# Growth, Industrialization, and the Intergenerational Correlation of Advantage

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We are grateful to Esther Duflo for sharing her data on school construction.

# Growth, Industrialization, and the Intergenerational Correlation of Advantage

The shift from feudalism to industrial capitalism was generally accompanied by an increase in social mobility. We ask whether such an increase has occurred in a developing nation currently undergoing rapid industrialization, Indonesia. It has, at least as measured by a declining intergenerational correlation of education. To highlight the effects of economic growth on intergenerational mobility, we contrast Indonesia's experience with that of Bangladesh, where industrialization has proceeded more slowly and the correlation between parents' and children's education has been roughly stable. We also examine potential causal channels for the rising educational mobility we find in Indonesia, but cannot identify specific pathways related to above-average school building or rapid industrialization.

In most complex pre-capitalist societies ranging from European feudalism and the Indian caste system to the Chinese imperial system, class barriers were mostly impenetrable. That is, children of aristocrats remained in the aristocracy and children of poor, malnourished and poorly educated peasants by and large remained poor, unhealthy, and poorly educated.[1]

Even in contemporary Indonesia, the setting for this study, there was a well-established caste system on Java that survived from the colonial era through the 1950s and beyond. Some were born aristocratic *priyayi*, others were born into a middle caste, and most were born and spent their lives as peasants. The intergenerational transmission of advantage for aristocrats included even the language that lower-caste people used when speaking to them.

In modern capitalist societies parental status remains important in predicting children's success (Zimmerman, 1992; Solon, 2002; Mazumder, 2001). Nevertheless, since the development and rise of capitalism in Great Britain, Western Europe, and the United States, the influence of family background on offspring success has waned.[2]

Has this tendency also characterized recent economic industrialization and development? Our answer is based on an examination of Indonesia between the 1960s and the mid-1990s, a period in which Indonesia experienced some of the fastest economic growth in history. During this interval, as per capita income quadrupled, the use of caste-specific formal Javanese declined. We analyze the educational opportunities of three generations to determine whether this decline in caste language signals a more comprehensive rise in intergenerational mobility.

To highlight the importance of economic growth and industrialization (as opposed to secular changes over the entire globe) we also present results from Bangladesh – a nation with similar location (South Asia), religion (heavily Muslim), and initial economic structure (largely agricultural), but slower industrialization during the same period.

Understanding changes in the consequence of family background is important for at least two reasons. First, the rigidity of Western-style feudalism and other pre-capitalist modes of production led to unequal opportunity. If societies in other parts of the modern world were similarly inflexible initially and then increasingly mobile across generations as they industrialized, economic growth can claim another significant success in addition to rising incomes: increasing equality of opportunity. The charge some critics level at orthodox prescriptions for economic development, that such development brings with it increasing inequality, would be partially checked if equality of opportunity rises along with income inequality during industrial development.

Second, there are several theories (reviewed below) linking economic development and intergenerational mobility, with many suggesting there need not be an equity-efficiency tradeoff and furthermore that causation runs both from growth to mobility *and* from mobility to growth. Contrasting cases of rapid (Indonesia) and fairly feeble (Bangladesh) economic growth can illuminate and provide partial tests of these theories.

Our results join the small but growing body of empirical literature on intergenerational mobility in developing countries (e.g., Cheung, 1998; Oksamitnaia, 2000; Behrman, Gaviria, and Szekely, 2001; Binder and Woodruff, 2002), enhancing knowledge of the peculiarities of mobility in those countries as well as broadening the

base for comparison with developed countries. In addition, we expand on earlier analyses by explicitly testing several channels through which intergenerational mobility is thought to be affected.

## Motivation and Theory

Nations with tradition-based economies and little industry have low levels of income and education. A set of overlapping theories predicts that such societies will also produce high correlations between children's education and parental advantages.

This outcome is most pronounced in societies with a strong caste system, where both parent and offspring must choose education under an identical set of binding constraints. While Indonesia's caste system has not been as relentless or encompassing as that found in much of India, for example, in portions of the archipelago such as Java and Bali (where the majority of Indonesians live) social status and roles were strongly inherited during pre-colonial and colonial times. Less elaborate tribal systems, typically exhibiting lower intergenerational correlation of status, prevailed over the remaining parts of the archipelago (Mulder, 1996), but relatively few Indonesians lived in these areas.[3]

Economic theories also predict a high intergenerational correlation for several reasons. First, incomes are low on average and by definition very low for the poor. To the extent education is a normal good, its demand will also be very low for the poor (Becker and Tomes, 1979). At the same time, poor families also frequently face liquidity constraints (Becker and Tomes, 1986), if only because they have essentially no assets with which to provide collateral. Liquidity constraints prevent optimal borrowing for high-return investments in offspring education.

Low national income also implies lower government tax revenues and less per-capita spending on education. In poor nations, one manifestation of low school spending is the scarcity of physical educational capital such as school buildings. Geographically diffuse schools raise schooling costs, especially for the poor who tend to live in remote areas and often do not have a steady stream of relatively liquid income to pay for regular transportation.

In such societies, where the poor rarely attend school, low average education levels can imply high returns to schooling. In the model of Owen and Weil (1997), these high returns imply that the children of the rich, even those with low innate ability, often attend school. This factor may increase the intergenerational correlation of advantage.

Finally, low incomes, low income growth, and technological stagnation imply that most jobs are passed from parents to children. As Hassler and Rodriguez Mora (2000) explain, in such settings traditional learning, not formal education, is cost-effective. This model matches the historical accounts of Indonesia before industrialization: a strong caste system on Java, little expectation that education would be available to most citizens, and most children pursuing their parents' occupation (Mulder, 1996).

Many of these forces are reversed as economies industrialize and incomes rise. Economic development and urbanization are typically associated with declining attention to customs such as caste. Spending on normal goods such as education rises with income. Liquidity constraints are relaxed both because more families have disposable income to spend on schooling and because more families have assets to borrow against to fund investment in children (Owen and Weil, 1997).

Furthermore, economic development is often accompanied by bundles of new technologies. When that is the case, fewer jobs rely on skills that can be learned from watching one's parents and more opportunities depend on abilities enhanced by schooling (Hassler and Rodriguez Mora, 2000). In addition, returns to abilities may increase in the sectors employing the new technologies, encouraging able people to seek employment in those sectors rather than the sector in which their parents were employed (Galor and Tsiddon, 1997).

When national income rises, a concomitant increase in public sector spending, including on education, usually follows. A school-building program, as Indonesia undertook in the 1970s, reduces the opportunity cost of education, particularly for the poor (Duflo, 2001). Iyigun (1999) provides a theoretical analysis of this case, where increasing the public-sector resources devoted to the supply of education reduces competitiveness in admissions, tempering the advantage that children of educated parents have in achieving schooling success.

In short, all of these forces suggest that industrialization, the introduction of new technologies, and rising incomes will reduce the effects of family advantage on children's education. Industrial development in Indonesia began in earnest in the late 1960s and continued through the end of our study period (1997); manufacturing output's contribution to total GDP increased nearly 200 percent during this period. By examining three cohorts across several different provinces in Indonesia, we can test whether intergenerational correlations of advantage have been affected by these changes.

## Data

The data used in this analysis come from the 1993, 1997, and 2000 waves of the Indonesia Family Life Survey (IFLS) (Frankenberg et al., 1995; Frankenberg and Thomas, 2000; Strauss et al., 2004, respectively). The IFLS has information on individuals in approximately 7224 households distributed in several hundred villages or neighborhoods, making it a representative sample of 83% of the late-1993 population, covering 13 of 27 provinces in the country. Small and/or politically unstable provinces such as Irian Jaya and the former East Timor were not sampled. After stratifying by urban and rural areas, households were randomly selected in 321 enumeration areas. Within households different members were interviewed according to various selection criteria to ensure adequate numbers of older respondents.

We examine intergenerational mobility in education for three different cohorts. The Younger Cohort, those born between 1976 and 1980, gives us the most recent generation that had largely completed its education by the time of the second wave of the survey.[4] We compare their experiences with the Middle Cohort, born between 1961 and 1969, and the Older Cohort, those born between 1943 and 1956.[5] The selection criteria imply that some individuals who were children in the Older Cohort appear again as parents of Younger Cohort children. Cohorts were chosen to take advantage of the coincidence of the IFLS waves with the age at which Indonesians typically complete school and the age at which Indonesians typically move from their parents' households to establish their own as well as to avoid confounding effects from the Indonesian financial crisis of 1997-1998. Additional discussion of cohort makeup takes place in specific analyses below.

Education increases as the level of schooling (primary, secondary, tertiary) and the number of years completed at that level (0, 1, 2, … , graduated) increase, as is standard. The education for an individual can be reported by one or more of the respondent, the household head or spouse (when filling out a household roster), or a child reporting on deceased or non-resident parents. While we use self-reports whenever possible, we will use others' reports when necessary and available. Implications of this choice and other structural issues in the IFLS education data are discussed in the appendix.

For some analyses we drew on the 1985 and 1995 Intercensal Population Surveys (Supas). The Supas 1995 contains data on more than 200,000 households that include almost 950,000 people. The Supas 1985 includes 124,000 households with almost 600,000 people. Households are interviewed to obtain information regarding household and individual characteristics; we use the Supas to measure the share of prime-age adults working in manufacturing. The Supas sample was selected to be representative for each of Indonesia's roughly 300 districts and oversamples smaller districts to increase precision.

Another supplement we use is information from a massive school construction program (Sekolah Dasar INPRES) launched by the Indonesian government in 1973 and completed in 1979. More than 61,000 primary schools were built during this period and the program targeted children who had not previously been enrolled by making the new school allocation in each district proportional to number of children of primary school age *not* enrolled in 1972. A detailed description of the program can be found in Duflo (2001).

Finally, we also analyze the 1996 Matlab Health and Socioeconomic Survey (MHSS) (Rahman et al., 1999) to measure intergenerational correlations of education in Bangladesh. The MHSS has information on individuals in approximately 4539 rural households clustered in 2687 *baris* (residential compounds) in the Matlab study area of the International Center for Diarrheal Disease Research in Bangladesh (ICDDR,B). Matlab is an isolated deltaic plane some 40 miles from the capital, Dhaka, but is one of the most densely populated agrarian areas in the world, with over 2000 people per square mile (Menken and Phillips, 1990). So, while the MHSS does not attempt to be representative of the entire country, it does randomly sample a typical rural-agricultural region: in Matlab, approximately 60 percent of the MHSS population has worked most of their lives in agriculture, while in Bangladesh as a whole, between 60 and 70 percent of the total labor force is employed in agriculture and about 80 percent of the population lives in rural areas. The MHSS randomly selected approximately one third of the *baris* in the ICDDR,B's surveillance area.

The MHSS questionnaires for households and individuals were developed from the IFLS questionnaires (Rahman et al., 1999). In particular, units on education were nearly identical in the two surveys, so we were able to measure it essentially identically to the way we measured in Indonesia while making exceptions to reflect educational idiosyncrasies in Bangladesh.[6] Because the MHSS interviews took place during 1996, the youngest cohort that had (mostly) completed its education by the time of the MHSS was 17 to 21 years old in 1996 and therefore 18 to 22 years old in 1997. To make comparisons as straightforward as possible, the other cohorts in Bangladesh are defined

exactly as the Indonesian cohorts: the Middle Cohort was 28 to 36 years old in 1997 and the Older Cohort was 41 to 54 years old in 1997.

