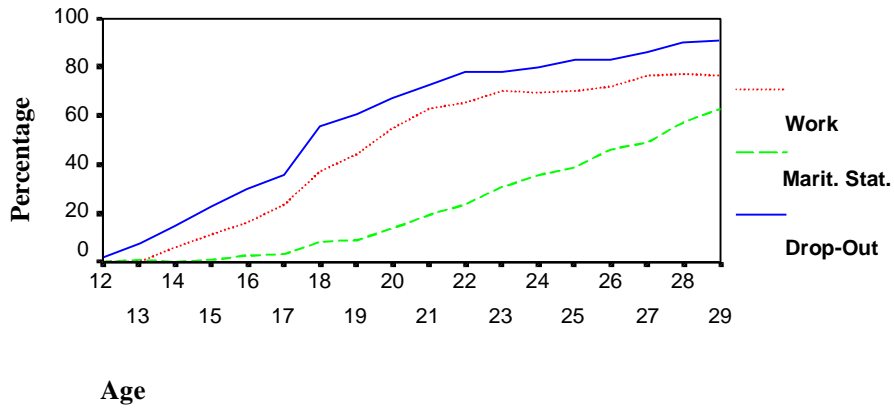
Uruguay, the other more developed country under consideration, presents a pattern that is similar in some aspects to that of Chile, though with some telling differences (see Table 3). Even though Uruguay shares with Chile a late pattern of emancipation, it presents for both education and work an earlier adoption of “adult values.” Drop-out at age 15 is 10 percent higher than in the Chilean case, and something similar occurs with work. Among older cohorts, though, drop-out becomes less marked than in the case of Chile, while employment continues to grow at a faster rate than Chile. Two additional distinct patterns are worth mentioning in the case of Uruguay. First, employment does not lag behind drop-out; instead, they evolve as parallel lines throughout the age distribution. Secondly, while early drop-out and entering the work force evolve at a faster rate than in Chile, marriage does not. The linear pattern in Uruguay regarding family formation mirrors the Chilean case, and even shows slight differences in favor of Chile (that is, more youth marry by age group).

Since the precise year of schooling drop-out is known, but not the equivalent in work and marriage, it is not easy to assume a causal relation. More precisely, it is not known if a young person leaves school *because* he or she enters the labor market or forms a new couple. It is highly probable they do so or, alternatively, it is probable that drop out indicates a predisposition to assume adult roles in the near future. In any case, it is preferable not to interpret the relations in terms of causality but merely as associations.

This pattern of emancipation thus shares with Chile relatively high ages at which the young become adult. At the same time, it suggests that gender and income stratification operate differently in Uruguay. Demand for the educational system between 12 and 18 years reaches far less adequate levels than in Chile, yet demand among older cohorts reverses that trend.

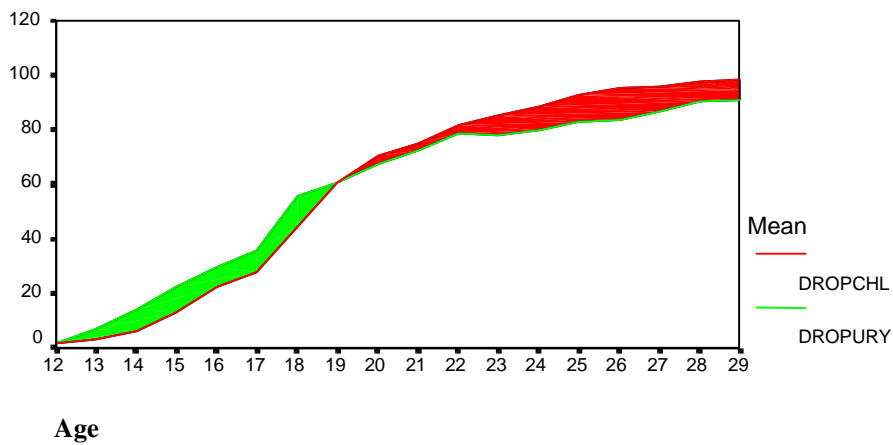
Figures 2 and 3, showing the difference between each curve in drop-out for Chile and Uruguay, convey this message more clearly.

Figure 2. Emancipation Patterns: Drop-Out, Work and Marital Status, Uruguay



Lines correspond to the % that assumes adult values.

Figure 3. Drop-Out in Chile and Uruguay for Cohorts 12-29 Years of Age (as % of each cohort)



An overall more egalitarian society (i.e., one with less stratification discontinuity) but with less protection for those worse in the income distribution is at work here. Yet the data suggests that Uruguay is also lagging behind high school completion for the middle sectors when compared to Chile. An instrumental market-oriented educational investment in a strongly stratified society might be behind Chile's good performance. Conversely, a more symbolic and status-oriented educational investment, which works mainly for part of the middle and most of the upper end of the stratification system, might be at work in the case of Uruguay. Beyond these (mostly unwarranted) interpretations it seems clear that in Chile progress has been made, while in Uruguay there are very good reasons to be rather worried as to the type of society that might be in the wings (see Table 3).

Table 3. Percentage of Youth with Adult Roles at Age 15 and 18 by Gender and Income

Countries	Age	Income* Level	Emancipation Dimensions					
			School Drop-out		Work		Married or informal union	
			Men	Women	Men	Women	Men	Women
Uruguay	15 years	Low	43.9	35.4	25.1	6.9	1.3	3.7
		Middle	9.2	8.1	11.3	4.6	---	3.1
	18 years	Low	75.5	63.9	46.6	28.2	5.2	16.1
		Middle	55.4	46.8	53.2	26.5	1.1	14.7
Chile	15 years	Low	18.3	17.1	4.2	3.9	---	2.7
		Middle	14.8	7.9	8.6	2.7	0.5	0.8
	18 years	Low	48.9	49.2	25.1	7.5	6.5	14.5
		Middle	42.0	44.2	33.1	15.9	1.3	13.9

Source: Based on special tabulations from Household Surveys, IADB, 1999.

* Household per capita Income is coding in three levels.

The former ideas might nonetheless explain both the high retention rates in older cohorts and the low retention rates in younger ones. To this should be added the different characteristics of Chilean and Uruguayan educational systems at the tertiary level. In the case of Uruguay, an educational system that is designed to allow for both work and study at the post-secondary level is a major factor in understanding high retention rates after 18 years of age. In contrast to Chile, Uruguay has a completely free state university where most tertiary-level students are

concentrated, and it is typically built along lines that allow for work and study (e.g., flexible hours, no requirements for grades or yearly progress to remain in the programs, etc.) This also makes for very long study careers that very frequently span until people reach thirty and beyond. In Chile access to tertiary-level education is more stratified, the possibility of working and studying less easy to combine, and study careers shorter.

Regarding the work/family pattern, the data for Uruguay suggests that large differences should not be expected in emancipation paths according to gender. Work and education remain the two critical first choices both for women and men, while marriage comes in a clear second. In Uruguay there is a far larger proportion of unmarried youth who both work and have left the educational system than in Chile. This is due mainly to the fact that women of all strata enter the labor force as men do (and even more than men at lower income levels) rather than marry and withdraw from the labor market. Consistently, and in contrast to Chile, factor analyses for the case of Uruguay show a different pattern in how variables cluster for men and women.

