Protecting Long Term Human Capital in a Financial Crisis: Evidence from the Indonesian Family Life Survey

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Abstract

The East Asian Financial crisis of the late nineties made its way to Indonesia in January 1998. Using longitudinal data from the Indonesian Family Life Survey (1993-2015), this paper studies the impact of the crisis on education attainment. In the midst of economic upheaval, households with liquid assets at hand, particularly gold, were better able to maintain per capita expenditures. Tracing out the impact of gold ownership on completed education, I find that the effect is most apparent on 7 to 12 year olds in Indonesia. Using within-household variation in completed education, I find that a divergence in the use of gold to protect child education: urban households direct it towards older children, while rural households do the opposite. This result is best understood by considering the effect of the crisis on opportunity costs of schooling. In urban areas, wages declined sharply, while in rural areas, the return to food production increased dramatically. Thus older children in rural areas would be more likely to exit schooling during the crisis, and consequently not benefit from gold ownership in the household. The evidence examined indicates that families sought to protect their children's long-term human capital, but in households with fewer resources, the children suffered permanent consequences.

JEL classification: D1, I2, O0
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Sections

I. Introduction

Indonesia experienced a massive macroeconomic shock in 1998, in a dramatic turn of fortunes after three decades of robust growth. Within the span of a year, real GDP fell by 13% and median real wages declined by over 20%, reversing the gains that had been made in the prior decade. Extreme volatility defined this period, as is evident in the wild fluctuations of the exchange rate (see figure 1). At its lowest, the Indonesian Rupiah was at a fourth of its late 1997 value against the US dollar. With unpredictable interest rates and a precipitous drop in consumer confidence, credit all but dried up and foreign capital exited the country. The weakening currency triggered spiraling inflation, at 80% in 1998 by some estimates, with a near threefold increase in the food price index. By all accounts, the intensity of the crisis was unanticipated, both domestically and in the international community.

By 1999, inflation had been curbed at 20% and the GDP stabilized. Growth returned in 2000, at 4.5%, and inflation was restored to normal levels. While the shock was relatively short-lived, its effects may have not been; per capita GNI did not recover to its 1997 level until 2004 (World Bank). Furthermore, the strategies employed by households to cope with the crisis could have had consequences for the next generation that persisted well into the future. This paper aims to address that possibility.

Previous work has detailed these coping mechanisms and their immediate welfare implications, using rounds of the Indonesian Family Life Survey (IFLS) from 1997, 1998 and 2000. The findings paint a picture of a diverse response to the shock. Median household sizes increased as extended families combined households to take advantage of economies of scale. Households sought to maintain expenditure on food in 1998, choosing to make cuts elsewhere; average spending on education and health declined by 37%, more so among poorer families (Frankenberg et al. 2003). Poor households with older children were less likely to cut back on investment in education, and consequentially school enrolment, than those with younger children, perhaps in an effort to protect past investments in older children (Thomas et al. 2004). Labor supply increased even as wages collapsed, largely driven by prime age females entering the workforce during the crisis; in this low-income setting, the pressure from reduced household incomes easily dominated the lowered opportunity cost of leisure (Strauss et al. 2004). Use of health services, especially by children, fell substantially between 1997 and 1998. However, both self-reported and physically assessed measures indicated that health status

had improved along many dimensions, and fewer children were found at the lowest end of the weight-for-height spectrum (Frankenberg et al. 1999).

With the latest round of IFLS completed in 2015, we can begin to answer questions pertaining to the longer run implications of an economy-wide shock using detailed longitudinal data. In this paper, I investigate whether the reduced investment in them education of children had consequences on long-term human capital. I do so by examining relationships between asset holdings in 1997 and completed education, taking pre-crisis resources as a marker of a household's ability to continue investing in its children on the basis of a long-term optimization. The overwhelming weight of the evidence indicates that households pulled all stops to protect their children from suffering permanent consequences from a short-lived shock. In households with fewer means to do so, however, the long-term human capital attainment of children suffered.

My analysis is centered on the role that gold, held as jewelry in the hands of Indonesian women, played during the crisis. While deposits in the bank or savings instruments such as bonds lost a lot of their value to inflation during the crisis, gold did not. The price of gold is determined in the world market, the collapse of the currency led to a fourfold increase in its nominal value in Rupiah, far in excess of the inflation rate. Gold is also amongst the most liquid of assets in Indonesia. With at least one trader in nearly every community, gold can readily change hands, bought and sold by weight. Given this confluence of factors, a large fraction of households were found to have sold all their gold less than a year into the crisis. Unsurprisingly then, pre-crisis holdings in gold were found to be predictive of a household's ability to maintain per capita expenditure between 1997 and 1998 in rural areas (Frankenberg et al. 2004).

Building on this work, I find gold ownership in 1997, controlling for total household assets, to be predictive of more years of completed education for children in the household. The effect is most apparent for 7 and 12 year olds. One can glean insights on how households may have chosen to allocate resources between their children by exploiting within household variation in completed education, and studying the differential impact, by age and sex, of asset holdings in 1997 on attainment. In an urban setting, gold ownership benefited the youngest children the least, a trend that is reversed in rural households that were in the top half of per capita expenditures in 1997. This may reflect a divergence in the opportunity cost of schooling between rural and urban areas that resulted from the specific nature of the crisis. With dramatic food inflation, the return to employment for older children in rural areas, particularly in landed rural households, increased sharply; older children could engage in food production as an alternative to going to school. Additionally, I find that among rural households, education outcomes for young boys were more sensitive to total asset holdings in 1997 than those of young girls, that is, increasing total assets had a larger effect on the education of male than the female child between 0 and 6 years old. There is no asset dependent divergence in education attainment between sexes among older children, 13-18, at the time. This disparity may have emerged because during the crisis, households were forced to recognize the greater expected returns to education for boys and direct their resources accordingly.

The remainder of this paper is structured as follows. The next section reviews the literature that describes the short and long run effects of shocks experienced in childhood. Section 3 provides some context, on Indonesia and the financial crisis. Section 4 describes aspects of IFLS data that are of relevance to this study. Section 5 details the empirical specification and presents the results. The final section concludes.

II. Literature

Most obviously, this study is an addition to the body of work on the Indonesian financial crisis, which is quite substantial. More broadly, this paper contributes to the literature on impacts of transitory shocks on child health and education, which documents both immediate repercussions and long-term ramifications.

Immediate effects have been studied in the context of employment shocks experienced by the male breadwinner (Duryea et al, 2003), agricultural volatility (Jensen 2000; Beegle et al. 2006) and macroeconomic shocks (Funkhouser, 1999; Thomas et al. 2004; Schady 2004). In nearly every case, modest declines in school enrollment are reported, and many also document increases in child labor supply. Additionally, Beegle et al. (2006) find that households with more assets are better able to keep from pushing their child into work when facing an accidental crop loss, and Duryea et al. (2003) report an increased likelihood of failing to advance to the next grade for children from households where male head lost his job. Schady (2004) presents evidence to the contrary when studying the 1988-92 macroeconomic crisis in Peru. Cross-sections of households in the 1985-6, 1991 and 1997 LSMS surveys indicate that while school attendance was stable across years, children in the 1991 survey were least likely to be in school and working at the same time. This is hypothesized to have resulted from a lack of employment opportunities during the crisis.[1]

To formulate effective policy in response to macroeconomic crises, it is crucial to understand whether any of these immediate effects translate into long-term consequences. Mechanisms that could lead to long-term effects are fairly straightforward. Reallocation of a child's time from school to work and the stress experienced by the household during the shock could lead to poorer performance in school. Children pulled out of school may never return, and if they do, they may have trouble readjusting to school after the disruption and consequentially fail to advance grades or drop out of school. Reduced investment in health, while having no apparent immediate effect on health, could operate through similar means and result in lower education attainment in the long run. The child's mother or primary caretaker, having entered the workforce, would have less time to ensure the child's learning is on track. A priori, one cannot assert that any such mechanism will bear out. Perhaps short-term adjustments during the crisis had no long-term implications on human capital attainment. If the reduced spending on education is achieved by delaying expenditures on semi-durables such as uniforms and school

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[1] It is worthwhile to distinguish idiosyncratic shocks to a household or a community (such as loss of employment or rainfall volatility) from shocks to the aggregate economy, because theoretical predictions of their effect on schooling differ (Ferreira & Schady, 2008). For a household experiencing an idiosyncratic income shock, the increase in marginal utility of additional child income makes schooling less attractive, with no countervailing effect. Whereas in the midst of a macroeconomic crisis, a fall in real wages or decreased opportunities for employment could possibly overcome the effect of an increase in marginal utility of additional income, and make staying in school *more* attractive. Predictions from theory on the impact of a macroeconomic shock on investments in education are ambiguous; the size of the competing effects, the nature of the crisis, and the extent to which credit constraints are binding would play an important role. In any case, evidence indicates that short run education outcomes are pro-cyclical in low and middle-income countries (Ferreira & Schady, 2008), so I shall operate under the assumption that longer run effects of the Indonesian Financial crisis, if any, would also be negative.

supplies, it may come at no cost to long-term education. Alternatively, if these mechanisms are realized, the impact on completed education could turn out to be larger than what is suggested by the documented immediate effects.

