Education in a Crisis

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1. Introduction

In recent years, financial markets have played an important role in the transmission of economic fluctuations. In the United States, the wealth effect associated with the rise -- and, subsequent decline -- of the stock market during the 1980s and 1990s has influenced many behaviors. The effects of exchange rate crises in Latin America and Asia have not only had a profound effect on the economies in those regions but reverberated throughout the world. Exchange rate shocks have been both large and frequent in the last fifteen years. This paper examines the effect of one such crisis -- the collapse of the Indonesian economy -- on the behavior of households. We focus on decisions regarding investments in human capital and, in particular, in the education of the next generation.

A good deal has been written about exchange rate crises, in general, and the Asian crisis, in particular, from a macro-economic perspective.[1] Much less is known about the impact of these crises at the micro-level.[2] Yet, it is important to know how the impacts are distributed across economic and social strata within a population and to also know how households have responded to the crises in order to understand the effects of the crisis on a population and to design policies that will mitigate the deleterious effects of the crisis.

The majority of the literature on risk in low income settings has focussed on farmer response to weather risk and the adoption of mechanisms to provide insurance in the fact of that risk. (See, for example, Rosenzweig, 1988; Rosenzweig and Wolpin, 1993; Udry, 1994; Fafchamps, Udry and Czukas, 1998; Townsend, 1993; Platteau, 1991.) The effects of financial crises are likely to be different for several reasons. First, the immediate effect of the crisis is likely to be felt not by relatively low income farmers, many of whom are isolated from market economies, but by those active in the modern or commercial economy -- people who tend to be urban and relatively high income. Second, exchange rate crises typically translate into relative price shocks which are transmitted more efficiently where markets are more fully developed. Subsistence farmers are likely to be largely protected from the effects of exchange rate risk. Indeed, it is precisely because markets are poorly developed in rural economies that there are likely to be limited mechanisms to insure oneself against

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[1]See, for example, Radelet and Sachs (1998), Corsetti, Pesenti and Roubini (1998a, 1998b) and the materials produced by the NBER Project on Exchange Rate Crises in Emerging Market Countries. Ahuja et al, (1997) and Cameron, (1999) provide a description of the Asian crisis in the context of the Indonesian economy.

[2]Fallon and Lucas (2000) provide an excellent summary of the evidence on the effect of economic shocks on household well-being. Frankenberg, Beegle and Thomas (1999) provide a broad overview of the immediate effect of the Indonesian crisis on an array of indicators of individual and family well-being. Those, and other results, are summarized in Poppele, Sudarno and Pritchett (1999). Levinsohn, Berry and Friedman (1999) explore the likely effects of the crisis using household budget data collected prior to the crisis.

weather risk. Third, the effects of weather shocks are typically more spatially concentrated than those of exchange rate shocks.

These insights suggest that the effects of the Indonesian crisis were likely to be felt primarily by the urban elites (as suggested by Sudarno, Popelle and Pritchett, 1999, for example). If, however, higher income households have more opportunities to smooth the effects of a major shock than households with fewer resources, then this intuition may be wrong. The question of how individuals and households have been affected by the crisis -- and how they have responded to it -- is fundamentally an empirical issue.

To address this question, this paper draws on household longitudinal survey data that were specifically collected for this purpose in conjunction with a time-series of SUSENAS, a cross-section household survey conducted annually by the Indonesian Government. Our primary data source is two waves of the Indonesian Family Life Survey (IFLS). The earlier wave, IFLS2, was conducted in the second half of 1997, prior to the full brunt of the crisis unfolding in Indonesia, and the follow-up survey, IFLS2+, was conducted a year later in the second half of 1998.

We begin with evidence on the trajectory of school enrolments in Indonesia during the 1990s and demonstrate that the trend of increased enrolments among school-age children was dramatically reversed at the time of the crisis. Turning to IFLS, we provide an overview of the magnitude of the crisis, as indicated by changes in household *per capita* expenditure (PCE) and argue that interpretation of those changes as indicative of changes in welfare is far from straightforward. We proceed to examine spending on education and show that it has declined most for the poorest households and provide suggestive evidence that schooling of young children in these households has been most deleteriously affected by the crisis. At the same time, poor households appear to have sought to protect the education of older children. Similar finding emerge for school enrolments. In contrast, among households that were better off in 1997, there is little evidence that the crisis has had any impact on schooling of children.

Two conclusions emerge. First, the distribution of the medium and longer-term effects of the crisis may be substantially different from the immediate impacts. Real resources of households throughout the income distribution were affected by the crisis. In terms of investments in schooling, it is the poorest who appear to have made the deepest cuts. If schooling is productive and the young children from poor households are not able to catch up with their peers who did not delay or interrupt their schooling, they may well pay the price of the crisis throughout their lives. Second, the results suggest that poor households have adopted strategies with regard to investment in education that seek to minimize the economic burden of the crisis on

the well-being of the entire household and chosen to invest in schooling of those children for whom the returns are likely to be greatest.

The next section provides background and lays out our conceptual framework. Description of the IFLS is followed by the empirical evidence. The magnitude of the crisis in terms of school enrolments is presented drawing on both the SUSENAS and IFLS. We then examine the allocation of the household budget and test hypotheses suggested by that evidence using information on enrolments. The final section concludes.

2. Background

After almost three decades of sustained economic growth, Indonesia is in the midst of a major economic and financial crisis. Relative to its level in 1997, output in 1998 declined by over 12% and remained at about the same level in 1999. This major shock has been accompanied by dramatic shifts in both the economic and political landscape in the country.

As indicated in Figure 1, the rupiah came under pressure in the last half of 1997 when the exchange rate began showing signs of weakness. It fell from around 2,400 per US$ to about 4,800 per US$ by December 1997. In January 1998, the rupiah collapsed. Over the course of a few days, it fell by a factor of three to Rp15,000 per US$. Although it soon recovered, by the middle of the year the rupiah had slumped back to the lows of January, 1998. Since then, the rupiah has fluctuated between Rp7,000 and Rp10,000 per US$. The exchange rate has been characterized by extremely high volatility, particularly around the time of the onset of the crisis, and there has been considerable uncertainty in the financial markets. Chaos has reigned in the banking sector. Several major banks have closed or been taken over by the Indonesian Bank Restructuring Agency which has been racked by controversy. All of this turmoil has wreaked havoc with both the confidence of investors and the availability of credit.

For most inside and outside Indonesia, the timing and severity of the crisis came as a shock. In January of 1998, days before the collapse of the rupiah, the IMF described Indonesia's economic situation as “worrisome” (IMF, 1998) while President Soeharto, announcing measures intended to boost the economy, predicted zero economic growth and inflation of 20% for 1998. In fact, economic growth in 1998 declined by 15% and inflation hit around 80%. In July of 1998, James Wolfensohn, president of the World Bank, remarked “we were caught up in the enthusiasm of Indonesia. I am not alone in thinking that 12 months ago, Indonesia was on a very good path.”

After the rupiah collapsed, prices spiralled upwards. In part, this was because subsidies were removed on several goods -- most notably rice, the staple, as well as oil and fuel. Food prices, especially staples, rose about 20% more than the general price index during this time. In 1999, prices remained fairly constant overall and food prices declined slightly.

Simultaneously, Indonesia is undergoing dramatic transformation in the political sector. After over three decades as President, Suharto resigned in May 1998. Multi-party elections were held in mid-1999 and reforms to revive political activity have been instituted through the country. How effective these reforms will ultimately be remains to be seen. There are mounting pressures for devolution in parts of the country and protests, in some cases violent, continue to rock the country.

Few Indonesians have remained untouched by the upheavals associated with the financial crisis. For some, the turmoil has been devastating. For others, it has brought new opportunities. Exporters, export producers and (net) food producers[3] are likely to have fared far better than those engaged in the production of services and non-tradeables or those on fixed incomes. There are many dimensions to the crisis in Indonesia and many ways in which individuals and families are likely to have responded to it. Precisely because of this complexity, in the absence of empirical evidence, it is difficult to predict with much confidence what the combined impact of all facets of the crisis are likely to be -- and how the impacts are likely to vary across socio-economic groups and across demographic groups.

We assume that households allocate resources to maximize the present discounted value of utility which depends on consumption of goods and leisure, x_t. The production of human capital of children, θ_t, depends on inputs, some of which involve expenditures -- such as fees at school and costs of transport to school -- whereas others are produced at home. To the extent that parents value investments in their children directly, child human capital will enter the utility function, u:

$$\max \sum_t u_t(x_t,\theta_t,\mu_t,\varepsilon_t)\, e^{-rt}$$

where μ and ε represents observable and unobservable household characteristics, respectively, and r is the discount factor. In the absence of liquidity constraints, conditional on characteristics, μ, and tastes, ε, demand will, in general, depend on (the present discounted value of) life time resources, R, and all prices:

$$\omega_t = \omega_t(R, \mu, p, \varepsilon)$$

[3]The inference that net food producers were protected from the negative effects of the crisis because of the rise in the relative price of foods needs to be tempered by the fact that there was a prolonged drought in the east of the country in 1997 and that relative food prices had begun to decline by 1999.

where ω encompasses both consumption, x, and investment goods including investment in schooling, θ. μ and p are vector-valued and vary over time. More generally, if households are limited in their scope to shift resources across time, current consumption and investment will also depend on current resources, R_t, household characteristics, μ_t, and prices, p_t:

$$\omega_t = \omega_t(R_t, \mu_t, p_t, R, \mu, p, \varepsilon) \quad [1]$$

In order to place the spotlight on the impact of the crisis, we take first differences of [1] and examine changes in the allocation of resources to consumption and investment. Treating life time resources and characteristics as a household-specific fixed effect which enters [1] in a linear way we have

$$\Delta\omega_t = \Delta\omega_t(R_t, \mu_t, p_t, \varepsilon) \quad [2]$$

We focus on investments in education of children which we measure with both education expenditures and the probability a child is enrolled in school (which depends on household characteristics and the child's characteristics).