Table 4. Factor Analysis for Uruguay*

<i>Lower Income Group</i>	MEN		WOMEN	
	Factor 1	Factor 2	Factor 1	Factor 2
Educational attendance	-0.812		-0.847	
Work	0.792		0.480	
Marital Status	0.688		0.752	(0.359)
Age	0.861		0.851	
Years of Education		-0.705		0.745
Number of children in household		0.742		-0.718
Type of Household		0.467		-0.422
<i>Upper Income Group</i>				
<i>Upper Income Group</i>	MEN		WOMEN	
	Factor 1	Factor 2	Factor 1	Factor 2
Educational attendance	-0.833			-0.745
Work	0.750	(0.322)	0.590	(0.467)
Marital Status	0.627			0.696
Age	0.735	0.555	0.757	(0.516)
Years of Education		0.842	0.782	
Number of children in household	(-0.448)	-0.581	-0.700	
Type of Household	(0.307)	-0.372	(-0.395)	0.532

Rotation Method: Varimax with Kaiser Normalization

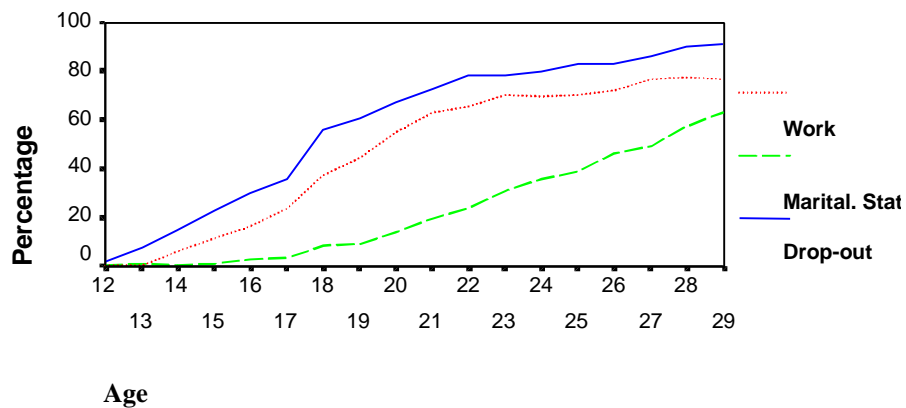
* Loadings of less than .300 are not shown, brackets indicates shared loadings between factors

Source: Based on special tabulations from Household Surveys, IADB, 1999.

Uruguay is the only case in which women of lower incomes define factors that are equal to men. In particular, work is not related to years of education, but to time and other emancipation dimensions.

Venezuela presents an emancipation pattern that combines aspects of both the Uruguayan and the Chilean pattern, although somewhat worsened. On the one hand the relative distance of the three curves mirrors the Chilean case, yet the ages at which drop-out occurs more closely resemble Uruguay in both younger and older cohorts. In effect, drop-out in Venezuela is similar to Uruguay, presenting a continuous albeit slightly higher increase, with low retention at the early stages, but with a less marked increase in drop-out in older cohorts. In contrast to both Chile and Uruguay, rates of marriage increase somewhat more steeply at early ages, though they subsequently follow the classic linear pattern of the other two countries.

Figure 4. Emancipation Patterns: Drop-Out, Work and Marital Status, Venezuela



Lines correspond to the % that assumes adult values.

Venezuela seems to combine a more traditional division of roles between women and men and a relatively open education pattern (i.e., one that does not close off so markedly among older cohorts). As in Uruguay—and in fact slightly worse—retention in young cohorts is rather low. This is not due to worse performance for those at the lowest income levels, however, but

rather to low retention rates in the middle sectors. The factor analysis in Table 5 below permits a better understanding of both gender and stratification effects.

As can be seen, 33.7 percent of 15-year-old males have left the school system in the lower income group. This puts Venezuela in a better position than Uruguay (see Table 3). Yet at 15 years of age almost the same percentage of men have left the system in the middle sectors. Women, on the other hand, while more protected from drop-out, enter the labor force very rarely (10.7 percent at 18 years in low-income households and 21.7 percent in middle-income household) even though more than half at either income level have left the educational system. This traditional gender pattern can also be seen in factor analysis (Table 6).

Table 5.
Percentage of Youth with Adult Roles at Age 15 and 18 by Gender and Income

Countries	Age	Income Level	Emancipation Dimensions					
			School Drop-out		Work		Married or informal union	
			Man	Woman	Man	Woman	Man	Woman
Honduras	15 years	Low	68.3	51.6	56.4	10.9	---	1.9
		Middle	54.7	49.3	50.2	19.9	0.5	5.7
	18 years	Low	80.8	83.0	75.8	18.8	5.6	37.8
		Middle	73.6	70.4	68.1	32.5	5.1	34.5
Venezuela	15 years	Low	33.7	28.9	29.7	6.4	0.8	7.5
		Middle	25.5	15.2	20.4	5.5	0.6	4.3
	18 years	Low	72.8	62.6	43.3	13.0	8.4	22.2
		Middle	64.5	50.7	53.4	21.7	5.3	23.1

Source: Based on special tabulations from Household Surveys, IADB, 1999. Expanded Data.

* Household per capita income is coded in three levels.

As can be seen in the table presenting the loadings for factor analyses, among Venezuelan women work and years of education are the most important variables in the second factor, again suggesting a more traditional pattern in gender behavior among less educated women in both income groups. This factor holds both for upper and lower income women.

Table 6. Factor Analysis for Venezuela*

<i>Lower Income Group</i>	MEN			WOMEN		
	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3
Educational attendance	-0.832	(-0.318)		-0.865		
Work	0.795				(0.404)	(0.435)
Marital Status	0.697			0.824		
Age	0.837			0.825		(0.336)
Years of Education		0.913				0.873
Number of Children in Household		(0.393)	0.866		0.692	(-0.425)
Type of Household			0.675		0.793	
<i>Upper Income Group</i>						
<i>Upper Income Group</i>	MEN			WOMEN		
	Factor 1	Factor 2		Factor 1	Factor 2	
Educational attendance	-0.824	(0.324)		-0.811		
Work	0.831			0.578	(-0.325)	
Marital Status	0.631			0.713		
Age	0.832			0.812		
Years of Education		-0.650			-0.657	
Number of Children in Household		0.773			0.769	
Type of Household		0.580		(0.345)	0.556	

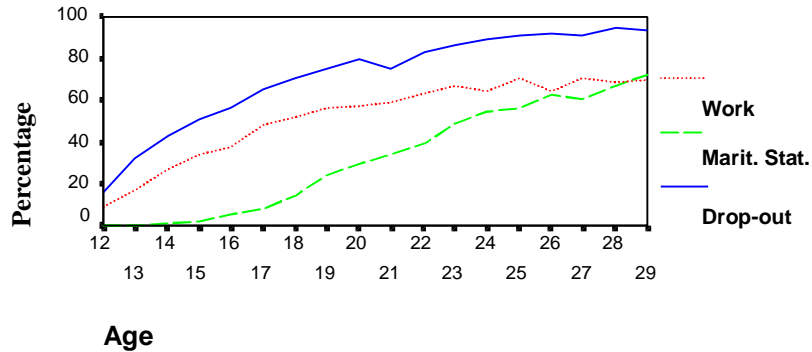
Rotation Method: Varimax with Kaiser Normalization

* Loadings of less than .300 are not shown; parentheses indicate shared loadings between factors

Source: Based on special tabulations from Household Surveys, IADB, 1999.

As shown in Figure 5, the case of Honduras, the least developed of the cases under consideration, presents a pattern consistent with the typology of development and demographic stages in Latin America presented above. Of all the cases, this is the only one where a significant percentage of 12-year-olds are outside the educational system. Indeed, almost 20 percent of 12-year-olds have dropped out of school, indicating a large proportion of people who do not reach 6 years of schooling. By 15 years of age, more than 50 percent of the population has left the system. Child labor is also a clear difference between Honduras and the other cases. Thirty percent of those in the age cohort of 15 years work, and at age 18 close to 50 percent (in that age group) are classified as having a job. It is interesting to note that from that age onwards labor remains almost stagnant as a percentage of age cohorts, rising only 15 percent for the nine years remaining in the age distribution. At the same time (around 18 years), marriage, which also begins earlier, rises more steeply and catches up with employment by age 26.

Figure 5. Emancipation Patterns: Drop-Out, Work and Marital Status, Honduras



Lines correspond to the % that assumes adult values.