In the past, a constraint to studying long-term effects of unpredictable shocks such as financial crises has been the availability of data. Detailed longitudinal data, from around the time of notable shocks that extends far enough into the future to allow for the study of long-term effects, is scarce. To get around this limitation, many studies of long-run impacts of shocks combine knowledge of temporal and/or spatial variation of a shock in the past – a famine, a pandemic, rainfall volatility, financial downturns or crop loss — with cross-sectional data. This strand of literature finds substantial negative effects of early in life shocks on a host of long-term outcomes. Neelsen and Stratmann (2011) find that early life exposure to the Greek famine in 1941-1942 lowered the likelihood of being literate and the years of education attained. The cohort in utero during the 1918 Influenza Pandemic in the United States fared poorly across many dimensions, including education, income, socioeconomic status and mortality relative to other cohorts (Almond 2006). Maccini and Yang (2009) find that Indonesian females with low rainfall in their birth region in their year of birth completed fewer years of education and lived in households with lower per capita expenditure. Banerjee et al. (2010) use regional variation in the timing of the spread of phylloxera insects that reduced the output of French vineyards in the latter half of 19th century, and find that those born in a year when phylloxera affected crops in their region of birth were shorter as adults. In 19th century Netherlands, the state of the business cycle in the year of birth was found to affect mortality later in life (Van Den Berg, 2006). Those born in boom years live longer than those born in years when the economy contracted.

An obvious limitation of this strategy is the fact that exposure to a shock can only be defined by birth year and region of birth. Thus its use so far has been restricted to studies of shocks experienced in utero or the first year of life. In the context of studying the effects of a financial crisis on education, the bulk of the insights will lie in the differential impact of the shock across the span of childhood. It would be challenging, if possible at all, to adapt this strategy to enable the exploration of this dimension.

Studies can alternatively rely on datasets that collect retrospective information on life histories. Havari and Peracchi (2014) use the Survey of Health Ageing and Retirement in Europe (SHARE) to examine the relationships between exposure to different types of hardships in the "era of two world wars"[2] and later in life outcomes, considering if the duration of the hardship, sex, socio-economic status in childhood and age at exposure are relevant. They find war-related hardships to be associated with lower health, education, cognitive ability and wellbeing later in life. But with any retrospective data, recall error may be a concern, doubly so when the respondents are elderly. However, Havari and Mazzonna (2014) argue that one need not worry about recall error in SHARE as responses hold up to various internal and external consistency checks. Another problem with using retrospective data to study shocks is that it can be quite difficult to argue that

[2] In addition to the two world wars, this period includes the other armed conflicts like the Spanish Civil War (1936-39), the Spanish Flu (1918-21) and the Ukrainian Famine (1932-33).

the data provide exogenous variation that can be exploited (as Havari and Peracchi openly admit). Thus getting at causal effects will usually not be feasible.

Given the data scarcity, Alderman, Hoddinott, and Kinsey (2006) are notable for their use of long-term panel data in studying the long-term consequences of early childhood malnutrition in Zimbabwe. A sample of 665 respondents from 330 households that was interviewed in 1983-4 or 1987 was re-interviewed in 2000. They use exposure to the civil war and drought as instruments for nutritional status, and estimate a maternal fixed effects model. Pre-school nutritional status, as measured by height-for-age, is associated with being taller in adolescence, completing more years of schooling and starting school sooner. This study demonstrates the distinct advantages to using longitudinal data to study effects in the long run, but the relatively small sample size is less than ideal.

Through its use of a large, comprehensive panel dataset, this paper can define exposure in terms of pre-shock circumstance, and not be limited by birth years and regional variation. Furthermore, the large sample size (14,000 respondents between 0 and 18 years old in 1997, living across nearly 6,000 households) enables the exploration of differential impact by age and sex. This is crucial in the context of education, as the opportunity cost of schooling, the perceived long-term consequences of disruptions in schooling, and the return to additional investments vary dramatically over the span of childhood. With comprehensive, well-measured data on asset ownership in the months leading up to the crisis, I can investigate differences in education outcomes that follow from a household's ability to protect investments in education during the crisis. The main contributions of this paper to the literature are tied to its use of IFLS. A satisfying analysis could not have been provided without a large, long-running, broad-purpose panel survey in the mold of IFLS.

III. Background

In the latter half of the 20th century, Indonesians experienced rapid improvements in their living standards. Per capita GDP quadrupled between 1965 and 1995, rising from $800 to $3300 (in 1995 US dollars). By the dollar-a-day definition, the number of Indonesians living in poverty went from 87.2 million in 1975 to 21.9 million in 1995, even as the population grew by 50% in that time. Infant mortality more than halved, the fertility rate fell and life expectancy improved dramatically (Struass et al. 2004). However, in this archipelago of over 17,000 islands, these advances were not uniform. Incidence of poverty varied substantially across provinces; remote and less populated parts of the country did not do as well.

In the same period, education attainment among Indonesians was on the rise and several policy changes were instituted. The Indonesian schooling system serves over 50 million students across more than 250,000 schools. Providing education is considered to be an essential role of the government; the 1945 constitution enshrines a right to basic education for every Indonesian. A 1985 policy made primary schooling mandatory for children between 7 and 12 years old, followed by a 1994 extension of basic education to the lower secondary years. In the mid-2000s, laws and constitutional amendments mandated that the government to spend 20% of its budget on education, and provide basic education without charging fees, leading to the abolishment of tuition fees. In 2013, the compulsory education policies were extended to include upper secondary education (World Bank).

Despite these policies, enrollment and completion are far from universal, particularly in post-primary education. However, substantial gains have been made in completion rates at all levels of education over time. As evident in Figure 2, which draws on data from IFLS, completion rates have steadily risen with each birth cohort. The most dramatic increases happened for the cohorts born in the 1960s. Primary school completion, having become nearly universal, leveled off since the early 1970s cohort. Junior secondary and senior secondary completion continued to grow at an impressive pace. College completion, though still under 20% for those born in 1990, nearly doubled in the span of 30 years.

Given all the progress in the three decades leading up to the crisis, the scale of the financial crisis came as a shock to Indonesians and to outside spectators (Frankenberg et al. 2003). The Indonesian rupiah began losing value in the latter half of 1997, declining from 2400 rupiah per US dollar to 4800 rupiah per dollar. The full force of the crisis only hit starting January 1998, when the currency collapsed to 16000 rupiah per US dollar in a matter of days, and remained volatile over the next 18 months (Figure 1). Removal of subsidies on essential goods and the pressure from the declining exchange rates led to widespread inflation in tradable goods, especially food, while nominal wages failed to catch up. Net food consumers would have felt the deleterious effects of rapid food inflation, while net food producers would have been protected. The typical Indonesian household at the time spent over half its budget on food (Strauss et al. 2004), and poorer households had even larger food shares. Thus the price shock would have led to

substantial reduction in real incomes of the many Indonesian households that were net food consumers.