## Methods

Social scientists study the intergenerational transmission of advantage using a number of characteristics such as income and education and using a number of specifications. As is standard in this literature, we first examine a first-order Markov model in which our variable of interest for a child *c* in cohort *t*, $Y_{c,t}$, depends on the value of that indicator for his father and mother ($Y_f$,$Y_m$) along with a stochastic term, $u_{ct}$, that is independent of parental characteristics and that is independently distributed across individuals and across periods:

$$Y_{ct} = \alpha + \beta_1 Y_f + \beta_2 Y_m + u_{ct} \quad (1)$$

The coefficient of interest is $\beta$ ($= \beta_1 + \beta_2$), which measures the intergenerational transmission of our outcome variable, education. Richer specifications include additional characteristics of the child (age and sex) and of the parents (age when the child was born, father's profession, and so forth).

This intergenerational correlation is not necessarily causal but is an important descriptive parameter that captures all possible influences on offspring education that are correlated with parents' education. A $\beta$ near one would imply an extremely rigid society where an offspring's education level would typically replicate her parents' education level (unless the variance of education were rising rapidly). In contrast, an intergenerational transmission parameter equal to zero, where offspring's education is unrelated to parents' education, may be evidence of a perfectly mobile society.

## Results

First we present the summary statistics in Table 1. The lowest possible education level is zero years, while the maximum is 19 years. The trend in education is strongly upwards, particularly for women: Younger Cohort males (born near 1978) have gained about 40 percent, and Younger Cohort females 95 percent, over their Older Cohort (born near 1950) counterparts. Hence, the schooling gap between men and women in Indonesia is narrowing. Figure 1 presents a graphical presentation of the trend, including average completed education by sex (right axis) for each five-year birth interval between 1927 and 1972. Unsurprisingly, the upward trend is present in every generation within our cohorts: parents of the Younger Cohort have gained over 100 percent on parents of the Older Cohort, with Younger Cohort mothers gaining as much as 160 percent. Male children experienced the largest gains (absolutely and as a percentage of Older Cohort education) between the Older and Middle Cohorts while female children experienced equally large increases between both periods.

As schooling has trended upward and the male-female schooling gap has decreased, there has been a slowdown in the rate at which children overtake their parents. Male children in the Older Cohort achieved more than double their fathers' education and almost triple their mothers, while female children in the same cohort surpassed their mothers by nearly 160 percent and their fathers by about 60 percent. However, on average, both men and women in the Younger Cohort complete about 50 percent more than their fathers and about twice their mothers.

The standard deviation of children's education has fallen by up to a year between the Older and Younger cohort while for parents it has risen by about the same amount (slightly more for mothers, slightly less for fathers).

## Changing Intergenerational Correlations

Table 2a presents results from regressions based on equation (1) with education as the variable of interest:

$$E_{ct} = \alpha + \beta_1 E_f + \beta_2 E_m + e_{ct} \quad (2)$$

where $E_{ct}$ , $E_f$ and $E_m$ are offspring's, father's and mother's education, respectively, and $e_{ct}$ is assumed to be independently distributed across parents and cohorts and captures random noise in offspring education such as measurement error.[7]

Compare individuals in the Older Cohort born largely in the 1950s with those in the Younger Cohort born in the late 1970s. The sum of the coefficients on mother's and father's education has fallen from around 0.7 to around 0.54 for males and from around 0.84 to around 0.58 for females.[8] Also, while the coefficient on parents' education has lost magnitude absolutely, notice that mother's education's relative importance has risen from a little over half that of father's education for males and from a little over 70 percent for females to almost equality for both. Unlike increases in educational levels, most of the increase in intergenerational mobility has come relatively recently, as there is little change in coefficients on mother's and father's education from the Older Cohort to the Middle Cohort (born largely in the 1960s). Figure 1 demonstrates, with five-year cohorts, the recent increase in intergenerational mobility (left axis). The coefficient on parents' education for females born near 1930 is basically indistinguishable from the same coefficient for females born around 1965, but drops quickly for those born near

1975.[9] The same coefficient has slowly been falling for males, but the largest drops have coincided with the most recent generations' schooling.

Determining conclusively which factors are behind the rising relative importance of mother's education in offspring education is beyond the scope of this paper. It is, regardless, a provocative suggestion that the advantages useful for children to absorb, as well as the processes by which they are absorbed, are changing. Taking as given our characterization of pre-industrial Indonesia, we can offer a coherent theory about the declining importance of fathers, but we leave confirmation and elaboration to future papers. Less attention paid to caste and other customs which circumscribe education and career possibilities should tend to dull the influence of both mother and father, as neither parent will be the "quintessential" adult to imitate any longer. As liquidity constraints are relaxed and/or the cost of education is reduced, a father's income, and therefore his education, should not bind as early, or for as many. As the education gap between sexes narrows, more mothers are able to provide the extracurricular nurturing necessary for success in school, including help with homework, proper nutrition and hygiene, and instilling attitudes about work and play. So, parents' total influence declines, perhaps because of a larger set of opportunities. Simultaneously, mothers' relative influence rises, presumably because of her enlarged skill set coupled with the fact that in Indonesia (as in most of the world), mothers are primary caregivers during the schooling period.

If we standardize the coefficients in Table 2a by multiplying them by the standard deviation of parents' education, we find a similar change between the Older and Younger Cohorts (results not presented). For males and females, the sum of these standardized coefficients falls by about 0.1 and 0.4 (or by about 0.4 and 0.6 for unenrolled individuals

only), respectively, between the Older and Younger Cohorts. Either an extra year of parental education or an extra standard deviation of parental education have less predictive power for children born in the younger cohort. However, for both the Older and Younger Cohorts, an extra standard deviation of parental education produces roughly the same effects in terms of standard deviations of children's education, as the standard deviation has fallen for children and risen for parents between those Cohorts. As mean education has risen, an extra parental standard deviation produces less extra education, as a percent of the mean of children's education, in the Younger Cohort than an extra parental standard deviation in the Older Cohort.

## Robustness

An important concern when measuring the effects of education is measurement error in the education variables. Intuitively, if education is measured with random error, its effect will be attenuated. If measurement error is most severe in the older cohorts, the apparent decline reported in Table 2a may be understated.

As a remedy, we next present a regression in which parental education variables have been corrected for measurement error. We calculate coefficients in these regressions as:

$$B' = (\mathbf{X}'\mathbf{X}-\mathbf{S})^{-1}\mathbf{X}'\mathbf{Y},$$

where **S** is a diagonal matrix with elements $N(1-r_i)s_i^2$. $N$ is the number of observations and $s_i^2$ is the variance of the variable $i$. The term $r_i$ is the reliability of variable $i$, defined as one minus the noise-to-variance ratio of the variable. We calculate measurement error and reliability by analyzing the multiple reports on education found in the IFLS; details are in the appendix.

In Indonesia, as in much of the rest of the world, well-educated people tend to marry each other.[10] Due to the resulting collinearity, we could not run the measurement error model with separate corrections for maternal and paternal education. Instead, we predict a child's education with the sum of mother's and father's education. These results are shown in Table 2b, along with the each cohort's calculated reliabilities (shown at the bottom of each column). Again, the effect of parents' education is declining over cohorts, and the decline is larger (both absolutely and as a percentage of the Older Cohort coefficients) when correcting for measurement error (Table 2b) than when not making that correction (Table 2a).[11]

Table 2c adds to the baseline specification a number of control variables in order to capture other salient aspects of family background: mother's and father's height-for-age, father's profession (7 dummy variables), and parents' ages at child's birth. Due to missing data, there are no longer enough observations for comparisons with the Older Cohort; in addition, we were forced to drop our indicator of early parental death due to lack of variation. There remains a large decrease for females in the magnitude of the coefficients on parents' education when moving from the Middle to the Younger Cohort. For males, the coefficients are virtually equal in both Cohorts.[12]

Comparing the effect of parents' education with and without controls for father's profession (Tables 1a and 1c) we find it reasonable to conclude that father's profession matters little for the educational achievement of female offspring but is important for male offspring. Indeed, some of the effect of parents' education on male offspring education that we measured in Table 2a can actually be attributed to father's profession. The larger difference (between coefficients on parents' education with and without

controls) for the Middle Cohort again suggests stronger inheritance of advantage for older cohorts.[13] Here also we find rough confirmation of our theory regarding the relative importance of mothers in determining offspring education. Fathers' profession was associated with education levels (even after controlling for fathers' education) for older generations of boys, who could reasonably expect to later work in the same professions as their fathers. There would have been no such expectation among older generations of women, who instead acquired as much education as their parents' status allowed them. For more recent generations of men, the influence of father's profession is waning, as father's profession is no longer a good predictor of male offspring profession.

In analyses not presented, we repeated all of the regressions with a slightly different cohort structure (i.e., choosing a younger, middle, and older cohort with different cutoff ages), and by separating the entire IFLS population aged 20 to 70 (in 1997) into five- and ten-year cohorts (giving us ten and five cohorts, respectively). A summary of the results obtained by using the five-year cohorts is presented in Figure 1, which presents the evolution of the intergenerational correlation of education (defined as the sum of coefficients on mother's and father's education in equation (2)) from the oldest cohorts to the youngest on the left axis and the evolution of mean education for the same cohorts on the right axis. In addition, we repeated the analyses excluding enrolled individuals from our Younger Cohort and by imputing enrollees' completed education. In order to produce standard errors robust to the common influences to which we expect household or family members to be exposed, we clustered regressions by household. These sensitivity tests produced very similar results in all regressions and did not change any of the qualitative conclusions. Finally, we used as regressors dummy variables

representing the achievement of different levels of parental education. Though we found nonlinearities in the correlation of education (higher levels of parental education cause a greater marginal increase in children's education than lower levels), there was no substantial change across cohorts in the ratio of the coefficient on the highest level to the coefficient on the lowest level of parental education

In short, the intergenerational transmission of education weakened in Indonesia during 1960-1997 while annual real GDP growth during those years averaged over 6 percent[14], which is a full 4 percent higher than the previous 40-years' average. Indonesia's experience is similar to that of pre-1970s United States, with rising mobility (proxied by intergenerational correlations of earnings in most US studies) coinciding with the spread of industrialization (Mazumder and Levine, 2001; Solon, 2002). However, even our Younger Cohort expect higher intergenerational correlations of education than analogous correlations (either educational or earnings) in developed countries (Couch and Dunn, 1997; Dearden et al., 1997; Mulligan 1999; Solon 2002). Among developing countries for which there are published empirical studies, Indonesia's intergenerational correlations are approximately average (Behrman et al., 2001; Binder and Woodruff, 2002; Heckman and Holtz, 1986;Lillard and Willis, 1994).[15] There are few developing-country longitudinal studies covering as great a span as the IFLS; Binder and Woodruff (2002) use the 1994 Gender, Age, Family and Work household survey in Mexico to follow intergenerational correlations of education since the mid-1920s. They too find a modest decline through most of their study period; however, they document a reverse in the downward trend between the two youngest cohorts, suggesting to them that intergenerational mobility "stalled" in Mexico in the 1980s.

## In what Cases did the Intergenerational Correlation Decline?

The main result so far is that the intergenerational correlation of education declined in Indonesia between the cohort born in the 1950s and cohort born at the end of the 1970s. The theories reviewed above posited that industrialization, school construction, or declining poverty might account for such a decline. In this section we examine whether the decline was concentrated in regions with those factors. As a further robustness check we then examine changes in the intergenerational correlation of consumption.