On the basis of cohort evolution alone, it is clear that Honduras represents a radically different kind of society than the other countries. Much progress remains to be made in basic schooling and suppression of child and adolescent labor, which penetrate deep into Honduras' social structure (see Table 7).

Table 7. Factor Analysis for Honduras*

<i>Lower Income Group</i>	MEN			WOMEN		
	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3
Educational attendance	-0.799	(0.312)		-0.803		
Work	0.779			(0.302)		0.482
Marital Status	0.705	(0.325)		0.852		
Age	0.837			0.859		
Years of Education		0.794				0.840
Number of children in household		-0.563	0.523		0.744	
Type of Household			0.911		0.757	(0.332)
<i>Upper Income Group</i>						
	MEN			WOMEN		
	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3
Educational attendance	-0.806	(0.339)		-0.842		
Work	0.827			(0.376)	0.450	
Marital Status	0.641			0.820		
Age	0.785	(0.440)		0.736	(0.474)	
Years of Education		0.831			0.879	
Number of children in household		-0.662	(0.375)		(-0.451)	0.690
Type of Household			0.958			0.866

Rotation Method: Varimax with Kaiser Normalization.

* Loadings of less than .300 are not shown; parentheses indicate shared loadings between factors.

Source: Based on special tabulations from Household Surveys, IADB, 1999.

Without questioning this paper's basic assumption and pragmatic end (namely the importance of demand on school attainment and the impact of emancipation patterns on educational demand), it can still be safely said that in Honduras the expansion in quantity and quality of supply remains important.

Factor analyses show, as in the case of Venezuela and lower income women in Chile, the importance of years of schooling for women's participation of women in the labor market. Instead of clustering with time and emancipation variables, work clusters with education for lower-income women and splits between the two factors for upper- income women.

d. Some Basic Findings

In all four countries, cohorts behave in a manner that broadly resembles a classic emancipation pattern. As noted above, drop-out from the educational system occurs first, followed by work and finally by marriage. All countries also show a marked difference between the public dimensions (work and education) of adult values and the private one (marriage). In effect, a high percentage of young people leave the educational system and start working long before they get married. In contrast to these common patterns, however, some striking differences can be found among the cases.

- Chile and Honduras represent the two extremes regarding drop-out. While in Chile a majority of young people complete approximately nine years of study (only 12.7 percent of the 15-year-old cohort do not attend school), in Honduras at already half (50.5 percent) have left the educational system at age 15. Between these two countries fall Uruguay and Venezuela, with relatively high drop-out rates for the first years of secondary schooling (at age 15 the drop-out reaches 22.2 percent and 23.5 percent, respectively). The case of Uruguay is especially striking given the maturity of its educational system and the overall low levels of inequality present in the society at large; early drop-out in this country cannot be attributed to problems of educational supply. The deficit in demand for basic secondary schooling thus suggests that processes of poverty "hardening" might be taking place at the lower end of the stratification system, leading to the creation of intra and intergenerational circles of poverty. Venezuela, on the other hand, resembles the Uruguayan pattern of low retention at early ages, with two important caveats. First, at age 12 Venezuela has already lost more than 4 percent of that cohort, compared to less than 2 percent in Uruguay. These differences become more marked

toward the end of secondary education. In effect, at age 17 (the end of high school, assuming no repetition or extra age) Venezuela retains only 55 percent of that cohort in the educational system, while Uruguay retains 65 percent of that same age cohort.

- Cohort behavior regarding work follows a slightly different ordering among countries than school drop-out at the earliest age. Child labor at age 12 is non-existent in Uruguay and almost nil in Chile (0.9 percent), yet it reaches 2.7 percent in Venezuela and nearly 10 percent in Honduras. Early adolescent labor orders countries almost identically to drop-out, already showing the strong association between drop-out and employment. In Chile 6 percent of 15-year-olds work, while in Honduras 33.8 percent do. Between these extremes are Uruguay, where 11.1 percent in that cohort work, and Venezuela with 14.2 percent of that age group in the labor market. Employment at older ages shows some interesting differences. Uruguay leads the way, with almost 70 percent of cohort at age 24 working, while Venezuela shows the lowest (57 percent) proportion in the same age, followed by Chile (60 percent). Honduras presents a relatively high proportion of people in that same age working (64 percent). Women's labor market participation is behind these differences, as shown in Tables 3 and 5.
- Forming a new family or marrying clearly reinforces the impression that Chile and Uruguay differ markedly from Honduras and Venezuela, which in these dimensions seem to behave quite similarly. At age 18 only 7 percent of Uruguayans and 7.9 percent of Chileans are married; 12 percent of Venezuelans and 14 percent of Hondurans, on the other hand, are married at the age of 18. The differences at age 22 show an even more important delay in marriage in Uruguay (followed by Chile) in comparison to the other countries. The data in the same country order is in this case 23 percent, 26 percent, 33 percent and 39 percent.
- Factor analyses show that gender and income interact in the countries under consideration, affecting how work relates to other variables. In three cases (Chile, Venezuela and Honduras) women of lower socioeconomic status enter the labor market more as a function of their educational attainment than as a function of time and other role changes. In the case of Venezuela this is also true for higher income women. Only in Uruguay do the three emancipation dimensions cluster together with time without regard to gender.

5. Cox Regression and Hazard Analyses: Class, Gender, Emancipation Patterns and Educational Attainment

a. Problem Formulation, Survival and Hazard Functions, Life Tables and Cox's Regression

The original formulation of survival analysis supposes that a group of individuals can be followed through time in order to establish if, during that period, a given phenomenon has taken place (as, in this case, drop-out from the educational system). The objective of the analysis is to obtain a time function—the *survival function*—the values of which establish an individual's likelihood of remaining in the educational system beyond a moment t of his or her life.

The method applied implies the existence of a sample of N individuals for whom it is periodically registered whether or not the phenomenon under analysis occurs. In this case two variables are registered: t , the individual's age, and δ , a dichotomous variable that indicates whether the individual has dropped out of the educational system at that age. Then a matrix with N rows and t columns is constructed, computing in each cell the values of δ in the period: 0 if the individual does not drop out and 1 if he does. Once the matrix is constructed, the life tables calculate the survival probabilities at a given age t , using the probabilities conditional on the fact that the individual has not dropped out up to moment t .⁸

An operative aspect influencing the form of the probabilities calculus derives from the fact that generally the observation periods are not the same for all individuals. In a panel study it is frequent to find desertions among the individuals participating, due to different reasons such as fatigue and defects in the framework, among other reasons. For these individuals, then, it is not possible to know the real moment they drop out from the educational system. What it is known is the information of the moment until which they were present, which is used for the calculus of the corresponding probabilities. These observations, called censored observations, will be treated in a especial form in the different modalities the survival analysis can adopt.

The life tables, despite permitting the introduction of control factors such as the individuals's economic level and sex, present limitations since they do not allow the introduction of other factors, and the direct comparison of the influence of ones and others jointly. For that,

⁸ Instead of using the direct calculus derived from the survivals, the calculus of the survival probability at moment t is constructed from a chaining of conditional probabilities, with which a more precise description can be obtained, due to the use of the whole information from the sample, independently of the quantity of periods the individual is subjected to it.

the Cox's Regression method is used. It assumes the existence of a group of independent variables X , the values of which influence the current time until the final event occurs. For simplicity, this kind of regression uses the hazard rate to estimate individuals' possibilities of dropping out of the system. This is a time function $h(t)$ that estimates—determined by certain independent variables—the potential system withdrawal per unit of time in a given moment, conditional on the fact that the individual has survived up to that instant. Greater values of the function indicate a greater mortality rate. Defined in such a way, the hazard rate is not a probability, therefore its values can be out of the unit circle, taking any value between 0 y $+\infty$.

