Inter-American Development Bank
Banco Interamericano de Desarrollo

Office of the Chief Economist
Working paper #376

Children's Advancement Through School in Brazil: The Role of Transitory Shocks to Household Income

Por

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Oficina del Economista Jefe
Documentode Trabajo #376
Julio 1998

I wish to thank Deborah Levison, David Lam, Charles Brown, Agnes Quisumbing and Timothy Waidmann for useful comments and discussion. Support for this research was provided in part by NIH grant HD31214-01A2. This paper was presented at the 1997 annual meetings of the Population Association of America (PAA) and the Latin American and Caribbean Economic Association (LACEA). The views expressed here are those of the author and do not necessarily represent the views of the Inter-American Development Bank. Please address correspondence to suzanned@iadb.org.

Abstract

This paper investigates the effects of short-run economic shocks on children's progress through school in urban Brazil using a unique panel data set. The severe problem of grade repetition in Brazil contributes to overall low levels of educational attainment. Of children ages 10-15 who are enrolled in school, only 69% advance on average to the next grade. This paper investigates whether children's effort on schoolwork is diminished when fathers experience a transitory shock to income. The results suggest that children's time is used to buffer short-run economic shocks to the household which is consistent with models of education incorporating assumptions of imperfect credit markets.

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I. Introduction

Although schooling is associated with high private rates of return in the labor market including higher wages and lower unemployment as well as other positive outcomes such as lower infant and child mortality rates, levels of schooling attainment remain low in developing countries.[1] The positive relationship between children's educational attainment and household income is a well established empirical regularity.[2] The stylized facts are consistent with a variety of economic models of education, including models which incorporate incomplete capital markets.

Mean levels of schooling in Brazil, according to Londoño (1996), are 3 years lower than is predicted by in a regression of mean schooling on GDP per capita and public expenditures on education for a sample that includes both developing and industrialized countries. Behrman (1996) also finds that the schooling of recent cohorts in Brazil lies below the international regression line. Along with low levels of educational attainment, Brazil is plagued by the severe and costly problem of grade repetition. In urban Brazil, only 69% of children ages 10-15 who are enrolled in school advance on average to the next grade. Brazil's repetition rates are much higher than other middle-income countries with similar per capita incomes (Mexico, Venezuela, Uruguay, Panama) and are even higher than the mean repetition rates for low-income countries.[3] Few studies have addressed this critical problem in the developing world with exceptions including Behrman and Deolalikar (1991), Hanushek and Harbison (1992), Jacoby (1994), Gomes-Neto and Hanushek (1994) ,Mello e Souza and Silva (1996) and Jacoby and Skoufias (1997).[4] This paper uses a unique set of panel data to

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[1] Schultz (1988), Summers, Lockheed and Vespor (1991), Lam and Schoeni (1993), Strauss, Thomas and Henriques (1990), Lam and Duryea (1995).

[2] Lazear (1980), King and Lillard (1987), DeTray (1988), Levison (1991), Deolikar (1993), Lam and Duryea (1995), Lam and Schoeni (1993), Thomas, Schoeni and Strauss (1996), Schultz (1995).

[3] IPEA (1993) and Lockheed and Vespoor (1991) Table A-ll, p. 301. Low income countries defined by the World Bank.

[4] Glewwe and Jacoby have investigated the phenomenon of delayed primary school enrollment in Peru.

investigate whether children's progress in school is adversely affected by transitory shocks to fathers' income.

Cornia, Jolly and Stewart (1987) focused attention on who suffers when structural adjustment programs are implemented, arguing that stabilization programs disproportionately affect poor children. In light of the large fluctuations in macroeconomic conditions in Brazil over the last two decades as well as the absence of well-functioning credit markets and social safety nets, it is important to understand how households buffer shocks. Our results suggest that children's time is used to buffer short-run economic shocks to the household.

The paper proceeds as follows. The relevant literature is discussed in Section II and theoretical considerations are discussed in Section III. Section IV provides a description of the data. The empirical model is presented in Section V and the results are presented in Section VI.

II. Literature Review

A variety of economic models relate parents ’characteristics to the schooling attainment of children. In particular, much attention has been given to the role of parents ’ permanent income in the demand for children ’s education. Since schooling typically involves investments in the early part of the lifecycle generating higher earnings later in life, static models have considerable limitations. Much of the literature extends Becker ’s (1964), Ben-Porath ’s (1967), and Heckman ’s (1976) early work on dynamic models of human capital investment.

Typically in investment models of schooling, parents can borrow against future earnings to finance investment in children ’s education. Investment in education occurs at young ages when children ’s opportunity costs are the lowest. The dual assumptions of perfect capital markets and perfect foresight imply that the optimal consumption and investment paths are fully separable. Low income parents invest as much in their children ’s

education as high income parents.[5] However if borrowing constraints are binding or access to credit varies by parents 'income level then the separability of the consumption and investment decisions breaks down and parents 'permanent income may affect investment in children's schooling.

In another vein of literature, consumption models of education predict a positive effect of parents 'permanent income on children's educational attainment even in the absence of credit constraints.[6] The schooling of a child is a normal good which varies positively with parents 'income. Empirical investigation of the effect of parents '*permanent* income can not therefore help to distinguish between the two theoretical approaches discussed above. However, if credit markets are perfect, investment in children's schooling should not be sensitive to *transitory* changes in parental income in either the consumption model of education or the investment model of education. If children's schooling is responsive to changes in transitory income then this suggests that the basic consumption model of education (without credit constraints) is inappropriate for the case of Brazil. In fact, little attention has been paid to the effect of transitory income on the educational attainment and progress of children. This likely is a result of the general lack of panel data for developing countries.

Panel data are important for capturing the dynamic nature of human capital accumulation. Gomes-Neto and Hanushek (1994) lament the lack of data and knowledge about the process of promotion, repetition and dropping-out behavior in developing countries. Although many studies show a positive correlation of income and educational attainment, static approaches are flawed since the current stock of human capital is a function of past decisions about education. A positive empirical relationship between educational attainment and father's income estimated from cross-sectional data as in Psacharopoulos and

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[5] Becker and Tomes (1979).

[6] Rosenweig and Evenson (1977) and Gullason (1989) apply consumption models of schooling.

Arriagada (1989) and Levison (1991) may arise from unobserved heterogeneity. For example, unobserved tastes for education may be correlated with father's income.

Strauss and Thomas (1995) describe the extensive literature which examines the adverse impact of weather shocks such as floods and famines on children's health and note that whether human capital accumulation is affected by households' ability to adjust to more common shocks has not be adequately addressed.[7] The few studies which examine the determinants of repetition in developing countries focus mainly on school and community inputs, not on household level determinants. Hanushek and Harbison (1992) and Gomes-Neto and Hanushek (1994) examine the effects of resources purchased and used by schools on repetition rates in Brazil using a data set of rural schools, EDURURAL. They have rather severe problems finding longitudinal matches of students, since in rural areas many schools closed, higher levels of instruction didn't exist, and student drop-out rates were higher. Conditional on the school existing, only approximately 10% of second graders were found in the fourth grade two years later.

