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**Out of school and out of work: A conceptual framework for
investigating “*ninis*” in Latin America and the Caribbean**

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1. Introduction

The proportion of youth that is not in work nor in school or *ninis*¹ in Latin America and the Caribbean (LAC) remains high. The latest estimates show that about 19 per cent of 15-24 years olds in the region, were in this status in 2010 (de Hoyos, Rogers and Popova (2013)).² This status entails a series of negative implications for the life-cycle development of the youth involved with a break in the human capital accumulation process that translates into a reduction in future productivity and labor market outcomes. A large share of *ninis* might also entail risks for society at large through potential short-term effects such as crime rates, and through the long-term sequels from not fully capitalizing on the “demographic window of opportunity” of historically low economic dependency ratios, among others. The objective of this paper is to develop a conceptual framework for laying out the main elements involved in the dynamics of choices and restrictions faced by youth in the 15-24 age range. The paper also discusses different approaches that could be used to test the empirical validity of the theoretical implications presented here.

Earlier work on out-of-school youth have identified student’s schooling expectations (Jacob and Wilder (2010)), motivation (Papay, Murnane and Willet (2011)) and perceptions on future market value of skills acquired in school (Jensen (2010)) as important determinants of secondary completion rates. Other studies such as Harding et al (2010) and Bobonis and Finan (2009) explore the effects of neighborhood context on schooling completion rates and find that factors such as peers’ decisions to enroll in school, proximity to jobs, violence, neighborhood resources, cultural isolation, or social organization help explain how young people make their schooling decisions. A third strand in the literature has identified the importance of early investment in child development as a policy to increase secondary and postsecondary completion rates (Heckman (2006), Cunha and Heckman (2007), Heckman and Masterov (2007) and Dynarski et al (2011)). A fourth contribution of the literature has underlined the need to improve quality

¹ The term *nini* originated from the Spanish “*ni estudia ni trabaja*” and it has been widely used throughout Latin America and Spain.

² The same source documents that there has been a steady decline from about 23.4% two decades earlier.

education as a policy to prevent dropouts. For instance, Lyche (2010), Faubert (2012) and OECD (2012) state that dropouts are the outcome of a cumulative process of disengagement that occurs over time and manifests through low learning outcomes.

The literature on youth unemployment sheds light on the school-to-labor market transition followed by Latin American youth and the effectiveness of temporary training programs to improve labor market outcomes. According to Cunningham and Bustos Salvagno (2011) youth in Latin America typically leave school to spend a short time in the informal sector then, they move on to a formal position for a longer period and, finally, they become self-employed. In the authors' setting, the informal sector of the economy provides a type of job training, or rather informal job training, that lets young individuals acquire job-relevant skills. However, the productive options for those youth that are *ninis* and do not have the relevant skills are scarce (Edwards (2005)), therefore providing them with training may help them to enter the labor market. Using a randomized controlled trial Card et al (2007) find a negligible impact on employment, but positive effects on the average monthly wage among participants of the program *Juventud y Empleo*, a training program in the Dominican Republic. According to Attanasio, Kugler and Meghir (2008) the Colombian training program *Jóvenes en Acción* raises employment and wages of women by 14 percent and 18 percent, respectively.

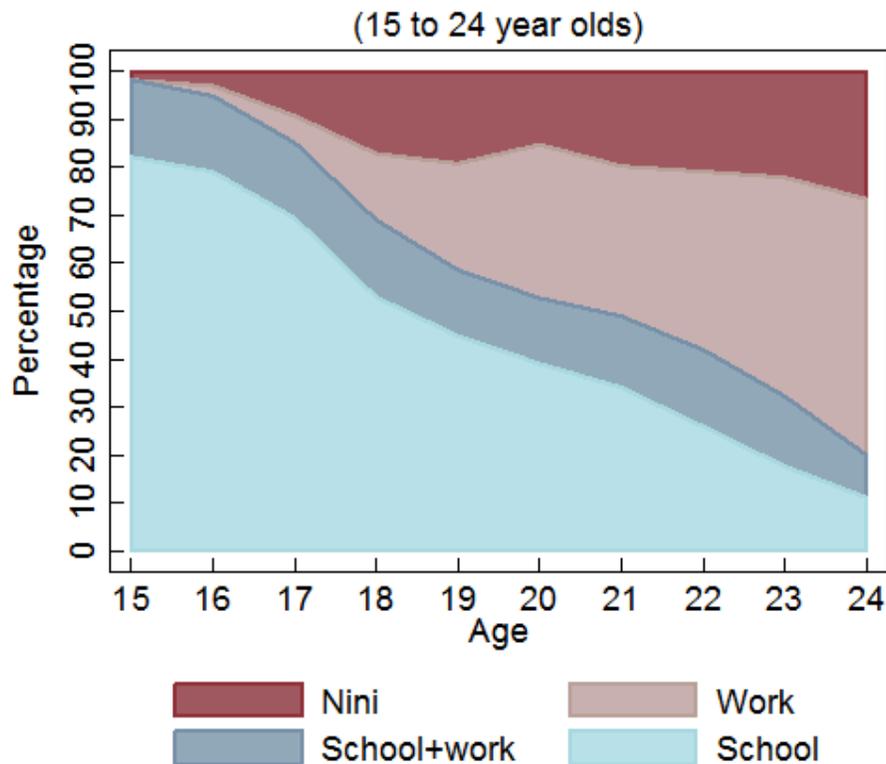
In general, the literature on the out of school and out of work phenomenon has focus on (i) reducing secondary-school dropouts, (ii) the effectiveness of vocational schooling, training or temporary employment programs to reduce youth unemployment, or (iii) the mismatch between skills acquired in schools and those demanded by the labor market. However, these literatures tend not to acknowledge each other, nor recognize that they are intimately interconnected, which makes their analysis partial. The contribution of the framework, therefore, consists in incorporating these approaches in a unified framework to provide a more comprehensive view.