If households are not liquidity constrained, and there are no changes in the expected net return to schooling, then changes in investments in education, $\Delta\omega$, should not vary with resources or household demographic characteristics (except to the extent that education needs vary with a child's age). If, however, households are liquidity constrained then they are likely to reduce spending on those items that contribute least to the present discounted value of welfare. Delayed purchases of durables and semi-durables are good candidates since the welfare costs are likely to be relatively low particularly if the crisis is expected to be short-lived (Browning and Crossley, 1997). A similar argument might be made for education spending if those reductions have a small impact on the life-time accumulation of human capital of household members. For example, if children who do not pay fees, wear school uniforms or do not purchase books and supplies learn as much as other children, then it makes sense for households to cut back their education budget although taking account of general equilibrium effects tempers that inference.

As a complement to analyses of education spending at the household level, child school enrolments are examined. If one views reductions in spending on schooling as operating on the intensive margin, the failure of a child to be enrolled in school provides information at the extensive margin. If cuts in spending have no consequences on human capital accumulation, we would expect no changes in enrolment rates.

Investments in schooling will be reduced if the net expected benefit associated with those investments declines at the time of the crisis. On the one hand, the pecuniary cost of schooling rose and the quality of (public) schooling likely declined as the crisis unfolded. In the public sector, school budgets are set in nominal

terms about a year before the beginning of the school year. With inflation spiralling to around 80% during the first nine months of 1998, by August 1998, the beginning of the 1998/99 school year, school purchasing power was severely eroded. The IFLS community survey indicates that over three-quarters of schools reported their operations were negatively impacted by reduced real resources. On the other hand, real market wages declined by about 40% between 1997 and 1998 and the reduced opportunity cost of schooling would presumably result in higher enrolment rates. This substitution effect must be balanced against the income effect associated with reduced real household resources which would lead to greater allocation of time to earning (or substituting for the time of others in the household who earn income).

A priori, it is not obvious which of all these effects would dominate. It is plausible that the relative magnitudes of the different effects will vary with the age of a child and also across the income distribution which affects the interpretation of evidence based on [2].

It is possible to make some progress on interpreting the data by assessing whether household composition influences investments in human capital and if those effects vary with household resources. In the spirit of tests for completeness of markets adopted by Pitt and Rosenzweig (1986) and later Benjamin (1990), if households are not resource constrained, there is no reason to expect the demographic structure of the household to influence investment decisions. If, however, households are resource constrained, then they are likely to maintain investments in the education of those children for whom reduced spending is likely to incur the greatest cost to the household. In that case changes in school spending and enrolments will vary with both resource availability and household structure. We will present evidence along these lines below.

3. Data

IFLS is a large-scale integrated socio-economic and health survey that collects extensive information on the lives of individuals, their households, families and the communities in which they live. The sample is representative of about 83% of the Indonesian population and contains over 30,000 individuals living in 13 of the 27 provinces in the country. A broad-purpose survey, IFLS contains a wealth of socio-economic and demographic information about each household. For the purposes of this paper, we rely primarily on detailed information on household demographic characteristics, expenditure patterns, school enrolment and labor supply.

An on-going longitudinal survey, the first wave was conducted in 1993/94 (IFLS1), with a follow-up in 1997/98 (IFLS2). A special resurvey, designed for this project, was conducted in late 1998 (IFLS2+) and followed a 25% subset of the IFLS sample. A follow-up of the entire sample of households was conducted

in 2000 (IFLS3). In this study, we focus on the immediate effects of the crisis and, therefore, draw primarily on interviews with those households that were interviewed in both 1997 and 1998. Our analytical sample contains information on almost 10,000 individuals living in around 2,000 households.

The IFLS sampling scheme was designed to balance the costs of surveying the more remote and sparsely-populated regions of Indonesia against the benefits of capturing the ethnic and socioeconomic diversity of the country. The scheme stratified on provinces, then randomly sampled within enumeration areas (EAs) in each of the 13 selected provinces.[4] A total of 321 EAs were selected from a nationally representative sample frame used in the 1993 SUSENAS (a survey of about 60,000 households). Within each EA, households were randomly selected using the 1993 SUSENAS listings obtained from regional offices of the Bureau Pusat Statistik (BPS).

The second wave of IFLS (IFLS2) was fielded four years later, between August 1997 and January 1998, (Figure 1). The goal was to recontact all 7,224 households interviewed in IFLS1. If during the course of the fieldwork, we discovered that a household had moved, we obtained information about their new location and followed them as long as they resided in any of the 13 IFLS provinces. This means that, by design, we lose households that have moved abroad or to a non-IFLS province; they account for a very small proportion of our households (<1%) and are excluded because the costs of finding them are prohibitive. 93.3% of the IFLS1 households were re-contacted and successfully re-interviewed. Excluding those households in which everyone has died (usually single-person households), the success rate is 94.5%.[5]

Given this success, and the timing, IFLS2 was uniquely well-positioned to serve as a baseline for another interview with the IFLS respondents to provide some early indicators of how they have been affected by the economic crisis. In August-December, 1998, we fielded IFLS2+.

In a study of this nature, time is of the essence. It took over two years to plan, test and field IFLS2. Because our goal was to measure the immediate effect of the crisis, we did not have two years for IFLS2+. Nor could we raise the resources necessary to mount a survey of the same magnitude as IFLS2. Funding availability and human resources dictated that we field a scaled down survey.

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[4]The provinces are four on Sumatra (North Sumatra, West Sumatra, South Sumatra, and Lampung), all five of the Javanese provinces (DKI Jakarta, West Java, Central Java, DI Yogyakarta, and East Java), and four provinces covering the remaining major island groups (Bali, West Nusa Tenggara, South Kalimantan, and South Sulawesi).

[5]Few of the respondents refused to participate (1%) and so the vast majority of those households that were not re-interviewed were not found. About 15% of these are known to have moved to destinations outside Indonesia or in a non-IFLS province; they were, therefore, not followed. The rest are households that have moved but that we were unable to relocate.

By design, IFLS2+ re-administers many of the IFLS1 and IFLS2 questions so that comparisons across rounds can be made for characteristics of households and individuals (although some sub-modules were cut to reduce costs). The key dimension in which the survey was scaled down is sample size. Using all of the original 321 IFLS EAs as our sampling frame, we drew the IFLS2+ sample in two stages. First, to keep costs down, we decided to revisit 7 of the 13 IFLS provinces: North Sumatra, South Sumatra, Jakarta, West Java, Central Java, West Nusa Tenggara and South Kalimantan. These provinces were picked so that they spanned the full spectrum of socio-economic status and economic activity in the fuller IFLS sample. Second, within those provinces, we randomly drew 80 EAs (25%) with weighted probabilities in order to match the IFLS sample as closely as possible.[6]

Counting all the original households in IFLS1 (whether or not they were interviewed in IFLS2) as well as the split-offs in IFLS2, there are 2,066 households in the IFLS2+ target sample. The turmoil in Indonesia during 1998 made relocating and interviewing these households particularly tricky. Fortunately, the combination of outstanding fieldworkers, the experience of IFLS2 and the willingness of our respondents to participate meant that we achieved an even higher success rate than in IFLS2. As shown in Panel A of Table 1, over 95% of the target households were re-interviewed; excluding those households in which all IFLS1 household members are known to have died by 1998, the household completion rate increases to 96%. The re-interview rate exceeds 90% in all provinces and exceeds 95% in 5 of the 7 provinces.

From a scientific point of view, it is important to retain all the original respondents in our target sample, even if they were not interviewed in IFLS2. This means, therefore, that our target sample includes the (approximately) 6% of households in the IFLS2+ EAs that were not interviewed in 1997. In 1998, we successfully contacted over 60% of those households. However, for the purposes of this paper, the households of central interest are those that were interviewed in both 1997 and 1998 since it is only for these households that we can contrast their lives now with their lives a year ago. These are the households which form the analytic sample used in the rest of this paper. Restricting ourselves to these 1,934 households, we re-interviewed over 98% of the IFLS2 households (see panel B of Table 1). The completion rate exceeds 95% in every province and in one province, West Nusa Tenggara, we re-interviewed every IFLS2 household.

[6]The weights are based on the marginal distributions of sector of residence (urban or rural), household size, education level of the household head and quartiles of per capita expenditure (measured in 1993). The IFLS2+ sample is representative of the entire IFLS sample and our purposive sampling has, in fact, achieved a very high level of overall efficiency -- 74% relative to a simple random sample.

While we have succeeded in keeping attrition low in the survey, it is important to recognize that the households that were not recontacted are not likely to be random. To provide some sense of the magnitude of the problem, we can compare the observed characteristics (measured in 1993) of the households that were recontacted with the target sample of all IFLS households. Results for some key households characteristics are reported in Panel C of Table 1. The differences between the full sample of IFLS households in the EAs included in IFLS2+ and the households that were re-interviewed (in 1997 and again in 1998) is, in all cases, small and not significant. Households that were not re-interviewed tend to have slightly higher levels of *per capita* expenditure, lower food shares and fewer members than the full sample in 1993.

We know a little more about households that have been lost to attrition. Recall, in 1998, we found 60% of the households that were originally living in IFLS2+ EAs but were not found in 1997. In terms of their characteristics in 1993 and 1998, these households are not significantly different from the sample of households that were interviewed in all three waves. We conclude, therefore, that attrition bias is not likely to be of overwhelming importance in the analyses presented below.

The majority of longitudinal household surveys in developing countries have not attempted to follow households that move out of the community in which they were interviewed in the baseline. In the IFLS, we did attempt to follow movers. Had we followed the strategy of simply interviewing people who still live in their original housing structure, we would have re-interviewed approximately 83% of the IFLS1 households in IFLS2 and only 77% of the target households in IFLS2+ rather than the 96% that we did achieve. Thus, movers contribute about 20% to the total IFLS2+ sample and they are extremely important in terms of their contribution to the information content of the sample. This is apparent in the last two columns of Panel C of Table 1 which present the characteristics (measured in 1993) of households that were found in the original location in 1997 and 1998 (column 4) and movers (column 5). Mover households are smaller, younger and had higher expenditures in 1993.[7] Given our goal is to examine the impact of the crisis on expenditures of households, the act that movers have expenditures that are 50% higher than stayers indicates the critical importance of following movers in order to interpret the evidence. Had we not attempted to follow movers, we would have started out with a substantially biased sample. (For a fuller discussion of attrition in the IFLS along with a discussion of the costs and benefits of tracking movers in longitudinal surveys, see Thomas, Frankenberg and Smith, 2001.)