In response to unanticipated income shocks that are perceived to be transitory, households would make adjustments that minimize the impact on long-term welfare. In absence of credit constraints, that would have presumably entailed borrowing to smooth consumption while maximizing long run utility. But in an environment where credit was hard to come by (Frankenberg et al. 2003), households may have had to resort to spending down assets to maintain consumption, and possibly cut back on expenditures. As a result, parents may no longer be able to invest in the education of their children on the basis of a long-term optimization. Households may be forced to reallocate their children's time from school to work, and reduce spending on education. Evidence indicates that this concern was realized in Indonesia during the crisis. Figure 3 displays the relationship between school enrollment in 1997 and 1998 and per capita expenditure in the child's household (as measured in 1997). In both urban and rural areas, the poorer, resource constrained households found it necessary to pull their children out of school between 1997 and 1998.

A key finding of Frankenberg et al. (2003*)* was that the reported value of gold in 1997, in the form of jewelry, is a significant predictor of rural households' ability to maintain consumption during the crisis. They find this result to be unsurprising for a number of reasons, described below.

First, ownership of gold is prevalent – over 60% of IFLS households reported owning some gold in 1997 – and fairly uniform across the wealth distribution. This is much larger than the 25% that reported having some financial assets (savings, certificate of deposits, stocks and receivables). Indonesian households, particularly those in rural areas, may opt to save by purchasing gold rather than through formal instruments like CDs because gold traders can be accessed more easily than the nearest bank in many rural communities. Next, unlike many other asset classes that lost value during the crisis, gold actually increased in value; the decline in exchange rate combined with the fact that the world market determines the price of gold, led to a fourfold increase in its value. Financial assets not only lost value to inflation but also to a stock market collapse, and the tightening of credit markets would have impeded the sale of already illiquid assets such as land and housing. The capital gains, along with its relative liquidity, positioned gold as an excellent means for financing consumption during the crisis. Finally, a large fraction of the gold owners from 1997 – over half in rural areas and close to a third in urban areas — had sold all their gold by 1998. Few households went in the other direction. At the same time, ownership rates of business, housing and land assets remained stable. All of this provides ample support for the claim that gold played a central role in consumption smoothing during the financial crisis. Therefore, it shall be central to my analysis as well.

The immediate and medium-term impacts of the crisis have been studied using data from IFLS2, IFLS2+ and IFLS3. See Frankenberg et al. (2003) and Thomas et al. (2004) for further discussion of immediate effects on education and the strategies employed in response to the unanticipated shock to household income. Strauss et al. (2004) study the

changes in IFLS households between the IFLS2 and IFLS3, which was fielded nearly three years after the brunt of the crisis hit. Their findings indicate that while some of the immediate term adjustments – specifically women and children supplying more labor — had persisted three years down the line, households were not substantially worse off in 2000 by most measures. Wages largely recovered to pre-crisis levels, as did household expenditures. The initial declines observed in school enrollment among younger children in poor households had been reverted, and child height in fact improved over the period. Obviously, the lack of a decline between 1997 and 2000 does not necessarily indicate that the crisis did not affect long-term welfare. If the counterfactual involves the continuation of the trends from the years before 1997, then the crisis knocked the Indonesian economy off its impressive upward trajectory, and set Indonesians back by at least three years.

IV. Data description

The Indonesian Family Life Survey (IFLS) is a longitudinal survey with 5 completed rounds spanning from 1993 to 2015. Individuals answer detailed modules on various aspects of their lives: education, health, fertility, marriage, employment, assets, businesses, and more. The first wave, fielded in 1993, interviewed 7,224 households from 13 of Indonesia's 27 provinces that are representative of 83% of the Indonesian population. Follow-ups conducted 1997-8 (IFLS2), 2000 (IFLS3), 2007-8 (IFLS4) and 2014-15 (IFLS5) attempted to track down all respondents from the baseline survey. Additionally, a 25% subsample of IFLS2, labeled IFLS2+, was fielded in late 1998 to assess the immediate impacts of the crisis. IFLS2 was conducted between August 1997 and January 1998, and successfully reached 93.3% of IFLS1 households (94.5% if we exclude households where all members had died). Indonesians began to feel the effects of the crises starting January 1998 when the exchange rate declined sharply. Most of the interviews in IFLS2 had been completed by December 1997; the interviews conducted in 1998 were for those that had moved from their 1993 location and had not already been found. Given the low attrition in IFLS2 and its timing, it serves as a baseline for pre-crisis circumstance of Indonesian households in this paper.

My analytical sample is composed of respondents that were between 0 and 18 years old at the time of their interview in IFLS2. The youngest respondents in this group will be at least 17 years old when they are interviewed in IFLS5. This makes them old enough for their junior secondary education, or 9 years of schooling, to be considered complete.[3] However most would have not completed their senior secondary education or started college by 2015. In the interest of including the youngest cohort in this analysis, I have top coded my outcome variable, years of education, to 9 years. The typical Indonesian child will start primary schooling at 7, and complete it by the time he is 12. Junior secondary schooling ages are 13 through 15, and senior secondary is 16 through 18. Instance of grade repetition is high or starting late is fairly high. In IFLS2, about 25% of 16 year olds that were still in school had completed less than 9 years of schooling.

Several features of the IFLS design prove to be invaluable to this study. A number of deliberate choices in the tracking protocol and the design of the survey questionnaire help minimize selective attrition. Most notably, interviewers in IFLS attempt to track down households that moved between waves to their new location[4]. Respondents that split off from a household to form their own household are followed as well. This was not usual practice at the time IFLS was first fielded, and many surveys today do not follow movers. Thomas et al. (2001) argue that following these individuals was essential to maintaining usefulness of the IFLS panel, as those that move are shown to be substantially different in observed characteristics from those that do not, and thus add a lot of informational value. Additionally, knowledgeable members of the household is asked to complete proxy

[3] A concern in using such cutoffs is that some respondents may not have completed the relevant level of schooling by that age due to repeating grades or starting late. Examining the data from IFLS2, about 12% of respondents aged 17 (or above) that were still in school and had not completed at least 9 years of schooling (half of them were in their 9th year). I chose this cutoff because the drop off in later years was not substantial enough to justify excluding the youngest cohort from the analysis (for instance, about 5% of 20 year olds still in school had not completed 9 years of schooling)

[4] In IFLS2 this was true so long as they have remained in one of the 13 IFLS provinces. In IFLS3, a selected set of additional provinces was included. All provinces have been eligible for tracking IFLS4 onwards.

surveys for members that are not present at the time of the interview, and a household roster that is completed in each wave (usually the household head) records the current education level for all members. This ensures that an individual's level of education will be observed in a round if at least one member of their household is found. Finally, unlike some longitudinal surveys, IFLS interviewers attempt to find every baseline respondent in every wave of the survey, even if they were not found in an intermediate wave. It is not unusual for panel surveys to make no attempt to find respondents that were missed in one round in all future rounds.

Put together, these decisions led to an overall attrition rate of 5% (4.6% if the children that were reported to have died before adulthood are excluded). Completed education is observed for 95% of 0 to 16 year olds in 1997.[5] This is achieved by making use of all of IFLS waves 3, 4 and 5. Since households will be interviewed up to three times after IFLS2 (excluding IFLS2+), it is not necessary for respondents to be found in IFLS5 for their completed education to be observed; many would be 17 years or older in earlier waves.[6] One additional advantage of having data from multiple rounds is that it can be used to fill in missing values of variables that are unlikely to change between years, such as parental education.

IFLS collects data on household assets through multiple modules. Measuring wealth in a developing country can be challenging, but the details of the assets modules and of how they are administered are reassuring. One respondent from each household, the head or the head's spouse in nearly all cases, is asked to estimate the value of all business and non-business assets as part of the household questionnaire book. Values of farm business assets, non-farm business assets, and non-business assets are reported in separate modules. Each is broken down into as many as 10 relevant categories, such as farmland, crops, animals, equipment and tools for farm assets, or property, financial instruments, jewelry and household durables for non-business assets. Separately, the same non-business assets module is also completed as a part of the individual interview of the head's spouse (or of the household head's, if the spouse answered the household questionnaire book). Thus the reported value of a household's non-business assets by the head can be crosschecked with the spouse's report. This unusual design choice proves to be immensely important. Since females largely control jewelry ownership in the household, there is systematic under reporting by males; in nearly 10% of households, males report no ownership of jewelry when females report owning some. For this reason, I use the females' report for jewelry in all households. Had the assets module not been administered twice, this substantial measurement error in a key covariate would have gone entirely undetected. For the remaining asset categories, male and female reports are fairly close and show no cause for concern. Differences do emerge, possibly from the difficulty in estimating the value of durable items such as refrigerators or illiquid assets such as land or housing; I use the average reported value within each category. The double reporting is also useful in the cases where one of the head or their spouse was

[5] 17 and 18 year olds are excluded from this calculation because there reported education in IFLS2 is "complete".