Whereas the EDURURAL data have advantages for measuring the effects of school inputs on repetition rates, the data used in this analysis, the Pesquisa Mensal de Emprego (PME), are more appropriate for measuring effects of household level effects on repetition and drop-out rates.[8] Also note that since the choice of school is endogenous, samples based on schools, such as EDURAL, may introduce more bias than random samples of households.

One study that does examine the effects of family background on promotion rates is Mello e Souza and Silva's (1996). Using retrospective data for São Paulo in 1982 they find that high repetition rates for the first 2 years of schooling are negatively related to parents'

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[7] For example Ravallion (1987), and Razzaque, Alam Wai and Foster (1990) analyze the impact of a severe flood in Bangladesh on child mortality and Foster (1995) examines the impact of the flood on children's weight gain in the following months.

[8] Also note that the PME covers the 6 largest metropolitan areas of Brazil which are more representative of the country than the rural areas covered by EDURURAL.

income levels. While their survey instrument, the supplement to the 1982 annual household survey, asks about students' school attendance and attainment in 1981 as well as in 1982, the data cannot be used to connect transitory household shocks to transition rates.

Jacoby and Skoufias (1997) develop a dynamic model of school attendance which incorporates uncertainty and incomplete markets. They use time allocation data for rural India to estimate the response of school attendance to idiosyncratic income shocks. They find that children's time is used to buffer idiosyncratic shocks to household income in rural India. Lacking information on children's schooling attainment they are unable to estimate the actual effect on children's achievement in school.

Recently much attention has been given to the role of the quality of schooling in the demand for education (Behrman and Birdsall 1983). Hanushek (1995) notes that "low school quality may frequently be an important explanation for the widespread failure to take advantage of the apparently high returns available from education". The gap between mean years of schooling for Brazil and the predicted years of schooling from Londoño and Behrman's cross-country regressions may be related to a lower than average level of quality of schooling in Brazil compared to the rest of the sample. However within Brazil the same economic puzzle applies to the case of quality as to quantity: if private returns to quality are high then why don't low income families borrow funds and choose the same levels of quality and quantity as high income households?

A recent study by Flug, Spilimbergo, and Wachtenheim (1997) examines secondary school enrollment rates using cross-country panel data for the period 1970-1992. After controlling for each country's initial per-capita income and mean educational attainment of the adult population they find that differences in financial depth (as a proxy of credit availability) account for 30% of the difference in secondary school enrollment rates between Latin America and industrial countries. They also find that employment volatility has a significant negative effect on school enrollment in low-income countries. Clearly this study suggests that further research is warranted at the household level.

III. Theoretical Considerations

The relevant theoretical model should incorporate 1) the dynamic process of schooling, 2) part-time schooling, 3) credit constraints, and 4) transitory shocks to income. Jacoby (1994) presents a particularly compelling model of progress through school applied to the case of Peru. His dynamic human capital investment model focuses on the switching point from full to part-time schooling in an environment of perfect foresight. Parents maximize a single welfare function for the family and value child consumption equivalently to own consumption. Failure to progress in school is linked to the (unobserved) decision to work part-time**.** While total years in school are the same for constrained and unconstrained children, constrained children go to school only a fraction of the year so they ultimately complete fewer grades than unconstrained children and earn lower discounted lifetime income.

The Jacoby model captures many of the salient features of the Brazilian situation**.** Grade repetition is the leading cause of low levels of educational attainment in Brazil. Barros and Lam (1996) note that the difference in mean educational attainment of 14 years olds in the Northeast of Brazil and São Paulo is not explained by regional differences in school attendance rates, but by regional differences in repetition rates. Our estimates show that approximately one-third of students are not promoted to the next grade and of those children who are not promoted over 90% repeat the grade again. Levison (1991) notes that children ages 10-14 have an active presence in the labor force as child labor laws are rarely enforced. Since children spend on average only 4-5 hours a day in school they are able to combine market work with school attendance.[9] Social safety nets and capital markets are not well developed in Brazil. Not captured in the Jacoby model however is the fact that family income in Brazil is subject to great deal of volatility and uncertainty.

[9] The mean time spent in public schools is 4 hours as reported in Mello e Souza and Silva (1996).

Although estimation of a full dynamic model is beyond the limitations of the data, we can informally extend Jacoby's model by assuming that parents know their path of permanent income but do not know when they will experience transitory deviations from this path. As in the Jacoby model under perfect capital markets parents can borrow against own and child's future earnings to finance investment in children's education. However if the borrowing constraint is binding and families have not accumulated adequate assets, transitory shocks to family income are hypothesized to affect children's progress through school by affecting the intensity with which children approach their schoolwork.

Although Brazil is classified as a middle income country according to its level of per capita income, the distribution of income is highly unequal. In 1995, 35% of the population lived below the World Bank's $2 a day poverty line (Londoño 1996). Families at the lowest end of the income distribution are not likely to have savings they can spend down or to have access to credit and may have to rely on children's labor force participation to smooth consumption. Alternatively another family member may increase her or his hours in the work force and the child may be required to increase time on home production. As children focus less on schoolwork as a result of increased time on labor market or home production activities they are less likely to acquire the skills necessary to pass the grade.

Negative shocks to income may have long run consequences in the form of lower schooling attainment for constrained households if positive shocks are not completely offsetting. One reason an asymmetry to the shocks can exist is if the opportunity costs to time on school are increasing with age. For example, wage opportunities increase with age apart from schooling as children mature physically and emotionally and as labor force participation becomes legal. Another possibility is that children become discouraged after failing a grade and subsequent effort on school work is diminished. The child's ultimate lower productivity as an adult in the labor force will be reflected in a lower lifetime wage profile.

Due to the nature of human capital accumulation, the implications of credit market imperfections on human capital investment may be more severe than the effects on physical investment. Most importantly, unlike physical capital, human capital cannot be "repossessed" or "resold"; hence lenders are less willing to finance investments. Also, investments in human capital in the form of formal schooling tend to take place at young ages when opportunity costs from other activities are the lowest. Timing may matter more in the acquisition of human capital than in the acquisition of physical capital. While middle-income households are hypothesized to have both greater assets and access to credit than poor households, their assets and credit may not be sufficiently liquid. In other words, to meet immediate cash demands these household may have to rely on changes in children's schooling intensity as well as poor households.

This theoretical framework provides the baseline for the empirical analysis which follows.