The objective of the regression analysis is to establish the relative influence of certain independent variables on a young person's hazard of dropping out of the educational system. These variables include household type, family economic level and educational climate, gender, and the adoption of different roles that typically take place in the transition from adolescence to adulthood, such as job seeking, couple formation and having children.

The following equation is a simple way of specifying the model, making it possible to compare the situation using control variables, or evaluating the differences aroused from the presence or absence of a certain characteristic.

$$h(t) = [h_0(t)] e^{(BX)}$$

According to this model, the hazard function may be expressed as the product of a baseline hazard function, which quantifies the hazard of dropping out of the system when none of the factors is present, and an exponential term, which represents the influence of each variable that is assumed to affect that hazard. These variables are introduced into the model as dummies, facilitating the subsequent comparison of the influence of the different factors considered.

It is additionally possible to transform the model, with the objective of simplifying the interpretation. This consists of taking the ratio between the hazard function and the baseline function, which is termed the relative hazard.

$$h(t)/[h_0(t)] = e^{(BX)}$$

In this way it is possible to estimate the impact of a given factor configuration on the drop-out hazard with respect to the baseline situation where those factors were not present. So if the hazard factor is belonging to a low economic level, the variable X takes value 1 for that

stratum and 0 for the high stratum. The baseline hazard function corresponds to the high stratum,⁹ and the Exp(B) value, which is presented in the regression output, is the term that multiplies the baseline hazard when individuals belonging to the low economic level are considered.

It is also possible to establish a connection between the hazard and survival functions, through the following equation:

$$S(t/X) = \exp\left\{-\int_0^t h(\mathbf{q}/X) d\mathbf{q}\right\}$$

b. Adaptations and Assumptions Imposed by Household Survey (“Encuesta de Hogares”) Data

The data matrix constructed from the Household Survey generates several problems. First, the age at which an individual drops out of the educational system is not recorded; consequently an estimation of age from individual educational achievement becomes necessary. Assuming there was no repetition, and that the age at the beginning of the cycle was 6 years old, the drop-out age is calculated as 6 plus the years an individual attended the educational system, giving variable δ the value of 1 since that moment. In addition, the surveys do not allow a panel study, basically because none of them have this form. Therefore, at the beginning of the analysis period there are important proportions of censored observations, which diminish when drop-out rates increase. The treatment of censored observations in life tables¹⁰ leads to an underestimation of the mortality at the beginning of the period, which becomes smaller as time goes by.

The survival function depends on the validity of two assumptions: that the schooling cycle begins on time, which seems quite probable, at least for the data that are used in Uruguay, and that repetition does not exist. The latter is more difficult to support because of the high repetition rates that occur, particularly during the first year of primary and secondary school. These would lead to an underestimation of the age at which an individual adopts an adult role, and to the existence of a bias, especially in boys of low socioeconomic level, among whom the greatest repetition rates and schooling lags occur. This leads to a function that in some cases overestimates the educational achievement of children and youth. This is due to the fact that we

⁹ When X takes the value 0, the exponential term displays the unit value and $h(t)=h_0(t)$.

¹⁰ The censored observations are incorporated into the denominator in the probabilities' calculus (multiplied by 0.50) but without affecting the numerator, which is given by registered cases of drop-out.

equate age with school year as if no repetition occurred. Yet, in many cases children who drop out at, say, age 10 have reached the second grade and not the fourth grade due to repetition. Still, our survival function assumes that such a child did reach the fourth grade. The net effect of these events cannot be established, because they present opposite influences.

c. The Regression Analysis Results and their Interpretation

As outlined above, the survival function expresses the probability that an individual continues studying depending on his age. As the drop-out from the educational system begins before, this information is taken into account for the calculus of such a function using the life tables, although the study focuses on young people from 12 to 29 years old. From this method it can be proved that the introduction of control factors such as sex and socioeconomic level allows the observation of different behaviors within the sample. The socioeconomic level influence always appears, and in the expected sense. For the same age, young people from the highest socioeconomic level have higher survival probabilities than those from the lowest level. The gender influence is also relevant. In general, life tables show that boys are more likely to drop out of the educational system.

Cox’s regression analysis allows a wider comprehension of the problem. The variables that are used and the categories that have been identified as risky are presented in the following description.

Table 8. Description of Variables Used

Variable	0 “Hazard absence”	1 “Hazard Presence”
Sex	Female	Male
Household type	Unipersonal and Nuclear	Extended and Composed
Household income level (1)	High	Low
Household income level (2)	High	Medium
Household educational climate	High	Low
Employment	Not employed	Employed
Couple situation	Single	Married or out of wedlock, widowed, divorced or separate
Socioeconomic level * educational climate	High socioeconomic level or high educational climate	Low socioeconomic level and low educational climate
Employment * couple situation	Not employed or single	Employed and not single

The regression coefficients’ magnitude and sign—estimated by maximum likelihood—makes it possible establish the influences that the mentioned factors have on the relative hazard (holding everything else constant). So, those B that are statistically significant (Sig< 0.05) and

have a positive sign will result in values of the hazard multiplier (Exp (BX)) greater than one. On the contrary, a negative sign will imply a smaller hazard in the presence of this factor. Therefore, the greater the magnitude, the greater the multiplication. Considering two risk factors simultaneously will simply imply the product of the multipliers belonging to each of them. For the interaction terms between two variables, the total effect will have to consider the coefficients of those terms and those of the simple variables. In Table 2 the compared situation of the hazard multipliers—the exp (BX)—is presented for the four countries under analysis.

d. Variables Construction

- **Household income level.** This variable classifies the individuals into per capita income quartiles from the household they belong to, not considering the members, nor the domestic services income and their relatives. To analyze the information, this variable is recodified into three levels: Low, corresponding to the lowest per capita income quartile; Medium corresponding to the following two quartiles; High, including the households with the highest per capita income.
- **Household educational climate.** This variable is constructed from the average years of study of the household head and his or her spouse, if present. Otherwise only the household head's years of study are considered. The households are classified into two levels—low and high educational climate—depending on whether they are under or over the median. Finally, individuals are classified into these levels according to educational climate.
- **Type of household.** This variable denotes the type of household to which individuals belong. Households are classified into two categories. Extended Households are those where at least one of its members (excluding domestic service and their relatives) is related to the head of household as another relative or not relative corresponding to the Extended and Composed categories in the classic terminology. Others households—Unipersonals and Nuclears in this classic terminology—are included in the Rest category.
- **Drop-out from the educational system.** This is the first of three variables considered in characterizing the transition from adolescent to adult roles. It classifies individuals into those who have dropped out from the educational formal system and those who have not.

- **Employment.** A second transition variable, this classifies individuals into two categories, according to whether they are employed or not.
- **Couple situation.** The last variable used to illustrate the adoption of adult roles, couple situation classifies the individuals according to their marital status into two categories: one includes only single individuals, and the other accounts for couple formation, which includes married and out of wedlock couples, and widowed and divorced individuals.
- **Age at moment of dropping out from the educational system.** This variable is used as a temporal variable in the application of life tables and Cox's regressions. It is constructed based on the individual's maximum educational achievement in the formal system, on his participation or non-participation in the educational system at the time of the survey, on his age and on two assumptions: that the educational achievement referred has been achieved without repetition, and that the schooling cycle has been started at six years old. Therefore, for those who have withdrawn from the educational system, the withdrawal age was estimated by adding six years (the assumed initial age) to the maximum educational achievement, measured in education years from the variables incorporated in the base. When the individual is still in the system, this variable value is his chronological age.
- Besides, other variables have been used such as sex and age, while for the new variables it has been applied to the variables already created in the data base, or to calculus done by the researches.

e. Cox's Regression Analysis

Synthetically, the most relevant findings in Table 9 are:

- Gender is significant in all cases even though, alone, its effects are relatively modest in comparison with other variables. In Uruguay and Venezuela men have on average 20 percent greater drop-out risk than women, while in Honduras the effect is negligible. The case of Chile is interesting, since it indicates a higher risk for women than men. Men have on average 15 percent less risk than women.