[6] I use the education level observed in the most recent wave the respondent is found, most often IFLS5

unable to provide an estimate the value of particular assets, leading to far fewer missing values than there would have been otherwise.

Arguably, my findings are not plagued by substantial attrition bias or systematic biases resulting from measurement error. The low levels of attrition, combined with the confidence in the measurement of key covariates, support this claim.

All told, 14,168 respondents living in 5,932 households at the time of IFLS2 form my analytical sample. Table 1 reports on some characteristics of interest, providing mean values separately for urban and rural households and further stratifying by whether the household is in the top or bottom half of per capita expenditures (PCE) in 1997.[7] Households with higher per capita expenditures tend to be smaller, and have fewer 0 to 18 year olds. It is unclear if this is truly informative about the welfare of individuals in the higher PCE and smaller households. Larger households gain from economies of scale; they would not need to spend as much per household member. Higher PCE households have better educated household heads, and urban heads have many more years of education than their rural counterparts on average. Gold ownership rates do increase with PCE, but are very high (50%+) even among the lower PCE households. The median value of gold holdings is substantially larger among higher PCE households; the median household in the upper half of PCE owns more than twice as much as the household in the bottom half in both urban and rural areas. This difference is even larger for total household assets in urban areas. A much larger fraction of higher PCE households only have one 0 to 18 year old; this number is reported because these households will need to be excluded from the household fixed effects models. Of the households that qualify to included in the sample, that is any household with at least one 0 to 18 year old whose completed education is known, a larger share comes from the lower half of PCE of the all households in the IFLS2 round. This is indicated by the disparity in the number of households in the upper and lower half of PCE in the last row. It is not surprising; children do not contribute nearly as much to household income, but are treated as equivalent to adults in the calculation of PCE. If children are less expensive than adults, the lower PCEs may not mean lower welfare in these households.

Next I turn to table 2, which reports mean years of completed education (top-coded to 9 years) by age. Once again, these are separated by whether the household is in an urban or rural area and PCE in 1997. Younger cohorts and children from higher PCE households complete more years of education. Urban children of all ages attain significantly more education than rural counterparts. Additionally, attainment for rural children aged 7 through 18 is more sensitive to PCE than for urban ones. Differences in attainment by sex are generally not significant, and exhibit no obvious patterns.

[7] PCE is calculated using consumption and household transfers. IFLS' detailed consumption modules record value of expenditures and production for own consumption on over 50 groups of items in the household budget. Whether a household belongs in the top or the bottom half of PCE is determined using the entire IFLS2 cross-section, not just the households included in my analysis.

Table 3 reports the ownership rates of different asset classes in urban and rural households, along with the median reported value conditional on owning some assets in that class.[8] Urban households are wealthier but much less likely to be engaged in farming or own any land. Rural households are somewhat less likely to own jewelry, and substantially less likely to own financial assets. This may be indicative of poorer access to formal financial institutions and a stronger preference for saving through gold. Nearly all households report owning at least some assets; those that do not were often unable or unwilling to estimate the value of their asset holdings.

[8] "Housing and household assets" includes the value of houses and buildings owned by the household as well as durables and semi-durables such as furniture, vehicles and household appliances. "Financial assets" includes savings, certificate of deposits, stocks and receivables.

V. Empirical Specification and Results

My basic specification is the following linear regression:

$$y_{ij} = \beta_0 + \beta_1 Assets_j + \beta_2 Gold_j + \beta_3 X_{ij} + \varepsilon_{ij} \quad (1)$$

where y_{ij} is the years of education attained by individual *i* from household *j*. As mentioned in the previous section, the outcome variable is top-coded to 9 years. Sacrificing some the variation in years of education allows for the study of effects of the financial crisis in early childhood. *Assets* is the log of total assets owned by the household in 1997[9], and *Gold* is an indicator variable that equals 1 if the household *j* reports having a non-zero quantity of jewelry in 1997 and zero otherwise. The set of individual and household controls in *X* include a linear term in age in 1997, years of parental education, household composition in 1997, and kecamatan fixed effects. Kecamatans are administrative units in Indonesia that can be thought to be equivalent to counties in the United States. Thus the inclusion of this fixed effect will sweep out many regional determinants of education attainment that are unchanging over time, as well as the variation in the local economy shocks in 1997, lending more credibility to this estimation.

The primary variable of interest is the indicator for gold ownership. The coefficient β_2 captures the effect of owning some assets that can be easily liquidated — which enhances a household's ability to maintain investments in its children during the crisis— controlling for total household assets at the time. Needless to say, owning gold in the form of jewelry could be a marker of female bargaining power, of a household's (particularly women's) propensity to save, and maybe even of recent good times that would encourage the household to purchase a luxury item. In other words, there are a number of ways in which gold ownership will be correlated with unobserved and omitted variables that could come in the way of the interpreting β_2 as merely the impact of owning liquid assets during the crisis.

Instead of estimating (1) by pooling the entire sample, it is probably useful to differentiate along certain dimensions. As noted in previous sections, the perceived long-term consequences of disruptions in schooling vary over the span of childhood. Pulling out a 17 year old from school probably entails a permanent exit, while delaying education for a 6 year old could come with no long-term cost. Older children can be more gainfully employed as well, thus the opportunity cost of schooling differs substantially with age. Additionally, urban and rural households faced substantively different shocks during the crisis; as rural households are more likely to be engaged in food production, the sharp food inflation would affect their budgets and work incentives differently. The effect of the crisis may need to be differentiated by sex as well. These dimensions are worth exploring, thus (1) is estimated separately by age, sex and whether the household resides in a rural or an urban area. The need for this stratification is further justified by significant and substantive differences in the empirical results. The age groups I've

[9] About 1.3% of the entire sample of households reports 0 assets and are thus excluded from the analysis present. Including those 89 households and taking quartic root of assets instead of log does not change results. I have presented models with logs because they can be easily interpreted.

separated the sample into are 0-6, 7-12 and 13-18 year olds at the time of interview in IFLS2. These loosely correspond to preschool, primary and secondary schooling ages respectively. However, I would caution against interpreting the results exclusively through this lens, as the incidence of starting school late and repeating grades is non-trivial.

Table 4 reports the results from estimating (1). A salient pattern here is that completed education of older children in rural areas is significantly more sensitive to total assets in 1997 than of younger children. It appears that less wealthy households are unable to protect education of their older children as well as they can for younger ones. This may be a reflect both the difference in the opportunity cost to schooling by age, which would have encouraged households with older children to pull them out of school and into the labor market, and the fact that disruptions to schooling for older children tend to be permanent. However, I cannot definitively claim that this effect was caused by the crisis. Perhaps this is simply an underlying pattern that would exist independent of the crisis, that is, current assets matter more for older children at all times. This seems plausible, as the opportunity cost differential by age is larger, if anything, when wages are higher and the economy stable.

Turning to gold ownership, I find remarkable separation in the education attainment of 7 to 12 year olds between households with and without gold. Gold ownership also significantly predicts of more education for 13 to 18 year old females in rural areas, and this effect is significantly larger than that for 13 to 18 year old rural males. In many instances, the coefficient sizes on 0-6 year olds are almost as large as on 7-12 year olds, however none are significantly different from zero at 5%.