### The role of industrialization

Indonesia's growth has been accompanied by increasing industrialization. Several of the theories cited above posit that the shift to industrialization will trigger a rise in educational mobility. From the IFLS and the Supas, we have constructed two regional indices of manufacturing. The simplest measure, a count of the number of factories in a particular district, comes from the IFLS. Our second measure, from the 1985 and 1995 Supas, is the percent of potential workers in manufacturing, defined as the number of manufacturing workers divided by the age18 to 60 population in a district. Below, we examine whether increasing intergenerational mobility in education has been shared more or less equally by Indonesian provinces, or instead has been concentrated in those areas where most industrialization has occurred.

Consistent patterns of intergenerational mobility between heavily and lightly industrialized districts in Indonesia are difficult to distinguish. In Table 3, we examine mobility in the presence of factories in 1993 first for the Younger Cohort (who were turning 13-17 in 1993) and find very little evidence that mobility is higher in districts

with more factories (columns (1) through (4)). Though intergenerational correlations are lower in districts with a higher factory count, the difference is slight and never statistically significant. When we use the percentage of district workers in manufacturing in 1995 as an alternate measure of industrialization (columns (5) through (8)), we see that Younger Cohort males might be slightly more mobile in *less* industrialized communities, while there is no significant difference in regions for females.

We can also measure what effect industrialization had on the intergenerational transmission of education for the Middle Cohort[16] by using manufacturing presence in 1985 (columns (9) through (12)). The evidence is similar to that for the Younger Cohort: factory presence did not affect the intergenerational transmission of education.[17]

To check the robustness of these findings, we ran the regressions for each cohort and each measure of industrialization using progressively more exclusive boundaries for lightly- and heavily-industrialized districts (results not presented). For example, we selected districts with percent manufacturing at or below the $40^{th}$ ($25^{th}$) percentile and compared them to districts with percent manufacturing at or above the $60^{th}$ ($75^{th}$) percentile. The coefficient patterns we describe above were essentially unchanged in all of these analyses.

In short, living in more industrialized regions does not imply detectable increases in educational mobility in Indonesia, at least at the level of our admittedly coarse measures of industrialization. It appears, rather, that any gains in enrollment or completion made in Indonesia recently are relatively equally distributed throughout more and less industrialized regions. That is not to say that more industrialized regions present the same setting as less industrialized regions regarding potential educational

achievement. In the Younger Cohort, for example, the relative importance of mother's education in predicting offspring education rises in more industrialized regions. In addition, while never statistically significant, the decline in the intergenerational correlation in more industrialized regions is usually larger for females than it is for males. As these are repetitions across regions (from less- to more-industrialized) of our cross-cohort (from older to younger) findings, analogous conclusions apply: an industrializing community produces, for its inhabitants, noteworthy changes in the transmission and absorption of advantage.[18] While only suggestive, this evidence is consistent with the hypothesis that the importance of occupation-specific knowledge that fathers can transmit might be shrinking relative to the importance of more general health and human capital that's usually a product of maternal education.

### The role of school construction

School construction has also accompanied increased GDP growth in Indonesia. The Sekolah Dasar INPRES school building program mentioned above was the fastest primary school construction program ever undertaken in the world (World Bank, 1990). Did this enormous increase in resources devoted to public education change patterns of intergenerational mobility in those districts that received the bulk of the outlays?[19]

Table 4 presents regressions similar to the baseline specification in Table 2a but which control for the INPRES primary school-building program. Instead of the original three cohorts, we selected a Treatment Cohort just young enough to be affected by the new schools and a Control Cohort just old enough to have finished primary school before the program started. Here, regions are divided into high- and low-program regions according to how many schools-per-child were constructed during the INPRES

program.[20] In the Cohort Differences panel, we again observe that intergenerational correlations are falling for newer cohorts, but without much variation across regions. That is, correlations seem to be falling by similar amounts regardless of the amount of school construction that took place. And, changes over time in regional differences (basically, a difference-in-difference indicator) reveal that for both males and females, intergenerational correlations of education are lower in regions with lower school building rates, even for the cohort young enough to be exposed to the program. However, this difference between high- and low-program regions hasn't moved significantly across cohorts.

Neither lower cost of schooling nor increasing industrialization has been associated with movements in the intergenerational transmission of education. If Indonesia's labor market is geographically integrated and migration is not too costly, increasing local industrialization could be a powerful incentive for more schooling across Indonesia (rather than just locally). However, Levine and Federman (2002) find that returns to education have not changed much in Indonesia, at least between 1985 and 1995 (years during which the Younger and Middle Cohorts would have been finishing school and looking for employment).

Since there was a cohort young enough to be exposed to the school building program as well as increasing industrialization, some of the effect of the INPRES program may be counterbalanced by increasing industrialization, or vice-versa. Assume, for example, that the school-building program primarily helped the poor send its children to school, but increasing industrialization was primarily responsible for decreasing intergenerational correlations among the rich. Then, the failure to find differences across

high- and low-INPRES (or across heavily- and lightly-industrialized) regions may be an artifact of differential settlement patterns: the rich could be living in heavily-industrialized regions that received few new schools, while the poor might be living in lightly-industrialized regions that received many new schools. Our difference-in-difference statistic may not adequately resolve this confound, since the cohort not exposed to the INPRES program began would not have experienced much community industrialization either (e.g., 88 percent of communities had no factories in 1974). We split our INPRES-exposed cohort up into four different samples based on extent of school building and extent of industrialization (results not presented) and found no significant differences in the behavior of the intergenerational transmission of education among them.

### The role of declining poverty

Perhaps, then, education is a normal good which the poorer populations in Indonesia have previously been unable to afford. If it was primarily the poor and uneducated who were constrained in investments in their children's education, then some relaxation of these constraints could be enough to lower the average intergenerational transmission of education for the entire population. In Table 5, we present evidence that suggests it is the more affluent families in Indonesia that have produced the largest decline in the intergenerational transmission of education.

We first divided the population up into families with high versus low predicted-consumption.[21] Repeating our baseline analysis for this sample division, we see that while the intergenerational transmission of education is nearly the same for low

predicted-consumption families in the Older and Younger Cohorts, it has fallen by about 0.28 between the Older and Younger Cohorts for high predicted-consumption families.

Others who have examined intergenerational correlations separately among those with high and low levels of advantage (Corak and Heisz,1999; Andrade et al., 2003) have emphasized that liquidity constraints are particularly likely to appear among those with fewer assets and other advantages. While we do not have direct measures of liquidity constraints, our results do not support the hypothesis that relaxing liquidity constraints among the poor is responsible for the declining intergenerational correlation we observe.

### The intergenerational correlation of consumption

Table 6 presents evidence that increasing mobility in education may not translate immediately into increasing mobility in well being (as measured by consumption) in Indonesia. Here, we regress household per-capita consumption on parents' education and additional controls. Few IFLS respondents established their own households before age 24, so the cohorts are structured to take advantage of the correspondence between survey waves and an individual's life cycle[22] as well as to match the cohorts from the education regressions whenever possible.

To discuss the influence of parental education on consumption, we must distinguish between cohort effects (or the variable impact of parental education across similarly-aged cohorts at different points in time) and life-cycle effects (or the variable impact of parental education within one cohort as that cohort progresses through its life cycle). Take our two young cohorts (age 24 to 32 in 1993 and age 24 to 32 in 2000): the influence of parental education on young cohorts' consumption is more or less equal in 1993 and 2000. Now, follow our young 1993 cohort as it becomes 31 to 39 year-olds in

2000: within this cohort, the influence of parental education wanes as the cohort ages. That is, for those aged 24 to 32, having each parent's education rise one year predicts 17 percent higher consumption in 1993, falling to 16 percent in 2000 (difference not statistically significant). For those aged 31 to 39 in 2000 (the same young cohort from 1993 aged 7 years), the decline is to 14.8 percent and is statistically significant at the 5 percent level.[23]

When we compare the influence of parents' education on a young cohort and an old cohort in a given year, any difference will be made up of both a cohort effect *and* a life-cycle effect.[24] Parents' education appears to influence the young slightly more (relative to the old cohort) in both 1993 and 2000, though the 2000 difference is statistically significant and larger than in 1993. This difference-in-difference seems to indicate that parental education has recently become *more* important in explaining offspring consumption.[25]

Examining the old cohorts (age 37 to 50) in different time periods leads to more anticipated conclusions: for the old cohort in 2000, parental education matters less in explaining consumption than for the old cohort in 1993. This indicates that parental education has recently become less important in explaining offspring consumption. It is plausible, then, that any recent decline in the power of parental education to predict offspring consumption for recent young cohorts may not become evident for a number of years. For the young cohort (age 24 to 32), we see a decline in the effect of parents' education on consumption between 1993 and 2000 that is not perceptible statistically. Given the difference between 1993 and 2000 in the old cohort, however, we might expect the imperceptible difference to grow larger as the young cohorts age.[26]

So, though we see little empirical support for the hypothesis that increasing mobility in education has been accompanied by increasing mobility in consumption, neither do we see empirical support for rejecting that hypothesis yet. Since we will not know what happens to the 2000 young cohort's consumption until much later, any conclusion must remain tentative until that time. In addition, some of the 2000 24 to 32 would have been establishing households during and shortly after the financial and macroeconomic crisis of 1997-1998, which should caution against drawing conclusions until more data is available. That effects from the life-cycle must be unraveled from cohort effects further complicates any deductions.

## Contrasting results from Bangladesh

Because we are unable to associate falling intergenerational correlations of education with either increasing industrialization or decreasing cost of schooling, we are tempted to say that it is development more generally, or the rising incomes that accompany general economic development, that is responsible for this movement. Indeed, if education is a normal good, Becker and Tomes (1979) observe that rising incomes will increase the demand for education.

As a suggestive test of this hypothesis we examine the intergenerational correlations of education in rural Bangladesh. Bangladesh and Indonesia are both South Asian nations with significant Muslim populations influenced by Islamic cultural norms and notions about family responsibilities. Furthermore, the structure of economic activity in these two countries was quite similar at the beginning of our study period. They were both primarily agricultural economies in 1960, having over half of value added in GDP coming from that sector.[27] Labor has been slow to exit the agricultural sector in both

countries as well: 47 percent of males were employed in agriculture as late as 1997 in Indonesia, while Bangladesh still had around 50 percent of males employed there in 2000. However, while both nations had low numbers employed in and little value-added produced by manufacturing from 1960 through 1980, by 2000 Indonesia had 25 percent of value-added coming from the manufacturing sector while Bangladesh had only 15 percent (only 2 percent more than value added by that sector in 1980 in either Indonesia or Bangladesh). Furthermore, while real GDP per capita increased by over 350 percent in Indonesia between 1960 and 1997, the comparable figure for Bangladesh is only 40 percent.[28]

With data from the MHSS (described above) we return to equation (2) to describe the intergenerational correlation of education in Bangladesh for a young, middle, and old cohort (whose structure is also described above in the 'Data' section). Our methods are identical to our baseline regressions in Indonesia, with exceptions and corrections (noted in the text and tables) made for the peculiar nature of the MHSS and Bangladesh.

### Summary Statistics

From Table 1, we observe that trends in mean education in Bangladesh were similar to those in Indonesia. For instance, mean education has been steadily rising for both sexes in Bangladesh, but the gains for women have been more impressive: where the Older Cohort females used to achieve about one-quarter the education of males, the Younger Cohort females now achieve about the same amount as their male counterparts. By contrast, the figure for Indonesian females in the Older Cohort was roughly three-quarters of males, also moving to near-equality by the Younger Cohort. Whereas the rate at which males outperform (in education, anyway) their parents has slowed between

Older and Younger Cohort in Bangladesh, for females it has actually increased from Older to Middle Cohort and increased again from Middle to Younger Cohort. Younger Cohort females are outdoing Older Cohort females by nearly 500 percent.