Table 9. Multiplier Risk Factor of Drop-Out by Country

Variable	Chile	Honduras	Uruguay	Venezuela
Male	0.8680	1.0193	1.2034	1.2081
Extended Household	0.9599	0.8115	-.-	0.9304
Low Income	3.0583	1.4614	2.6191	1.6473
Medium Income	1.7519	1.1389	1.5924	1.4754
Low Educational Climate	2.0134	2.2509	1.9441	2.0108
Employed	2.0743	1.7819	1.6272	1.8351
Not single	2.0685	2.2027	1.9823	2.2200

(1) Compares the difference between high and low income.

(2) Compares the difference between high and medium income.

Source: Based on special tabulations from Household Surveys, IADB, 1999.

- Contrary to the coding criteria, extended households operate mainly as a protection from drop-out as the coefficients below “1” indicate. Even though the effects are again modest, three or more generations and large households seem to provide multiple caretakers that allow people to share household tasks and build compatibility between private demands and education attendance. Furthermore, where extended households typically correspond to large households as in Honduras (as shown through its demographic structure and factor analyses) the effect is larger (almost 20 percent less risk for those belonging to these households). In contrast, where extended households are more “modern” and entail a lesser increase in size and multiple generations, the effect is neutral as in the case of Uruguay and almost nil in the case of Chile.
- Low income and low household educational climate significantly increase the risk of dropping out, and they do so with stronger coefficients than the previous variables. The extreme comparison of lowest to highest income shows that the risk of school drop-out increases in all cases, tripling in Chile and more than doubling in Uruguay. It is nevertheless counterintuitive that these coefficients are clearly lower for Honduras and Venezuela, even though they are still of important magnitude (an increase of approximately 50 percent). There is no convincing interpretation for this beyond the possible fact that in moving to these countries an even more continuous income scale would be necessary to capture differential risk, since at the highest level (our baseline function) the risk is still too high, and thus the increase in risk is less in moving to lower

income categories.¹¹ The comparison between medium and high levels of income offers coefficients that are consistent with the extreme comparison: medium-income youth have a higher risk than higher-income ones, but less than low-income people. Finally, the present findings on low household educational climate confirm previous findings that low household educational climate is a strong risk factor for educational attainment in youth, in all cases roughly doubling drop-out risk.

- Regarding the two emancipation variables, and consistent with factor analyses, the coefficients are in most cases as important or more important than individual and household background variables. Work has a similar influence, doubling the risk in Chile and almost doubling it in Venezuela and Honduras (1.8 and 1.7, respectively). Again, in Uruguay there appears to be greater compatibility between work and education (1.5 times the risk of its baseline function).
- Forming a new family or marrying increases the coefficients even more than employment. Yet, given the fact that the adoption of marital status occurs quite late in all countries as compared to other adult roles, a straightforward interpretation of marriage as a hazard factor for educational attainment is unwarranted. Strictly speaking these coefficients tell two analytically distinct stories that cannot be differentiated with the technique at hand. In some cases it is indeed correct to assume that marriage has operated as a deterrent of educational investment given the increasing load of household responsibilities and the need to enter the labor market. Yet in other cases, the coefficients simply suggest that as people grow up they leave the educational system and they also get married (given the Cox regression, it is known that marriage happened before, but imputing to marriage/school drop-out a causal link is harder when ages of tertiary studies completion are considered). This is radically different than leaving the system *because* one has gotten married. Particularly at higher income levels and at older ages, the second situation is more likely than the first. While this problem of causation is essentially true for all dimensions in the emancipation process, both the causal link and proximity in time allow for a less problematic interpretation of work as risk for educational attainment. The

¹¹ In the case of Honduras, for instance, roughly 30 percent of the population is in the highest income category though, according to some measures, 75 percent of the population is poor. Yet, this is clearly less plausible in the

coefficients are nonetheless significant and of magnitude, making people roughly two times as likely to leave the educational system in all four countries.

The coefficients presented above hide important differences in how these variables affect men's and women's chances of dropping out. Repeating the analysis for men and women in each country reveals telling differences.

Table 10. Multiplier Risk Factors of Drop-Out by Country and Gender

Variable	Chile		Honduras	
	Men	Women	Men	Women
Extended Household	0.9595	0.9920	0.9021	0.7276
Low Income	2.9488	3.1796	1.3975	1.4404
Medium Income	1.6829	1.7797	1.1638	1.1138
Low Educational Climate	1.9854	1.9080	2.0209	2.3306
Employed	4.4213	1.5499	3.8526	1.1614
Not Single	1.2623	2.7041	1.3605	3.0649

Variable	Uruguay		Venezuela	
	Men	Women	Men	Women
Extended Household	1.0279	0.9734	0.9720	0.9051
Low Income	2.5292	2.8389	1.6850	1.6814
Medium Income	1.6039	1.6238	1.4822	1.4719
Low Educational Climate	1.8670	1.9890	1.9964	1.9430
Employed	2.1540	1.3714	3.1107	1.2813
Not Single	1.4467	2.5316	1.3921	3.1859

Source: Based on special tabulations from Household Surveys, IADB, 1999.

Three major general and very synthetic findings are worth mentioning:

- While work increases the risk of dropping out for men far more than for women, marriage increases risk in exactly the opposite way. Women who get married are far more likely to leave the educational system than men. This suggests that a gendered approach to school attainment and emancipation paths will bear prove fruitful, given the presence of what could be termed Dual Emancipation Patterns. While for women predominantly private adult roles affect their educational investment, for men public roles do so. It is interesting to note that a country comparison of these Dual Emancipatory patterns is consistent with the previous findings and interpretations. As

factor analysis showed, Uruguay was the only case in which factors for men and women were formed by roughly the same variables. As can be seen in the table above, this is also the country in which the hazard differentials for gender regarding marriage and work are the lowest. This implies again more homogeneous behavior among genders than in the other countries.

- The result for household type reinforces the findings from Table 7. If extended households operate as a protection against drop-out because of the availability of multiple caretakers and shared responsibilities, then their impact should be higher for women, who traditionally assume roles of caretaking and household responsibilities. The results, though modest, are significant and consistent with this interpretation. Especially in Venezuela and Honduras, where extended households are larger and more common, the effect clearly favors women and only slightly favors men. In Chile the results contradict this hypothesis. In Uruguay the apparent neutral effect of household type becomes visible with gender, though only to a very modest degree (in men it becomes a risk factor, while in women a mild protection factor).
- Socioeconomic status presents mild differences in its effect on men and women. This finding is nevertheless extremely important. As shown in the next hazard analysis, this is not because income and gender do not interact and contribute to explain educational attainment. But they do so mediated by two central emancipation variables, here introduced as independent variables: marriage and work. Educational climate also presents small differences among men and women, even though Honduras shows a 30 percent difference in favor of men. Low educational climate is associated with more traditional gender roles. Where this climate is extremely low, study for women might seem irrelevant, leading to lower demand and larger risks of drop-out.

Table 11a. Multiplier Risk Factors of Drop-Out by Gender and Income, Chile

Variable	Low		Middle		High	
	Men	Women	Men	Women	Men	Women
Extended Household	0.9049	0.9923	0.9857	0.9548	1.0360	1.1918
Low Educational Climate	2.1524	2.2181	1.8573	1.8878	2.0977	1.6876
Employed	2.9917	1.6952	4.4678	1.3760	7.2586	1.9491
Not Single	1.6368	3.6943	1.1476	2.7075	1.2052	1.8411

Source: Based on special tabulations from Household Surveys, IADB, 1999.