I interpret the positive coefficients as gold ownership leading to better protection of long-term education, through enabling households to maintain investments in their children. Since I'm controlling for total assets, β_2 is not a wealth effect,. Instead, this result indicates that the composition of the household's asset portfolio right before the crisis was relevant to long-term outcomes of its children. Gold ownership allowed households to keep from making cuts in investments in their children that would have lead to lower accumulation of human capital in the long run. The effect cannot be dismissed as unobserved heterogeneity; it seems unlikely that excluded characteristics would drive the effect on 7-12 year old females but not affect 0 to 6 and 13-18 year old females in urban areas. The divergence in the effect of gold on older rural males versus females could perhaps be understood by returning to opportunity costs in rural areas: 13-18 year old males plausibly make more productive farm workers than females of the same age, and sharp food inflation made food production an attractive alternative to school.

In the immediate aftermath of the crisis, households with older children were found to be less likely to reduce investments in education compared to those with younger children, and the largest drop in enrollment was observed for primary-school aged children (Thomas et al. 2004). In that the effect of gold ownership on completed education is most apparent for 7 to 12 year olds, my findings are consistent with earlier work. Households with fewer means to shield their 7 to 12 year olds from the crisis were unable to keep

their education attainment from being harmed, to the tune of 0.24-0.36 years of education.

I extend this analysis by estimating models with household fixed effects. This will address a lot of the substantive unobserved heterogeneity that poses a challenge to my interpretation of β_2 above. Inclusion of these fixed effects will sweep out wealth effects that affect all children in the household; tastes for investment in education; the propensity to save (and the extent of savings) either for future investment or for a rainy day, and so on. With such concerns out of the way, I can use a household fixed effects specification to investigate if households sought to protect certain children over others.

Given the constraints on their budgets during the crisis, it was likely the case that many households would have had to favor some of their children over others. These decisions could have been dependent upon a variety of child characteristics and parental preferences, and involved some complex interactions. For instance, households may choose to continue investing in their brightest child, to maximize the expected labor market returns down the line. Alternatively, families with stronger preference for equity may instead choose to shore up other children and withdraw the bright kid from school, as the perceived long term consequences of disruptions to that child's schooling are smaller than those to his siblings.

From a practical point of view, it is easiest and most useful to differentiate between children in my analysis by age and sex. These are easily observed, thus well measured, and the substantial variation in opportunity costs and expected returns to schooling by age and sex should influence household decisions on allocation of resources between children. To the extent that the outcomes reflect these allocations, I can make inferences about the human capital investment decisions made in households by exploiting within-household variation in completed education.[10] To do so, I estimate: [11]

$$y_{ij} = \beta_0 + \beta_1 agesex\ group_{ij} + \beta_2 Assets_j \times agesex\ group_{ij} + \beta_3 Gold_j \times agesex\ group_{ij} + \delta_j + \varepsilon_{ij} \quad (2)$$

where y_{ij} is the years of education, and *agesex group* is a vector of indicator variables that record the household member's age group (0-6, 7-12 or 13-18) in 1997 and sex. δ_j is a household fixed effect that sweeps out unobserved household characteristics that affect education attainment in a linear and additive fashion. Total assets and gold ownership are measured at the household level, so I interact them with age-sex groups. The coefficients on these interactions measure the differences in association between household wealth in 1997 and completed education by age and sex, relative to the excluded group. Thus they may be reflective of the household decision making process in allocating scarce resources

[10] The assumption here, that age and sex do not determine how well an individual converts inputs into outcomes is almost certainly an inaccurate description of reality, however it is a useful one. There are many other practical reasons why outcomes may not reflect investments. I can't do very much besides acknowledging this as a limitation of the analysis I engage in.

[11] An alternative specification that includes a linear term is age to account for the trend line in education does not change coefficients on any interactions. Therefore in this model the effects will be absorbed in the age-sex dummies.

between competing alternatives. Note that 1,784 household with only 1 member under 18 are excluded, as are 25 households with over 7 members under 18 (I want to limit my analysis to nuclear family structure the best I can, and some of these "households" are believed to be hostels) .

The results, reported in Table 5, are separated by urban and rural areas. Households are further divided into bottom and top half of per capita expenditure (PCE) in 1997. At all times in this analysis, it would serve the reader well to remember that these coefficients measure the effect sizes relative to the excluded group, that is females aged 0 to 6 in IFLS2. Also note that total assets are centered to value of median household assets in each regression. Therefore the dummy for females aged 7 to 12 in the first column (Urban, 0-100 PCE) captures the difference between the completed education of females aged 7 to 12 and females aged 0 to 6 in an urban household with median asset holdings and no gold. The second and third columns record the same, but only for the lower and upper half of urban households by PCE, respectively. To get the predicted difference between females 0 to 6 and females 7 to 12 in an urban household with median assets that also owned gold in 1997, one would need to add the age-sex group dummy for females 7 to 12 to the age-sex group dummy interacted with gold ownership dummy in the first column.

I begin by commenting on the differential effects associated with owning gold. In urban households, gold is used to shore up the education of older children, an effect that is driven by households in the bottom half of PCE. The model predicts that in an urban household with median asset holdings that owns gold, all age-sex groups will attain the about same number of years of education; whereas in households without gold, older cohorts are predicted to attain 0.4 to 0.5 fewer years of education than 0 to 6 year old females (the differences are significant). This suggests that the youngest cohort had the least to gain from their household's ownership of liquid assets, perhaps because households directed resources to meet the immediate educational needs of older children, leaving less behind for those who had not started school yet.

In contrast, among the top half of rural households by PCE, gold ownership benefits 0 to 6 year old females substantially (and significantly) more than males 7 to 18 and females 13 to 18. For a rural household with median asset holdings in the upper 50 percent by PCE, the model predicts that gold ownership reverses the trend in education attainment by age. In a household without gold, females age 0 to 6 complete the fewest years of education. The differences, while large, are not significant. With gold however, the 13-18 year olds complete significantly fewer years of education than females 0 to 12 and males 0 to 6, as should be expected from the long-term trend of education attainment by birth year in Indonesia (I produced standard errors by bootstrap to obtain this result; the differences are significant at 1%). This suggests that when rural households had the means to finance consumption during the crisis through ownership of liquid assets, their youngest children (particularly females) benefitted the most. This result in rural households, and its divergence from urban households, possibly follows from differences in the effect of crisis on the opportunity cost of schooling in urban and rural areas. Across the distribution, urban areas experienced larger declines in real wages and employment

opportunities than rural areas (Frankenberg et al. 2003). In isolation, this would reduce the opportunity cost schooling for older children more in urban areas relative to rural areas, incentivizing them to remain in school longer. On top of that, rapid food inflation increased the opportunity cost of schooling for older children in rural areas quite dramatically, especially if their households owned arable land, as food production suddenly got more lucrative. Therefore gold ownership would benefit the education of younger children more in rural households, as older children would have exited schooling during the crisis.

Next, I turn to the differential effects of total assets. Once again, it is worth emphasizing that each coefficient captures the differential effect from the excluded group (females 0 to 6). In an urban setting, education attainment for males 0 to 6 is least sensitive to changes in total assets of any group. Among males, older cohorts are more sensitive to total assets, while there is no such trend for females. Rural households exhibit two noteworthy patterns. First, education of older cohorts is more sensitive to total assets for both sexes, with the differences being significant for females. Second, the gap between males and females, in their sensitivity to total assets, closes with age. Males 0 to 6 are significantly more affected by total asset holdings than females of the same age, less so for 7 to 12 year olds (the difference is significant at 5%), while the coefficients are the identical to 3 decimal places for the oldest cohort. That older cohorts are more sensitive to total assets in rural households in consistent with the result from model (1).

The implications of these trends on predicted education are explored in table 6 and 7, where I report the education attainment predicted by model (2) at different percentiles of asset holdings among rural households, relative to females aged 0 to 6. Table 7 includes the shift predicted by gold ownership. Standard errors are produced through bootstrapping.[12] To aid visualization, the same information is plotted in Figure 4.