However, even with such impressive recent gains in mean education, Younger Cohort Bangladeshis are still only achieving levels of education that Older Cohort Indonesians enjoyed (approximately). The same is true for parents: parents of children in the Younger Cohort in Bangladesh achieve mean education levels similar to Older Cohort parents in Indonesia.

### Intergenerational Correlations

Table 7a presents results on the intergenerational correlation of education based on equation (2). For women in rural Bangladesh, the intergenerational correlation of education has changed very little over the three cohorts, going from 0.54 for the oldest cohort to 0.64 for the youngest. For males, it looks as though there has been a significant drop for the youngest cohort, but these results might be clouded by very high enrollment rates for that cohort (nearly 50 percent for both males and females at the survey date). In results not presented, we calculate the standardized coefficients, or the response of a child's education (in years) to a one standard deviation (rather than one year) increase in parent's education. From the oldest to the youngest cohort, the sum of the standardized coefficients on mother's and father's education falls from 2.4 to 2.0 for males and rises from 1.2 to 2.1 for females. We further standardize children's education and find that this coefficient falls from 0.56 to 0.54 for males and rises from 0.53 to 0.59 for females between the oldest and the youngest cohort. In short, little has changed for females in

between the Older and Younger cohorts, while for males parental education may be declining in importance.[29]

We use two strategies to deal with young cohort members who are still enrolled at the survey date. In table 7b, we impute completed years of education for enrollees in a particular age group by adding a fraction of years representing the probability of completion of all achievable higher grades. These fractions are calculated by examining mean rates of progression of each age group through the Bangladesh schooling system. Using this strategy, we see again that there has been no significant change for women over the three cohorts and young men still experience a drop in the intergenerational correlation.

The second strategy we use is to define a slightly different young cohort. In table 7c, we use an Alternate Younger Cohort composed of 21 to 25 year olds (rather than 17 to 21 year olds) in 1996. We use only the unenrolled portion of this cohort in the analysis and find again that little has changed for women over the years. It appears as though young men are still experiencing a drop in the intergenerational correlation, but the coefficient for the youngest cohort is no longer significantly different (at the 5 percent level) from the oldest.

In results not presented, we also examined every five-year cohort of unenrolled individuals between the age of 20 and 70 in 1996. Surprisingly, the intergenerational correlation of education has been rising in Bangladesh since the oldest five-year cohort completed its education, and the correlation is larger for men than for women in all cohorts. The correlation peaked for both sexes with the cohort born around 1965. From there, it declined sharply for men born around 1970 and then turned back up again for

men born around 1975, leaving this most recent cohort of men with an intergenerational correlation of education indistinguishable by sight from the cohort born 40 years earlier (around 1935) and indistinguishable statistically from the cohort born 15 years earlier (around 1960). For women, the fall from the 1965 peak was not as dramatic, and the correlation for the youngest five-year cohort is equal (both statistically and visually) to the correlation for the cohort born around 1960.

In Indonesia, the intergenerational correlation has been flat or gently declining for most of the 20th century and has only recently come down decisively. Bangladesh, meanwhile, has seen steadily rising correlations over the same period. In Indonesia, mothers' relative importance has been rising, especially for males, while in Bangladesh mother's relative importance has been falling, especially for females. Furthermore, in Bangladesh, the correlation for men has been higher than for women in every cohort, while at the same time several older cohorts of women in Bangladesh experienced correlations lower than anything yet experienced in Indonesia. While a complete discussion of these intriguing facts is beyond the scope of this paper, we can offer a reasonable sketch: until recently, opportunities for women in Bangladesh were either so scarce or so circumscribed that parents' education was not advantageous but largely irrelevant for preparing a daughter for her future. More recently, many women's opportunities have risen to include more of the professions and occupations their brothers enjoy, making the "absorption" of parental (especially father's) education and its correlates (such as earnings) increasingly valuable.

The available evidence from Bangladesh and its stark contrast with Indonesian indicators, then, gives at least tentative support to the notion that it may be a general rise

in income that is responsible for the fall in the intergenerational transmission of advantage in Indonesia.

## Summary and Conclusion

We present three main results. First, the intergenerational correlation of education declined in Indonesia between the cohort born from 1943 to 1956 and the cohort born from 1976 to 1980. Returns to education were not that different (as best we can measure) for these different cohorts, but intergenerational correlations of parents' education with children's consumption (measured with incomplete data) remained stable, meaning any claims about well-being can only be verified at a later date

Second, the decline was not particularly faster in regions that industrialized more rapidly, in regions with more school building, or among families with fewer resources. These results cast doubt on some commonly-claimed hypotheses for the intergenerational correlation of advantage.

Third, the decline in intergenerational correlation is less visible in Bangladesh, a nation with initial conditions not that different from those in Indonesia. Precision is low, so while the Bangladesh data cannot reject the hypothesis of no decline, neither can they reject the hypothesis of a decline equal to that found in Indonesia.

These results are generally consistent with the hypothesis that very low incomes contribute to a high persistence in advantage. While hardly conclusive, they are broadly consistent with theories of poverty traps. Conversely, the preponderance of evidence suggests that one of the many benefits of rising incomes in Indonesia has been an increase in the equality of opportunity. These results are quite possibly contingent on the economic policies followed by the Suharto regime, which mixed a sometimes murderous

and often corrupt dictatorship with nation-wide investments in children's health and education.

It is important to compare results from Indonesia and Bangladesh with other emerging markets such as India (where urbanization has eroded the caste system). If the findings elsewhere are consistent with what we find (that is, economic development promotes intergenerational mobility), some concerns about any increase in cross-sectional inequality may be reduced. At the same time, no pattern of change in intergenerational mobility provides an ethical or efficiency justification for the world's poorest children to continue to receive minimal investments in health care and education (Sachs, 2005).

It remains to be seen how the economic effects of the 1997-1998 financial crisis (and resulting government changes and decentralization of resources to the regions) will affect the intergenerational correlation and equality of opportunity in decades to come.

## Appendix: Measurement Error

The IFLS, in all three waves (1993, 1997, and 2000), contains three potential sources of observations on an individual's education: (1) self-report; (2) report by the head of the household or spouse of the head of the household in the household roster; and (3), the child report for those adults who had either moved out of the household or had died by the time of the survey.

With multiple reports we can detect several sources of error. One form of error is bias. For example, reported education for the biological parents of the Younger Cohort was routinely higher in 1997 than in 1993. This discrepancy between IFLS waves was greatest in child-reports (almost ½ of a year), but was present in all sources and in every age group considered, and was (in all but one case) the same sign - 1997 education was higher than 1993 education. This tendency occurs in the 2000 (versus either 1997 or 1993) reports as well.

Discrepancies also show up in correlations between different years of observations on an individual's education, even within the same source (for example, comparing self-reports of education made in 1993 and 1997):

| Correlations of education reports from the same source in 1993 and in 1997[30] | 1993 and 1997 self-reports | 1993 and 1997 roster-reports by head of household | 1993 and 1997 reports by child on parents |
|---|---|---|---|
| Younger Cohort (born 1976 to 1980, so ages 13-17 in 1993) | 0.89 | 0.90 | 0.85 |
| Middle Cohort (born 1961 to 1969, so ages 24-32 in 1993) | 0.88 | 0.89 | 0.69 |
| Older Cohort (born 1943 to 1956 to , so ages 37-50 in 1993) | 0.79 | 0.90 | 0.65 |

The correlations across different sources (for example, between a child-report in 2000 and a roster-report in 1993 on the same individual) are consistently lower. That the correlations between multiple reports on an individual's education are not closer to 1 is not all that surprising: several U.S. studies find similar levels of measurement error in

education reporting (e.g., see Ashenfelter and Krueger (1994) for reports by twins or Black, Sanders and Taylor (2003) for multiple self-reports from the same individual).

To increase sample size, education variables are constructed by choosing observations according to the following algorithm:

education = self-report of education if available;
else education = roster-report of education if available;
else education = child-report of education if available;
else education = missing.

Depending on the shares of self-, roster-, and child-reports in education variables for each cohort, the variables may be measured with more or less error. The magnitude of the measurement error in turn attenuates coefficients in a regression of child education on parents' education. To correct for this bias, the reliability of the education variables is constructed.

Assume

$$E = E^{*} + \varepsilon,$$

where $E^{*}$ is true years of education, E is observed years of education, and the residual is well behaved. Then, reliability is defined as

$$1\text{-var}(\varepsilon)/\text{var}(E).$$

Self-reports from the year 2000 are assumed to be the true observation (and therefore have reliability equal to 1.00), while self-reports from earlier years and roster- and child-reports are assumed to measure education with error[31]. Under these assumptions, and given the shares of each report in the education variable, the average reliability (weighted by report share) for parents' education is:

| Average reliabilities | Parents' education |
|---|---|
| Younger Cohort (17-21 years old in 1997) | 0.90 |
| Middle Cohort (24-32 years old in 1993) | 0.70 |
| Older Cohort (37-50 years old in 1993) | 0.62 |

These are the reliabilities used in Tables 1b, where we estimate errors-in-variables models of intergenerational mobility. See Table 2b and preceding paragraphs for a description of how reliability measures are used in an errors-in-variables model and what the correction means for our results.

We were further concerned that measurement error in parental education might be systematically biased if highly-educated children over-report the education of their parents or if parents of highly-educated children falsely recall higher education levels for themselves. Such errors would bias the coefficients on parental education upward because they would not be the random noise as assumed in our measurement error correction model. We looked for such a bias in the subsample where both the parent and child reported the parent's education. In fact, neither report of parental education had a stronger correlation with child education, reassuring us on this point.

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**Notes:**

[1] There were some exceptions: a very small fraction of non-aristocratic Chinese benefited from the imperial examination system; hunter-gatherer and some tribal societies were more egalitarian (Diamond, 1999).

When we discuss the intergenerational correlation of "advantage" we mean all of the advantages of high education, good health, high consumption, and high-status occupation. Due to data constraints we focus on education, with some examination of the other measures.

[2] See, for example, Ganzeboom, Luijkx, and Treiman (1989), Duncan (1965), and Hauser and Featherman (1973). Further indirect evidence comes from studies comparing modern pre-industrial or industrializing economies with modern industrialized societies and noting that correlations of advantage are lower in the latter (Kelley, Robinson, and Klein, 1981).

[3] Approximately 70 percent of Indonesians lived in Java and Bali in 1930; by 1961, 65 percent; and by 2000, 60 percent (Badan Pusat Statistik, http://www.bps.go.id/).

[4] Though the IFLS and larger surveys confirm that just over 25 percent of Younger Cohort individuals were still enrolled in 1997, we were able to use the 2000 IFLS to record final education for Younger Cohort individuals after they had completed school. Furthermore, this cohort's education decisions should not have been strongly affected by the onset of the Indonesian financial crisis in 1997.

[5] The cohort ranges are somewhat arbitrary. The bounds selected for the Younger cohort are the least controversial as they were the youngest to have largely completed their schooling before the financial and macroeconomic crisis in 1997-1998. The Middle and Older cohort were selected to give comparable sample size and to be situated meaningful distances from each other temporally. In results not presented, we chose first ten- and then five-year bands (within the entire IFLS population aged 20 to 70 in 1997) as cohort bounds. That is, we ran similar analyses for the five ten-year groups (in 1997, age 21-30, age 31-40,….,age 61-70) and for the ten five-year groups (in 1997, age 21-25, age 26-30,…,age 66-70) and found no changes to our central results.