[7]These differences are all significant; the relevant t statistics are 4.1, 3.4 and 3.8, respectively.

4. Empirical evidence

We begin with a description of the trajectory of enrolment rates in Indonesia during the 1990s, focussing attention on changes at the time of the crisis. We proceed to examine the distribution of these changes across location and levels of household resources. We then discuss changes in spending on education by households and highlight the role of household composition. This leads us to return to the evidence on enrolments to assist in the interpretation of the evidence.

School enrolments

To place the effect of the financial crisis on educational attainment in a temporal context, Table 2a reports the percentage of children and young adults who were not enrolled in school for each year from 1993 through 1998. Non-enrolment rates are presented by year of age for children from 7 through 19 years old. These non-enrolment rates are based on the SUSENAS, a nationally representative household budget survey conducted by *Bidan Pusat Statistik (BPS)*, the Indonesian central statistical bureau, in February of each year.[8]

In the mid-1990s, over 90% of children age 8 through 12 were enrolled in school, as were about 75% of 13 to 14 year olds and about half children age 15 through 17. During the period 1993 through 1997, the fraction of children age 7 through 17 not enrolled in school declined substantially: relative to the early 1990s, in 1997, more children had started school by age 7 and young adults were staying at school longer. The reduction in the fraction of children not in school between 1993 and 1997 is greatest for younger children (about 30% for those age 7 through 13) and, by 1997, primary school was close to universal for these children.

In 1998, the trend of rising enrolments reversed for younger children. The fraction of children not enrolled in school increased for all children age 7 through 13 and, for those between 8 and 11, the increase was between 10 and 20%. In contrast, those age 14 and older were more likely to be in school in 1998, relative to 1997, perhaps because of diminished earning opportunities as the crisis unfolded.

These simple differences between enrolment rates in 1997 and 1998 understate the disruptive effect of the crisis on school attendance because they do not take into account the trends in enrolments in previous years. To provide a sense of the magnitude of that disruption, column 8 presents the predicted non-enrolment rate in 1998 for each age based on extrapolating the linear trend estimated with the data from 1993 through 1997. The (percentage) difference between the predicted non-enrolment rate and actual non-enrolment rate is

[8]Responses are drawn from the household roster which asks whether each household member is enrolled in school. The key respondent also provides more information on the main activity of each household member age 10 and older; unfortunately, the way that question was asked changed in 1998 rendering responses not comparable with prior years.

reported in column 9. Among 10 year olds, the fraction not in school in 1998 was over 25% higher than predicted by the linear trend. Clearly, the financial crisis has had a dramatic negative effect on school attendance among young Indonesians. The same cannot be said of older children: on average, 17 through 19 year olds were more likely to be in school in 1998 than would be expected in the absence of the crisis.

How do the changes in enrolment rates vary across the distribution of socio-economic status? As a first step towards answering this question, Table 2b presents non-enrolment rates after stratifying respondents into quartiles of *per capita* household expenditure (PCE) at the time of the survey.

In every age group, non-enrolment rates decline as PCE rises. Nonetheless, even among children in the poorest quartile of the PCE distribution, less than 7% of those age 8-11 were not enrolled in school in 1997 demonstrating that Indonesia has made great strides towards achieving universal enrolment of children in this age range. However, among those in the bottom quartile of PCE, there was a 20% increase in the fraction non-enrolled between 1997 and 1998. Turning to young adults (age 16 through 19), those who stayed on at school during the crisis tended to reside in households in the top half of the PCE distribution. Thus, in terms of school enrolment, the crisis has appeared to have taken its greatest toll on young, poorer children while older, better off children have tended to continue in school.

In Table 2b, PCE is measured at the time of each survey and so we only know that young children in the bottom quartile of the PCE distribution in 1998 were less likely to be in school than those children at the bottom of the PCE distribution in 1997. Given the fact that there was a good deal of income mobility at the onset of the crisis (Smith et al, 2001), this says nothing about whether it is children who were poor in 1997 who were most affected by the crisis. To address that question, it is necessary to have repeated observations on the same child in 1997 and 1998. We turn, therefore, to the IFLS.

Table 3a reports non-enrolment rates in 1997 (in the first three columns) and 1998 (in the fourth column). The first column is based on SUSENAS, excluding the provinces that are not covered by IFLS. Those provinces are on the outer islands, where school attendance is slightly lower than the rest of the country. IFLS estimates are presented in column 2; relative to SUSENAS, estimated enrolment rates are slightly lower for children age 8 through 12. In IFLS, 95.3% of these children are reported as currently enrolled in school; in SUSENAS, 96.9% are reported as enrolled. The main reason for this discrepancy lies in the way the questions are asked. In SUSENAS, when completing the household roster, the interviewer asks the household respondent whether each person is enrolled in school. The same question is asked in the IFLS roster. Based on that response, the enrolment rate for children age 8 through 12 in IFLS is 97.2%, which is not significantly

different from the SUSENAS-based estimate of 96.9%. In IFLS, however, each household member is administered an individual-specific interview and in that interview a battery of questions are asked about current and prior school attendance. (The questions are answered by the child's caretaker if the child is age 10 or under.) We use the answers from those questions in our analyses based on IFLS since the respondent to these questions is chosen because he or she is better informed about the index child, relative to the person completing the household roster.

Column 3 restricts the sample of IFLS2 respondents to those from households that were living, in 1993, in the 7 provinces included in IFLS2+. This restriction has little impact on the estimates indicating that in terms of school attendance the IFLS2+ provinces are not much different from the full set of IFLS provinces. The final column presents the non-enrolment rates in 1998, based on IFLS2+. The same patterns observed for the whole country based on SUSENAS, and reported in Table 2a, emerge in the IFLS sample. Young children are much less likely to be in school in 1998, relative to 1997, whereas older children are slightly more likely to be in school.

The relationship between school attendance and PCE is presented for IFLS respondents in Figure 2. Household PCE is measured in 1997. Enrolment rates increase with PCE in both 1997 and 1998 -- but not at the same rate. The gap between the two lines provides information about how the impact of the financial crisis on education enrolments is distributed. Among children in low PCE households, enrolments declined very substantially, the gap disappears around the 25th percentile of PCE, then widens until median PCE whereupon it declines, diminishing to zero at the top of the PCE distribution. This suggests the crisis affected the schooling of children from the poorest households and those from middle income households (as measured in 1997).

The lower panel of Figure 2 separates urban from rural children (where location of residence is also measured in 1997). The non-monotonicity of the impact of the crisis described above reflects the combination of substantially different effects in the urban and rural sector. In the urban sector, the enrolment gap is largest among children from households that were poorest in 1997, declines as 1997 PCE rises and it disappears at the top of the PCE distribution. In the rural sector, it is only children in the bottom quartile of the PCE distribution whose education has been perceptibly affected by the crisis.

Table 2b provides estimates of the magnitudes of the enrolment differences based on regressions that simultaneously control age, gender and (1997) province of residence of each child. PCE is specified as an indicator variable, one for each quartile. Standard errors take into account correlations among children within

a family. The first column reports the adjusted relationship between 1997 PCE and the probability a child is enrolled in school in 1997. Relative to a child in the bottom quartile of PCE, the reference category, a child in the second quartile is 6% more likely to be in school, 14% more likely in the third quartile and 17% more likely in the top quartile. The association between enrolments in 1998 and PCE (in 1997) is reported in the second column. Differences in enrolments across the distribution of PCE are greater in 1998 -- those in the top quartile are 23% more likely to be in school than those in the bottom quartile. Differences in the PCE profile between 1997 and 1998 are in the third column. The decline in enrolments between 1997 and 1998 is between 4 and 5 percentage points higher among children from households that were in the bottom quartile of PCE in 1997 relative to all other children. These results, and those in Figure 2, indicate that it is the poorest children whose education was deleteriously impacted by the crisis.

In the urban sector, it is only the enrolment gap between the bottom and top quartiles of PCE that is significant in 1997. By 1998, the advantage associated with elevated PCE accrued to all children in households above median PCE and the estimated enrolment gap between them and the poorest children doubled in size. Relative to children in the top quartile of PCE in 1997, there was a 10% point decline in the enrolment rate of children in the bottom quartile between 1997 and 1998. Among rural children, in 1997, higher PCE was associated with an increased probability of school attendance throughout the distribution. While the association between schooling and PCE is stronger in 1998, the difference between 1997 and 1998 is not significant.

Clearly, in terms of investment in the education of the next generation, it is those children who were living in 1997 in the poorest households who have born the brunt of the crisis. While this is true for both rural and urban children, it is the urban children for whom the declines in enrolment rates between 1997 and 1998 appear to be the greatest. The conclusion of Sudarno, Popelle and Pritchett (1999) that the Indonesian crisis affected primarily the urban elites is simply not consistent with these data.

School attendance is one measure of investment in human capital. There are, however, many other dimensions in which investments in education may be influenced by the crisis. The evidence in IFLS points to a reduction in the infra-marginal allocation of time to schooling. Among those in school, in 1998, children spent slightly less time in school: the average child spent 6 hours per day in school in 1997 and 0.9 hours (standard error=0.03) less in 1998. Children in school were more likely to be also working for money in 1998. (3% reported working in 1997 and 6% in 1998.) Among those school children also working, the amount of time spent working was slightly higher in 1998 (2.2 hours per day in 1997 and 2.4 hours in 1998). Over 10% of children reported working in the family business in 1998 and, of them, one third reported working more

hours in 1998 than in 1997, with the remaining two-thirds reporting that the hours had not changed. This suggests that school participation became less intensive as the financial crisis unfolded with children substituting time in school for time at work, helping in the family business or, possibly substituting for parents' time at home. Whether these shifts in time allocation have affected the accumulation of skills is not obvious and depends on the extent to which experience in the market place or family business is a good substitute in this regard for time in school. Addressing this important question will be possible only when the medium and longer-term effects of the changes in time allocation are revealed later in the respondents lives.