Table 11b. Multiplier Risk Factors of Drop-Out by Gender and Income, Honduras

Variable	Low		Middle		High	
	Men	Women	Men	Women	Men	Women
Extended Household	0.9082	0.8055	0.9144	0.6618	0.8750	0.7837
Low Educational Climate	1.6887	2.1244	2.0141	2.4014	2.2981	2.5239
Employed	3.8897	1.2213	3.7568	1.0917	4.0794	1.2399
Not Single	1.4657	3.2069	1.2886	3.2153	1.4444	2.5632

Source: Based on special tabulations from Household Surveys, IADB, 1999.

Table 11c. Multiplier Risk Factors of Drop-Out by Gender and Income, Uruguay

Variable	Low		Middle		High	
	Men	Women	Men	Women	Men	Women
Extended Household	1.0754	.9711	1.0173	1.0173	-.-	-.-
Low Educational Climate	1.7919	1.9482	1.7866	1.9350	2.1919	2.4346
Employed	1.7930	1.1446	2.4908	1.5256	3.6238	2.2161
Not Single	1.4258	2.6643	1.4253	2.4275	1.6036	1.9688

Source: Based on special tabulations from Household Surveys, IADB, 1999.

Table 11d. Multiplier Risk Factors of Drop-Out by Gender and Income, Venezuela

Variable	Low		Middle		High	
	Men	Women	Men	Women	Men	Women
Extended Household	0.9168	0.9790	0.9970	0.8618	0.9872	1.0137
Low Educational Climate	2.2812	2.4157	1.8970	1.8791	2.0118	1.5971
Employed	2.4002	1.1207	3.3643	1.2959	3.6815	1.4597
Not Single	1.6403	3.9296	1.3278	3.1847	1.3642	2.4229

Source: Based on special tabulations from Household Surveys, IADB, 1999.

Again some basic findings should be sketched:

- As income increases, the hazard effect of marriage on educational attainment decreases for all four cases. It does so dramatically for Chile (from more than three and a half times the baseline rate to slightly less than two) with Venezuela and Honduras in between, and Uruguay last (from 2.5 to 1.9).
- Further up the income ladder work increases the likelihood of school abandonment for men in almost all four cases. Here the caveat in interpreting the results mentioned above should be kept in mind. In Chile the risk for upper income men who start working is 7 times higher than for those who do not work. Given the average ages at which upper income males leave the educational system, these coefficients consider combined effects of actual hazard and completion rates in university that are accomplished while working.

f. The Issue of Proportionality: Breaking Down the Average Results

This research was based on a triangulation of methods that included stylized data for countries on emancipation variables, factor analyses that combined background and emancipation variables, and Cox proportional hazard models to study the determinants of dropout considering both emancipation and background variables. Overall, findings are consistent, suggesting both the importance of emancipation variables as an independent factor that affects dropout and the differential combination and effects of these variables with country contexts, household and individual background variables. Yet, the former findings, derived from Cox analyses, require strong specifications. This is due to the fact that Cox requires covariate effects to be proportional, and in the cases under consideration this happens only after much relaxation of the proportionality assumption has taken place. This does not mean that the hazard ratios are meaningless. In the first place they do indicate an effect and whether such an effect is statistically significant. Second, the specific hazard ratio can be loosely interpreted as the average effect of the different covariates for the full time length of the hazard line. Yet, in order to understand the real hazard ratios at different points in time, it is necessary to perform proportionality tests and specify new models.

A crucial assumption in the Cox proportional hazard model, for instance, is that the hazard ratio is proportional over time. In this kind of model, if the hazard of drop-out is 20

percent higher for married than for non married people, such effect should be the same for youth at different ages. In other words under the assumption of proportionality, the hazard effects of each covariate must be equal for the complete time frame under consideration. This is a strong assumption of the model, especially as the effects are being examined of a wide array of variables on educational drop-out in an age range from 12 to 29 years, including men and women as well as all income and educational strata. Two central problems make it extremely hard to sustain the proportionality assumption. One is substantive, and the other built into the data.

In the first place it is unlikely that the effects of the covariates will remain constant for all ages. Indeed, it would be a rather strange finding to prove that being married or working has a similar hazard rate at 16 than at 24 on the chances of dropping out of school. The stages of the life cycle encompassed in the age range are far too large to expect similar effects from the covariates. Second, while the dependent variable measures the exact age at which individuals abandon the educational system, other behavioral or emancipatory variables are measured as a given attribute at the age of the individual in the survey. Thus the event (i.e., marriage, work) might have occurred at any point in time (between 12 and the age of the respondent).

The first general test rejected the null hypothesis for all countries.

Table 12. Two Tests of Drop-Out Hazard

	Test of proportional hazards assumption			Global Test		
	Wald chi2	df	Prob>chi2	chi2	df	Prob>chi2
Uruguay	2821.79	6	0.0000	480.75	6	0.0000
Venezuela	4829.52	6	0.0000	695.86	6	0.0000
Honduras	1780.92	6	0.0000	97.41	6	0.0000
Chile	6978.41	6	0.0000	672.38	6	0.0000

The two covariates that showed the greatest nonproportional effects were sex and family income. The use of stratification, which allows the covariates to have effects on different baseline functions, sought to solve the proportionality problems for sex and income level, but the assumptions were still found to be invalid. In other words, running the proportionality test again still failed to reject the null hypothesis (that the effects are equal) Thus the samples are separated for men and women and for different income levels. In the case of Honduras, income level was not a problematic covariate, so the samples were simply separated by sex. Still, and as expected for all four countries, in many covariates the proportionality assumption was invalid. The covariates were then allowed to have different effects on four segments of the baseline hazard in

the four countries. The segments were not the same for each country since the year at which young people finish institutionally defined stages of their educational career varies from country to country. In general, the cut-off points were 6-8 years of age, 9-11, 12-17, and 18 and more. Sequential testing resulted in the simplest specification of the different models that for each sample does not violate the proportionality assumption of the Cox proportional hazard model. Testing for each country and each sample finally failed to reject the null hypothesis both in each covariate and for the global test. The global test results for each sample are depicted below.

Table 13. Global Test of Drop-Out Hazard

	Global Test		
	chi2	df	Prob>chi2
Uruguay (by sex and income)			
Men, Low Income	7.91	14	0.8940
Women, Low Income	10.77	14	0.7040
Men, High Income	22.94	14	0.0612
Women, High Income	9.43	20	0.9774
Venezuela (by sex and income)			
Men, Low Income	10.25	11	0.5078
Women, Low Income	18.88	20	0.5293
Men, High Income	14.69	14	0.3999
Women, High Income	22.33	20	0.3227
Honduras (by sex)			
Men	6.22	12	0.9046
Women	6.56	18	0.9934
Chile (by sex and income)			
Men, Low Income	17.48	17	0.4222
Women, Low Income	18.71	21	0.6035
Men, High Income	21.83	17	0.1915
Women, High Income	22.97	17	0.1502

With respect to the specific hazard rates of the proportional models (see appendix for detailed data) the results indicate:

- a. Of the four countries, the two that present simplest models are Honduras and Venezuela, followed by Uruguay and Chile, suggesting that constant effects should be expected in countries of lower social and educational development. This is not surprising, since in those countries the bulk of the population has earlier and more condensed emancipation patterns. This fact has two positive effects on the test of proportionality. On the one hand it reduces the “built-in” data problems of large age brackets with no exact date for emancipation variables. On the other, it contains the effect of the substantive problem of differential effects

along the age continuum (in other words, regardless of an individual's age, it is likely that he or she underwent early emancipation processes).