The paper includes 4 sections. Section 2 starts with a simple characterization of the life-cycle transition of time uses for youth in LAC. Section 3 introduces a more formal presentation of what underlies these processes and what impact they may have. Section 4 addresses the considerations for empirical analyses and policy discussion. The last section includes some final remarks.

2. Simple Characterization of Time Use Transition among Youth

Figure 1 gives a simple characterization of the transition processes of time uses for youth ages 15 to 24 in Mexico. Youth can be in school, working, doing both or neither. At the age of 15, almost all youth in Mexico are in school, with almost 20% also working; however, as we move further along the x-axis into older cohorts, the proportion of the population in school declines, coupled with an increase in the shares of youth working or being *nini*. As the regional data in de Hoyos, Rogers, and Popova (2013) shows, the transitions out of school into work or *nini* in Latin America and the Caribbean (LAC) intensify when youth are ages 16 to 18, though a significant minority is still in school even at age 24.

Figure 1: Education and Labor Market Transitions, Mexico 2008



Source: World Bank calculations using ENTELEMS 2008

Following Cárdenas, de Hoyos and Székely (2011), it is helpful to consider separately the 15-18 and 19-24 age groups because generally in LAC primary and the first cycle of secondary schooling span the 9 years between ages 6 to 14. The official age for attending upper secondary is around ages 15-18, and after, those continuing in the schooling system are eligible to enter higher education, which generally is 4 to 5 additional years.³ Furthermore, those *ninis* between 15 and 18 years of age are particularly worrisome. At this stage of the life cycle, as compared with those 19 to 24, there is no ambiguity that being in the formal education system is the most desirable and socially productive activity. In many countries, those under the age of 18 have not reached the minimum mandatory education level and their physical, mental and emotional development process is still underway. In this sense, being in school in a protected and constructive environment is a critical determinant for developing individual personality and a capacity for decision-making, constructing behavioral patterns, accumulating human capital, acquiring capabilities for social interaction, conforming one's personal identity and relationships toward peers, and developing civic values, among others. These are also critical years for integration into the community, for acquiring social values, and for building trust in institutions and the rule of law. Without adequate protection and support and integration mechanisms, 15 to 18 year old youth out of school and not working are often exposed to situations that may affect their future development prospects negatively and threaten others in their societies.

The set of full choices faced by youth at, say, age a is defined as study, work, do both or being out of school and out of work. Youth can transition into any of the four alternative time-use states at age $a + 1$ or remain in the same state. This is not to say that all states are equally possible at age $a + 1$ no matter what the state at age a . To the contrary, there probably is inertia or persistence or state dependence, so that youth in a particular state at age a are more likely than those in the other three states at age a to be in that same state at age $a + 1$. Moreover if there is a transition between one state at age a to one of the other three states at age $a + 1$, the probabilities of transitioning do not have to be equal or independent of age a . For example, youth who transition out of schooling at age 15 probably are more likely to enter into the *ninis* category than youth who transition out of schooling at age 23.

³ This is a general pattern, although there are some countries with different definitions, which can be accounted for in establishing the relevant age groups.

Figure 1 suggests that the probabilities of re-entering school after entering the work or *ninis* states are fairly low in Mexico, as they are in on most Latin American countries. Therefore the “full choice” assumption might only empirically be relevant for younger ages. No school re-entry after dropping out, of course, limits the options and the transition paths. That does not mean, however, that there might not be high rates of return to “second chance” programs that include re-entry to school.

Limitation to the four states of school, work, both or none, as in Figure 1, is a simplification that captures the major concern of the research agenda put forward here. There may be compound states of work and training or of being out of school and out of work and training, both of which may importantly affect future transition probabilities. Further, the *ninis* state may be combined with considerable non labor market work and responsibilities such as parenting, which can be considered a productive activity contributing to early child development and therefore the wellbeing of the society at large.

Like any other conceptual framework the one developed here is a simplification of a much more complex process. Adolescence is a time of life in which there are major developments and transitions, not limited to those major time uses discussed above (e.g., see Lloyd et al 2005 and National Research Council and Institute of Medicine Panel on Transitions to Adulthood in Developing Countries 2005). Many of these transitions, however, are inter-related with the time uses already mentioned. Important examples include leaving parental homes, initiating sexual interactions, exploring new options some of which may be risky (e.g., consumption of alcohol or other drugs), entering into marital or cohabitation relations (and perhaps exiting such relations), initiating parenting, and entering into new formal or informal social networks, including gangs. Although out of the scope of the present study, analysis of these other transitions together with analysis of the major time uses of youth in general is likely to lead to a richer understanding of how the major time uses fit into the overall development of youth and what might be policy handles for affecting the major time uses. Bearing this limitation in mind, the rest of this paper develops a simple framework to identify the underlying objectives and constraints characterizing youth’s major time uses and their transitions over time.

3. Framework for Thinking about Youth Transitions

The standard economic framework for analyzing decisions regarding investment in schooling is that such investments are made by the relevant decision maker until the expected marginal benefits of schooling equal their expected marginal costs.⁴ The prototype for this type of framework probably is Becker's (1967) well-known Woytinsky Lecture. The expected private marginal benefits decrease as schooling increases in the relevant range due to diminishing marginal returns to fixed abilities and to human capital stocks accumulated in previous age periods. The expected private marginal costs are increasing due to increasing private opportunity costs of more schooling in terms of other time use options (e.g. working, caring for other family members, performing household chores) and possibly increasing marginal costs of financing current schooling investments given imperfect or missing capital markets for such investments. The equilibrium private investment of time in school is given by the intersection of the expected private marginal benefits and expected private marginal costs.