[6] For example, instruction in *maktabs* (primary schools for instruction in the Qur'an) in Bangladesh was not counted as schooling.

[7] Because errors among members of the same household may be correlated, in results not presented we clustered errors by household and found no changes to our results.

[8] Some members of the Younger Cohort were still enrolled during the 2000 IFLS. If we exclude these people the decline in the effect of parental education is slightly, but not statistically significantly, larger. If we exclude any 1997-enrolled in order to wholly avoid children whose education decisions might have been colored by the financial and macroeconomic crisis of 1997-1998, the drop is again larger but not statistically significantly so. Likewise, median regression (least absolute deviations) including enrolled individuals produces a slightly, but not statistically significantly, larger decline.

[9] In results not presented, we confirm, using five-year bands for cohorts, that only for the most recent generations are the intergenerational correlations of education (the sum of coefficients on mother's and father's education) different statistically from older generations. .

[10] Interestingly, assortative mating on education has not changed much in Indonesia, with correlation(father's education, mother's education) near 0.7 for all three cohorts.

[11] In results not presented, we use as our Younger Cohort sample only non-enrolled children and find the coefficient on the sum of parents' education to be virtually identical to that in Table 2b.

[12] Data on profession is relatively scarce in the IFLS: running the Table 2c regressions on five-year (ten-year) cohorts, we find enough observations for only the three (two) youngest cohorts (results not presented). However, with these cohorts, we do observe a drop between the youngest and oldest for males

in the coefficients on parents' education, and we find again that father's profession mattered only for males, regardless of cohort. We also still observe a larger decline for females.

[13] While we expect parents' education to be a good predictor of offspring education (because at least some portion of success in educational achievement is due to biologically distributed traits), we have no *a priori* expectations about the usefulness of parents' profession (conditional on parents' education) as a predictor of offspring education. Given what we know of social structure in Indonesia, however, it makes sense that profession could have an effect even when controlling for education. Because roles were rigidly defined, social position, rather than ability, was important for determining achievement.

[14] Average annual real GDP growth in Indonesia was nearly 7.5 percent from 1967-1997.

[15] Survey selection criteria, cohort structure and methodology are not necessarily similar or even comparable in the studies mentioned. We reference them only to demonstrate that Indonesia's indicators are comfortably within the range of estimates for developing nations.

[16] The available data did not permit a calculation of industrialization at a year early enough to have affected the education of Cohort 3 children.

[17] In tables not presented, we place cohort members in their birth districts before calculating the effect of district industrialization. Results are nearly identical to those presented in Table 3.

[18] An industrializing nation, meanwhile, produces changes in the same process across all of its communities. We are not claiming that the regional changes are necessarily similar in nature to the national changes, but only that both sets of changes can be documented by the same data.

[19] In results not presented, we confirmed the following results which are loosely similar to results from Duflo (2001): For control females (too old to be affected by the school-building), living in a region that eventually received more INPRES schools meant lower educational attainment, even after controlling for parents' education. However, by the time treatment females were in school, there was no longer such a disadvantage. Males faced no initial (statistically significant) disadvantage by living in a region that eventually received more INPRES schools. We further discovered that the effect of the school building program was strongest for females with more educated fathers.

[20] As in Duflo (2001), high program regions are defined as regions where the residual of a regression of the number of schools on the number of children is positive.

[21] Actual consumption was only recorded for households identified in the 1993 IFLS sampling frame. To recreate the household consumption that a Middle or Older Cohort child would have faced during childhood, we regressed the log of household per-capita consumption on father's profession, father's and mother's age at child's birth, and a variable indicating if a parent had died before the child turned 10 on the sample of biological children aged 1 to 25 still living at home. We used the coefficients from this regression to create fitted values of (childhood) log household per-capita consumption for all three Cohorts.

[22] Since having one's own household (separate from one's parents or providers) is necessary before one's own household consumption can be measured, the first cohort is between 24 and 32 in 2000, capturing individuals who for the most part have recently left their parents' households to set up households of their own. We analyze members of the second cohort twice: aged 31 to 39 in 2000 and seven years earlier, aged 24 to 32 in 1993. This cohort is equivalent to the Middle Cohort from above. The third cohort, age 37-50 in 2000, provides an older cohort with which to compare the young. Our final cohort , aged 37 to 50 in 1993, again provides an older cohort with which to compare the young and is equivalent to the Older Cohort from above.

[23] It is unclear how to describe the coefficient changes from 1993 to 2000 because consumption inequality within each cohort declined markedly during this period. The standard deviation of log consumption falls from roughly 1.2 in 1993 to near 0.7 in 2000. Thus, parental education actually rose in importance if measured as a standardized coefficient or in terms of percentile gain from having well-educated or prosperous parents.

[24] To see this, note that an old cohort's consumption is determined in part by the way the labor market operated when it was younger - a cohort effect. An old cohort's consumption is also determined in part by the fact that they are older and have more experience - a life-cycle effect.

[25] All results are similar if the sample in each cohort is restricted to household heads.

[26] Also, parental education is less important for the 2000 24 to 32 year-olds than for the 1993 37 to 50 year-olds, which suggests the life-cycle effect (parents' education matters most when children are young) and the cohort effect (the influence of parents' education is declining recently) are oppositely signed. It also suggests the life-cycle effect may be strengthening along with the cohort effect.

[27] Income distributions were also similar at the beginning *and* end of our study period: Gini coefficients fell from 37.3 to 28.3 in Bangladesh between 1963 and 1992 and from 33.3 to 31.7 in Indonesia between 1964 and 1993. The income share of the richest quintile as a fraction of the income share of the poorest 40 percent during the same time periods fell from 2.5 to 1.7 in Bangladesh and from 2.2 to 1.9 in Indonesia (Deininger and Squire, 1995).

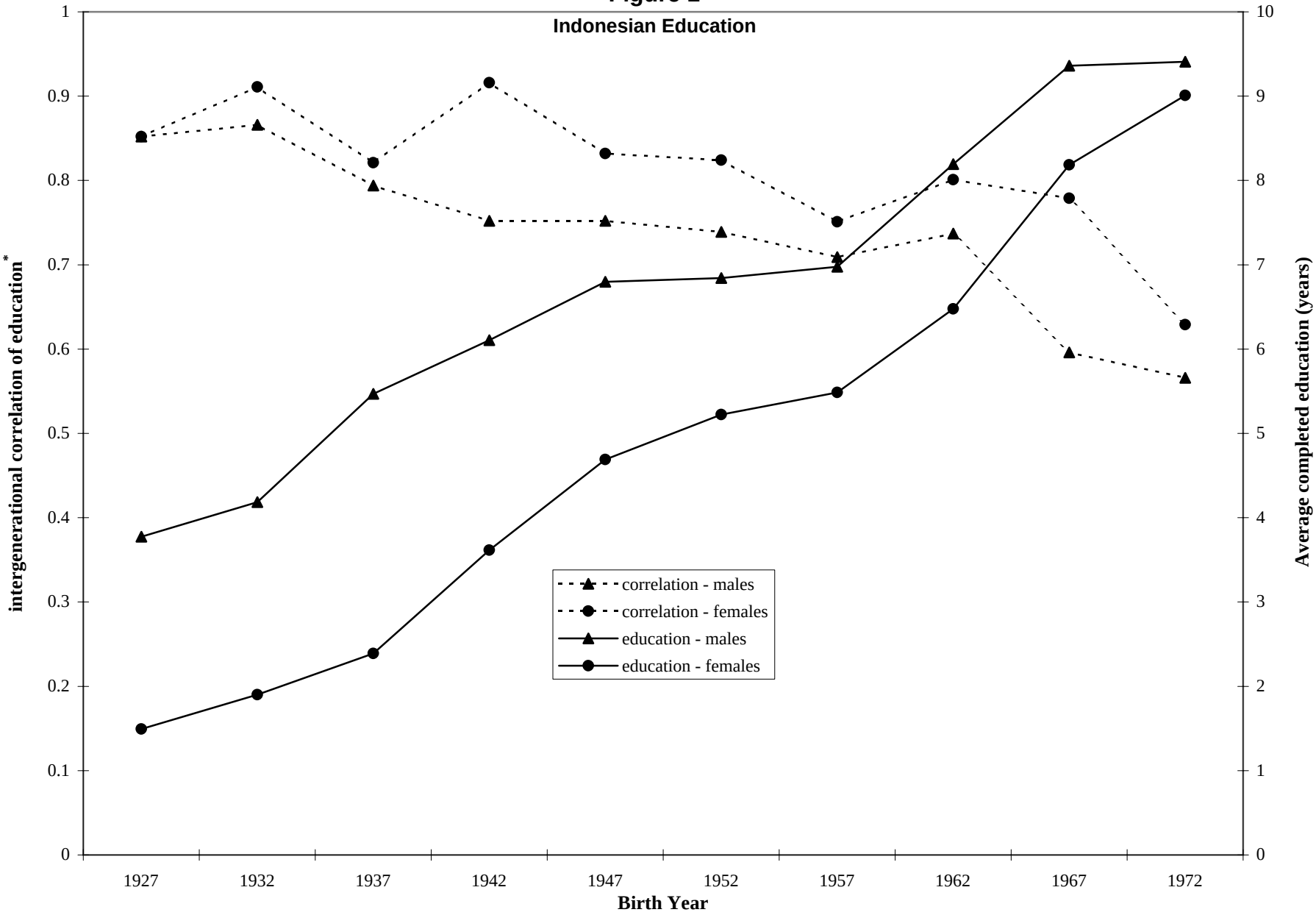
[28] Though real (non-PPP) GDP per capita was equal in Indonesia and Bangladesh in 1963, Bangladesh by 2000 had only achieved 1974 Indonesian real GDP per capita.

[29] As in the IFLS, the MHSS questionnaires provides up to three reports on an individual's education: the respondent, the household head or spouse, or a child reporting on deceased or non-resident parents. While we take advantage of multiple reports to increase sample size, these multiple reports expose all the same measurement error problems confronted in the IFLS and discussed in the appendix. With only one MHSS wave, however, there weren't enough overlapping observations among different reports to construct the reliabilities necessary for the error correction model employed against the Indonesia data.

[30] These correlations have been averaged across all groups (children and parents) in a particular cohort. The Younger Cohort is an exception: reports on children's education (i.e. those 17-21 years old in 1997) were deliberately excluded from the average, because 1997 education was likely to be higher than 1993 education for that group.

[31] Even this assumption may be controversial: taking 1997 or 1993 as the year in which self-reports recorded education without error, the reliability of self-reported education is only about 0.8 for the Younger and Middle Cohort, and about 0.65 for the Older Cohort.

## Figure 1




* Intergenerational correlation of education is the sum of coefficients on mother's and father's education in equation (2).