IV. Data

The Pesquisa Mensal de Emprego (PME)

The PME is a short panel survey of households in six metropolitan areas of Brazil. The PME survey, collected by the Brazilian census bureau (IBGE), includes random samples of households in the metropolitan areas of Rio de Janeiro, São Paulo, Belo Horizonte, Porto Alegre, Recife and Salvador. The PME staff of trained interviewers surveys approximately 35,000 households each month, including 4,500 to 7,500 households in each of the six areas. The sample size of the PME was reduced in August of 1988 to approximately 30,000 households per month. The rotating panel nature of the survey is similar to the US Current Population Survey (CPS). Households are interviewed once a month for four consecutive months, dropped from the sample for eight months, then picked up again for four final months.

The basic demographic and labor related questions are the same over the February 1982 to December 1995 surveys. The panel nature of the PME allows us to follow children's attendance and progress through school over a sixteen month period, while we are also tracking the employment and earnings experiences of their parents. Information on household composition such as the number of household members and the number of children younger than age 10 is provided at each interview. Each person in the household over age 10 is assigned a numerical code necessary for matching. At each of the eight interviews household members 10 years of age and older are asked to report whether they are currently attending school as well as their last completed grade. In a separate question respondents are asked about their main activity last week. Possible responses are attended school, worked, looked for work, cared for domestic (home) affairs, was retired or other. There is some concern that children's work may be under-reported in response to the main

activity question. Using another data source, the supplement to the 1985 annual household survey, Levison (1991) finds that many children who report that school is their primary activity report that they "normally" work part-time.[10] Fortunately the direct question about enrollment ensures that school enrollment is reported regardless of children's other activities. We track student's progress over a 1 year interval by looking at their completed years of schooling at the time of their first interview and comparing that with their completed schooling reported at their fifth interview, exactly 1 year later, for those students who are enrolled in the first interview. The samples used in this paper consists of children ages 10-15 from all 6 metropolitan areas over the period February 1982-September 1995. Mean promotion and repetition rates are presented in Table 1 for children ages 10-15 at the time of their first interview. The first two columns show promotion rates for all children observed in school at their first interview. Overall only 64% of the boys successfully complete the grade compared with 71% of the girls. Children are supposed to begin the first grade in the year in which they turn 7. We have defined children as already lagging in school if they older than the "on-time" age range listed in the middle column of Table 1. The promotion rates vary by grade, even when the sample is restricted to children who are not lagging behind in school given their age (see on-time, all children). The third and fourth columns in Table 1 present grade promotion rates by sex and grade for the sample which will be used for the main analysis of the paper and is described in Section VI. For the analysis we need to restrict the sample to children from two parent families in which both the child's and parent's variables are non-missing for the first 5 interviews. The advancement rates for the regression sample are slightly higher than those presented for all boys and girls in columns 1 and 2.

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[10] Of 19,371 10-14 years olds included in the supplement, 2051 report that work is their main activity in the previous week. 585 children report that they "normally" work although they do not list work as their primary activity last week. The supplement to the 1985 Pesquisa Nacional de Amostra de Domicilios (PNAD) also includes information on whether the child normally helps with household chores and time use.

The bottom half of Table 1 presents repetition rates for those children who did not successfully complete the grade in which they were enrolled at the time of their first interview. In other words, we observe these children attempting the same grade one year later. Overall 92% of all girls and boys who did not pass the grade are re-enrolled in this same grade one year later. Children who have not yet fallen behind in their schooling have higher repetition rates. Repetition rates for the children included in the regression sample used later in this paper (columns 3 and 4) are slightly higher than the rates for all children.

Table 1: Grade Promotion and Grade Repetition Rates, 1982-1995 PME

Children ages 10-15 who are enrolled in school at time of initial interview and observed one year later

A. Promotion Rates

Proportion of Students Who Complete the Grade Successfully

	All Ages					Restricted to On-Time Children			
	Full Sample		Reg. Sample		On-Time	Full Sample		Reg. Sample	
	Boys	Girls	Boys	Girls	Age Range	Boys	Girls	Boys	Girls
Grade									
1	0.427	0.498	0.441	0.502	6-8				
2	0.571	0.629	0.588	0.641	7-9				
3	0.632	0.697	0.648	0.708	8-10	0.678	0.739	0.694	0.751
4	0.708	0.758	0.726	0.777	9-11	0.769	0.815	0.776	0.827
5	0.591	0.669		0.687	10-12	0.658	0.721	0.667	0.732
6	0.643	0.697		0.718	11-13	0.685	0.738	0.694	0.755
7	0.704	0.746	0.711	0.755	12-14	0.730	0.771	0.737	0.780
8	0.708	0.750	0.712	0.765	13-15	0.708	0.750	0.712	0.765
9	0.703	0.770	0.710	0.778	14-16	0.703	0.770	0.710	0.778
10	0.725	0.778	0.752	0.791	15-17	0.725	0.778	0.752	0.791
Total	0.639	0.707	0.653	0.723		0.704	0.757	0.713	0.770
N	69,752	67,363	44,723	42,741		36,478	41,867	24,567	27,638

B. Repetition Rates

Conditional on Not Advancing Above, Proportion of Students Observed Repeating Grade

	All Ages					Restricted to On-Time Children			
	Full Sample		Reg. Sample		On-Time	Full Sample		Reg. Sample	
	Boys	Girls	Boys	Girls	Age Range	Boys	Girls	Boys	Girls
Grade									
1	0.844	0.810	0.863	0.848	6-8				
2	0.914	0.913	0.931	0.922	7-9				
3	0.928	0.924	0.939	0.933	8-10	0.986	0.983	0.987	0.989
4	0.920	0.907	0.930	0.921	9-11	0.984	0.984	0.986	0.985
5	0.911	0.916	0.919	0.922	10-12	0.975	0.966	0.980	0.964
6	0.927	0.924	0.936	0.923	11-13	0.973	0.965	0.979	0.966
7	0.928	0.938	0.936	0.949	12-14	0.947	0.952	0.953	0.963
8	0.961	0.960	0.962	0.962	13-15	0.961	0.960	0.962	0.962
9	0.912	0.941	0.911	0.944	14-16	0.912	0.941	0.911	0.944
10	0.961	0.979	0.978	0.983	15-17	0.961	0.979	0.978	0.983
Total	0.917	0.919	0.927	0.927		0.968	0.965	0.972	0.968
N	25,213	19,756	15,508	11,853		10,789	10,166	7,048	6,366

Notes:

1) Children are expected to enter first grade when they are 7 years old. On-time heading indicates that children who are behind in school 2 or more years for their age are excluded. Note that we can't observe any children attending grade 1 or 2 "on-time" because children younger than age 10 are excluded from the PME survey. Note also that all children observed in grades 8, 9 and 10 are considered to be on-time since the oldest children in our constructed sample are 15 which is a permissible age for those grades.

2) The sample for regressions is considerably smaller because we restrict the analysis to children from 2-parent families, in which both the child's and father's information are non-missing for the first 5 interviews.