What might make the expected private marginal benefit higher? Expected private marginal benefits may be higher because of factors that can be categorized for convenience into three hierarchical groups:

- (1) *Family and individual factors at age a* such as greater ability, greater motivation for outcomes for which schooling might be helpful, greater human capital stocks (e.g., cognitive skills, executive function, self-efficacy, health and nutritional status) due to investments prior to this age, greater family support for learning that is complementary with time in schooling, lesser diversions from dysfunctional family environments, higher expectations of the expected longer-run rate of return to time spent in school because of family connections or demographic characteristics (race, ethnicity, language group, gender), and higher expectations of the expected longer-run return to time spent in school because of more-informed (perhaps due to higher schooling) parents and other family members.

⁴ The comparison is between *expected* private marginal benefits and *expected* private marginal costs because many of the benefits and costs will be revealed only in the uncertain future.

- (2) *Community factors at age a* including economic factors such as the access to existing schooling services, the quality of schools, matching of skills supplied by schools and those demanded by the labor market, the quality of other institutions that provide services complementary to time in school in the production of different dimensions of human capital (e.g., youth centers, libraries, athletic facilities), and expected rates of return to time spent in school depending in part on expectations regarding the availability of jobs and the level of wages in local labor markets, and in other labor markets that can be accessed. Cultural patterns, religion, demographic characteristics, and community traditions can also play important roles through returns to human capital.
- (3) *Macro factors at age a* including the expected rates of return to time spent in school in the country overall derived from the relative abundance and scarcity of different types of human capital, the level of stability in the economic environment –with more uncertain contexts inhibiting longer term investments- interest rate levels signaling the returns to alternative investments, perceptions about access to capital markets, expectations about the evolution of real exchange rates, along with other important indirect macro factors that work through families or communities (e.g., if the quality of local schools depends on salaries paid by or transfers from the central government, or the access to schooling services that are financed through public spending). Additionally, rules in the schooling system regarding the definition of official ages for attending school, along with country wide cultural norms and traditions can affect returns to human capital.

Note that there may be important interactions among these three levels. For example, families and individuals may choose their communities and even their countries through migration, though the apparent costs of such movements may be considerable. And, as already noted, the nature of the community factors may depend on the macro economy if part of the resources for important community services come from the central government and if the state of the local economy reflects considerably the state of the macro economy, both of which seem likely.

What might make the expected private marginal cost lower? This curve may be lower because of factors that can be categorized for convenience into the same three hierarchical groups:

- (1) *Family and individual factors at age a* such as greater own income or greater access to kin or other networks to finance time in school if capital markets are not perfect for financing such investments, lower information costs regarding schooling options if other family members are more educated, lower opportunity costs of time spent in school if demographic factors such as those mentioned above limit options in the labor force or of other sorts (including, for example, care for siblings, own children or other family members in which there may be gender specialization).
- (2) *Community factors at age a* such as lower school fees, lower transportation costs to schools, lower opportunity costs of time for attending school if current non-school options are poor (e.g., local employment options), lower interest rates for investments because local capital markets are better developed.
- (3) *Macro factors at age a* such as greater transfers conditional on school attendance as for the Conditional Cash Transfer programs that are widespread in LAC, as well as possible indirect dimensions working through community factors such as school fees (that might be affected by central government mandates or subsidies), transportation and communication systems, and also country-wide policies promoting the labor market participation of certain groups (i.e. affirmative action, employment subsidies, or legal incentives for female labor market participation).

In addition to time use and human capital stocks at age a there are other important factors including what we call here “demographic” life-cycle decisions, that are likely to be determined simultaneously and have feedback on time use, including the state of being *ninis* at age a . Importantly among these are decisions pertaining to partnering (perhaps marrying), subsequent dissolution of partnering, co-residence with parents or with other partners, and parenting.

While we initiated this discussion with the particular example of time use in school because that is the most common example in the economics (and most other) literature, parallel discussions hold for time use in work or being *nini* or any of the other more disaggregated time uses noted

above. Moreover there are obvious cross-effects on time-use decisions because of the constraint for overall time available so that if more time is spent working then that time must come from some other activity such as schooling or being idle. Furthermore, all time uses are likely to affect some or maybe all dimensions of human capital through affecting the maintenance of previously-acquired human capital and current investment in human capital along the lines sketched out above. Further there are likely to be adjustment costs in transitioning from one time use at age $a - 1$ to another time use at age a , so there is likely to be path dependence in addition to dependence on the human capital stocks on previous decisions on time use.

3.1. A Simple Characterization of a Dynamic Model of Time Allocation⁵

Let us define the per-period utility function of individual “j” at age a as determined by a vector of consumption items including the consumption of leisure, \mathbf{C} (for simplicity we suppress the individual-level subscripts):

$$U_a = U(\mathbf{C}_a) \quad (\text{i})$$

Income at age a , Y_a , is the sum of an individual’s labor income –which is determined by human capital endowments (H_a) and their market prices (w_a) - plus exogenous income such as parental or family intra-household allocations, or governmental transfers (Y_a^0):

$$Y_a = (w_a * H_a)h_a + Y_a^0 \quad (\text{ii})$$

where h_a is an indicator variable equal to 1 when the individual participates in the labor market, zero otherwise. Individuals allocate their time among four mutually exhaustive choices: attend school, $s_a = \{0,1\}$, work in the labor market, $h_a = \{0,1\}$, do both, $b_a = \{0,1\}$, or do neither of these, $n_a = \{0,1\}$ following a utility-maximization process:

$$\max_{\{s,h,b,n\}} \sum_{a=a^*}^A \alpha_a(U(\mathbf{C}_a)) \quad s.t. \quad Y_a \leq \bar{Y}_a \quad (\text{iii})$$

⁵ The setting in this section follows, loosely, the framework developed in Merlo and Wolpin (2009).

where α_a is a parameter capturing the individual's value of present versus future consumption or his or her marginal propensity to consume, and $Y_a \leq \bar{Y}_a$ is a budget constraint. Below a given age threshold, say a^* , youth are either culturally bound or legally required to observe $h_a=0$ and hence intra-household or governmental transfers are youth's only source of income. Above that critical age threshold a^* , individuals decide, given the set of constraints imposed by their micro, community and macro context, if they attend school, work in the labor market, do both, or do neither of these. The decision will determine the type of transition as shown in Figure 1.