Recall that real wages collapsed by around 40% between 1997 and 1998 reducing the opportunity cost of time in school which should induce children to spend more time in school. However, for many families, incomes collapsed along with wages and so, for them, there is a counter-balancing income effect which would tend to reduce investments in human capital -- both time spent in school and expenditures on schooling. We turn next to the allocation of the household budget on education.

Education expenditures

Household expenditure, including the value of own produced goods and those provided in kind, was collected from each household in both 1997 and 1998 using the same "short form" consumption questionnaire which asks about broad categories of expenditure.[9] Since inflation for 1998 is estimated to be around 80%, it is important to deflate expenditures in 1998 so that they are comparable with 1997. We have used a cummunity specific price index based on prices that are collected at that level as part of IFLS.[10] Real

[9]Household expenditure in the IFLS is based on respondents' recall of outlays for a series of different goods (or categories of goods); for each item, the respondent is asked first about money expenditures and then about the imputed value of consumption out of own production, consumption that is provided in kind, gifts and transfers. The reference period for the recall varies depending on the good. The respondent is asked about food expenditures over the previous week for 37 food items/groups of items (such as rice; cassava, tapioca, dried cassava; tofu, tempe, etc.; oil; and so on. For those people who produce their own food, the respondent is asked to value the amount consumed in the previous week. There are 19 non-food items; for some we use a reference period of the previous month (electricity, water, fuel; recurrent transport expenses; domestic services) and for others, the reference period is a year (clothing, medical costs, education). It is difficult to get good measures of housing expenses in these sorts of surveys. We record rental costs (for those who are renting) and ask the respondent for an estimated rental equivalent (for those who are owner-occupiers/live rent free). All expenditures are cumulated and converted to a monthly equivalent. The sample is restricted to those households who completed the expenditure module in both IFLS2 and IFLS2+.

[10]It is extremely difficult to get prices right in an environment of very high inflation where there is substantial variation in price increases across goods and location. Since the price of foods increased more rapidly than other goods and food accounts for a bigger fraction of the budget of the poorer households, it is appropriate to construct a price index which varies across space and across the distribution of socio-economic status. We have chosen to compute a community (*desa)* specific index since most of the variation in socio-economic status in IFLS is across relative to within communities. The community survey in IFLS collects information on 10 prices of standardized foods from up to 3 local stores and markets in every community; in addition, prices for 39 items are asked of the *Ibu PKK* (leader of the local women's group) and knowledgeable informants at up to 3 *posyandus* (health posts) in every community. Using those prices, in combination

monthly PCE (in thousands of 1997 rupiah) is reported in the first row of Table 4 for urban and rural households. PCE has declined by 22% for the average urban household: this is a very large decline. The decline in PCE is much smaller for the average rural household.

Putting aside the complexities associated with measurement of expenditures and of prices (see Thomas et al, 1999; Berry, Levinsohn and Friedman, 1999), it is not straightforward to interpret changes in PCE as changes in welfare. Over and above measurement, there are at least two additional issues: how to deal with changes in household size and composition and whether households re-allocate the budget among goods in response to the crisis.

With regard to the first issue, in both the urban and rural sectors, household size increased between 1997 and 1998. In the urban sector, this percentage increase is about half the magnitude of the decline in PCE and so total household expenditure declined by around 10%. For urban households, there has surely been a decline in welfare. However, among rural households, household size increased more than the (absolute value of the) decline in PCE and so total household expenditure rose for the average household. Inferences about changes in real resources among rural households turn on assumptions about the consumption weights that should be attributed to each household member. The calculation of those weights, or equivalence scales, is fraught with difficulties and very controversial. Moreover, treating household size and composition as exogenously given in this framework makes little sense: it is clearly an instrument that may smooth the welfare consequences of the economic crisis. As wages and incomes fall, the evidence in IFLS2/2+ suggests that the benefits associated with economies of scale as household size increases outweigh the disutility associated with reduced privacy, less space and more sharing of services at home. (See Frankenberg, Smith and Thomas, 2001, for a fuller discussion and additional results.)

The second panel of Table 4 takes up the second issue regarding the link between changes in PCE and welfare. PCE is separated into food and non-food items. Real *per capita* spending on food remained constant in both the rural and urban sectors. Since PCE declined, food shares rose. In 1997, food accounted for about half the budget of the average urban households and three-quarters of the average rural household. By 1998, those shares had increased by 25% among urban households and 10% among rural households. To some extent, this reflects the fact that food prices increased more than other prices. Since food shares increased, the

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with household-level expenditure shares aggregated to the community level, we have calculated community-specific (Laspeyres) price indices for every IFLS community in 1997 and in 1998. All expenditures are deflated to the 1997 price levels.

share of the budget spent on other goods declined. Real *per capita* spending on non-foods declined by around 40% between 1997 and 1998. This is a dramatic decline and it is unlikely that it can be explained by changes in relative prices alone. Rather, it is probably a reflection of behavioral choices of households who, faced with reduced real spending power, re-allocate the budget away from expenditures that can be delayed without having a severe impact on welfare.

Durables are obvious candidates for such goods. When resources are tight, a household will presumably defer replacement of durables that are owned as long as the durable is providing services of sufficient value to the households. The welfare costs of replacing a television with a newer model are not likely to be as great as the costs of tightening one's belt and reducing the quality and/or quantity of one's diet. Because the consumption of services from durables are typically spread over several years, and expenditures are lumpy, those expenditures are not included in our measure of PCE. However, precisely the same intuition applies to semi-durables such as clothing, household goods and furniture and possibly to spending on recreation and entertainment. Those commodities make up the lion's share of non-food spending and it seems reasonable to suppose that reducing those expenditures reflects household choices to inter-temporally substitute by delaying those purchases in favor of greater spending on food now.

Much of the literature on consumption smoothing in the development literature has focussed on (smoothing out) fluctuations in PCE. If households smooth welfare, then negative income shocks should be associated with reductions in current spending as households defer spending until better times assuming that the welfare consequences of those deferrals are less than the costs of borrowing. This may provide one motivation for some of the "excess sensitivity" observed in data (Campbell, 1987; Deaton, 1992).

The welfare consequences of deferred spending are *a priori* not obvious for every component of non food expenditure. Spending on human capital investments provide an example. The final rows of Table 4 focus on education spending. Expenditure on education per age-eligible child (household member age 5 through 20) declined by about 3,000 rupiah in both the urban and rural sectors and that decline is significant among rural children. The share of the budget allocated to education also declined (significantly in both the rural and urban sectors).

Education spending is made up of fees, uniforms, books and supplies. It is reasonable to suppose that reductions in spending on the latter three categories, particularly uniforms, will have fairly modest impacts on performance in school. Reduced spending on fees may arise because schools have provided waivers to students because of the crisis. There are two reasons why that is unlikely to be the case in Indonesia in the first half

of 1998. First, recall that public finance budgets for the 1998/9 school year were set in late 1997, prior to the crisis and that budgets were set in nominal terms. With inflation climbing to 80% during the first nine months of 1998, real resources available to schools were severely reduced. Moreover, some part of the fees paid by students are for examinations and have to be transferred to the administrative centers; schools are not able to forgive these charges. Second, in the 1998 wave of IFLS, we asked households about the extent to which they received assistance with school costs in 1997 and 1998. A very small fraction reported assistance in either year (1% and 3%, respectively) and the difference between those years is both small as well as insignificant. (Filmer, 2000, reports a higher rate of assistance about a year later when several programs financed by NGOs were in place.)

The costs of sending a child to school involve additional items that are not included in these numbers but appear elsewhere in the expenditure module. The most important of these are transport, food at school and, for some children, lodging costs. IFLS contains specific questions about such education-related expenditures in a separate module and we find that school-related spending on these items declined in about the same proportion as the expenditures discussed above.

The fact that school-related expenditures declined between 1997 and 1998 does not necessarily imply that there will be deleterious medium or longer-term consequences on human capital outcomes of children. It may be that those children who were affected by the reduced spending and left school, for example, would have benefitted little from another year of study. It will only be by following the IFLS school-age respondents into adulthood that it will be possible to definitively assess the longer-term consequences of the crisis on human capital outcomes in Indonesia. We can, however, make some progress by examining the characteristics of households that cut spending on education and link the results with evidence on school enrolments.

Income effects

Estimates of education Engel curves specified in terms of changes in shares of the budget spent on education in 1998, relative to 1997, are presented in Table 5. To sweep out the main effects of spatial differences in price levels and changes in prices, the models include community fixed effects. In addition, the regressions include ℓnPCE (specified as a spline with a knot at the median), detailed information on household composition, along with age, gender and education of the household head. Separate models are reported for urban and rural households. All covariates are measured in 1997.

If the decline in education shares is the same across the income distribution, the coefficients on ℓnPCE will be zero. If the poorest cut their shares the most, the coefficients will be positive (since education shares

declined, on average). As shown in the first column of the table, all urban households with PCE below the median cut their shares by about the same fraction. This cut was larger than the cut made by higher PCE urban households and, above median PCE, the magnitude of the cut declines with PCE. In fact, households at the top of PCE distribution maintained the same share of their budget on education during this period. Among rural households, the poorest reduced the share of their budget on education the most. As PCE increases, the cut in the education share declines and while this association is significant throughout the distribution of PCE it is greater in magnitude among rural households below median PCE. In sum, in both the rural and urban sectors, it is the poorest who have reduced the share of their budget spent on education the most.