V. Empirical Model

Achievement in school is assumed to be a function of the child's effort spent on schoolwork with a stochastic component.

$$E_{it}^{*} = X_i'\theta + Y_i'^{p}\sigma + T_{it}'\delta + \omega_t + \mu_{it}$$

$$E_{it} = \begin{cases} 1 \text{ if } \mu_{it} \geq -X_i'\theta - Y_i'^{p}\sigma - T_{it}'\delta - \omega_t \\ 0 \text{ otherwise} \end{cases} \qquad (1)$$

Assume that E^* in equation (1) represents the child's effort on schoolwork over the year which is a function of child and family characteristics. X_i represents a vector of demographic characteristics for the child and his family. Y_i^p represents a vector of permanent income variables for the family. ω_t are period specific constant terms representing the different year-to-year panels over February 1982-September 1995. μ_{it} is a normally and independently distributed error term. The stochastic component μ_{it} reflects the fact that parents and children cannot perfectly predict the amount of effort necessary to pass a grade. Since we do not observe actual effort on schoolwork, E^* is treated as a latent variable and the probability of grade advancement is modeled as a probit such that if E^* exceeds an unobservable threshold the child is promoted to the next grade.[11]

The vector T_{it} is an indicator of transitory shock to household income. Identifying exogenous shocks to permanent income is an extremely difficult empirical task**.** In this case certain designs of the PME survey preclude us from using deviations from a long-run income profile as a measure of T_{it} . Most importantly, the PME is a short panel of less than 2 years, hence we cannot estimate a lifecycle income profile. In addition, the earnings variable in the survey is associated with measurement error as a result of reported earnings being tied to the reference job, i.e., the job held last month. For example, individuals who start a new job sometime in the current month would report zero earnings or incomplete monthly earnings

[11] Given valid instruments to identify dropping out of school, an appropriate specification would be the bivariate probit with selection. Progress in school is observed only if students attend school. The bivariate model could incorporate the correlation of the error terms in these equations as well as control for the selection of attendees in the progress equation. It is difficult to imagine there is any variable that would affect enrollment while not affecting advancement.

for the current month because the earnings from the new job are not included.[12] Thus the change in reported monthly earnings may appear to be very large and negative while the difference in actual earnings may be zero or positive.

Fortunately the labor force status of fathers presents fewer concerns about measurement error in the survey. We assume that unemployment shocks represent unanticipated deviations from a permanent income path. Therefore the sample is restricted to children whose fathers are employed at the time of the initial interview. Fathers who are currently unemployed or not in the labor force at the time of their first interview may already have experienced a shock and may be deviating from their long run path when first observed in the survey. The unemployment shocks are also assumed to be less endogenous than changes in income.

It is well-recognized that the marginal propensity to save in developing countries increases with income either because a minimum level of subsistence must be reached before savings is feasible or for other theoretical reasons as discussed in Gersovitz (1983). Lower income families are less likely to have access to credit and savings to draw down and thus may be expected to be more responsive to shocks than higher income families. We assume that lower income parents do not have lower income elasticities of demand for education. We also assume that poor households do not self-insure to a greater extent than rich households as a precautionary response to higher variable income and lack of access to formal credit. In either of these cases the poor households could be less responsive to shocks.

VI. Results

The dependent variable in Table 2 is a dichotomous variable indicating whether or not a child gained a year of schooling from one year to the next, conditional on being

[12] The specific question is translated along the lines of "In the job you had last week, how much did you earn last month?".

enrolled in school at the first interview.[13] This is an extremely important outcome measure in Brazil since a high fraction of children who report being enrolled do not complete that year of school. The mean pass rate for the 10-15 year olds in this sample is only .69, a rate that falls rapidly with age.

Independent variables in the regressions in Table 2 include dummies for the child's age at the time of the first interview, dummies for the father's and mother's schooling levels, the number of other children ages 0-10 and 10-15 in the family, and dummies for each of the PME panels by metropolitan area. A dummy is also included to measure the effect of the child being 2 or more years behind in schooling attainment for their age as a result of previous grade repetition or late entry into school.[14] The father's and mother's education levels and the log of the father's initial monthly earnings are intended to proxy for the family's permanent income. Mother's income is excluded because of concerns about endogeneity. The 365 dummies representing the panels for each metropolitan area also control for differences in macroeconomic conditions across region and time. As well as controlling for differences in labor market opportunities, the dummies will control for differences in grade promotion policies and in school quality. Unfortunately we do not have a measure of school quality that can be linked with smaller geographic units such as municipalities. By using the same interview month for each child across the 1 year period we are controlling for seasonality in enrollment.

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[13] Measurement error in the dependent variable is handled as follows. Observations with negative changes in schooling or positive changes greater than 2 years are thrown out. Since skipping a grade is plausible, changes equal to two years are coded as advances (1).

[14] Previous repetition and delayed first enrollment may be different phenomenon however we cannot differentiate between them here. Note that given the minimum age of 10 in the sample, all children enrolled in grades 1 and 2 are considered behind in school.

Table 2: Probit Regressions: Probability of Grade Advancement, Childre

Children who are enrolled in school with fathers who are employed at time of initial interview

	Regression 1		**Regression 2**	
	Boys		Girls	
	Coef.	S.E.	Coef.	S.E.
Constant	0.230	0.124	0.344 *	0.136
Child's age at first interview				
11	-0.093 *	0.021	-0.036	0.022
12	-0.135 *	0.021	-0.123 *	0.022
13	-0.157 *	0.022	-0.131 *	0.023
14	-0.193 *	0.022	-0.144 *	0.023
15	-0.257 *	0.023	-0.199 *	0.025
Child behind in school attainment for age	-0.143 *	0.015	-0.191 *	0.016
Number of kids under age 10 in family	-0.057 *	0.006	-0.040 *	0.007
Number of kids ages 10-15 in family	-0.020 *	0.008	-0.028 *	0.008
Log of father's earnings	0.069 *	0.010	0.078 *	0.010
Father's Employment Transitions				
Father unemployed during school year (U_S)	-0.090 **	0.045	-0.103 **	0.045
Father unemployed after school year (U_A)	-0.008	0.047	-0.013	0.050
Father unemployed both during and after (U_{AS})	-0.163	0.118	-0.029	0.140
Father leaves labor force at any time (N)	-0.012	0.028	-0.036	0.029
Father's completed level of schooling				
1-3 years	0.028	0.025	-0.017	0.026
4 years	0.052 **	0.024	0.007	0.026
5-7 years	0.055	0.034	-0.007	0.036
8 years	0.075 **	0.032	0.052	0.035
9 or more years	0.196 **	0.033	0.076 **	0.035
Mother's completed level schooling				
1-3 years	0.047 **	0.023	0.087 *	0.024
4 years	0.073 *	0.023	0.129 *	0.024
5-7 years	0.062 **	0.031	0.110 *	0.033
8 years	0.102 **	0.032	0.183 *	0.035
9 or more years	0.223 **	0.032	0.256 *	0.035
Panel Dummies by Metropolitan Area				
Panel beginning March 1982 for Salvador	0.070	0.173	-0.127	0.193
Panel beginning April 1982 for Salvador	-0.144	0.180	-0.463 **	0.184
Panel beginning May 1982 for Salvador	-0.327	0.174	-0.099	0.182
Other 362 panel dummies not shown				
N	44,723		42,741	
Pseudo R2	0.047		0.047	
Log Likelihood	-27,502		-24,059	
Mean of dependent variable	0.652		0.721	

Notes:

1) Huber/White standard errors reported.