- b. Household educational climate presents a consistent and clearly interpretable non-proportional effect. In effect, the earlier the drop-out the more important the educational climate of the household is. In other words, early drop-out is strongly associated with low family education. In the earliest drop-out bracket (between 6 and 8-9) the effect of low educational climate is never less than 3.8 (women of low income for Uruguay), while among the latest drop-outs (17 or 18 and more) the effect of low educational climate never surpasses 1.5.
- c. Extended households show a particularly telling story. First, in the case of men, they do not have differential effects over time, and the average effects are usually small. For women they are far more important, and they tend to protect women at early ages and increase the risk of dropping out in older cohorts. As an example while low-income women in extended households in Venezuela experience a 50-decrease in drop-out risk, at older ages (17 and above) they experience a 70-percent increase. This suggests that extended households do indeed operate as a risk pool mechanism that distributes domestic burdens differentially across age groups, especially for women.
- d. In regard to emancipation variables (marriage, work, and children) and given the built-in problems that are present, the results should be interpreted with a grain of salt. Still, it is clear that work, marriage and number of children in the family are positively associated with leaving the educational system at all ages. Furthermore, employment and marriage, as expected, become more important risk factors in older age groups. A finding that is consistent with previous claims and that relates to Chile and Uruguay should also be highlighted. Marriage is a significantly larger risk factor for women in Chile for both income groups than in Uruguay.

6. In Closing

Emancipation patterns matter, and not just for educational attainment. They matter because they define future chances as well as immediate additional choices. As shown by factor analysis and hazard rates, studies that neglect the patterns and sequences of adult role adoption do so at their own peril. This is not meant to question the robust correlations that numerous studies have shown regarding the effects of income, educational climate, and household characteristics on youth educational investment. Those relations hold, but unless the “black box” that connects structural aspects with education outcomes is opened it will be hard to properly guide policy action. This link resides essentially in mechanisms of youth choices and behavior in the transition to adult life. This paper has only been able to properly consider three dimensions of such a path: marriage, work and educational attendance itself.

The first finding is that countries differ as to when youth move into adult roles. This is quite clearly linked to demographic stages that are also closely associated with development levels and educational supply. Furthermore, these countries present different distributions of drop-out, labor market incorporation and marriage ages for different classes and genders. This can be seen both in the factor analysis and in the Cox regressions results. A more graphic description of this issue can be seen in the appendix on Cox survival functions by class and gender.

Secondly, the results further an understanding of how class and gender interact to affect emancipation patterns (factor analysis constitutes a first approach), and how this interaction changes from country to country. From this exercise the idea of a “Dual Emancipation Pattern” clearly emerges as a useful concept in understanding how public and private adult roles affect the educational investment of men and women. The regressions also show the mellowing of these two distinct emancipation patterns at higher levels of income within countries and development among countries.

Third, demographic factors matter as well. They affect the weight of extended households, which in turn affects hazard rates for educational attainment. Countries at the beginning of their demographic transition confront huge obstacles in increasing their educational performance. Maybe their only advantage lies in extended households and the protective function they provide. As these countries move into the next demographic stages they are likely to lose that form of protection. Chile, however, shows that this change does not imply decreasing

educational attendance, especially for lower income sectors. Besides market signs and legacies of traditional societies, though, it is still not clear how Chile achieved its results. Uruguay represents the opposite scenario, where lower income sectors with very “modern” roles and family structures have left a vacuum of basic integrative and protective mechanisms, now evident in very weak educational demand in the lower income groups.

Finally, given the strong links between structural factors, emancipation patterns and educational attainment, policies geared only toward improving the supply side of the equation will do little to improve young people’s educational attainment. Policies oriented towards the reproductive patterns of young poor women, labor market regulation on youth labor and education attendance, curricula at the high school level that allows for labor market entry, and patience seem to be the most promising guidelines for innovative reform.

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Appendix: Hazard Results of Proportional Models and Baseline Survival Functions for Each Subsample

Honduras

	MEN			WOMEN		
	Hazard ratio	Std. Err.	P > [z]	Hazard ratio	Std. Err.	P > [z]
exthou0	0.944	0.077	0.479	0.502	0.045	0.000
nhe9	0.798	0.063	0.004	0.629	0.051	0.000
nhe12	0.861	0.033	0.000	0.753	0.032	0.000
nhe18	0.861	0.078	0.100	0.947	0.065	0.430
nnived0	7.546	1.059	0.000	10.776	1.570	0.000
nnived9	3.385	0.323	0.000	4.140	0.360	0.000
nnived12	1.553	0.065	0.000	1.662	0.071	0.000
nnived18	1.079	0.115	0.473	1.166	0.093	0.054
dnivech	1.169	0.041	0.000	1.190	0.041	0.000
numkids	1.043	0.009	0.000	1.048	0.010	0.000
rol_emp	3.375	0.163	0.000			
nemp0				0.847	0.077	0.069
nemp9				0.991	0.082	0.914
nemp12				1.170	0.045	0.000
nemp18				1.482	0.099	0.000
rol_par	1.326	0.045	0.000			
npar0				3.206	0.286	0.000
npar9				4.040	0.337	0.000
npar12				2.322	0.095	0.000
npar18				2.000	0.137	0.000

Venezuela

	MEN, LOW INCOME			MEN, HIGH INCOME			WOMEN, LOW INCOME		
	Hazard ratio	Std. Err.	P > [z]	Hazard ratio	Std. Err.	P > [z]	Hazard ratio	Std. Err.	P > [z]
hog_ext	0.981	0.034	0.587	0.977	0.038	0.555			
nhe0							0.587	0.062	0.0
nhe9							0.770	0.042	0.0
nhe12							0.984	0.047	0.7
nhe17							1.739	0.339	0.0
nnived0	4.195	0.590	0.000	7.794	1.574	0.000	8.304	1.598	0.0
nnived9	2.787	0.178	0.000	3.297	0.265	0.000	3.943	0.274	0.0
nnived12	1.348	0.071	0.000	1.562	0.073	0.000	1.123	0.054	0.0
nnived17	0.721	0.172	0.172	0.975	0.121	0.840	0.546	0.108	0.0
numkids	1.017	0.008	0.023						
nnumki0				1.047	0.042	0.250	1.042	0.027	0.1
nnumki9				1.072	0.021	0.000	1.055	0.013	0.0
nnumki12				1.076	0.016	0.000	1.024	0.012	0.0
nnumki17				0.846	0.034	0.000	0.802	0.050	0.0
rol_emp	3.073	0.118	0.000	3.825	0.201	0.000			
nemp0							0.866	0.114	0.2
nemp9							1.295	0.075	0.0
nemp12							1.420	0.068	0.0
nemp17							2.023	0.375	0.0
npar0	0.871	0.081	0.138	0.773	0.137	0.147	2.868	0.294	0.0
npar9	1.237	0.061	0.000	1.056	0.082	0.484	4.200	0.226	0.0
npar12	1.851	0.097	0.000	1.484	0.067	0.000	3.512	0.158	0.0
npar17	2.718	0.634	0.000	1.788	0.175	0.000	2.010	0.376	0.0

Uruguay

	MEN, LOW INCOME			MEN, HIGH INCOME			WOMEN, LOW INCOME	
	Hazard ratio	Std. Err.	P > [z]	Hazard ratio	Std. Err.	P > [z]	Hazard ratio	Std. Err.
hog_ext	1.083	0.049	0.077	1.013	0.043	0.769	0.939	0.043
nhe0								
nhe12								
nhe17								
nhe21								
nnived0	6.436	2.059	0.000	5.745	1.907	0.000	3.874	1.238
nnived9	2.935	0.253	0.000	4.779	0.547	0.000		
nnived12	1.396	0.098	0.000	1.940	0.108	0.000	1.508	0.043
nnived17	1.097	0.096	0.288	1.544	0.091	0.000	1.220	0.043
nnived21							0.914	0.043
nnumki0	1.044	0.056	0.424	1.187	0.305	0.504	1.132	0.043
nnumki9	1.102	0.013	0.000	1.181	0.053	0.000		
nnumki12	1.027	0.020	0.167	1.128	0.026	0.000	1.106	0.043
nnumki17	1.001	0.029	0.977	0.961	0.028	0.176	1.064	0.043
nnumki21							0.538	0.043
nemp0	0.669	0.117	0.022	0.401	0.158	0.020	0.936	0.043
nemp9	2.072	0.139	0.000	2.808	0.370	0.000		
nemp12	1.787	0.124	0.000	2.602	0.209	0.000	1.238	0.043
nemp17	2.215	0.267	0.000	3.338	0.360	0.000	1.593	0.043
nemp21							2.547	0.043
rol_par	1.385	0.065	0.000	1.546	0.062	0.000	2.756	0.043
npar0								
npar12								
npar17								
npar21								