There are two reasons why we have used budget shares rather than expenditure levels. First, examination of shares places the focus on the trade-offs households make in deciding how to allocate the budget among competing goods. Second, as an empirical matter, the shapes of Engel curves specified in expenditure levels are often complex and difficult to capture in a simple functional form. Expressing expenditure in terms of budget shares does a good job of capturing much of the non-linearity linking expenditure on education with total household expenditure. In addition, expenditure distributions are skewed to the right and estimates of income effects may be dominated by a small number of large values; their influence is down-weighted when expressed in terms of shares or logarithms. The latter is not an option (because of non-positive values) but we have re-estimated the model with a transformation that has much the same effect: the square root of (the absolute value of) the change in education expenditures (retaining the sign of the change). Those models indicate that reductions in education expenditures decline with PCE to the median household and then remain constant in urban areas; the declines are approximately constant across the PCE distribution in rural households. The same pattern emerges with expenditure levels after trimming the top 5% of cases and also when we estimate median regressions (both strategies providing more robust measures of central tendency in the presence of large outliers).

Contrasting these shapes with those documented for school enrolments of individuals suggests that there is additional information contained in the analysis of education expenditures. In part, expenditure cuts likely reflects more subtle changes in investment behavior than the extreme of not being enrolled in school. In addition, budget allocations reflect the combined effect of allocating resources to the education of a particular child -- including the decision to spend nothing on a child's education -- and the allocation of resources among children within the household. Obviously cuts in spending on education will likely affect those who are of school age and have little impact on adults or very young household members. What is less clear is whether

there are specific demographic sub-groups that are associated with deeper cuts in shares of the budget spent on education. Addressing this question provides information about the distribution of the effect of the crisis on education spending within households.

Household budget shares and household composition

The regressions in Table 5 include controls for the number of household members in each of 9 age groups, stratified by gender.[11] In urban households, the reduction in education shares is smallest in those households that have more 15-19 year old males (in 1997). The presence of more females in that age group is not related to the change in education shares. The difference between the male and female effects is significant. Additional adolescent females (10-14 year olds) in the households are associated with significantly lower education shares. Thus, young men (age 15-19) stand out as the only group associated with increases in education shares.

While the regression estimates do not tell us who is benefitting from these higher shares, two obvious interpretations suggest themselves. First, households that have more young working-age men may be able to maintain their income by having these men enter the labor force; the rest of the household benefits from this additional income by increasing shares of commodities that are income elastic. That interpretation does not have much appeal since no other shares are impacted by the presence of males in this age group (Thomas, et al. 1999.) If the males are bringing income to the household, one would expect that additional income to be spread across more goods than only education services. Moreover, this does not explain the observation that the presence of young teenage females is associated with lower education shares.

An alternative explanation is that it is these young men who are benefitting from the higher education shares and young women in the household are making room for them in the household budget by having less spent on their own schooling. Two pieces of evidence provide some evidence in support of this interpretation. First, in the urban sector, more young women have entered the labor market than young men between 1997 and 1998. During this period, the labor force participation rate among 15-19 year olds increased by 4 percentage points more for women, relative to men (with a t statistic of 2.2.) Second, 15-19 year old women are associated with higher shares spent on clothing -- possibly in order to find or keep employment (Thomas et al., 1999).

[11]The models include the number of members in each demographic group. We have experimented with including total household size and the number of members (excluding one group) to separate the effects of size from composition. The substantive results are essentially identical and so we report these estimates which can be interpreted directly.

The results in the previous sub-section demonstrate that declines in budget shares were greater for poorer urban households. It is reasonable to suppose that the association between household composition and education shares also varies with household resources. This issue is explored in the second and third columns of the table which report estimates from an expanded regression that includes an interaction between lnPCE and each of the household composition covariates. The direct effects are reported in column 2 and the interactive effects are reported in column 3. The estimates are standardized so that the direct effect can be interpreted as the effect of additional members in each demographic group on the change in education shares for the poorest household. The interaction terms indicate how those effects vary as household lnPCE changes.

Among the poorest urban households, education shares are significantly higher if there are more males age 15 to 19 and this effect declines with expenditure. In poor households, additional females in this age group are associated with higher education shares although the effect is much smaller than it is for males and it is not significant. (The difference between the male and female effect is significant.) Thus, the poor are not choosing to spend more on the schooling of the young males in the household while cutting education expenses for females in the same age group: rather, they are spending more on males while maintaining resources for both males and females in this age group to remain in school. However, the evidence does indicate that among the poorest households, it is younger males *and* females (10-14 year olds) who are making room for the education expenses of their older siblings. Low resource households with more children in this age group have lower education shares. These (negative) effects are large and significant at the bottom of the PCE distribution but disappear as PCE increases indicating that the poorest children may be paying a heavy price in terms of foregone education opportunities.

The interaction between lnPCE and the number of females age 15 to 19 in column 3 of Table 4 is negative and significant. This indicates that the lower education shares associated with additional 15-19 year old females in the household (in column 1) is a reflection of not the poorest cutting back the share of the budget spent on education but reductions by higher PCE households. It is apparently young women in these households who are less likely to be in school in 1998, relative to 1997. In fact, we find that it is households with young women who experienced smaller reductions in household income between 1997 and 1998 whereas there is no similar association for males. As noted above, this likely reflects the fact that it is young women from higher PCE households who are joining the labor force.

The links between household consumption and household composition are markedly different in the rural sector. Whereas education shares are higher among urban households with more males age 15 to 19,

in the rural sector, additional males in this age group are associated with lower education shares. Additional females in this age group have no impact on education shares.

Turning to the interactive model in columns 2 and 3 of the rural panel, we see the same pattern for younger children that was observed in the urban sector: education shares are substantially and significantly reduced in low PCE households that have more 10 to 14 year old children. The cuts are the same for male and female children and the magnitude of the cut declines as PCE increases. Furthermore, in rural households, there is a suggestion that education shares are lower in households with more young boys (5-9 year olds).

The same inferences regarding the relationship between household composition and the education budget are drawn from models that are specified in terms of (transformations of) education expenditures. Specifically, in the urban sector, OLS and median regression models specified in terms of changes in education expenditures and also OLS models of the square root of (the absolute value) of the change in spending (while retaining the sign of the change) tell essentially the same story. 15-19 year old males and females are associated with smaller cuts in education spending among poor households and that advantage declines with PCE. 10-14 year olds in poor households are associated with bigger cuts and the disadvantage declines with PCE. The only difference is that the result for 10-14 year old females is only significant in the median regression case and the magnitude of this effect is muted relative to that of males of the same age.

Summarizing the results, there have been substantial reductions in the share of the household budget allocated to schooling between 1997 and 1998. The reductions are concentrated among the poorest households. The regression results suggest that when faced with a trade-off, poor households in both urban and rural areas are investing less in the schooling of their young children (particularly male 10-14 year olds) while seeking to protect education expenditures on older children.

Household resources, household composition and school enrolments

What are the likely consequences of these budget allocation choices by households? It is possible that as the crisis unfolded, relative to post-primary schools, primary schools were more forgiving of students who did not pay their fees or did not wear school uniforms. It may also be that younger students are better able to do without books and supplies, relative to older students. Under these conditions, the immediate effects on human capital accumulation of reduced investment in the schooling of young children may be modest. One direct way to assess whether re-allocations of the household budget affected schooling of young children is to examine the link between households resources, composition and school enrolments in 1997 and 1998.

Table 6 reports results from models of the probability a child is enrolled in school in each year of the survey. The regressions include controls for household resources (measured by indicator variables for each quartile of PCE), household composition, location and characteristics of the head (as in Table 4), all measured in 1997. The models include a 1998 year effect along with interactions between the year effect and all the covariates. Regressions are estimated separately for urban and rural children who have been stratified into three age groups. Since there are a large number of coefficients in these models, we limit attention to the effects of PCE and the age-specific number of household members in the table. Estimates of variance-covariance matrices take into account within-family correlations in unobservables.

The main effects provide information about differences in enrolment rates of children as household resources and composition vary. The year interactions -- or difference-in-difference -- tell us how these relationships have been mediated as the crisis has unfolded. Household resources do not appear to have significantly constrained school attendance in urban areas in either year but resources are important predictors of school enrolment in rural areas, particularly among teenage children. There is little evidence that household composition affected school enrolments in 1997 or that there was a change in their influence between 1997 and 1998. (Six of the composition coefficients are significant at 5% which is about the number we would expect to be significant when there are, in fact, no effects of composition since there are 108 estimated coefficients.) Overall, the differences between 1998 and 1997 in the differential effects of household composition on school enrolment are not significant.

Our analyses of education spending suggest that the crisis took its greatest toll on the schooling of young, poor children who had older siblings. The difference-in-difference estimates in Table 6 do not speak directly to this hypothesis. Rather we need to examine the difference-in-difference-in-difference by further interacting the composition and year interaction with household resources. Results from models that include these triple interactions are reported in Table 7.

Specifically, we report the estimated effect of the number of people in the household in each of three age groups interacted with two indicator variables -- one that identifies households in the bottom quartile of the PCE distribution in 1997 and a 1998 year effect. In the first column, for example, we focus attention on changes in enrolment rates of urban children age 6-9. If those children who were poor in 1997 and had more 15-19 year olds in the household in 1997 are less likely to be enrolled in school in 1998, the triple interaction should be negative. It is and it is significant at a 10% size of test. Among children age 10-14, there are no differential effects across the PCE distribution of household composition on enrolment in 1998, relative to

1997. The expenditure results suggest that among older children from relatively poor households, the probability of enrolment in school in 1998, relative to 1997, should be higher if there are younger children in the household. The evidence in column 3 of the table supports this interpretation: the coefficients on both 5-9 year olds and 10-14 year olds are positive (and not different from each other) and significant (at a 5% size of test, taken together). In the rural sector, there is no evidence that enrolment probabilities vary between 1997 and 1998 for poorer households, relative to better off households as household composition changes.

The evidence on changes in enrolment probabilities of younger and older children in urban households are thus consistent with the results for the allocation of the budget to education described in the previous sub-section. We conclude that reduced investments in schooling are manifest in reduced enrolments among those poor, younger children who have older children in their households. (The vast majority of these children are siblings with a small fraction being cousins.) For these children, it appears that cuts in spending on education are associated with reduced likelihood of being in school and these choices may have deleterious medium and longer-term consequences on human capital accumulation of these people.