## Table 1: Summary Statistics

### Education

| Indonesia - 1997 | | | mean | sd | min | max | N |
|---|---|---|---|---|---|---|---|
| **Younger Cohort: ages 17-21** | Education (years) | males | 9.39 | 3.65 | 0 | 16.0 | 2523 |
| | | females | 9.18 | 3.79 | 0 | 17.0 | 2767 |
| | Father's education (years) | | 6.08 | 4.27 | 0 | 19.0 | 4200 |
| | Mother's education (years) | | 4.63 | 3.94 | 0 | 17.0 | 4518 |
| | 1993 Factories | | 0.41 | 0.93 | 0 | 5.0 | 4757 |
| | 1995 % Manufacturing | | 0.05 | 0.05 | 0 | 0.2 | 3707 |
| **Middle Cohort: ages 28-36** | Education (years) | males | 8.60 | 4.64 | 0 | 18.0 | 3060 |
| | | females | 6.96 | 4.72 | 0 | 18.0 | 3225 |
| | Father's education (years) | | 4.55 | 4.07 | 0 | 18.0 | 4356 |
| | Mother's education (years) | | 3.17 | 3.62 | 0 | 18.0 | 4680 |
| | 1985 % Manufacturing | | 0.03 | 0.03 | 0 | 0.2 | 3741 |
| **Older Cohort: ages 41-54** | Education (years) | males | 6.71 | 4.60 | 0 | 19.0 | 2662 |
| | | females | 4.69 | 4.31 | 0 | 16.0 | 2813 |
| | Father's education (years) | | 3.00 | 3.51 | 0 | 16.0 | 3604 |
| | Mother's education (years) | | 1.79 | 2.86 | 0 | 16.0 | 3754 |

| Bangladesh - 1997 | | | mean | sd | min | max | N |
|---|---|---|---|---|---|---|---|
| **Younger Cohort: ages 18-22** | Education (years) | males | 5.76 | 3.70 | 0 | 13.0 | 1251 |
| | | females | 5.48 | 3.58 | 0 | 12.0 | 1204 |
| | Father's education (years) | | 3.60 | 3.97 | 0 | 13.0 | 2059 |
| | Mother's education (years) | | 1.50 | 2.51 | 0 | 13.0 | 2186 |
| **Middle Cohort: ages 28-36** | Education (years) | males | 4.32 | 4.41 | 0 | 13.0 | 1570 |
| | | females | 2.71 | 3.41 | 0 | 13.0 | 1807 |
| | Father's education (years) | | 2.62 | 3.57 | 0 | 13.0 | 2985 |
| | Mother's education (years) | | 0.83 | 1.97 | 0 | 11.0 | 3066 |
| **Older Cohort: ages 41-54** | Education (years) | males | 4.25 | 4.29 | 0 | 13.0 | 1226 |
| | | females | 1.11 | 2.17 | 0 | 12.0 | 1402 |
| | Father's education (years) | | 2.01 | 3.28 | 0 | 13.0 | 2393 |
| | Mother's education (years) | | 0.43 | 1.40 | 0 | 10.0 | 2405 |

**Table 1 (cont.)**

## Consumption

| Indonesia | | | mean | sd | min | max | N |
|---|---|---|---|---|---|---|---|
| **24-32 years old in 2000** | Log (per capita consumption, 2000) | all | 12.18 | 0.74 | 10.68 | 13.93 | 8357 |
| | | heads | 12.27 | 0.72 | 10.68 | 13.93 | 1648 |
| | Father's education (years) | all | 5.6 | 4.3 | 0 | 18.0 | 5961 |
| | | heads | 5.0 | 4.1 | 0 | 18.0 | 1154 |
| | Mother's education (years) | all | 4.2 | 3.9 | 0 | 18.0 | 6431 |
| | | heads | 3.7 | 3.8 | 0 | 16.0 | 1173 |
| **37-50 years old in 2000** | Log (per capita consumption, 1993) | all | 12.13 | 0.74 | 10.68 | 13.93 | 7229 |
| | | heads | 12.15 | 0.73 | 10.68 | 13.93 | 3423 |
| | Father's education (years) | all | 3.6 | 3.7 | 0 | 19.0 | 5164 |
| | | heads | 3.4 | 3.5 | 0 | 16.0 | 2480 |
| | Mother's education (years) | all | 2.3 | 3.1 | 0 | 19.0 | 5456 |
| | | heads | 2.1 | 3.0 | 0 | 16.0 | 2574 |
| **24-32 years old in 1993** | Log (per capita consumption, 1993) | all | 11.08 | 1.21 | 9.12 | 15.11 | 3653 |
| | | heads | 11.10 | 1.15 | 9.12 | 15.11 | 1096 |
| | Father's education (years) | all | 4.5 | 4.0 | 0 | 18.0 | 3298 |
| | | heads | 3.7 | 3.7 | 0 | 15.0 | 914 |
| | Mother's education (years) | all | 3.0 | 3.5 | 0 | 16.0 | 3553 |
| | | heads | 2.5 | 3.2 | 0 | 14.0 | 929 |
| **37-50 years old in 1993** | Log (per capita consumption, 1993) | all | 11.02 | 1.23 | 9.12 | 15.11 | 4423 |
| | | heads | 11.04 | 1.22 | 9.12 | 15.11 | 2303 |
| | Father's education (years) | all | 3.0 | 3.5 | 0 | 16.0 | 3603 |
| | | heads | 3.0 | 3.5 | 0 | 16.0 | 1775 |
| | Mother's education (years) | all | 1.8 | 2.9 | 0 | 16.0 | 3753 |
| | | heads | 1.8 | 2.8 | 0 | 15.0 | 1815 |

**Table 2a: Predicting Education**

*Dependent Variable: Education (years)*

| | Younger Cohort | | Middle Cohort | | Older Cohort | |
|---|---|---|---|---|---|---|
| | (1) male | (2) female | (3) male | (4) female | (5) male | (6) female |
| Father's education | 0.271 | 0.2984 | 0.3851 | 0.4286 | 0.4761 | 0.4894 |
| | (0.0214)** | (0.0222)** | (0.0308)** | (0.0263)** | (0.0374)** | (0.0294)** |
| Mother's education | 0.2715 | 0.2784 | 0.2972 | 0.3975 | 0.2351 | 0.348 |
| | (0.0233)** | (0.0245)** | (0.0343)** | (0.0303)** | (0.0442)** | (0.0382)** |
| Constant | 6.6408 | 6.40940 | 5.7809 | 3.81890 | 4.7227 | 2.68320 |
| | (0.1214)** | (0.1244)** | (0.1396)** | (0.1124)** | (0.1260)** | (0.1044)** |
| Observations | 1805 | 1831 | 1852 | 2297 | 1657 | 1833 |
| R-squared | 0.33 | 0.35 | 0.29 | 0.38 | 0.25 | 0.33 |
| *sum (father's + mother's education.)* | *0.543*** | *0.577*** | *0.682*** | *0.826*** | *0.711*** | *0.837*** |
| TESTS: parents' education significantly different? | | | | | | |
| across cohorts | | | | | | |
| vs. Middle Cohort | *yes*** | *yes*** | | | *no* | *no* |
| vs. Older Cohort | *yes*** | *yes*** | | | | |

Standard errors or significance level of coefficient tests in parentheses; * significant at 5%; ** significant at 1%

Notes:

a. For all cohorts: Own and Mother's/Father's education comes from a combination of self reports, roster reports, and recall from children about their non-coresident parents.

b. Roughly 880 observations are shared by the column (1) and column (5) regressions -- some Younger Cohort fathers appear also as Older cohort sons. Roughly 1140 observations are shared by the column (2) and column (6) regressions -- some Younger Cohort mothers appear also as Older cohort daughters.

c. Roughly 13 to 16 percent of Younger Cohort males and females were reported as "enrolled" in 2000. Expected final education of Younger Cohort enrolled individuals is not much different from education already completed in 1997.

d. Younger Cohort were born between 1976 and 1980; Middle Cohort were born between 1961 and 1969; Older Cohort were born between 1943 and 1956.

**Table 2b: Predicting Education with measurement error**

*Dependent Variable: Education (years) - errors-in-variables specification*

| | Younger Cohort | | Middle Cohort | | Older Cohort | |
|---|---|---|---|---|---|---|
| | (1) male | (2) female | (3) male | (4) female | (5) male | (6) female |
| Parents' education (sum) | 0.3023 | 0.3215 | 0.4943 | 0.5927 | 0.5932 | 0.6963 |
| | (0.0098)** | (0.0099)** | (0.0163)** | (0.0134)** | (0.0230)** | (0.0192)** |
| Constant | 6.3097 | 6.06110 | 4.5684 | 2.51370 | 3.6372 | 1.53900 |
| | (0.1253)** | (0.1276)** | (0.1570)** | (0.1182)** | (0.1446)** | (0.1089)** |
| Observations | 1806 | 1842 | 1851 | 2297 | 1652 | 1833 |
| R-squared | 0.37 | 0.39 | 0.42 | 0.55 | 0.39 | 0.54 |
| *Reliability* | *0.90* | *0.90* | *0.70* | *0.70* | *0.62* | *0.62* |

Standard errors in parentheses; * significant at 5%; ** significant at 1%

Notes:

a. The errors-in-variables specifciation uses the reliabilty estimates on parental education (whose derivation is explained in the appendix) to modify the estimation and correct for measurement error on parental education, as described in the text.

b. Independent variable is the sum of mother's education and father's education.

c. For all cohorts: Own and Mother's/Father's education comes from a combination of self reports, roster reports, and recall from children about their non-coresident parents.

d. Roughly 880 observations are shared by the column (1) and column (5) regressions -- some Younger Cohort fathers appear also as Older cohort sons. Roughly 1140 observations are shared by the column (2) and column (6) regressions -- some Younger Cohort mothers appear also as Older cohort daughters.

e. Roughly 13 to 16 percent of Younger Cohort males and females were reported as "enrolled" in 2000. Expected final education of Younger Cohort enrolled individuals is not much different from education already completed in 1997.

f. Younger Cohort were born between 1976 and 1980; Middle Cohort were born between 1961 and 1969; Older Cohort were born between 1943 and 1956.

**Table 2c: Predicting Education with rich family background**

*Dependent Variable: Education (years)*

| | Younger Cohort | | Middle Cohort | |
|---|---|---|---|---|
| | (1) male | (2) female | (3) male | (4) female |
| dad's education (years) | 0.2087 | 0.2719 | 0.2199 | 0.4085 |
| | (0.0270)** | (0.0289)** | (0.0745)** | (0.0938)** |
| mom's education (years) | 0.2686 | 0.2507 | 0.2575 | 0.4237 |
| | (0.0282)** | (0.0302)** | (0.0814)** | (0.1012)** |
| *sum (father's + mother's ed.)* | *0.477*** | *0.523*** | *0.477*** | *0.832*** |
| dad's height-for-age (cm) | 0.0241 | 0.0028 | 0.0177 | 0.0067 |
| | (0.0123) | (0.0162) | (0.0418) | (0.0341) |
| mom's height-for-age (cm) | 0.0185 | 0.0241 | 0.0254 | -0.0331 |
| | (0.0146) | (0.0130) | (0.0329) | (0.0204) |
| dad's age at child's birth (years) | -0.0397 | 0.0125 | -0.0202 | 0.0842 |
| | (0.0164)* | (0.0186) | (0.0552) | (0.0615) |
| mom's age at child's birth (years) | 0.0422 | 0.0030 | -0.0063 | -0.0116 |
| | (0.0182)* | (0.0204) | (0.0644) | (0.0732) |
| (mom's age @ birth - mean (moms' age @ birth))$^2$ | -0.0013 | 0.0030 | -0.0031 | -0.0023 |
| | (0.0016) | (0.0017) | (0.0067) | (0.0073) |
| dad's profession = professional/technical | 1.2445 | 0.9739 | 3.0485 | -0.1879 |
| | (0.4096)** | (0.4110)* | (0.8728)** | (1.0888) |
| dad's profession = administrative/managerial | 1.0406 | 1.2052 | 2.4331 | 0.4178 |
| | (0.5426) | (0.7594) | (1.3802) | (1.3347) |
| dad's profession = clerical | 1.5252 | 0.9256 | 2.2020 | 1.1514 |
| | (0.3936)** | (0.4161)* | (0.8874)* | (1.1025) |
| dad's profession = sales | 1.2866 | 1.1961 | 1.6039 | 1.6828 |
| | (0.2625)** | (0.2834)** | (0.7335)* | (0.7516)* |
| dad's profession = service | 0.8830 | 1.2112 | 3.3384 | 2.0915 |
| | (0.2915)** | (0.3281)** | (0.8747)** | (0.8264)* |
| dad's profession = production/transportation/manual | 0.4560 | 1.1121 | 1.3999 | 1.2001 |
| | (0.2212)* | (0.2292)** | (0.6034)* | (0.6109) |
| Constant | 6.8611 | 5.7619 | 7.0216 | 1.8708 |
| | (0.4106)** | (0.4535)** | (1.8512)** | (1.8396) |
| Observations | 1224 | 1145 | 253 | 236 |
| R-squared | 0.38 | 0.39 | 0.40 | 0.52 |

Standard errors in parentheses; * significant at 5%; ** significant at 1%

Notes:

a. Height comes from the anthroprometric records in all three IFLS waves.

b. Top and bottom 1% of the height distribution were compressed before creating standardized version of height.

c. Dad's profession = farming/fisheries/forestry was dropped.

d. For both cohorts: Own and Mother's/Father's education comes from a combination of self reports, roster reports, and recall from children about their non-coresident parents.

e. Roughly 13 to 16 percent of Younger Cohort males and females were reported as "enrolled" in 2000. Expected final education of Younger Cohort enrolled individuals is not much different from education already completed in 1997.

f. Younger Cohort were born between 1976 and 1980; Middle Cohort were born between 1961 and 1969.