Among households without gold (Table 6), the predicted years of education for males 0 to 6 goes from -0.257 years at the 10^{th} percentile of asset holdings to +0.399 years at the 90^{th}, relative to females of the same age (the difference is marginally significant at 90^{th} percentile of assets for a 10% size test). In households with gold, the predicted shift is from -0.557 years at the 10^{th} percentile to +0.1 years at the 90^{th}, and differences are significant at 5% at the 10^{th} and the 25^{th} percentile of asset holdings. The differences by sex are narrower for 7 to 12 year olds, and fewer are significant, but follow the same trend. In contrast, the difference between 13 to 18 year old males and females remains constant throughout the asset distribution (and is insignificant throughout, both with and without gold). This suggests that poor rural households were less able to protect young boys from the crisis compared to young girls, regardless of whether the household owned gold. Among wealthy households that did not own gold, young males did better than young females. The key finding here is that belonging to a household with more assets would benefit males 0 to 6 more than females 0 to 6, with no such difference existing

[12] These standard errors are somewhat larger than those in table X; the bootstrap imposes fewer assumptions. (With 10,000 replications, the bootstrapped errors had definitely converged).

among older children that are 13 to 18. A plausible interpretation of this result relies on the difference in return to schooling on the labor market by sex. Like in much of the developing world, additional schooling leads to greater labor market returns for males in Indonesia. For 0 to 6 year olds that are not even in school yet, this is perhaps the best indication families will have of the expected returns to investing in their child. It is unsurprising then, that male will wins out when competing for additional resources against a female of same age. Among older children, this effect may be muted because parents have more information, and these children have fewer years remaining until completion. It seems very likely that the emergence of this gender disparity, where one did not exist before, resulted from the shock experienced by households because of the financial crisis.

All of the suggested differences in education attainment in this section are quite substantial. For comparison, note that in evaluating an Indonesian school construction program from the 1970s that constructed over 60,000 schools in the archipelago, Duflo (2000) found that children aged 2 to 6 in 1974 completed 0.12 to 0.19 more years of education for every school constructed per 1000 children in their region of birth. Using IFLS, Maccini and Yang (2007) find that women with one standard deviation more of rainfall in their year and location of birth finished 0.15 more years of education.

VI. Conclusion

In 1998, the Indonesian economy was embroiled in a largely unanticipated financial crisis. A collapse in the exchange rate resulted in a price shock, which in turn hurt real household incomes and budgets. Households responded by reallocating resources towards immediate expenditures like food and away from purchases of semi-durables and investment in the human capital of the next generation. Short-term evidence indicates that there was a drop in enrollment for children from poorer households and reduced spending on education, especially in households with young children. These coping strategies had substantial implications for long-term human capital attainment. Using the Indonesian Family Life Survey's 1997 round as baseline, this paper investigates the consequences on completed education through the lens of consumption financing achieved by spending down wealth during the crisis.

Gold, held as jewelry in the hands of Indonesian women, played a central role in consumption smoothing during the crisis; it gained value as the currency collapsed, while remaining relatively liquid. It turns out that ownership of gold in the months leading up to the crisis, controlling for total household assets at the time, is also a significant predictor of more education attainment in children. This effect is most apparent for 7 to 12 year olds in urban households. Additionally, using within household variation in education attainment yields interesting insights about the allocation of resources between children. Relative to the youngest cohort, older children benefitted more from ownership of gold in an urban setting, and less in a rural one. This result is best explained by considering the divergence in the opportunity cost of schooling between urban and rural areas: dramatic food inflation during the crisis increased the returns to food production, an activity that older children in rural areas could most easily partake in.

This paper adds to the large and growing literature on the long-term effects of shocks on children using panel data, with a unique focus on tracing out the impact of consumption financing enabled by asset holdings at the time of the shock. It is enabled by distinct design choices in IFLS that minimize attrition and measurement error. The Indonesian story is one where parents sought to shield the long-term human capital of their children from the financial crisis. Regrettably, education attainment of children in households with fewer means took a substantial hit; a transitory shock came with long-term consequences for Indonesian children.

WORKS CITED

Almond, D. (2006). Is the 1918 Influenza Pandemic Over? Long-Term Effects ofIn UteroInfluenza Exposure in the Post-1940 U.S. Population. Journal of Political Economy, 114(4), 672-712. doi:10.1086/507154

Banerjee, A., Duflo, E., Postel-Vinay, G., & Watts, T. (2010). Long-Run Health Impacts of Income Shocks: Wine and Phylloxera in Nineteenth-Century France. Review of Economics and Statistics, 92(4), 714-728. doi:10.1162/rest_a_00024

Beegle, K., Dehejia, R. H., & Gatti, R. (2006). Child labor and agricultural shocks. Journal of Development Economics, 81(1), 80-96. doi:10.1016/j.jdeveco.2005.05.003

Berg, G. J., Lindeboom, M., & Portrait, F. (2006). Economic Conditions Early in Life and Individual Mortality. American Economic Review, 96(1), 290-302. doi:10.1257/000282806776157740

Duflo, E. (2000). Schooling and Labor Market Consequences of School Construction in Indonesia: Evidence from an Unusual Policy Experiment. doi:10.3386/w7860

Duryea, S., Lam, D., & Levison, D. (2007). Effects of economic shocks on children's employment and schooling in Brazil. Journal of Development Economics, 84(1), 188-214. doi:10.1016/j.jdeveco.2006.11.004

Ferreira, F. H., & Schady, N. (2008). Aggregate Economic Shocks, Child Schooling And Child Health. Policy Research Working Papers. doi:10.1596/1813-9450-4701

Frankenberg, E. 1999. “The Real Costs of Indonesia’s Economic Crisis.” Working paper. rand, Santa Monica, Calif.

Frankenberg, E., Smith, J. P., & Thomas, D. (2003). Economic Shocks, Wealth, and Welfare. The Journal of Human Resources, 38(2), 280. doi:10.2307/1558746

GNI per capita (constant 2010 US$). (n.d.). Retrieved April 14, 2017, from http://data.worldbank.org/indicator/NY.GNP.PCAP.KD?end=2015&locations=ID&start=1985

Havari, E., & Mazzonna, F. (2015). Can We Trust Older People’s Statements on Their Childhood Circumstances? Evidence from SHARELIFE. European Journal of Population, 31(3), 233-257. doi:10.1007/s10680-014-9332-y

Havari, E., & Peracchi, F. (2016). Growing up in wartime: Evidence from the era of two world wars. Economics & Human Biology. doi:10.1016/j.ehb.2016.09.002

Jensen, R. (2000). Agricultural Volatility and Investments in Children. American Economic Review, 90(2), 399-404. doi:10.1257/aer.90.2.399

Maccini, Sharon, and Dean Yang. "Under The Weather: Health, Schooling, And Economic Consequences Of Early-Life Rainfall". *American Economic Review* 99.3 (2009): 1006-1026. Web.

Neelsen, S., & Stratmann, T. (n.d.). Effects of Prenatal and Early Life Malnutrition: Evidence from the Greek Famine. SSRN Electronic Journal. doi:10.2139/ssrn.1570650

Schady, N. R. (2004). Do Macroeconomic Crises Always Slow Human Capital Accumulation? The World Bank Economic Review, 18(2), 131-154. doi:10.1093/wber/lhh036

Strauss, J., Beegle, K., Herawati, Y., Dwiyanto, A., Pattinasarany, D., Satriawan, E., . . . Witoelar, F. (2004). Indonesian living standards before and after the financial crisis: evidence from the Indonesia Family Life Survey. Santa Monica, CA: RAND.