Chile

	MEN, LOW INCOME			MEN, HIGH INCOME			WOMEN, LOW INCOME		
	Hazard ratio	Std. Err.	P > [z]	Hazard ratio	Std. Err.	P > [z]	Hazard ratio	Std. Err.	P > [z]
hog_ext	0.897	0.025	0.000	0.996	0.028	0.878			
nhe0							0.834	0.093	
nhe9							0.752	0.046	
nhe12							0.806	0.037	
nhe15							1.134	0.041	
nhe18							1.093	0.107	
numkids	1.015	0.009	0.085	1.071	0.012	0.000	1.041	0.011	
nnived0	8.560	1.887	0.000	6.976	1.452	0.000	9.430	2.247	
nnived9	6.760	0.763	0.000	7.465	1.189	0.000	8.051	0.806	
nnived12	2.261	0.113	0.000	3.072	0.210	0.000	2.519	0.119	
nnived15	1.323	0.055	0.000	1.567	0.053	0.000	1.018	0.040	
nnived18	1.123	0.140	0.351	1.162	0.082	0.034	0.964	0.095	
nemp0	1.565	0.188	0.000	1.354	0.230	0.074	1.007	0.136	
nemp9	4.016	0.303	0.000	5.597	0.909	0.000	1.466	0.104	
nemp12	4.588	0.263	0.000	6.390	0.669	0.000	1.505	0.075	
nemp15	3.107	0.163	0.000	4.513	0.276	0.000	1.434	0.054	
nemp18	4.295	0.604	0.000	12.009	1.539	0.000	2.407	0.223	
npar0	1.531	0.208	0.002	0.718	0.183	0.192	2.315	0.249	
npar9	1.348	0.095	0.000	0.931	0.118	0.572	3.915	0.231	
npar12	1.293	0.064	0.000	0.905	0.065	0.164	4.051	0.175	
npar15	1.486	0.065	0.000	1.185	0.040	0.000	2.600	0.095	
npar18	2.073	0.277	0.000	1.288	0.073	0.000	2.519	0.237	

Figure A1. Baseline Survival Functions, Chile

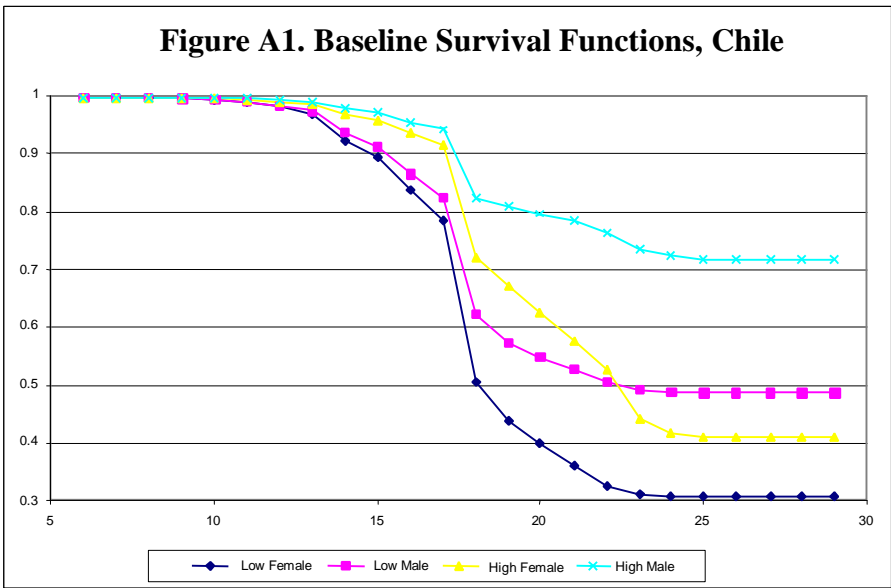


Figure A2. Baseline Survival Functions, Uruguay

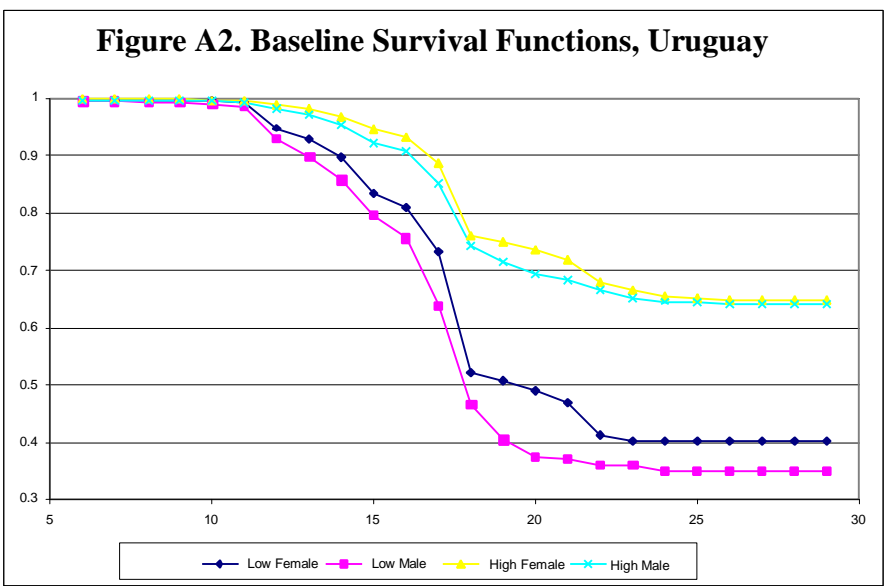


Figure A3. Baseline Survival Functions, Venezuela

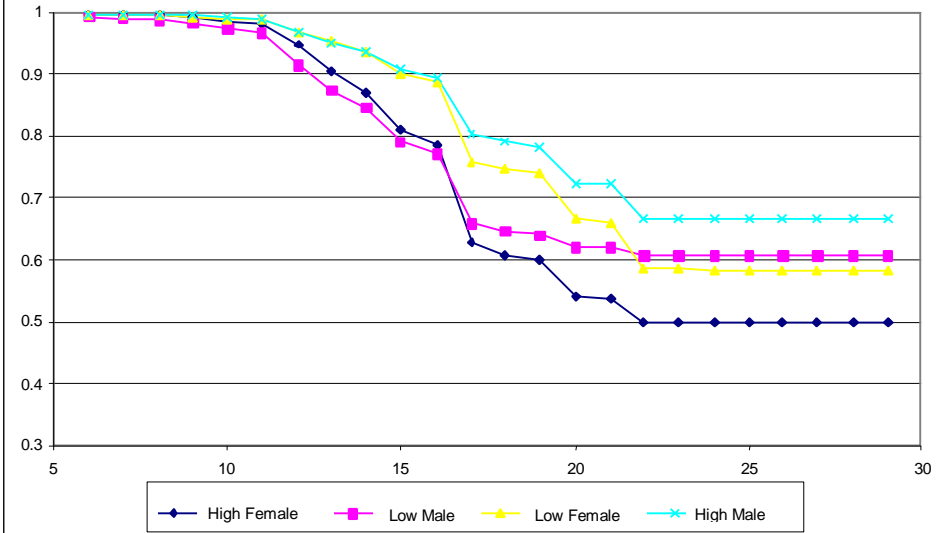


Figure A4. Baseline Survival Functions, Honduras