**Table 3: Predicting Education with measures of industrialization**

*Dependent Variable: Education (years)*

| | Younger Cohort | | | | | | | | Middle Cohort | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1993 district factories = 0 | | 1993 district factories > 0 | | 1995 %mfg < median | | 1995 %mfg > median | | 1985 %mfg < median | | 1985 %mfg > median | |
| | (1) male | (2) female | (3) male | (4) female | (5) male | (6) female | (7) male | (8) female | (9) male | (10) female | (11) male | (12) female |
| Father's education | 0.2919 | 0.3613 | 0.2568 | 0.3078 | 0.2477 | 0.3591 | 0.2639 | 0.3082 | 0.2283 | 0.4960 | 0.3656 | 0.3427 |
| | (0.0454)** | (0.0545)** | (0.0398)** | (0.0359)** | (0.0426)** | (0.0443)** | (0.0446)** | (0.0424)** | (0.0957)* | (0.0646)** | (0.0812)** | (0.0700)** |
| Mother's education | 0.3070 | 0.2807 | 0.2904 | 0.2865 | 0.2176 | 0.2937 | 0.3539 | 0.2758 | 0.4079 | 0.4112 | 0.2980 | 0.4643 |
| | (0.0453)** | (0.0752)** | (0.0375)** | (0.0360)** | (0.0412)** | (0.0544)** | (0.0372)** | (0.0478)** | (0.1005)** | (0.0883)** | (0.0917)** | (0.0646)** |
| Constant | 6.4504 | 5.9898 | 6.6800 | 6.7021 | 6.9347 | 6.0330 | 6.4243 | 6.7848 | 5.2940 | 3.3156 | 5.8668 | 3.7812 |
| | (0.4499)** | (0.4768)** | (0.2527)** | (0.3305)** | (0.3203)** | (0.3867)** | (0.3506)** | (0.3935)** | (0.4094)** | (0.3016)** | (0.3319)** | (0.2818)** |
| Observations | 446 | 391 | 824 | 783 | 521 | 501 | 684 | 601 | 325 | 436 | 321 | 400 |
| R-squared | 0.33 | 0.38 | 0.34 | 0.38 | 0.22 | 0.36 | 0.41 | 0.41 | 0.18 | 0.37 | 0.25 | 0.36 |
| *sum (father's + mother's ed.)* | *0.599*** | *0.642*** | *0.547*** | *0.594*** | *0.465*** | *0.653*** | *0.618*** | *0.584*** | *0.636*** | *0.907*** | *0.664*** | *0.807*** |
| TESTS: parents' education significantly different? | | | | | | | | | | | | |
| across regions | *no* | *no* | | | *yes*** | *no* | | | *no* | *no* | | |

Standard errors or significance level of coefficient tests in parentheses; * significant at 5%; ** significant at 1%

Notes:

a. %mfg = number of manufacturing workers/district population aged 18-60.

b. For the Younger Cohort, sample is restricted to persons whose 1997 IFLS community of residence was the same as his/her 1993 IFLS community of residence. '1993 community factories' corresponds to the number of factories present in 1993 in a person's 1993 community of residence. '1995 %mfg' corresponds to the %mfg present in 1995 in a person's 1997 district of residence.

c. For the Middle Cohort, individuals were assumed to face 1985 levels of %mfg in the communities they lived in at age 12, even though this cohort was turning 12 from 1970-1980. That is, '1985 %mfg' corresponds to the %mfg present in 1985 in a person's age-12 district of residence. 893 males (37%) and 1158 females (42%) from the full sample never moved villages after age 12.

d. In all regressions, observations are clustered by district to produce robust standard errors.

e. For both cohorts: Own and Mother's/Father's education comes from a combination of self reports, roster reports, and recall from children about their non-coresident parents.

f. Roughly 13 to 16 percent of Younger Cohort males and females were reported as "enrolled" in 2000. Expected final education of Younger Cohort enrolled individuals is not much different from education already completed in 1997.

g. Younger Cohort were born between 1976 and 1980; Middle Cohort were born between 1961 and 1969.

**Table 4: Predicting Education with school construction**

*Dependent Variable: Education (years)*

| | **Control Cohort**: 35-40yr. olds in 1997 12-17 yrs. olds in 1974 | | | | **Treatment Cohort** 25-29: yr. olds in 1997 2-6 yrs. olds in 1974 | | | | **Cohort Differences** Control - Treatment | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *high program regions* | | *low program regions* | | *high program regions* | | *low program regions* | | *high program regions* | | *low program regions* | |
| | (1) male | (2) female | (3) male | (4) female | (1) male | (2) female | (3) male | (4) female | (1) male | (2) female | (3) male | (4) female |
| Father's education | 0.4194 | 0.3807 | 0.4893 | 0.3514 | 0.4561 | 0.4576 | 0.3130 | 0.2634 | -0.0367 | -0.0769 | 0.1763* | 0.0880 |
| | (0.0773)** | (0.0547)** | (0.0701)** | (0.0531)** | (0.0693)** | (0.0598)** | (0.0605)** | (0.0582)** | | | | |
| Mother's education | 0.2673 | 0.3849 | 0.2060 | 0.3570 | 0.1353 | 0.3029 | 0.1678 | 0.4010 | 0.1320 | 0.0820 | 0.0382 | -0.0440 |
| | (0.0889)** | (0.0642)** | (0.0844)* | (0.0600)** | (0.0883) | (0.0712)** | (0.0693)* | (0.0681)** | | | | |
| *sum (father's + mother's ed.)* | *0.687*** | *0.766*** | *0.695*** | *0.708*** | *0.591*** | *0.761*** | *0.481*** | *0.664*** | *0.095* | *0.005* | *0.215** | *0.044* |
| | | | | | | | | | **Change over time in regional differences** | | | |
| **Regional Differences** | high-low, Control Cohort | | | | high-low, Treatment Cohort | | | | male | | female | |
| *sum (father's + mother's ed.)* | -0.009 | 0.057 | | | 0.111 | 0.096 | | | -0.120 | | -0.039 | |

Standard errors in parentheses; * significant at 5%; ** significant at 1%

Notes:

a. High program regions are defined as regions where the residual of a regression of the number of schools on the number of children is positive.

b. Each cohort is placed in its age-12 region of residence.

c. A constant term was included in all regressions.

d. All regional differences, all cohort differences except males in low program regions, and all difference-in-differences are not statistically significant.

e. For both cohorts: Own and Mother's/Father's education comes from a combination of self reports, roster reports, and recall from children about their non-coresident parents.

**Table 5: Predicting Education with household consumption**

*Dependent Variable: Education (years)*

| | Younger Cohort | | | | Middle Cohort | | | | Older Cohort | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | lconshat<median | | lconshat>median | | lconshat<median | | lconshat>median | | lconshat<median | | lconshat>median | |
| | (1) male | (2) female | (3) male | (4) female | (1) male | (2) female | (3) male | (4) female | (1) male | (2) female | (3) male | (4) female |
| Father's education | 0.2526 | 0.2866 | 0.2533 | 0.2969 | 0.3754 | 0.3827 | 0.3627 | 0.4167 | 0.4444 | 0.3455 | 0.4751 | 0.5055 |
| | (0.0324)** | (0.0329)** | (0.0291)** | (0.0306)** | (0.0603)** | (0.0505)** | (0.0360)** | (0.0307)** | (0.0821)** | (0.0649)** | (0.0417)** | (0.0332)** |
| Mother's education | 0.2810 | 0.2979 | 0.2457 | 0.2364 | 0.2474 | 0.3406 | 0.2924 | 0.4000 | 0.1642 | 0.3230 | 0.2598 | 0.3541 |
| | (0.0346)** | (0.0369)** | (0.0313)** | (0.0332)** | (0.0680)** | (0.0582)** | (0.0397)** | (0.0353)** | (0.0987) | (0.0826)** | (0.0491)** | (0.0431)** |
| Constant | 6.4688 | 6.2204 | 7.2181 | 6.8952 | 5.2827 | 3.5850 | 6.2434 | 4.1803 | 4.7223 | 2.5896 | 4.7283 | 2.7778 |
| | (0.1612)** | (0.1603)** | (0.1984)** | (0.2112)** | (0.2214)** | (0.1732)** | (0.1843)** | (0.1498)** | (0.2262)** | (0.1771)** | (0.1519)** | (0.1279)** |
| Observations | 1058 | 1111 | 837 | 898 | 938 | 1040 | 1707 | 1968 | 533 | 452 | 1356 | 1480 |
| R-squared | 0.21 | 0.27 | 0.33 | 0.37 | 0.15 | 0.23 | 0.31 | 0.40 | 0.10 | 0.21 | 0.24 | 0.37 |
| *sum (father's + mother's ed.)* | *0.534*** | *0.585*** | *0.499*** | *0.533*** | *0.623*** | *0.723*** | *0.655*** | *0.817*** | *0.609*** | *0.669*** | *0.735*** | *0.860*** |

Standard errors or significance level of coefficient tests in parentheses; * significant at 5%; ** significant at 1%

Notes:

a. 'lconshat' is the log of 'implied consumption', where 'implied consumption' is created by using the coefficients from a regression of the log of household consumption on father's profession, father's and mother's age at child's birth, and an indicator of whether a parent died before the child turned 10, to produce fitted values of childhood household consumption for all three cohorts.

b. For all cohorts: Own and Mother's/Father's education comes from a combination of self reports, roster reports, and recall from children about their non-coresident parents.

c. Roughly 880 observations are shared by the column (1) and column (5) regressions -- some Younger Cohort fathers appear also as Older cohort sons. Roughly 1140 observations are shared by the column (2) and column (6) regressions -- some Younger Cohort mothers appear also as Older cohort daughters.

d. Roughly 13 to 16 percent of Younger Cohort males and females were reported as "enrolled" in 2000. Expected final education of Younger Cohort enrolled individuals is not much different from education already completed in 1997.

e. Younger Cohort were born between 1976 and 1980; Middle Cohort were born between 1961 and 1969; Older Cohort were born between 1943 and 1956.