At the critical age threshold, $a = a^*$, a youth possesses a set of given immutable endowments, H_{a^*} , reflecting parental contributions during the youth's initial years $a < a^*$, family and individual factors including socioeconomic aspects (ω), demographic characteristics (x), as well as community and macro factors that shape the environment such as cultural norms, availability of public educational services, community characteristics, among other. The immutable endowments include the formal grades of schooling ($H_{a^*}^s$) attained at age a^* , cognitive abilities, and socio-emotional abilities such as self-efficacy and executive functions (η_{a^*}) all of which have market values.

$$H_{a^*} = H_{a^*}^s + \eta_{a^*}(\omega, x) \quad \Leftrightarrow a = a^* \quad (\text{iv})$$

Labor market experience (H_a^h) and further schooling (H_a^s) add to the immutable endowments to determine human capital (H_a) after the critical age threshold $a > a^*$:

$$H_a = H \begin{bmatrix} H_a^s(H_{a-1}, H_{a-2} \dots, H_{a^*+1}, H_{a^*}), \\ H_a^h(H_{a-1}, H_{a-2} \dots, H_{a^*+1}, H_{a^*}), \\ H_a^n(H_{a-1}, H_{a-2} \dots, H_{a^*+1}, H_{a^*}) \end{bmatrix} \Leftrightarrow a^* < a < \bar{a} \quad (\text{v})$$

where the expression $(H_{a-1}, H_{a-2} \dots, H_{a^*+1})$ is the history of past decisions regarding time allocations and H_{a^*} are the immutable endowments. Notice that we excluded the human capital accumulated under choice $b_a = 1$, this is just to simplify expression (v) since the time allocated to school or work under this choice can be placed under functions H_a^s or H_a^h , respectively. An assumption of the model –and partly the motivation of this paper, is that when youth “decide”, given their constraints, to be out of school and out of work $n_a = 1$ the human capital accumulation process stops. In other words, although $n_a = 1$ adds to youth's consumption of leisure, it does not add to (or it can even subtract from) their current level of human capital:

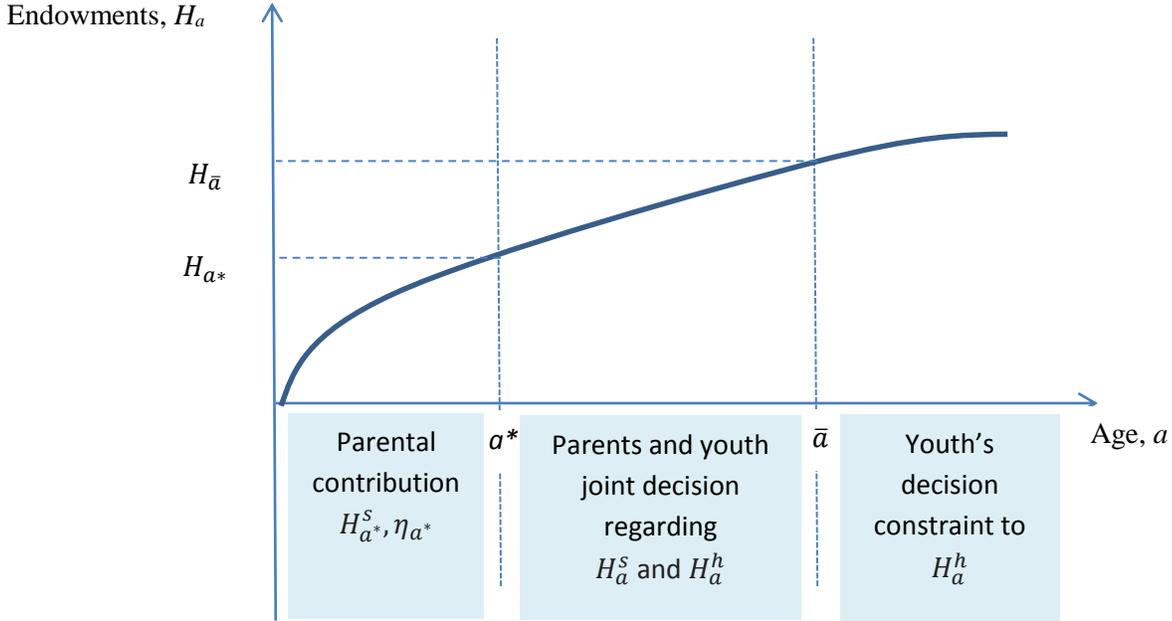
$$H_{a+1} - H_a \leq 0 \Leftrightarrow n_a = 1 \quad (\text{vi})$$

After a second critical age threshold in the life cycle $a = \bar{a}$, human capital accumulation is solely determined by years of experience, since school attendance is no longer viable –the age at which this occurs depends on cultural norms, the economic environment, exogenous circumstances, individual preferences or governmental regulation in the form of a maximum age at which an individual is permitted to attend school. Therefore the process of human capital accumulation between a^* and \bar{a} , can be characterized by the following expression:

$$H_a = \begin{cases} H_{a^*} \Leftrightarrow a = a^* \\ H[H_a^s, H_a^h, H_a^n] \Leftrightarrow a^* < a < \bar{a} \\ H[H_a^h] \Leftrightarrow a > \bar{a} \end{cases} \quad (\text{vii})$$

Figure 2 shows a simple graphic representation of the dynamic process of human capital accumulation before and after the “critical age thresholds”. Below a^* , the human capital accumulation process is determined by formal schooling financed by parental contributions, household characteristics including socioeconomic aspects, preferences, cultural norms, as well as micro, community and macro context variables that shape the environment. Between a^* and \bar{a} each youth takes his or her own decision regarding attending school, working, doing both or doing neither, perhaps in coordination with their parents. And finally, above \bar{a} the human capital accumulation process is related to years of experience in the labor market and it is a decision taken independently by the individuals.