2) *= significant at <.01 level. **=significant at <.05 level.

3) Both probits are conditional on father being employed at time of first interview, and child being enrolled at first interview. Omitted categories as follows: 10 years of age, 0 years of school for father and mother, father remaining employed during and after school year (E), the first panel (Feb. 1982) for Sao Paulo. 364 panel dummies covering 2/82-9/94 by metropolitan area included but not shown.

The sample is restricted to children who are observed in each of the first five interviews (i.e., interview months 1,2,3,4 and 13) so that we can contrast the timing of the father's unemployment shocks. We exclude all children for whom the first interview occurs during the summer vacation since reported enrollment is likely indicating only the intent to enroll when the new school year begins. We restrict the analysis to children of household heads in families where both parents are present. Table 3 provides means for the samples and Table 4 demonstrates the reduction in sample size as a result of our selection criteria as well as a result of missing variables.

There are a variety of important issues to consider in the construction of variables to measure the effect of the shock. Since we are concerned about transitory deviations from a permanent state we seek a good measure of the permanent path. We therefore restrict the sample to households in which the father was employed during the first interview and use multiple months to classify the paths of employment. Labor force transitions by the father are captured by five dummy variables classified according to the father's employment status in the first five interviews.[15] The omitted category, (E), represents fathers who reported being employed through all five interviews. Recall that we do not have information on the father's employment status in the 8 months between the fourth and fifth interviews.

Since the father's transition from employment to unemployment may be anticipated and may be associated with permanent, unobserved characteristics of the household we distinguish between three types of unemployment transitions categorized as unemployment during the school year (U_S), unemployment after the school year (U_A), and unemployment both during and after the school year (U_{AS}). U_S signifies that the father was initially employed

[15] We have at most 8 months of data for each household with a window of 8 months occuring between the fourth and fifth interview. We could extend this definition to cover employment status in all 8 interviews but we will see that non-representative attrition from the sample is a concern. We retain more households by using the first 5 interviews than if all 8 were used.

in the first month, then was unemployed in any of the next three months, then was employed again one year after the first interview. We would expect a negative effect of U_S on children's advancement in school if children's effort on schoolwork is responsive to transitory shocks.

The dummy variable U_A represents unemployment that occurs after the school year in question. For example, suppose the first interview occurred during the school year that began in March 1982 and the child reported he was attending the third grade. The U_A variable measures unemployment shocks that occur after the end of the school year which occurs at the end of November 1982. The father's employment status after November 1982 should not have an effect on the child's performance during the school year that occurs from March 1982-November 1982. Most ex-post (U_A) shocks are identified from father's unemployment in the fifth interview (one year after the first interview) which is by definition during the next school year since all first interviews are restricted to the school year.[16] The U_A category also includes unemployment during summer vacations occurring in the second through fourth interviews conditional on the father being employed in the first and fifth interview.[17] If the father becomes unemployed in the summer after the school year in question ends this should not have an effect on the child's school performance. The ex-post classification is important since we may be concerned that the variable representing unemployment during the school year (U_S) is picking up effects of permanent differences in income across families. For example, lower investment in children's schooling in families where the father is unemployed during the school year might be a reflection of lower permanent income anticipated by the families but not necessarily captured by our

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[16] For example, suppose the first interview occurred in March 1982. The shock would be classified as U_A if the father was initially employed in the first interview (March 1982), was employed in all of the next three months, and then was unemployed one year after the first interview (March 1983). The fathers' unemployment spell one year later in March 1983 should not have an effect on the child's performance during the school year that occurs from March 1982-November 1982.

[17] Suppose that the first interview occurred during the first week of September 1982. The fourth interview occurs during the summer vacation. Thus the shock would be classified as U_A if the father was initially employed in the first interview (March 1982), was employed in the next two months which occur during the school year, then was unemployed in the fourth interview (December 1982 which is during the summer vacation) then was employed in the fifth interview (September 1983).

econometric specification. The significance of the ex-post unemployment shock (U_A) is a test of the correlation of unobservables with permanent income after controlling for parents' education and initial monthly earnings.

The dummy variable U_{AS} represents fathers who were employed at the time of the first interview, were unemployed in one or more of the next three months, and were also unemployed at the time of the fifth interview. U_{AS} is measured as a separate effect to additionally purge the effect of unemployment during the school year (U_S) from unobservable permanent characteristics of the household associated with father's unemployment.

To simplify the dimensionality of the transition dummies, the last variable N represents fathers who were initially employed but who left the labor force at *any* time in the next four interviews (i.e., they were not employed and not looking for work).[18] Since leaving the labor force for many of these men is a voluntary and anticipated transition, we want to beware of a causal interpretation of this estimate. This variable is included mainly to control for fathers who make this transition.

We control for the effect of parent's education with a semi-parametric specification. Primary school in Brazil has two parts: lower primary school is completed in grade 4 and upper primary school is completed in grade 8. The initial levels of schooling in the regressions are grouped such that primary grades where we might expect "sheepskin" effects (grades 4 and 8) are entered individually. "Non-diploma" grades 1-3, 5-7, and 9 or more are grouped together, with 0 years of schooling being the omitted category. Parents' schooling is likely to influence children's success in school beyond the effects of income, with more highly educated parents being better able to assist with children's homework as well as being better able to promote children's health.

[18] Note that exiting the labor force overrides all unemployment transitions. For example if the father was unemployed in month 2 and not in the labor force in month 3 he would be classified as N. Similarly if the father was not in the labor force in interview 4 but unemployed at interview 5 he would be classified as N.