Why would households seek to protect investments in the schooling of older children at the expense of their younger siblings? There are at least two plausible reasons. First, the returns to primary schooling are very low in Indonesia but the returns to secondary schooling are much higher (Behrman and Deolalikar, 1995; Yukti, 1998). Given that, at the time of the crisis, households had already invested in the schooling of older children, it would have been prudent to continue to protect education-related expenditures for those children and keep them in school. For these older children, leaving school will typically presage a permanent movement into the work force. In contrast, delaying the start of school for younger children by a year -- or even disrupting their schooling for a year -- is unlikely to preclude their enrolment in school in the future. Many Indonesian children start school at age 7 or 8 and there is a good deal of movement in and out of school among young children. Thus, if resource-constrained households anticipate that the crisis will be short-lived -- or financial assistance for primary school education will be forthcoming in the future -- it makes good sense to allocate resources towards maintaining the education of older children, even at the cost of the schooling of younger children, in the face of a major economic crisis.

4. Conclusion

In the mid-nineties, Indonesia was cited as a remarkable success as it emerged from one of the poorest nations three decades ago to being on the cusp of joining the middle income countries. In early 1998, the

tables had turned and Indonesian was in the midst of a serious financial crisis. While measuring the precise magnitude of the crisis is difficult and controversial, there is little question that it is large. The evidence in IFLS suggests that real household resources *per capita* declined by around 15% between 1997 and 1998 and the crisis was felt by individuals throughout the income distribution.

We have focussed on the impact of reductions in real resources on investments in human capital as measured by spending on education and school enrolments. On average, both real education expenditures and the share of the household budget spent on schooling declined between 1997 and 1998 and these declines were greatest among those households that were the poorest in 1997. Reductions in spending have been particularly marked in poor households with more young children (10-14 year olds) and there has been a tendency to protect education spending in poor households with more older chidlren (15-19 year olds). The evidence on enrolments mirrors these findings. School enrolments have declined most for young children and those from the poorest households. Moreover, young urban children living in low resource households in 1997 were less likely to be enrolled in school in 1998 if they had older siblings living in the household. The converse is also true -- older children in these households were more likely to be in school if they had younger siblings.

We interpret the evidence as indicating that low resource households have sought to protect their investments in the schooling of older children at the expense of the education of their younger children. Given the relative returns to primary and secondary schooling in Indonesia, this is likely to be a prudent choice. It suggests, however, that these households have limited options for smoothing welfare in the face of a major shock. If the (present discounted value) of investments in primary school exceed the interest rate, then it is likely that these low resource households were credit constrained. There is little evidence that, in spite of facing large reductions in real resources, households at the top of the income distribution substantially reduced their investments in the human capital of their children.

The strategies adopted by lower and higher resource households to smooth the impact of the financial crisis on their welfare are very different. The evidence suggests that the immediate impacts of the crisis -- which were distributed across the entire income distribution -- are unlikely to be the same as the medium- and longer-term effects -- which will likely fall most heavily on the poorest. To the extent that mechanisms to smooth consumption have consequences for human capital investments in children and young adults, the effects of the crisis may be felt by that generation for many years to come. Evidence in the IFLS suggests that these concerns are particularly germane for the poorest.

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Figure 1: Timing of IFLS & Indonesian exchange rate

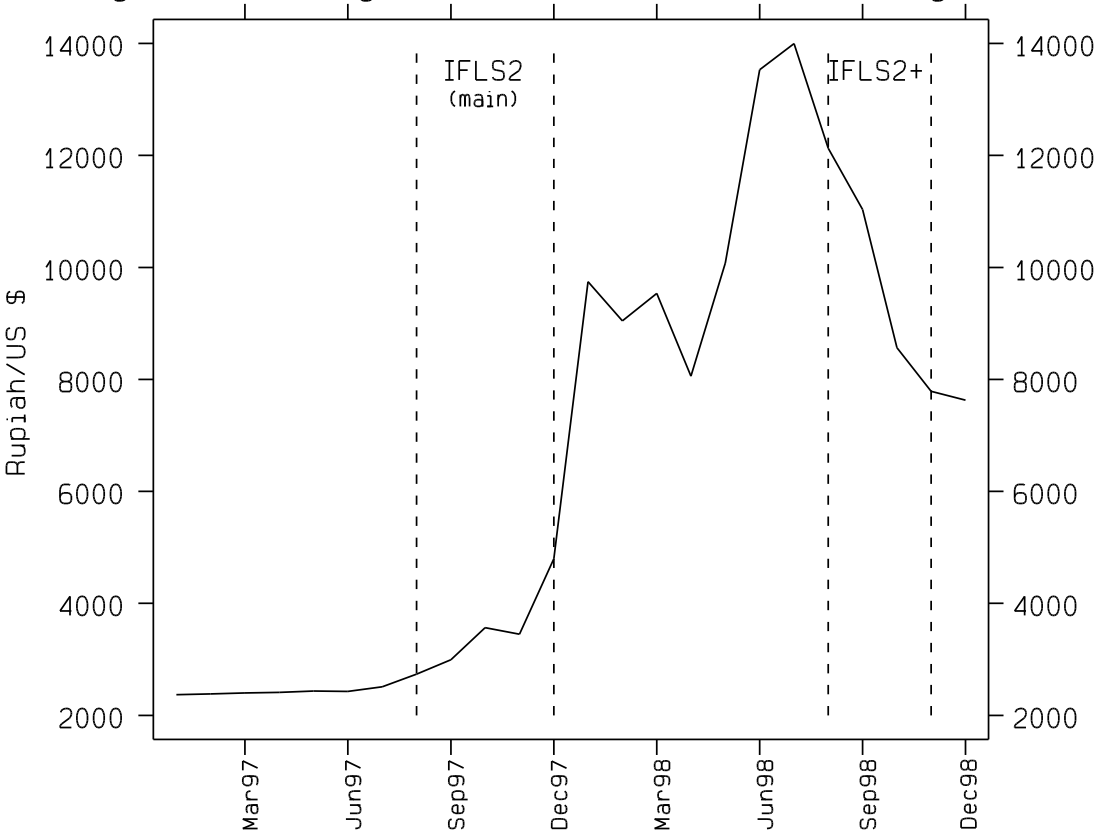
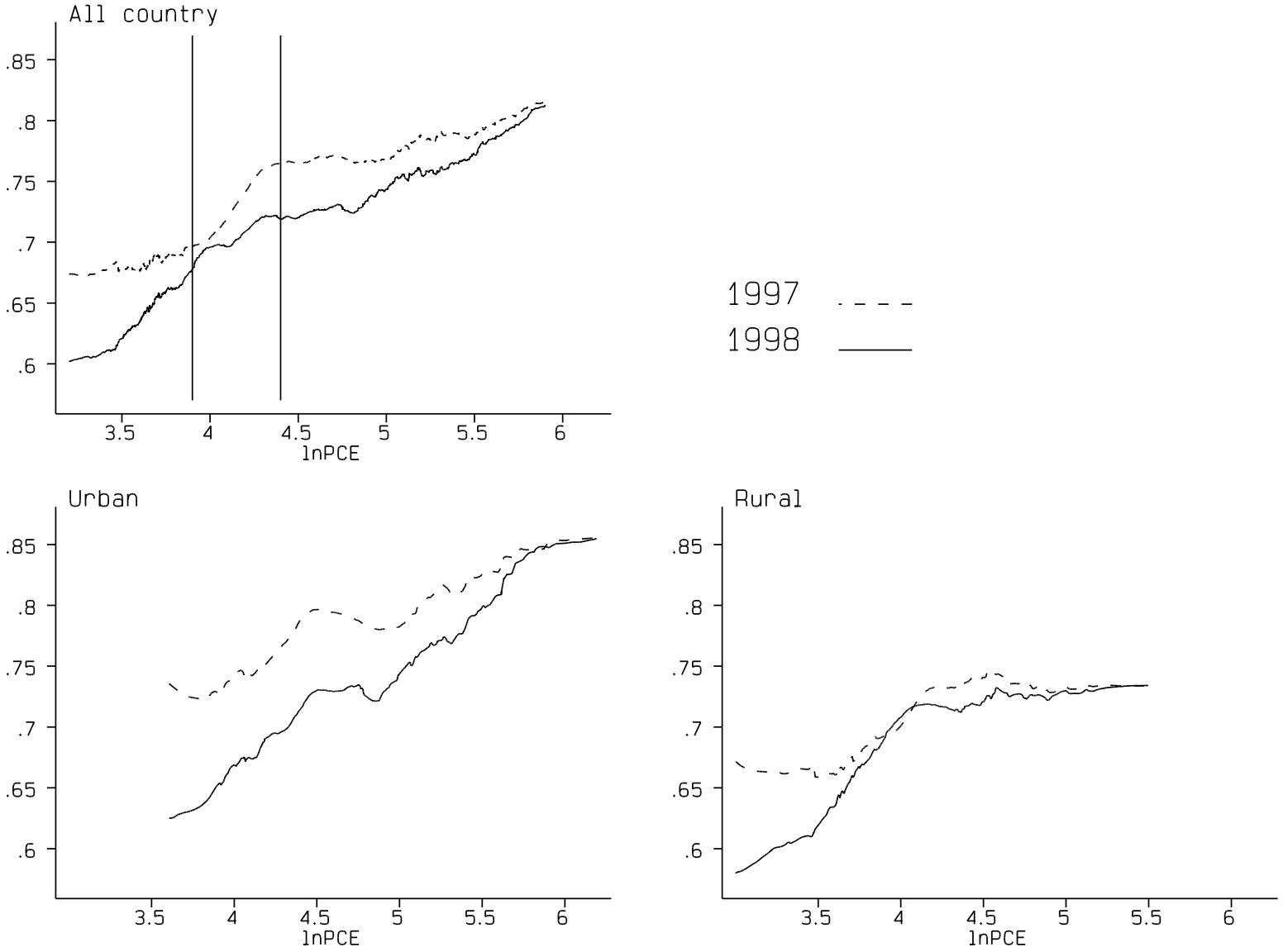