Figure 2: Human capital accumulation during a life cycle



Youth's decisions regarding time use will affect current and future consumption via human capital accumulation and its impact on future labor market outcomes. Therefore, labor markets are a link between the decision regarding time use and the net present value of utility. Wages at age a are determined by the market value of human capital endowments and other contextual variables affecting labor productivity such as labor market regulations, availability of technology, sectors of specialization, external trade intensity, and general macroeconomic conditions, π_a :

$$w_a = w(H_a(H_{a-1}, H_{a-2} \dots, H_{a^*+1}, H_{a^*}), \pi_a) \quad (\text{viii})$$

The expression for human capital endowments H_a includes the full history of past decisions and the immutable endowments to show, explicitly, the permanent effects of these two elements on labor market outcomes. In turn, the market value of human capital (β_H) will be determined, among other things, by the quality of the schooling received (Q^S) and aggregate macroeconomic conditions:

$$\frac{dw_a}{dH_a} = \beta_H(Q^s, \pi_a \dots)$$

where the market return of human capital is a function of the quality of schooling services, Q^s , the production function of the economic sectors, the relative scarcity of the endowments offered in the labor market, as well as sectoral shocks, labor market rigidities, macroeconomic conditions (π_a), and patterns of trade, among others.

Notice that the distribution of youth among the four mutually exclusive categories of time allocation $\{s, h, b, n\}$ is not necessary the outcome of a frictionless utility maximization process but mostly the result of constraints or circumstances faced by individuals. For instance, under certain circumstances a youth would observe $n_a = 1$ (*nini*) simply because the labor market is not creating enough employment opportunities for him or her to participate ($h_a = 1$) or because the schooling system is not providing schooling opportunities for human capital accumulation. Additionally, due to cultural patterns, community norms, etc. an individual may select state $n_a = 1$, for instance for performing household-related activities, or parenting.

Bearing these issues in mind, it would be expected that for $a > a^*$, the closer a is to a^* , the more individuals will be subject to:

1. High marginal propensity to consume derived from low inter temporal marginal rate of substitution that characterizes younger ages;
2. Liquidity constraints that restrict them from borrowing in capital markets, for instance, for investing in schooling;
3. Imperfect information on future returns to schooling; where information sets (ϕ_a), are determined by socio-economic context ω and demographic characteristics x :

$$E[w_{a+1}, w_{a+2}, \dots] = g(\phi_a(\omega, x) \dots) \quad (\text{ix})$$

Therefore, as described by expression (iii), at each point in time, between ages a^* and \bar{a} , youth will allocate their time into the different choices $\{s, h, b, n\}$ such that the net present value of their lifetime utility is maximized subject to the budget constraint (Y_a), youth's inter-temporal

rate of substitution (α_a), immutable endowments (H_{a^*}), history of past decisions regarding time allocation ($H_{a-1}, H_{a-2} \dots, H_{a^*+1}$), the quality of schooling services that youth have access to (Q^S), the returns to schooling (β_H), the perceived returns to education under imperfect information $g(\phi_a(\omega, x) \dots)$, as well as context variables including socio-economic (ω), demographic (x) and aggregate macroeconomic conditions (π_a).

The horizon of attention is restricted to $a^* \leq a \leq \bar{a}$, and in the utility maximization process the tradeoff for the youth comes in the form of more leisure consumption today versus a higher consumption of other goods (perhaps including leisure) in the future. Following Merlo and Wolpin (2009), the above model can be solved by backwards recursion. Assuming $a - (a - 1)$ represents a one year period and $a^* = 15$; $\bar{a} = 24$, the solution of this process –which is not undertaken by the authors, would yield decision rules $G(\cdot)$ for each of the four possible choices $j = \{s, h, b, n\}$ for 10 points in the youth life cycle $a^* = 15 \leq a \leq 24 = \bar{a}$ based on the parameters described above:

$$j = 1 \text{ if } G_{j,a}[Y_a, \alpha_a, H_{a^*}, (H_{a-1}, H_{a-2} \dots, H_{a^*+1}), Q^S, \beta_H, \phi_a | \omega, x, \pi_a] = 0 \quad (x)$$

where $j = 0 \quad \forall G_{j,a}(\cdot) < 0$. The decision functions $G_{j,a}(\cdot)$ take only negative values and are therefore maximized when they reach zero. The decision functions have enough structure to allow the researcher, given that the data exists, to identify all of the parameters defining the decision-making process. However, as will be discussed in the next section, estimating $G_{j,a}(\cdot)$ under the more realistic setting of imperfect and incomplete information can be challenging.