Table 3: Means for Samples Used in Probit Equations, 1982-1995 PME

	Boys 10-15		Girls 10-15	
	Means	Std. Dev.	Means	Std. Dev.
Advance	0.653	0.476	0.723	0.448
Child older than if had progressed "on-time"	0.451	0.498	0.353	0.478
Child's age at first interview				
10	0.190	0.392	0.190	0.392
11	0.183	0.387	0.189	0.391
12	0.181	0.385	0.177	0.382
13	0.165	0.371	0.165	0.371
14	0.152	0.359	0.150	0.357
15	0.129	0.335	0.130	0.336
Child's completed grade at first interview	3.797	1.964	4.164	1.967
0 years	0.039		0.023	
1 year	0.089			
2 years	0.138			
3 years	0.184		0.180	
4 years	0.211		0.209	
5 years	0.147		0.158	
6 years	0.094		0.118	
7 years	0.063		0.079	
8 years	0.029		0.041	
9 years	0.008		0.013	
Number of kids under age 10	0.979	1.153	0.972	1.160
Number of kids ages 10-15	1.956	0.937	1.952	0.928
Log of father's earnings	5.214	0.941	5.209	0.941
Father's Employment Transitions				
Father continuously employed (E)	0.899	0.302	0.897	0.304
Father unemployed during school year (U_S)	0.023	0.149	0.023	0.151
Father unemployed after school year (U_A)	0.019	0.135	0.019	0.137
Father unemployed both during and after (U_{AS})	0.003	0.054	0.003	0.051
Father leaves labor force at any time (N)	0.060	0.238	0.061	0.239
Father's completed years of schooling	5.446	4.285	5.428	4.256
Father's completed level of schooling				
0 years	0.115	0.319	0.114	0.318
1-3 years	0.196	0.397	0.195	0.396
4 years	0.327	0.469	0.331	0.471
5-7 years	0.070	0.256	0.068	0.252
8 years	0.091	0.287	0.094	0.291
9 or more years	0.201	0.400	0.198	0.398
less than 4 years	0.311	0.463	0.309	0.462
Mother's completed years of schooling	4.918	3.869	4.874	3.869
Mother's completed level schooling				
0 years	0.140	0.347	0.144	0.351
1-3 years	0.203	0.402	0.206	0.404
4 years	0.322	0.467	0.321	0.467
5-7 years	0.084	0.278	0.084	0.278
8 years	0.088	0.283	0.085	0.279
9 or more years	0.163	0.370	0.161	0.367
less than 4 years	0.343	0.475	0.349	0.477
Interactions with Father's Employment Transitions				
(E)*father less than 4 years schooling	0.270	0.444	0.268	0.443
(U_S)*father less than 4 years schooling	0.009	0.096	0.009	0.096
(U_A)*father less than 4 years schooling	0.007	0.083	0.007	0.082
(U_{AS})*father less than 4 years schooling	0.001	0.036	0.001	0.031
(N)*father less than 4 years schooling	0.026	0.158	0.026	0.158
Metropolitan area				
Salvador	0.129	0.336	0.131	0.337
Belo Horizonte	0.190	0.392	0.192	0.394
Recife	0.126	0.332	0.128	0.334
Rio de Janeiro	0.188	0.391	0.185	0.388
Porto Alegre	0.143	0.350	0.138	0.345
Sao Paulo	0.224	0.417	0.226	0.418
Panel beginning April 1982	0.019	0.135	0.019	0.135
Panel beginning May 1982	0.020	0.140	0.021	0.145
Means of other 73 panel dummies not shown				
Means of Panel by Region dummies not shown				
Total observations in sample	44,723		42,741	

Table 4: Reduction in Sample Size from Constraints and Non-missing Variables

Boys ages 10-15 with first interview occuring during school year (N=117,215)

Additional Condition	Sample Size	Reduction	Marginal Reduction
Attending school at first interview	106,051	0.10	0.10
Two parent family	89,577	0.14	0.16
Father employed at first interview	79,234	0.09	0.12
Household valid interview 2,3,4,5	49,612	0.25	0.37
Non-missing LF vars. for father	49,524	0.00	0.00
Non-missing dep. var. (advance)	48,161	0.01	0.03
Non-missing initial salary for father	44,723	0.03	0.07

Girls ages 10-15 with first interview occuring during school year (N=113,472)

Additional Condition	Sample Size	Reduction	Marginal Reduction
Attending school at first interview	103,376	0.09	0.12
Two parent family	86,612	0.15	0.16
Father employed at first interview	76,650	0.09	0.12
Household valid interview 2,3,4,5	47,290	0.26	0.38
Non-missing LF vars. for father	47,211	0.00	0.00
Non-missing dep. var. (advance)	45,985	0.01	0.03
Non-missing initial salary for father	42,741	0.03	0.07

As girls and boys may have different opportunity costs to time spent on schoolwork, with girls more likely to have home production responsibilities and boys more likely to work for pay in the labor force, the models are run separately for girls and boys. A larger response of girls could be related to changes in the labor force participation of mothers. Duryea (1998) provides evidence of added-worker effects using the same data, with married women being 8 percentage points more likely to enter the labor force if their husbands become

unemployed than if they stay employed. Girls may shift their time into home production as mothers shift their time to market work to buffer the income shock. On the other hand boys are significantly more likely than girls to report working for pay as their primary activity and may enter the labor force or increase their market hours if their father becomes unemployed. Unobserved child ability, and tastes for education may be correlated across children within the same family so we have corrected the standard errors using Huber/White estimation.

The sample in regression 1 in Table 2 includes boys ages 10-15 from two parent families in which the father is employed at the time of the first interview and the child is enrolled in school at the time of the first interview. Regression 1 demonstrates that an unemployment shock experienced by the father during the school year (U_S) has a significant negative effect on the probability that the son advances to the next grade. However, an unemployment shock occurring after the school year (U_A) does not significantly lower the probability of advancement. This suggests that the unemployment shock during the school year is capturing a true unanticipated transitory shock to household income which has an adverse effect on advancement.

Regression 2 represents the same probit for girls ages 10-15 from two parent families in which the father is employed at the time of the first interview and the child is enrolled in school at the time of the first interview. An unemployment shock by the father during the school year (U_S) also has a significant negative effect on the probability that the daughter advances to the next grade while the effect of the ex-post unemployment shock (U_A) is insignificant. The effect of father's unemployment during the school year on the probability of advancement for girls is not significantly different from the effect for boys. Given the relatively rare occurrence of the U_S and U_A shocks (approx. 2% each), parameter estimates become less stable when smaller age or grade cohorts are used.

Both regressions show that mother's and father's schooling are found to have positive effects on grade advancement as does father's income. The probit results in Table 2 also indicate that the mother's level of schooling has a significantly larger effect on the probability of grade advancement for girls than for boys.[19] In addition, mother's schooling has a significantly larger effect on girl's advancement than father's schooling.[20] These results are consistent with results on gender and children's schooling attainment in research by Thomas, Schoeni, and Strauss (1996).

The presence of additional children in the family below the age of 10 has a larger adverse effect on the probability of advancement than additional children ages 10-15. This suggests that older children have responsibilities related to younger children. While girls are significantly more likely to advance than boys at all ages, the probability of advancement drops significantly with age for both boys and girls. The negative effect of age is likely underestimated since the sample of older children is relatively more select as a result of lower ability children dropping out of school over time. Children are also significantly less likely to pass the current grade if they already lag 2 or more years behind in school for their age. This result is not surprising since previous performance is likely to be highly related to current achievement. The hypothesis that not being promoted discourages students which subsequently leads to a decline in their performance is often posed in education literature, and may apply to this result but is virtually impossible to quantify empirically.