Thomas, D., Frankenberg, E., & Smith, J. P. (2001). Lost but Not Forgotten: Attrition and Follow-up in the Indonesia Family Life Survey. The Journal of Human Resources, 36(3), 556. doi:10.2307/3069630

Thomas, D., Beegle, K., Frankenberg, E., Sikoki, B., Strauss, J., & Teruel, G. (2004). Education in a crisis. Journal of Development Economics, 74(1), 53-85. doi:10.1016/j.jdeveco.2003.12.004

World Bank and Education in Indonesia. (n.d.). Retrieved April 14, 2017, from http://www.worldbank.org/en/country/indonesia/brief/world-bank-and-education-in-indonesia

Figures

Figure 1: Exchange rate (Indonesian Rupiah per US Dollar) in the late 1990s

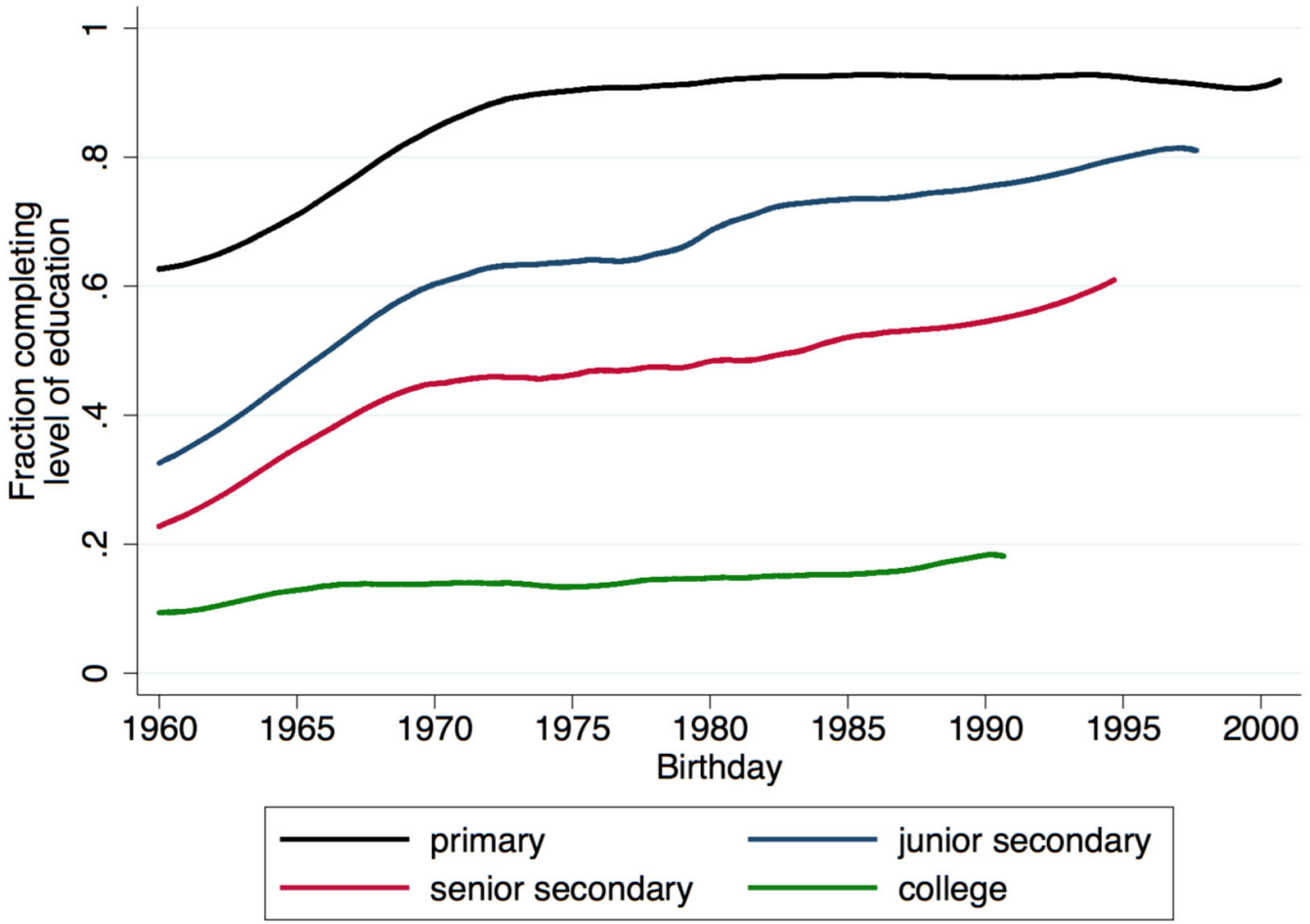

Figure 2: Education completion rates in Indonesia by birth cohort (lowess with 20% bandwidth and tri-cube weighting function). Data source: IFLS.

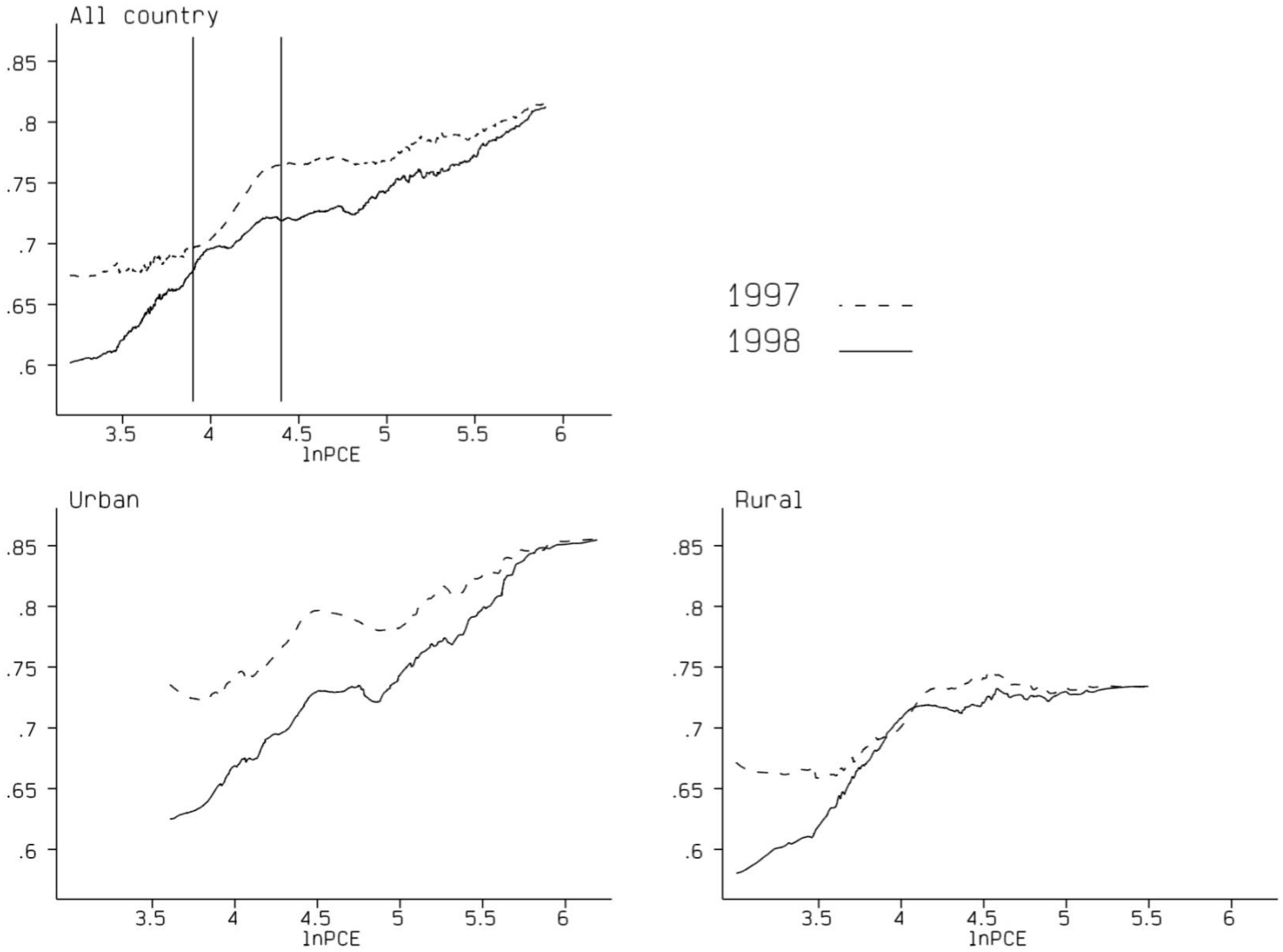

Figure 3: School enrollments by per capita expenditure in 1997 (lowess).
Source: *Thomas et al. (2004)*