Figure 2
School enrolments by per capita expenditure



Source: IFLS2/2+
Per capita expenditure (PCE) measured in 1997

Table 1
IFLS2+: HH Attrition

A. HH completion rates: All IFLS HHs

Province	Target # HHs	# HHs Interviewed	% HHs interviewed All	% HHs interviewed Alive
Total	2066	1972	95.5	96.3
North Sumatra	240	228	95.0	95.8
South Sumatra	312	297	95.2	96.1
Jakarta	206	191	92.7	92.7
West Java	334	334	96.4	97.9
Central Java	464	449	96.8	98.3
NTB	306	298	97.4	98.0
South Kalimantan	204	187	91.7	91.7

B. HH completion rates: All IFLS2 HHs

Province	Target # HHs	# HHs Interviewed	% HHs interviewed All	% HHs interviewed Alive
Total	1934	1903	98.4	98.5
North Sumatra	213	208	97.7	97.7
South Sumatra	289	283	98.0	99.0
Jakarta	181	178	98.3	98.3
West Java	318	312	98.1	98.1
Central Java	452	445	98.5	98.9
NTB	295	295	100.0	100.0
South Kalimantan	186	182	97.9	97.9

C. Characteristics of all HHs and re-interviewed HHS

	All HHs	Alive in 98	Ivwd in 98 All	Ivwd in 98 In origin	Ivwd in 98 New locn
Per capita expenditure (Rp000)	78.69 [2.99]	78.69 [3.02]	75.26 [2.69]	72.67 [2.68]	111.59 [12.8]
Food share	53.76 [0.38]	53.63 [0.38]	53.62 [0.38]	53.53 [0.38]	55.40 [1.62]
HH size	4.51 [0.05]	4.54 [0.05]	4.57 [0.05]	4.62 [0.05]	3.82 [0.19]
Age of HH head	45.95 [0.33]	45.75 [0.33]	45.81 [0.33]	46.07 [0.33]	41.76 [1.44]

Notes: Means and [standard errors] based on data collected in 1993 for HHs that were living in the IFLS2+ EAs at that time. Columns based on all HHs in IFLS1, all HHs known to be alive in 1998 and all HHs interviewed in 1998. Among those HHs, distinguish those found in the original EA in 1998 from those who were tracked to a new location by 1998.

Table 2a: School non-enrolment rates by age (1993-1998)
SUSENAS

Age (yrs)	% not enrolled in 1993 (1)	1994 (2)	1995 (3)	1996 (4)	1997 (5)	1998 (6)	%Δ(98-97) (7)	Predicted % not enrolled in 1998 (8)	%Δ(98-98^) (9)
7	18.2	15.8	16.0	14.8	12.8	12.8	-0.3	12.0	6.3
8	7.6	6.5	6.7	6.2	5.3	5.9	10.3	5.0	16.9
9	5.0	4.1	3.9	4.2	3.6	4.1	13.2	3.3	20.6
10	4.8	4.0	4.1	3.9	3.4	4.1	19.6	3.2	26.3
11	4.9	4.2	4.2	4.2	3.5	3.9	10.9	3.4	14.5
12	9.4	8.3	8.6	8.3	7.3	7.8	7.0	7.1	9.4
13	19.2	16.6	16.4	14.9	13.9	15.0	7.9	12.5	18.6
14	29.6	27.5	25.9	24.4	22.1	21.9	-1.2	20.5	6.7
15	40.0	37.1	37.4	34.0	31.9	31.3	-1.9	30.2	3.4
16	46.5	44.4	44.6	42.2	40.2	39.3	-2.4	39.2	0.2
17	54.5	52.1	53.2	51.9	51.0	48.4	-5.3	50.4	-4.0
18	64.1	62.6	64.2	63.3	62.4	61.7	-1.2	62.5	-1.4
19	73.8	73.3	75.4	76.1	76.4	75.0	-1.8	77.4	-3.1
Sample size	206,871	209,951	197,751	203,738	199,766	195,797	195,797	195,797	195,797

Notes: SUSENAS 1993 through 1998. Columns 1 through 6 are % children in each year of age not enrolled in school at time of survey. (7) is % change between 1998 and 1997; +ve number implies increase in non-enrolment rate. (8) is predicted percentage children not enrolled in school based on linear extrapolation to 1998 using 1993-1997 percentages. (9) is % difference between actual % not enrolled in 1998 and projected % would not be enrolled in 1998 assuming linear trend from 1993-1997 persisted. +ve implies more are not enrolled than projected.

Table 2b: School non-enrolment rates (1996-1998)
By age and quartile of household per capita expenditure
SUSENAS

Age (yrs)	Percentile of PCE	1996 (1)	1997 (2)	1998 (3)	%Δ (4)
ALL	1-25	34.5	33.7	34.6	2.8
	26-50	27.7	26.7	27.1	1.5
	51-75	22.6	21.7	21.7	-0.2
	76-100	16.4	16.5	16.1	-2.5
7	1-25	45.5	43.5	45.4	4.3
	26-50	37.2	34.1	35.5	4.0
	51-75	31.0	27.6	28.8	4.1
	76-100	21.4	18.3	21.1	15.0
8-9	1-25	9.1	7.9	9.4	18.9
	26-50	3.9	3.3	3.6	9.0
	51-75	2.4	1.8	1.7	-4.9
	76-100	1.3	1.2	0.8	-37.8
10-11	1-25	6.8	5.8	7.2	25.3
	26-50	3.6	2.9	3.2	10.4
	51-75	2.0	2.0	1.8	-5.6
	76-100	1.3	1.1	0.8	-23.8
12-13	1-25	18.0	16.5	17.8	7.8
	26-50	11.2	9.7	10.4	7.6
	51-75	7.1	6.4	6.8	6.8
	76-100	3.9	3.5	3.8	8.5
14-15	1-25	45.1	41.6	40.4	-2.9
	26-50	31.2	27.5	27.4	-0.4
	51-75	20.0	18.1	18.5	2.0
	76-100	11.6	10.8	11.3	3.9
16-17	1-25	69.8	66.5	66.1	-0.6
	26-50	52.0	50.0	48.3	-3.4
	51-75	37.9	35.7	33.5	-6.3
	76-100	23.1	23.0	21.4	-6.8
18-19	1-25	85.9	84.9	84.6	-0.3
	26-50	75.2	73.8	73.0	-1.1
	51-75	64.6	63.5	62.4	-1.8
	76-100	47.4	49.3	45.9	-6.9

Notes: SUSENAS 1996 through 1998. Columns 1 through 3 are % children in each year of age and quartile of household per capita expenditure (PCE) not enrolled in school at time of survey. Column 4 is % change between 1998 and 1997; +ve number implies increase in non-enrolment rate.

Table 3a: School non-enrolment rates by age of child
SUSENAS and IFLS

Age (years)	1997 SUSENAS IFLS2 Prov (1)	1997 IFLS2 IFLS2 Prov (2)	1998 IFLS2 IFLS2+ Prov (3)	1998 IFLS2+ IFLS2+ Prov (4)
7	9.4	10.8	9.2	6.0
8	2.4	4.3	3.1	7.0
9	1.4	2.7	1.0	6.3
10	1.9	2.6	2.6	4.4
11	2.2	4.3	3.7	7.8
12	5.1	9.1	12.7	12.3
13	13.6	14.4	13.5	19.0
14	21.8	19.4	24.9	22.1
15	31.3	28.2	31.7	29.9
16	39.3	37.5	39.3	48.7
17	50.6	45.4	48.4	52.0
18	61.7	58.4	62.3	72.6
19	75.3	74.3	80.1	79.5

Table 3b: School non-enrolment rates and quartiles of pre-crisis PCE
Regression effects relative to bottom quartile of pre-crisis PCE
IFLS2/2+

	1997 (1)	1998 (2)	Diff (3)
All country			
26-50%ile	0.063	0.109	0.046
	[0.025]	[0.023]	[0.022]
51-75%ile	0.136	0.169	0.034
	[0.025]	[0.023]	[0.023]
76-100%ile	0.167	0.225	0.057
	[0.026]	[0.023]	[0.023]
Urban			
26-50%ile	-0.028	0.053	0.081
	[0.052]	[0.045]	[0.043]
51-75%ile	0.062	0.131	0.069
	[0.047]	[0.044]	[0.039]
76-100%ile	0.093	0.195	0.102
	[0.046]	[0.041]	[0.039]
Rural			
26-50%ile	0.099	0.136	0.037
	[0.026]	[0.026]	[0.024]
51-75%ile	0.143	0.180	0.037
	[0.028]	[0.027]	[0.025]
76-100%ile	0.133	0.179	0.046
	[0.035]	[0.032]	[0.031]

Notes: Standard errors in parentheses robust to arbitrary forms of heteroskedasticity and permit within family correlations among unobservables. Regressions also control age, gender and location of index child.

Table 4: Changes in the household budget and the crisis
PCE, the allocation of the budget and spending on education
IFLS2/2+

	Urban			Rural		
	1997 (1)	1998 (2)	Change (3)	1997 (1)	1998 (2)	Change (3)
Household resources						
Per capita expenditure	298.81 [31.46]	232.22 [13.64]	-66.59 [29.33]	188.53 [6.58]	176.57 [4.62]	-11.96 [6.85]
HH size	4.68 [0.08]	5.14 [0.09]	0.46 [0.06]	4.30 [0.06]	4.90 [0.08]	0.60 [0.05]
Per capita expenditure on						
Food	158.44 [15.41]	153.33 [11.42]	-5.11 [15.28]	147.44 [5.20]	152.84 [4.42]	5.40 [5.65]
Non food	140.37 [24.00]	78.89 [5.32]	-61.47 [23.45]	41.09 [3.22]	23.73 [0.88]	-17.36 [3.18]
Education spending						
Per household member age 5-19	27.51 [2.51]	24.29 [3.59]	-3.22 [3.33]	8.13 [0.49]	5.70 [0.47]	-2.43 [0.44]
Share of budget on education	4.99 [0.25]	4.39 [0.25]	-0.60 [0.27]	2.37 [0.13]	1.68 [0.08]	-0.69 [0.12]

Notes: All expenditures are measured in 1997 thousands of rupiah. Standard errors in parentheses. There are 797 urban households and 1096 rural households who completed the consumption modules in both IFLS2 and IFLS2+.