3.2. Policy Relevant Features of the Model

First, all of these relations are dynamic both because the outcomes at age a depend on outcomes in previous ages ($H_{a-1}, H_{a-2} \dots, H_{a^*+1}$) and because some of the costs and particularly the returns depend on expectations about future returns to investment in human capital $g(\phi_a(\omega, x) \dots)$. Note that the dependence on past outcomes includes the possible positive accumulative effects of capital investments, or what Cunha and Heckman (2007) call “dynamic complementarities,” as well as the possible negative effects of being *scarred* by past negative

experiences including the depletion of human capital (or non-maintenance in the terms used above) through non-use if idle. This implies that the decisions regarding time allocation today can have a long lasting, permanent, effect which can be manifested in the form of poorer future labor market outcomes. Linking human capital decisions at age a to the entire history of past decisions also implies that there is hysteresis or path dependency in the model. Being a *nini* at one age may affect developments at future ages not only through the lagged time-use terms $(H_{a-1}, H_{a-2} \dots, H_{a^*+1})$, but also through the human capital stocks.

Second, the dynamic effects of time use may persist across many years, including into and throughout adulthood, because of possible transmissions through human capital stocks and demographic and related outcomes. Therefore, a feature of the model is the intergenerational transmission of well-being (or poverty) through the immutable endowments H_{a^*} .

Third, relations $G_{j,a}(\cdot)$ are general functional forms that will allow, for example, interactions among socio-economic context (ω), demographics (x) and aggregate macroeconomic conditions (π_a) as well as past time use, human capital stocks and other outcomes. Some possible interactions have been noted above. But it is important to note explicitly that these interactions can include age and gender dependence. As is noted in Section 1, Cárdenas, de Hoyos and Székely (2011), for example, document important differences in the prevalence of being *nini* between ages 15-18 years and 19-24 years old. They also document important differences by gender, with higher prevalence, but in recent years more-rapidly-falling prevalence, for females than for males. In general such differences by ages and gender are likely to reflect both differences in the right-side variables and differences in the impacts of the right-side variables, though almost for sure some of the important differences reflect the latter. For example, because of gender-differentiated roles in household production and in having and raising children, the impacts of cohabitating and parenting components almost surely differ between females and males.

Fourth, the relations described by the framework are consistent with the possibility that the transition from school to *nini* (or any other choice) may tend to occur at younger ages and earlier schooling levels in some countries than in others as noted above because of differences in socio-economic context (ω), demographics (x) and aggregate macroeconomic conditions (π_a), or differences among countries in the impact of those factors, and also due to differences in the age

at which a^* and \bar{a} are reached. As a result, the probability of entering into the state of being a *nini* when younger or at lower secondary school may be much higher in, say El Salvador, Nicaragua or Paraguay than in Chile or Argentina, with other countries such as Peru and Colombia in between.

Fifth, more binding liquidity constraints in the presence of imperfect capital markets, greater preference for present consumption (α_a) and more imperfect information regarding future returns to human capital, $g(\phi_a(\omega, x) \dots)$, would result in less investment in human capital. Given that poor households suffer more from liquidity constraints, attach a higher value to present consumption and have access to a more distorted information set, the model predicts an intergenerational transmission of poverty and inequality through restricted human capital accumulation among poor households and the subsequent unequal labor market outcomes.

Sixth, the setting of the model implies different social welfare outcomes depending on the allocation of youth into the four options of time use. For instance, a general equilibrium with a large proportion of youth in the *ninis* category would yield lower social welfare vis-à-vis a situation with a large proportion of youth in school or working. For the reasons described above, for youth aged 15 to 18, the socially desirable outcome is for all of them to be in school. This is not necessarily true for youth aged 19 to 24, where a share of them might decide, without a loss in social welfare, to sell their time endowment in the labor market. For this older age group, it is not at all clear which allocation of youth into the different categories of time use would maximize social welfare.

A final word of caution is needed before discussing the possible empirical approaches. Arguably, the decision related to human capital accumulation does not necessarily shift in a discrete way from parents to youth as it is suggested by equation (vii) and Figure 2. Most likely the shift of weight from parents to youth in the decision-making process is a gradual process with parents playing a larger role at initial ages (for a closer to a^* and $a > a^*$) and declining faster as a reaches \bar{a} . Modeling this process would require developing a model with two additional features: 1) an explicit utility function of parents which, if relevant, may differ from that of youth; and 2) a definition of the intra-household bargaining process solving the difference in preferences between youth and their parents. Additionally, the human capital accumulation process described by equation (vii) implies that parental contributions H_{a^*} are taken as given as opposed to

explicitly modeling behavior under specific constraints. Furthermore, the definitions of a^* and \bar{a} also depend on cultural patterns, socioeconomic characteristics, the definition of legal schooling and working ages, etc. Although identifying the forces behind the gradual shift from parents to youth in the decision-making process, the parental contribution to human capital accumulation during earlier years and country-specific definitions of a^* and \bar{a} are three important elements in the determinants of *ninis*, a formal discussion of them falls beyond the scope of the present study.

3.3 Potential Empirical Approaches

As presented in the previous section, at any youth age $a > a^*$, decisions about time use are made based on the previous history and on expectations regarding future developments. Whatever the critical age threshold when the adolescent's preferences become relevant in the decision-making process –for instance, youth in LAC seem to be reaching a^* at younger ages in the late 20th and early 21st century- choices among major time uses can be viewed as the allocation of available resources between the marginal returns to current consumption and to future investment benefits.