Table 5 shows marginal effects based on the estimates in regressions 1 and 2 for a subset of variables. The baseline predicted probabilities, (.69 for boys, .75 for girls) are calculated for a 12 year old child, with 1 sibling younger than 10 and another between the ages of 10-15 living in the metropolitan area of São Paulo in the first panel (Feb. 1982) with

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[19] Significant only at the 10% level.

[20] Comparing effects of 4 years of parent's schooling to 0 years. The effect of mother's schooling remains significantly larger than father's schooling if father's initial monthly earnings are omitted from the probits.

the log of father's income set to the mean and parents' education both set to 4 years. As simulated from the results in regression 1, the predicted probability of grade advancement for boys falls from .69 to .65, when the father experiences an unemployment shock during the school year (U_S). Regression 2 in Table 2 and the simulated marginal effects in Table 5 demonstrate that the effect is similar in magnitude for girls (the probability falls from .75 to .71). A one standard deviation increase in the father's log wages raises the probability of advancement by 2 percentage points for both boys and girls.

The predicted probability of advancement for a 10 year old boy is .73 which falls to .64 for a 15 year old boy with the same other characteristics. The predicted probability of advancement for a 12 year old boy falls from .69 to .63 if the child is already 2 or more grades behind in schooling for his age. The patterns for girls are similar. The predicted probability of passing for a 10 year old girl is .79 which falls to .72 at age 15. The predicted probability of advancement for a 12 year old girl falls by 7 percentage points (from .75 to .68) if the child is already 2 or more grades behind in schooling.

Since the 365 panel by metropolitan area dummies are very noisily estimated, the marginal effect of changing metropolitan areas is calculated by comparing the average of the predicted probabilities over the entire period for each metropolitan area. Note that there is a 11 percentage point difference associated with the probability of passing between São Paulo and Salvador for boys and a 9 percentage point difference for girls. This may be reflecting a lower overall quality of schools in Salvador than São Paulo. The Inter-American Development Bank (1996) reports that the rich states in Brazil spend six times as much on education as poor states. The predicted probabilities for the other metropolitan areas may suggest that school quality is better than Salvador but not as high as São Paulo.

Table 5: Predicted Probabilities of Grade Advancement Based on Probits in Table 2.2

	Regression 1 Boys Only	**Regression 2** Girls Only
Father remains employed	0.69	0.75
Father is unemployed during school year	0.65	0.71
Mother has 0 years of completed schooling	0.66	0.71
Mother has 4 years of completed schooling	0.69	0.75
Mother has 8 years of completed schooling	0.70	0.77
Mother has 9 or more years of compl. schooling	0.74	0.79
Father has mean log income	0.69	0.75
Father has mean log income plus 1 std. dev.	0.71	
Child's age is on-target for grade	0.69	0.75
Child is 2 or more years older for grade	0.63	0.68
Child lives in Sao Paulo (avg. all panels)	0.72	0.78
Child lives in Belo Horizonte (avg. all panels)	0.67	0.75
Child lives in Porto Alegre (avg. all panels)	0.67	0.73
Child lives in Rio de Janeiro (avg. all panels)	0.67	0.73
Child lives in Recife (avg. all panels)	0.63	0.73
Child lives in Salvador (avg. all panels)	0.61	0.69
Child's Age		
10	0.73	0.79
11	0.70	0.78
12	0.69	0.75
13	0.68	0.75
14	0.67	0.74
15	0.64	0.72

Notes:
Predicted probabilities calculated at: mean of father's income, 4 years of schooling for father and mother, child's age=12 , 2 children age 10-15, 1 child younger than 10, metropolitan area of Sao Paulo in the first panel (Feb. 1982) and for continually employed fathers (E) unless otherwise noted in Table.

There are compelling reasons why the true effect of a transitory unemployment shock may be larger than is estimated here. One reason the effect may be underestimated is the influence of positively correlated shocks to *local* labor market opportunities. Also, families in which the father experiences an unemployment spell are more likely to disappear from the sample than families in which the father remains employed. For example, if the father is employed in the first interview but then is unemployed in the second interview, the family is approximately 7 percent more likely to disappear from the survey than if the father were also employed in the second interview. This result is based on a probit model of a match which included the father's income, his employment status in interview 2, the age of the child and the parents' education for the sample of children enrolled in school in the first interview whose fathers were employed at the first interview. The most vulnerable children from extremely responsive families thus may not be included in our sample if their families have left the household dwelling as a result of the unemployment shock.

As previously discussed, children from lower income families may be expected to be more responsive to shocks to family income because their parents are less likely to have access to credit or savings with which to otherwise smooth the shock. Regressions 3 and 4 in Table 6 include an interaction effect of the unemployment shock during the school year (U_S) with fathers 'low level of education. A father's low level of schooling, fewer than 4 completed years, is used

to proxy for low-income since it is likely to be a better measure of permanent income than the monthly income reported at the time of the first interview. The interaction effect is positive but not significant for the samples of 10-15 year old boys or girls.[21] These results are not inconsistent with the credit-constraint hypothesis but neither do they provide additional evidence of credit-constraints.

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[21] If the specification is changed such that the low education group includes fathers with 4 years of schooling or less, the interaction of father's unemployment with the low education group is also not significant.

Table 6: Probit Regressions: Probability of Grade Advancement, Children Ages 10-15, 1982-1995 PME
Including Interactions of Unemployement Shock with Father's Education

	Regression 3		**Regression 4**	
	Boys		Girls	
	Coef.	Std. Err.	Coef.	Std. Err.
Constant	0.868 *	0.111	1.030	0.122
Child's age at first interview				
11	-0.090 *	0.021	-0.033	0.022
12	-0.126 *	0.021	-0.116 *	0.022
13	-0.141 *	0.021	-0.122 *	0.023
14	-0.173 *	0.022	-0.129 *	0.023
15	-0.232 *	0.023	-0.182 *	0.024
Child behind in school attainment for age	-0.210 *	0.015	-0.240 *	0.016
Number of kids under age 10 in family	-0.066 *	0.006	-0.049 *	0.007
Number of kids ages 10-15 in family	-0.028 *	0.007	-0.034 *	0.008
Father's Employment Transitions				
Father unemployed during school year (U_S)	-0.137 **	0.057	-0.137 **	0.059
(U_S)*father less than 4 years schooling	0.043	0.091	0.007	0.091
Father unemployed after school year (U_A)	-0.028	0.060	-0.001	0.063
(U_A)*father less than 4 years schooling	-0.014	0.095	-0.078	0.103
Father unemployed both during and after (U_{AS})	-0.293	0.161	-0.140	0.175
(U_{AS})*father less than 4 years schooling	0.252	0.237	0.251	0.291
Father leaves labor force at any time (N)	-0.033	0.036	-0.102	0.037
(N)*father less than 4 years schooling	-0.047	0.055	0.067	0.059
Father less than 4 years schooling	-0.101 *	0.017	-0.086 *	0.018
Mother less than 4 years schooling	-0.109 *	0.016	-0.133 *	0.017
Panel Dummies by Metropolitan Area				
Panel beginning March 1982 for Salvador	0.097	0.173	-0.154	0.193
Panel beginning April 1982 for Salvador	-0.097	0.177	-0.471 *	0.183
Panel beginning May 1982 for Salvador	-0.306	0.176	-0.093	0.184
Other 362 panel dummies not shown				
N	44,723		42,741	
Pseudo R2	0.041		0.042	
Log Likelihood	-27,678		-24,174	
Mean of dependent variable	0.652		0.721	