**Table 6: Predicting Consumption**

*Dependent Variable: Log(household per-capita consumption)* *Middle Cohort - Table 1a* *Middle Cohort - Table 1a* *Older Cohort - Table 1a*

| | 24-32 in 2000 | | 31-39 in 2000 | | 37-50 in 2000 | | 24-32 in 1993 | | 37-50 in 1993 | |
|---|---|---|---|---|---|---|---|---|---|---|
| dad's education (years) | 0.0383 | 0.0299 | 0.0407 | 0.0344 | 0.0402 | 0.0313 | 0.0484 | 0.0500 | 0.0496 | 0.0438 |
| | (0.0030)** | (0.0035)** | (0.0037)** | (0.0047)** | (0.0035)** | (0.0050)** | (0.0074)** | (0.0093)** | (0.0075)** | (0.0120)** |
| mom's education (years) | 0.0412 | 0.0427 | 0.0330 | 0.0275 | 0.0301 | 0.0260 | 0.0367 | 0.0294 | 0.0345 | 0.0294 |
| | (0.0033)** | (0.0036)** | (0.0042)** | (0.0052)** | (0.0042)** | (0.0057)** | (0.0085)** | (0.0104)** | (0.0093)** | (0.0141)* |
| *sum (father's + mother's ed.)* | *0.080*** | *0.073*** | *0.074*** | *0.062*** | *0.070*** | *0.057*** | *0.085*** | *0.079*** | *0.084*** | *0.073*** |
| parent died before child was 10 (0/1) | | -0.0404 | | -0.0177 | | -0.1349 | | -0.1070 | | -0.2106 |
| | | (0.0783) | | (0.0549) | | (0.0463)** | | (0.1047) | | (0.0848)* |
| dad's profession = professional/technical | | 0.1908 | | 0.2744 | | 0.2943 | | 0.0759 | | 0.0652 |
| | | (0.0496)** | | (0.0631)** | | (0.0702)** | | (0.1325) | | (0.1537) |
| dad's profession = administrative/managerial | | 0.2296 | | 0.2611 | | 0.2605 | | 0.2739 | | 0.0656 |
| | | (0.0649)** | | (0.0839)** | | (0.0873)** | | (0.1702) | | (0.2108) |
| dad's profession = clerical | | 0.1161 | | 0.1480 | | 0.1915 | | 0.2100 | | -0.1602 |
| | | (0.0489)* | | (0.0733)* | | (0.0842)* | | (0.1461) | | (0.2030) |
| dad's profession = sales | | 0.2116 | | 0.2106 | | 0.1964 | | 0.3270 | | 0.1739 |
| | | (0.0316)** | | (0.0405)** | | (0.0429)** | | (0.0798)** | | (0.0959) |
| dad's profession = service | | 0.0833 | | 0.0637 | | 0.1811 | | 0.0193 | | 0.3880 |
| | | (0.0388)* | | (0.0535) | | (0.0597)** | | (0.1133) | | (0.1281)** |
| dad's profession = production/transportation/manual | | -0.0496 | | -0.0163 | | -0.0325 | | -0.0255 | | 0.0314 |
| | | (0.0268) | | (0.0372) | | (0.0405) | | (0.0752) | | (0.0965) |
| Constant | 11.7812 | 11.7702 | 11.8446 | 11.8313 | 11.9062 | 11.8942 | 10.7698 | 10.7274 | 10.7349 | 10.7370 |
| | (0.0173)** | (0.0202)** | (0.0185)** | (0.0242)** | (0.0165)** | (0.0240)** | (0.0362)** | (0.0478)** | (0.0313)** | (0.0522)** |
| Observations | 5386 | 4334 | 3974 | 2761 | 4832 | 2654 | 2680 | 1906 | 3304 | 1462 |
| R-squared | 0.17 | 0.20 | 0.13 | 0.14 | 0.09 | 0.11 | 0.06 | 0.08 | 0.05 | 0.06 |
| TESTS: parents' education significantly different? | | | | | | | | | | |
| across cohorts | | | | | | | | | | |
| **24-32 in 2000 vs. 24-32 in 1993** | *no* | *no* | | | | | | | | |
| **24-32 in 1993 vs. 37-50 in 1993** | | | | | | | *no* | *no* | | |
| **24-32 in 2000 vs. 37-50 in 2000** | *yes** | *yes*** | | | | | | | | |
| **37-50 in 1992 vs. 37-50 in 2000** | | | | | *yes** | *yes*** | | | | |
| same cohort over time | | | | | | | | | | |
| **24-32 in 1993 vs. 31-39 in 2000** | | | *yes** | *yes** | | | | | | |

Standard errors in parentheses; * significant at 5%; ** significant at 1%

Notes:

a. Dad's profession = farming/fisheries/forestry was dropped.

b. Both 2000 and 1993 per-capita consumption are compressed at the top and bottom 2 percent. Also, household members age 0 to 10 are counted as 0.5 a capita.

c. Sample includes those identified as other than head of household.

d. For all cohorts: Mother's/Father's education comes from a combination of self reports, roster reports, and recall from children about their non-coresident parents.

**Table 7a: Predicting Education - Bangladesh**

*Dependent Variable: Education (years)*

| | Younger Cohort | | Middle Cohort | | Older Cohort | |
|---|---|---|---|---|---|---|
| | (1) male | (2) female | (3) male | (4) female | (5) male | (6) female |
| Father's education | 0.3326 | 0.3563 | 0.5645 | 0.3354 | 0.5083 | 0.2155 |
| | (0.0304)** | (0.0317)** | (0.0379)** | (0.0225)** | (0.0463)** | (0.0175)** |
| Mother's education | 0.2719 | 0.2783 | 0.3997 | 0.4186 | 0.5196 | 0.3336 |
| | (0.0492)** | (0.0483)** | (0.0742)** | (0.0383)** | (0.1108)** | (0.0400)** |
| Constant | 4.2131 | 3.76550 | 2.6576 | 1.14420 | 3.1432 | 0.49210 |
| | (0.1322)** | (0.1390)** | (0.1280)** | (0.0856)** | (0.1415)** | (0.0622)** |
| Observations | 1096 | 880 | 1264 | 1527 | 1014 | 1284 |
| R-squared | 0.23 | 0.29 | 0.28 | 0.34 | 0.19 | 0.25 |
| *sum (father's + mother's ed.)* | *0.605*** | *0.635*** | *0.964*** | *0.754*** | *1.028*** | *0.549*** |
| TESTS: parents' education significantly different? | | | | | | |
| across cohorts | | | | | | |
| vs. Middle Cohort | *yes*** | *yes** | | | *no* | *yes*** |
| vs. Older Cohort | *yes*** | *no* | | | | |

Standard errors or significance level of coefficient tests in parentheses; * significant at 5%; ** significant at 1%

Notes:

a. For all cohorts: Own and Mother's/Father's education comes from a combination of self reports, roster reports, and recall from children about their non-coresident parents.

b. Roughly 47 percent of the Younger Cohort was reported as "enrolled" in 1996.

c. Younger Cohort were born between 1975 and 1979; Middle Cohort were born between 1961 and 1969; Older Cohort were born between 1943 and 1956.

**Table 7b: Predicting Education - Bangladesh**

*Dependent Variable: Education (years) - expected* [a]

| | Younger Cohort | | Middle Cohort | | Older Cohort | |
|---|---|---|---|---|---|---|
| | (1) male | (2) female | (3) male | (4) female | (5) male | (6) female |
| Father's education | 0.3406 | 0.3638 | 0.5645 | 0.3354 | 0.5083 | 0.2155 |
| | (0.0311)** | (0.0325)** | (0.0379)** | (0.0225)** | (0.0463)** | (0.0175)** |
| Mother's education | 0.2782 | 0.2859 | 0.3997 | 0.4186 | 0.5196 | 0.3336 |
| | (0.0503)** | (0.0495)** | (0.0742)** | (0.0383)** | (0.1108)** | (0.0400)** |
| Constant | 4.2940 | 3.8449 | 2.6576 | 1.1442 | 3.1432 | 0.4921 |
| | (0.1352)** | (0.1424)** | (0.1280)** | (0.0856)** | (0.1415)** | (0.0622)** |
| Observations | 1096 | 880 | 1264 | 1527 | 1014 | 1284 |
| R-squared | 0.23 | 0.29 | 0.28 | 0.34 | 0.19 | 0.25 |
| *sum (father's + mother's ed.)* | *0.619*** | *0.650*** | *0.964*** | *0.754*** | *1.028*** | *0.549*** |
| TESTS: parents' education significantly different? | | | | | | |
| across cohorts | | | | | | |
| vs. Middle Cohort | *yes*** | *yes** | | | *no* | *yes*** |
| vs. Older Cohort | *yes*** | *no* | | | | |

Standard errors or significance level of coefficient tests in parentheses; * significant at 5%; ** significant at 1%

Notes:

a. Younger Cohort enrolled individuals were given extra education as follows (approximating expected completed education): age 17 = 0.29 years; age18 = 0.28 years; age 19 = 0.25 years; age 20 = 0.19 years; age 21 = 0.17 years.

b. For all cohorts: Own and Mother's/Father's education comes from a combination of self reports, roster reports, and recall from children about their non-coresident parents.

c. Roughly 47 percent of the Younger Cohort was reported as "enrolled" in 1996.

d. Younger Cohort were born between 1975 and 1979; Middle Cohort were born between 1961 and 1969; Older Cohort were born between 1943 and 1956.

**Table 7c: Predicting Education - Bangladesh**

*Dependent Variable: Education (years) - non-enrolled only*

| | **Alternate Younger Cohort**: non-enrolled | | **Middle Cohort**: non-enrolled | | **Older Cohort**: non-enrolled | |
|---|---|---|---|---|---|---|
| | (1) male | (2) female | (1) male | (2) female | (1) male | (2) female |
| Father's education | 0.4342 | 0.3894 | 0.5312 | 0.3237 | 0.506 | 0.2106 |
| | (0.0484)** | (0.0392)** | (0.0390)** | (0.0221)** | (0.0463)** | (0.0175)** |
| Mother's education | 0.3946 | 0.297 | 0.4342 | 0.4254 | 0.5221 | 0.3362 |
| | (0.0880)** | (0.0675)** | (0.0761)** | (0.0378)** | (0.1109)** | (0.0402)** |
| Constant | 2.9073 | 2.19360 | 2.5604 | 1.10740 | 3.1461 | 0.49130 |
| | (0.1608)** | (0.1529)** | (0.1270)** | (0.0837)** | (0.1417)** | (0.0618)** |
| Observations | 650 | 623 | 1216 | 1508 | 1012 | 1277 |
| R-squared | 0.22 | 0.28 | 0.26 | 0.34 | 0.19 | 0.24 |
| *sum (father's + mother's ed.)* | *0.829*** | *0.686*** | *0.965*** | *0.749*** | *1.028*** | *0.547*** |
| TESTS: parents' education significantly different? | | | | | | |
| across cohorts | | | | | | |
| vs. Middle Cohort | *no* | *no* | | | *no* | *yes*** |
| vs. Older Cohort | *no* | *yes** | | | | |

Standard errors or significance level of coefficient tests in parentheses; * significant at 5%; ** significant at 1%

Notes:

a. For all cohorts: Own and Mother's/Father's education comes from a combination of self reports, roster reports, and recall from children about their non-coresident parents.

b. Roughly 25 percent of the Alternate Younger Cohort was reported as "enrolled" in 1996.

c. Alternate Younger Cohort were born between 1971 and 1974; Middle Cohort were born between 1961 and 1969; Older Cohort were born between 1943 and 1956.