Table 5: Change in share of budget spent on education,
Relationship with household *per capita* expenditure and demographic structure

	Urban			Rural		
	Linear Model	Interactive model		Linear Model	Interactive model	
		Direct Effect	Intxn *lnPCE		Direct Effect	Intxn *lnPCE
	(1)	(2)	(3)	(1)	(2)	(3)
ℓn(PCE) (spline)						
-- below median	-0.482	-2.183	.	1.546	0.927	.
	(0.62)	(1.79)		(5.90)	(1.69)	
-- above median	1.000	0.142	.	0.627	0.458	.
	(2.02)	(0.19)		(2.21)	(1.09)	
HH composition: # of						
males 0-4	0.907	-1.305	1.148	0.233	-0.332	0.175
	(1.42)	(0.68)	(1.34)	(0.82)	(0.29)	(0.49)
females 0-4	0.392	-0.158	0.307	0.327	0.504	-0.056
	(0.61)	(0.09)	(0.42)	(1.13)	(0.45)	(0.16)
males 5-9	-0.280	-1.839	0.604	-0.069	-1.098	0.356
	(0.45)	(1.00)	(0.77)	(0.30)	(1.20)	(1.24)
females 5-9	0.259	-0.697	0.631	0.305	0.860	-0.139
	(0.41)	(0.42)	(0.88)	(1.20)	(0.82)	(0.43)
males 10-14	-0.317	-4.744	2.012	-0.400	-2.881	0.797
	(0.59)	(3.09)	(3.15)	(1.67)	(3.17)	(2.92)
females 10-14	-1.049	-3.882	1.383	-0.055	-2.319	0.674
	(2.11)	(2.97)	(2.55)	(0.23)	(2.48)	(2.54)
males 15-19	2.466	7.720	-2.364	-0.614	-2.453	0.565
	(5.91)	(5.73)	(3.95)	(2.43)	(2.25)	(1.77)
females 15-19	-0.773	2.623	-1.582	-0.175	-0.615	0.137
	(1.55)	(1.74)	(2.47)	(0.72)	(0.58)	(0.43)
males 20-24	-0.398	-2.901	1.054	-0.076	0.244	-0.099
	(0.62)	(1.56)	(1.40)	(0.23)	(0.18)	(0.25)
females 20-24	-0.803	-4.016	1.386	0.118	0.664	-0.176
	(1.25)	(1.90)	(1.56)	(0.34)	(0.49)	(0.45)
males 25-39	-0.491	0.043	-0.049	0.169	0.333	-0.094
	(0.91)	(0.03)	(0.10)	(0.48)	(0.28)	(0.26)
females 25-39	-0.111	-0.969	0.329	-0.318	-1.634	0.400
	(0.20)	(0.64)	(0.56)	(0.97)	(1.30)	(1.10)
males 40-54	-0.611	-0.630	0.223	-0.406	-0.404	-0.040
	(0.75)	(0.33)	(0.29)	(0.90)	(0.31)	(0.10)
females 40-54	-0.639	-5.000	1.744	0.135	0.366	-0.072
	(0.92)	(2.76)	(2.54)	(0.38)	(0.27)	(0.19)
males 55-64	-0.802	0.602	-0.411	-0.410	0.883	-0.395
	(0.69)	(0.24)	(0.43)	(0.72)	(0.57)	(0.92)
females 55-64	-0.249	-1.217	0.324	0.562	1.270	-0.228
	(0.28)	(0.63)	(0.44)	(1.32)	(0.86)	(0.54)
males >=65	1.071	1.040	0.116	0.551	1.346	-0.274
	(0.83)	(0.39)	(0.13)	(0.89)	(0.89)	(0.65)
females >=65	0.666	0.641	-0.160	0.631	1.822	-0.363
	(0.79)	(0.28)	(0.18)	(1.46)	(1.30)	(0.90)

Notes: There are 797 urban households and 1,096 rural households included in the regressions. t statistics in parentheses are robust to heteroskedasticity. Regressions include age, education and gender of household head along with community fixed effects.

Table 6: School enrolments, household PCE and demographic structure
IFLS2/2+

	Urban			Rural		
Age of child	6-9	10-14	15-19	6-9	10-14	15-19
	(1)	(2)	(3)	(1)	(2)	(3)
Household resources: (1) if 1997 PCE is						
26-50%ile	-0.107	0.006	0.079	0.022	0.148	0.201
	(1.96)	(0.09)	(0.58)	(0.84)	(3.39)	(3.42)
51-75%ile	-0.032	0.045	0.151	0.084	0.178	0.208
	(0.75)	(0.73)	(1.23)	(2.84)	(3.74)	(3.25)
76-100%ile	-0.023	0.070	0.209	0.037	0.207	0.274
	(0.53)	(1.17)	(1.80)	(0.83)	(3.88)	(3.87)
Interacted with 1998 indicator						
26-50%ile *1998	0.092	-0.058	0.127	0.055	0.039	-0.083
	(1.80)	(0.92)	(1.06)	(1.70)	(1.00)	(1.51)
51-75%ile *1998	-0.007	0.014	0.077	0.025	0.057	-0.055
	(0.16)	(0.26)	(0.78)	(0.79)	(1.25)	(0.93)
76-100%ile *1998	-0.002	0.005	0.191	0.070	-0.013	-0.053
	(0.05)	(0.10)	(1.99)	(1.58)	(0.26)	(0.73)
Household composition: # hh members age						
0-4	-0.014	-0.043	-0.054	-0.048	0.013	-0.054
	(0.52)	(1.57)	(1.16)	(2.50)	(0.43)	(1.28)
5-9	-0.025	-0.017	-0.078	-0.019	-0.007	-0.014
	(1.02)	(0.77)	(1.84)	(1.04)	(0.29)	(0.35)
10-14	0.011	-0.021	0.050	0.016	-0.032	0.013
	(0.86)	(1.27)	(1.33)	(1.01)	(1.33)	(0.36)
15-19	-0.021	-0.004	-0.044	-0.005	0.030	0.017
	(1.27)	(0.32)	(1.22)	(0.26)	(1.21)	(0.45)
20-24	0.016	0.009	0.011	0.029	-0.039	-0.020
	(0.85)	(0.50)	(0.33)	(1.18)	(1.05)	(0.51)
25-39	0.001	0.007	-0.027	-0.016	0.033	0.004
	(0.05)	(0.39)	(0.87)	(0.61)	(0.95)	(0.09)
50-54	-0.016	0.015	0.038	-0.026	0.060	0.093
	(0.85)	(0.68)	(0.97)	(0.99)	(1.52)	(2.69)
55-64	-0.008	0.024	-0.025	0.008	0.080	0.073
	(0.36)	(0.72)	(0.41)	(0.24)	(1.52)	(1.44)
$\geq$65	0.023	0.054	0.047	-0.021	0.033	0.085
	(0.83)	(2.16)	(0.65)	(0.72)	(0.55)	(1.43)
Interacted with 1988 indicator						
0-4 *1998	-0.002	0.024	-0.003	0.047	-0.037	-0.004
	(0.10)	(0.87)	(0.07)	(2.41)	(1.29)	(0.09)
5-9 *1998	0.024	-0.020	0.005	-0.032	-0.005	-0.007
	(0.90)	(0.99)	(0.13)	(1.48)	(0.24)	(0.18)
10-14 *1998	-0.008	0.022	-0.043	0.009	0.030	0.015
	(0.53)	(1.04)	(1.28)	(0.47)	(1.32)	(0.45)
15-19 *1998	0.025	0.008	0.055	-0.015	-0.014	0.037
	(1.42)	(0.52)	(1.70)	(0.55)	(0.55)	(0.82)
20-24 *1998	0.002	-0.013	0.035	-0.004	0.093	0.068
	(0.09)	(0.68)	(1.03)	(0.14)	(2.43)	(1.60)
25-39 *1998	0.011	-0.005	-0.008	-0.048	-0.070	0.016
	(0.77)	(0.25)	(0.26)	(1.57)	(1.85)	(0.39)
50-54 *1998	-0.004	0.006	-0.052	-0.022	-0.078	-0.046
	(0.15)	(0.29)	(1.55)	(0.67)	(2.04)	(1.15)
55-64 *1998	-0.028	-0.071	0.039	-0.034	-0.075	-0.041
	(0.77)	(1.73)	(0.73)	(0.94)	(1.59)	(0.77)
$\geq$65 *1998	-0.056	-0.044	0.007	-0.038	-0.023	0.015
	(2.41)	(1.62)	(0.11)	(0.74)	(0.37)	(0.27)
Number of children	730	1008	897	1154	1303	791

Notes: Linear probability models include gender, year of age indicators, characteristics of household head and location controls in addition to listed covariates. t statistics robust to heteroskedasticity and permits within family correlations in unobservables.

Table 7: Changes in school enrolments between 1997 and 1998
Interactive effects of household PCE and demographic structure
IFLS2/2+

Age of child	Urban 6-9 (1)	Urban 10-14 (2)	Urban 15-19 (3)	Rural 6-9 (1)	Rural 10-14 (2)	Rural 15-19 (3)
(1) if 1997 PCE is in bottom quartile *						
(1) if 1998 *						
# HH members						
age 5-9	-0.011	-0.090	0.266	-0.020	-0.055	-0.034
	(0.21)	(1.16)	(1.71)	(0.44)	(1.24)	(0.45)
age 10-14	0.009	0.139	0.296	0.047	0.035	-0.116
	(0.23)	(1.44)	(2.02)	(1.45)	(0.69)	(1.50)
age 15-19	-0.067	0.006	-0.163	0.043	0.045	0.094
	(1.70)	(0.14)	(1.07)	(0.92)	(0.90)	(1.53)

Notes: See Table 6. All models include main effects listed in Table 6, covariates listed at foot of Table 6 and interactions between low PCE, 1998 and all household demographic variables included in Table 6. t statistics in parentheses robust to heteroskedasticity and permit within family correlations in unobservables.