Notes:
1) Huber/White standard errors reported.
2) *= significant at <.01 level. **=significant at <.05 level.
3) Both probits are conditional on father being employed at time of first interview, and child being enrolled at first interview. Omitted categories as follows: 10 years of age, less than 4 years of school for father and mother, father remaining employed during and after school year (E), the first panel (Feb. 1982) for Sao Paulo. 364 panel dummies covering 2/82-9/94 by metropolitan area included but not shown.

Why might lower income households be less responsive to unemployment shocks? Unemployment rates for men with less than 4 years of education are approximately 1/2-1 percentage point lower than men with 4 or more years of schooling (Duryea 1996). Families may have already optimized their children's effort on schooling at lower levels, or have accumulated savings in anticipation of a higher probability of unemployment. In other words the U_S variable may be capturing more of a shock for higher income households than for lower income households. On the other hand lower income households may be less responsive than higher income households since the loss of father's income generally represents a smaller proportion of family income given the higher relative contribution of wives and children in these families. Although higher income households may have better access to credit we should also consider the possibility that liquidity constraints are as great or greater for middle-income families as for poor families. In other words, to meet immediate cash demands such as tuition at private schools these household may have to rely on changes in children's schooling intensity as well as poor households.

It is informative to compare the effects of an unemployment shock to the effects of parents' education. For example, the simulation in Table 5 based on regression 2 in Table 2 shows that the predicted probability of the child's advancement is 4 percentage points higher when the father remains employed in contrast to encountering an unemployment spell during the school year. Increasing the mother's education from 0 years of schooling to 4 years of schooling also raises the probability of advancement by approximately 4 percentage points. The low pseudo R-squares in regressions 1 and 2 indicate that the probability of passing any particular grade is dominated by the stochastic component.

While the effect of increasing the mother's education from 0 to 4 years only raises the probability of advancement in any one year by 4 percentage points, the effects of permanent characteristics such as parents' schooling cumulate over time. It would be a mistake to conclude from the advancement probits that parents' schooling isn't an strong determinant of children's educational attainment. Table 7 presents a regression of children's completed

schooling for boys and girls who are 14 at the time of their first interview and not necessarily enrolled in school. In contrast to the process of advancement in any particular grade, Table 7 shows that we are able to explain over 30% of the variance in the children's current level of schooling using the same measures of permanent characteristics as in the grade advancement regressions in Table 2. Note that increasing the father's or mother's education from 0 to 4 years has a large effect on the child's educational attainment. By age 14, children whose fathers have 4 years of schooling have completed an estimated .75-.80 additional years of schooling in comparison to children whose fathers have no schooling. Children whose mothers have 4 years of schooling have completed .87-.93 additional years by the time they are 14 years of age in contrast to children whose mothers have 0 years of schooling. Given that the annual wage returns to an additional year of completed schooling in Brazil are estimated at 15-20% the lifetime differences in income are considerable (Lam and Schoeni 1993).

Given the low incidence of unemployment shocks observed during the school year (approximately 2% of the sample experiences U_S shocks), increasing parents 'education in Brazil would have a much larger effect on children's ultimate educational attainment than eliminating transitory unemployment shocks. However, the results on the effects of unemployment shocks imply that children's progress in school is interrupted and lowered by transitory income shocks. High volatility in transitory income is a much more widespread problem than unemployment in Brazil and could result in significantly lower grade attainment for children through the same cumulative process through which parents 'education becomes so important.

Table 7: OLS Regressions of Child's Grade Attainment, Children 14 Years of Age, 1982-1995 PME

	Regression 5		Regression 6	
	Boys		Girls	
	Coef.	S.E.	Coef.	S.E.
Constant	3.016 *	0.087	3.617 *	0.089
Number of kids under age 10	-0.283 *	0.012	-0.311 *	0.012
Number of kids ages 10-15	-0.156 *	0.014	-0.174 *	0.015
Father's completed level of schooling				
1-3 years	0.491 *	0.045	0.486 *	0.046
4 years	0.805 *	0.044	0.751 *	0.044
5-7 years	0.916 *	0.067	0.802 *	0.069
8 years	1.068 *	0.062	1.115 *	0.062
9 or more years	1.501 *	0.059	1.349 *	0.060
Mother's completed level schooling				
1-3 years	0.484 *	0.043	0.470 *	0.043
4 years	0.866 *	0.042	0.925 *	0.042
5-7 years	1.024 *	0.062	1.050 *	0.063
8 years	1.322 *	0.063	1.273 *	0.064
9 or more years	1.722 *	0.060	1.578 *	0.061
Metropolitan area				
Belo Horizonte	0.646 *	0.048	0.546 *	0.047
Recife	0.040	0.049	0.137 *	0.049
Rio de Janeiro	0.406 *	0.049	0.293 *	0.049
Porto Alegre	0.904 *	0.051	0.729 *	0.052
Sao Paulo	0.949 *	0.047	0.813 *	0.047
Panel dummies (75) not shown				
N	15,604		14,723	
Adj. R2	0.339		0.325	
Mean of dep. var.				

Notes:
1) Huber/White standard errors reported.
2) *= significant at <.01 level. **=significant at <.05 level.
3) Omitted categories as follows: 0 years of schooling for father and mother, Salvador metropolitan area.
4) 75 panel dummies included but not shown

VII. Conclusion

This paper examines the effects of transitory shocks to family income on children's progress through school. We estimate a negative effect of the father becoming unemployed during the school year on the child's grade achievement, controlling for parent's education and initial earnings. This effect is statistically significant for both girls and boys. An unemployment shock by fathers during the school year is associated with a 4 percentage point decline in the probability of grade advancement for children ages 10-15. While this study measures the effect of relatively rare shocks, the estimates imply that children's time is used to buffer transitory income shocks to households in ways which are consistent with models of education incorporating assumptions of imperfect credit markets.

Direct analysis of more common shocks such as transitory deviations from the father's permanent income path requires a longer panel survey. Additional information on the number of hours each child spends attending school, completing schoolwork after school hours, and completing paid and unpaid chores would greatly expand our understanding of the process of grade promotion and educational attainment.

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