Empirically, estimation of the model developed in Section 2.1 can follow a structural approach by defining the function forms of the theoretical relationships underpinning the model. Alternatively, a linearized (first-order Taylor series expansion) of the decision functions $G_{j,a}(\cdot)$ yield reduced-form equations for the probability of choosing any of the four time use alternatives at age a :

$$G_{j,a} = G_{j,a}[Y_a, \alpha_a, H_{a^*}, (H_{a-1}, H_{a-2} \dots, H_{a^*+1}), Q^S, \beta_H, \phi_a | \omega, x, \pi_a] + u_{j,a} \quad (\text{xi})$$

where $u_{j,a}$ are random components capturing the joint distribution of all shocks. The random components, $u_{j,a}$, can follow many distributions, for example, normal, Poisson, extreme value or a combination of various distributions (logit kernel or mixed logit). An alternative would be to assume that $u_{j,a}$ are independently and identically distributed (i.i.d.) shocks with extreme value distribution. Under these assumptions, the probability that individual i will allocate time to alternative j at age a is defined as follows:

(xii)

$$\Pr(i = j|a) = \frac{\exp\{G_{i,j,a}[Y_a, \alpha_a, H_{a^*}, (H_{a-1}, H_{a-2} \dots, H_{a^*+1}), Q^S, \beta_H, \phi_a | \omega, x, \pi_a]\}}{\sum_{j=1}^4 \exp\{G_{i,j,a}[Y_a, \alpha_a, H_{a^*}, (H_{a-1}, H_{a-2} \dots, H_{a^*+1}), Q^S, \beta_H, \phi_a | \omega, x, \pi_a]\}}$$

where the individual subscript i is included in the decision functions of equation (xii) to denote that the estimation of this functional form should be undertaken at the individual level. Under this specification, the probability of observing any of the four choices $\{s, h, b, n\}$ at a given age is determined by a multinomial model with the following covariates:

- (a) Y_a = income of youth, which could be approximated by household per capita income or personal labor income when available
- (b) α_a = subjective value of youth for present over future consumption, which can be proxied by the self-declared willingness to give up a sum of income today in exchange for a larger sum in the future
- (c) H_{a^*} = immutable endowments while youth, which could be captured by grades of schooling at age 15 or measures of socio emotional skills at age 15
- (d) $(H_{a-1}, H_{a-2} \dots, H_{a^*+1})$ = history of past decisions regarding time use available from panel data
- (e) Q^S = quality of education received proxied by, for instance, private versus public schooling or the age-for-grade distortion
- (f) β_H = returns to schooling estimated from a Mincer wage specification for current labor force participants
- (g) ϕ_a = perceived returns to schooling, when available
- (h) ω = socio-economic context captured by parents' education
- (i) x = demographics such as gender, marital status, co-residing in parental household, among others
- (j) π = macroeconomic conditions such as GDP's volatility, inflation rates or trade openness

A second alternative could be to concentrate on estimating the probability of observing a transition between one choice of time use, for example, $s_a=1$ to $n_{a+1}=1$. In this case, the

parameters of the decision function would be identified by comparing the covariates of individuals that change their choice for time use with those who did not change:

(xiii)

$$\Pr(i = j|a, j') = \frac{\exp\{G_{i,j,a}[Y_a, \alpha_a, H_{a^*}, (H_{a-1}, H_{a-2} \dots, H_{a^*+1}), Q^s, \beta_H, \phi_a | \omega, x, \pi_a]\}}{\sum_{j=1}^4 \exp\{G_{i,j,a}[Y_a, \alpha_a, H_{a^*}, (H_{a-1}, H_{a-2} \dots, H_{a^*+1}), Q^s, \beta_H, \phi_a | \omega, x, \pi_a]\}}$$

where $j \neq j'$. Under both functional forms (xii) and (xiii) there are policy-relevant hypotheses that can be identified. For instance, the effect of Y_a on the probability of transitioning out of school:

$$\frac{\partial \Pr(i \neq s|a, s)}{\partial Y_{i,a}}$$

If the above expression is negative, then it would suggest that individuals are transitioning out of school due to budget constraints and hence a scholarship program financed by the government would be desirable. The functional forms can also quantify the importance of early child development and parental contributions to determine the probability of being out of school and out of work at age $a > a^*$:

$$\frac{\partial \Pr(i = n|a)}{\partial H_{i,a^*}}$$

Other important relationships such as the impact of perceptions of the returns to schooling (ϕ_a) on the probability of dropping out of school might be difficult to estimate given the lack of availability of a reliable measure of perceptions in existing data.⁶

A third alternative empirical approach exploits the relationship between the prevalence of *ninis* and aggregate conditions. Under this approach, the decision functions $G_{j,a}(\cdot)$ are approximated

⁶ For an estimation of the impact of the perceived returns to education on the demand for schooling see Jensen (2010).

by the proportion of the population at age a observed in each of the four choices of time use $\{s, h, b, n\}$, like in Figure 1. The macro or aggregate version of expression (xi) can be defined as follows:

$$G_{j,a} = G_{j,a}[Y_a, \alpha_a, H_{a^*}, (H_{a-1}, H_{a-2} \dots, H_{a^*+1}), Q^S, \beta_H, \phi_a | \omega, x, \pi_a] + \varepsilon_{j,a} \quad (\text{xiv})$$

where $\varepsilon_{j,a}$ is a random component normally distributed with zero mean and variance equal to σ_a^2 and the independent variables are also aggregated versions of the micro determinants. Notice that functional form (xiv) allows for age-specific effects a feature that can be easily incorporated under a cohort approach like the one described in Browning, Deaton, and Irish (1985) and Deaton (1985) and Attanasio (1998).

4. Implications for Empirical Estimates with Available Data

Estimation of relations such as (xii) and (xiii) is likely to be challenging because some important variables are not likely to be observed – to cite a few examples, the generally absent or very limited information on future expectations, and some of the right-side endogenous variables such as self-efficacy and executive function at age a^* (H_{a^*}). In principle, individual fixed-effects estimates and instrumental variable (IV) procedures might be used with individual panel data and sufficient lagged information, including on prices and policies, to deal with some of these estimation problems.

To our knowledge Argentina, Chile, Colombia and Mexico are the only countries in the region with a panel following individuals over time with fairly high frequency data for youth.⁷ The short-term rotating quarterly panel of Mexico’s “*Encuesta Nacional de Ocupación y Empleo*” (and similar databases for Argentina and Colombia) can be used to estimate equations (xii) and (xiii). Estimation of these equations with Mexico’s ENOE would shed light on the short-term dynamics of time use among youth and the potential influence of the variables identified by our theoretical model.

⁷ Other datasets such as MXFLS in Mexico, Young Lives in Peru, INCAP in Guatemala and panels for Ecuador and Nicaragua to not collect data on youth with enough frequency to estimate the dynamic model presented here.

But even these data sets fall far short of the ideal panel to estimate the dynamics depicted by Figure 1. These existing panels are too short and available for too few LAC countries to have sufficient macro and community variation to permit estimation of the community and macro effects. We lack true panel data sets with the requisite information for a sufficient number of countries and years, which limits the relevance of the empirical approach to analyze the evolution of *ninis* in different macroeconomic and other contexts.

However, estimation of equation (xiv) is possible using the rich panel of cross-sections assembled by Cárdenas, de Hoyos and Székely (2011) to adopt the average cohort approach initiated by Browning, Deaton, and Irish (1985) and Deaton (1985), which consists of grouping the households in subsequent surveys according to fixed criteria (in this case, years of birth) and following the average variables of interest for these groups rather than for individuals. By following a representative sample of each year-of-birth cohort, differences in the proportion of *ninis* across cohorts can be controlled with context variables, while aggregate conditions across countries can be captured through standard macro variables. Some other important features of this approach include:

1. While not able to integrate much explicit community information as such, for most countries it is possible to distinguish at least between rural and urban areas, between which generally the relevant infrastructure and markets differ markedly. Also as noted in Section 2, many of the community policy-related and market variables are likely to reflect macro conditions, which can be represented explicitly even though it might not be possible to identify well the particular community variables through which they work.
2. The lagged age period $a-1$ is not necessarily a year because the cross-sections are not available for every year; instead an assumption of linear effects between cross-sections proportional to the elapsed time between each pair of contiguous cross sections is needed.
3. Following the cohort analysis, it is possible to investigate a fairly wide range of birth cohorts, which increases the range of ages for which the ongoing impact of being a *nini* can be analyzed, though, of course, the interesting age ranges must include those in which individuals tend to be *ninis* (say, 15-24 years of age); but that there are nine

countries (Argentina, Brazil, Colombia, Costa Rica, El Salvador, Honduras, Mexico, Paraguay, and Venezuela) for which the lapsed time between the first and last available cross section is at least a quarter of a century makes possible some analyses over fairly long segments of the life cycle.

4. Definition of time uses include school, school and work, work, *nini* with own children and *nini* without own children to attempt to capture both the major types of being a *nini* and the major alternatives; the data do not permit including some time uses that might be of interest such as training, but other analysis confirms that the prevalence of such training is fairly low in the region in any case.
5. The analysis should be undertaken separately for females and males because of the different historical patterns in the key variables, including being *ninis*, and because of the probable different impacts of some variables such as being married or becoming a parent.
6. While there are not direct observations on expectations of future rates of returns to human capital investments, under assumptions about stability of such relations across generations within a country we can represent such expectations for current youth by the estimated rate of return in a log earnings function for adults in their 30s in the same cross-sectional survey.
7. The possibility of following cohorts beyond the 15-24 age range permits verifying whether cohorts with large proportions of *ninis* at those ages tend to also be cohorts with higher unemployment rates, informal labor, or wages, with which scaring effects can be identified.

This type of analysis sheds light on why the proportions of *ninis* vary across countries or have changed over time within countries--whether because of demographic shifts that increase the school-age population, changes in the characteristics of households (including income, schooling, and family size), or other changes in behaviors associated with the expected private marginal benefits of schooling (such as the expected private returns to schooling). Additionally,

understanding the pattern of *ninis* and the variations in this condition across different and well-defined population subgroups is useful for predicting future demands for schooling and employment and therefore, the provision of public goods in the future.

The analysis outlined in this paper allows testing of the following hypotheses, among others:

- (a) There are more *ninis* when access to schooling services is lower due to household budget constraints or more limited supplies of services;
- (b) Being a *nini* has a long lasting effect on labor market trajectories (scarring), perhaps well into adulthood;
- (c) The proportion of *ninis* is lower when labor market opportunities are greater –and thus, unemployment rates are lower;
- (d) There are more *ninis* when the macroeconomic environment is more adverse;
- (e) There are fewer *ninis* when the relative returns to upper secondary schooling are higher;
- (f) The determinants and impacts of being *ninis* vary between females and males, for instance, due to cultural norms or traditions;
- (g) The influence of family characteristics on the probability of being a *nini* is greater – and hence the intergenerational transmission of poverty is larger – when the macroeconomic environment is weaker and the provision of public services is inadequate.

5. Final Remarks

The proportion of LAC youth that is *ninis* remains high, almost a fifth. This status is alleged to entail a number of negative implications for the life-cycle development of the youth involved with a break in the human capital accumulation process that translates into a reduction in future productivity and labor market outcomes. A large share of *ninis* might also entail risks for society at large through potential short-term effects such as crime rates, and through the long-term sequels from not fully capitalizing on the “demographic window of opportunity” of historically low economic dependency ratios, among others. But many of the questions about *ninis* in LAC - related to the determinants of this status, the implications of this status and possible policies directed towards this status – are empirical questions. This paper develops a conceptual framework for laying out the main elements involved in the dynamics of choices and restrictions

faced by youth in the 15-24 age range that provide a framework for different approaches that could be used to investigate systematically empirical dimensions of the important *ninis* phenomenon in LAC in light of the considerable limitations in the information that is available. Despite these limitations, the study illustrates that some important insights may be obtained what micro, community and macro factors determine *ninis*, what the short- and longer-run implications are, and what policy changes may be effective – and how all these factors may differ among various contexts in the region.

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