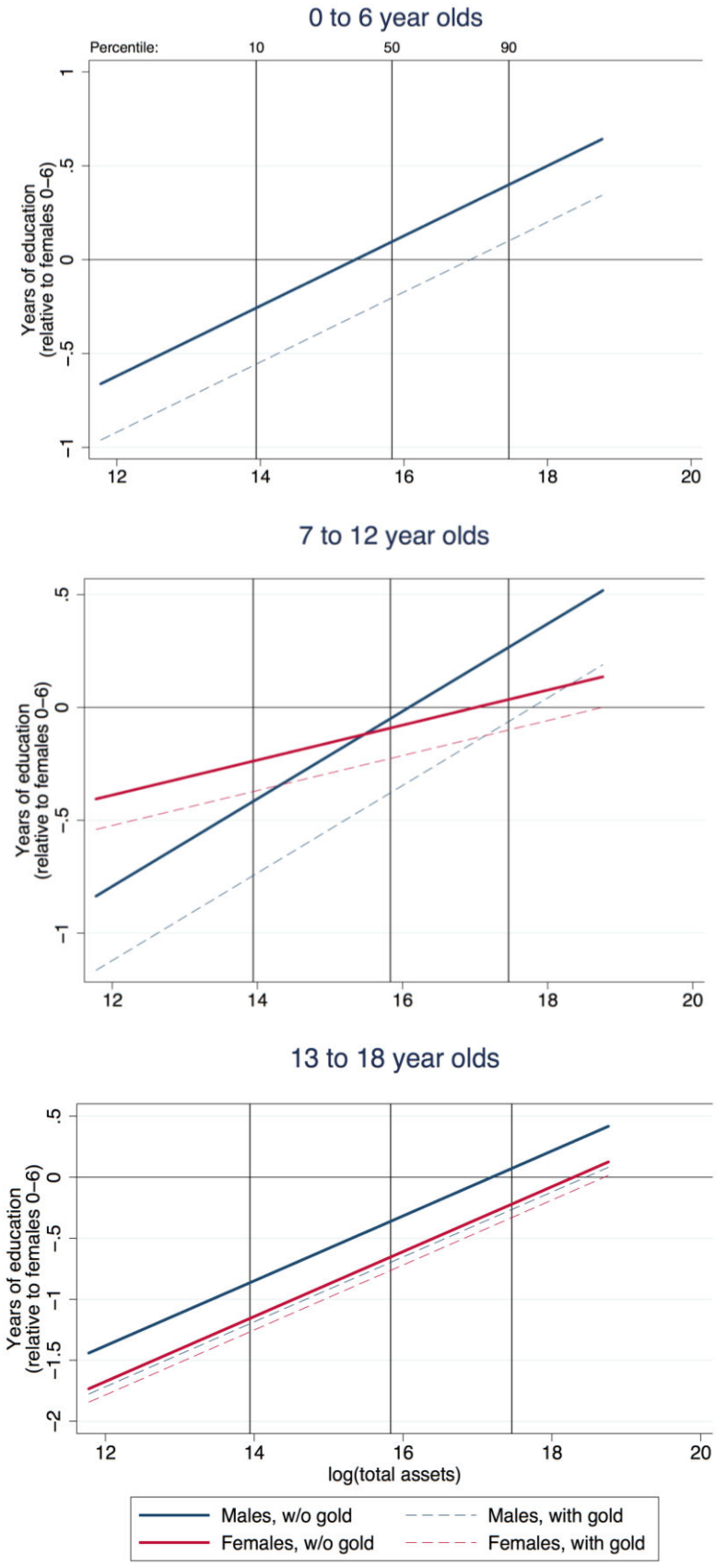

Figure 4: Predicted years of education over assets in rural households by model (2), relative to 0 to 6 year old females

HH Characteristic		Urban		Rural	
(in 1997)	PCE %ile	0-50	51-100	0-50	51-100
Number of members		5.962	5.649	5.737	4.950
		(0.060)	(0.068)	(0.051)	(0.047)
Number of 0 to 18 year olds		2.531	2.130	2.694	2.094
		(0.036)	(0.035)	(0.037)	(0.031)
Age of HH head		45.21	44.80	45.92	44.20
		(0.344)	(0.354)	(0.320)	(0.337)
Education of HH head		6.518	9.684	3.971	6.224
(in years)		(0.111)	(0.132)	(0.084)	(0.117)
Percentage of households:					
that owned gold		62.02	72.92	53.80	70.97
		(1.269)	(1.301)	(1.184)	(1.162)
that had a female head		14.28	14.48	14.93	12.25
		(0.914)	(1.031)	(0.846)	(0.840)
that had only one 0-18 year old		23.84	37.87	23.55	39.78
		(1.114)	(1.421)	(1.007)	(1.253)
Median value of gold (Rp000s)*		200	500	100	216
Median total assets (Rp000s)		7293.75	30000	5070	11624
Number of HHs		1464	1167	1775	1526

Table 1: Household characteristics in 1997 by urban/rural and PCE in 1997. Median value of gold conditional upon owning gold. Standard errors in parentheses.

Age		Urban		Rural	
in 1997	PCE %ile	0-50	51-100	0-50	51-100
	Males	8.27	8.73	7.77	8.25
		(0.073)	(0.068)	(0.080)	(0.087)
0 to 6	N	547	304	808	488
year olds	Females	8.38	8.84	7.97	8.24
		(0.076)	(0.051)	(0.076)	(0.093)
	N	560	266	789	446
	Males	8.10	8.60	7.37	8.16
		(0.077)	(0.073)	(0.084)	(0.083)
7 to 12	N	577	368	819	489
year olds	Females	8.25	8.81	7.41	8.30
		(0.077)	(0.055)	(0.083)	(0.069)
	N	526	329	798	526
	Males	8.15	8.55	7.16	8.08
		(0.064)	(0.058)	(0.086)	(0.073)
13 to 18	N	744	569	778	611
year olds	Females	8.19	8.42	6.96	8.06
		(0.065)	(0.055)	(0.088)	(0.072)
	N	751	650	790	635

Table 2: Mean years of completed education by age, sex and household PCE in 1997. Year of education to coded to 9 years. Standard errors in parentheses.

Asset class	Ownership rate in 1997 (%)	Median value* (Rp000s)
3,301 Rural HHs		
Farm	53.9	3,030
Business (non-farm)	29.8	300
Housing and household	98.6	3,570
Land	41.0	2,250
Financial	20.6	137.5
Jewelry	61.7	170
All	99.2	7,346
2,631 Urban HHs		
Farm	10.4	3,726
Business (non-farm)	34.9	610
Housing and household	97.3	9,338
Land	26.1	6,000
Financial	34.5	500
Jewelry	66.9	300
All	98.3	12,999

Table 3: Ownership rates of different assets in urban and rural households. Median values are conditional upon owning some assets in that class.Standard errors in parentheses.

	Age in 1997	0-6	7-12	13-18
Rural Males	log(total assets)	0.131**	0.177***	0.220***
		(0.0539)	(0.0458)	(0.0559)
	HH has gold	0.184	0.277*	-0.0654
		(0.166)	(0.155)	(0.156)
	R-squared	0.089	0.096	0.113
	Observations	1,294	1,297	1,366
	Kecamatans	202	178	190
Rural Females	log(total assets)	0.105**	0.157***	0.344***
		(0.0464)	(0.0392)	(0.0521)
	HH has gold	0.204	0.247**	0.345***
		(0.167)	(0.118)	(0.128)
	R-squared	0.076	0.094	0.183
	Observations	1,227	1,317	1,406
	Kecamatans	194	191	199
Urban Males	log(total assets)	0.0728	0.136***	0.137***
		(0.0526)	(0.0470)	(0.0410)
	HH has gold	0.272*	0.310**	0.163
		(0.148)	(0.134)	(0.108)
	R-squared	0.078	0.113	0.132
	Observations	838	937	1,279
	Kecamatans	193	203	221
Urban Females	log(total assets)	0.0911**	0.141***	0.0963**
		(0.0376)	(0.0439)	(0.0439)
	HH has gold	-0.00798	0.363**	0.114
		(0.147)	(0.173)	(0.118)
	R-squared	0.098	0.132	0.132
	Observations	819	841	1,364
	Kecamatans	192	183	247

Table 4: Models include kecamatan fixed effects, and control for parental education (both parents, specified as a spline), household composition in 1997 (number of people, by sex, in 8 age groups: 0-6, 7-12, 13-18, 19-24, 25-39, 40-54, 55-64 and ≥ 65) and a linear term in age.Standard errors included in parentheses are robust heteroskedasticity and intra-kecamatan correlations. (*** p< 0.01, ** p< 0.05, * p< 0.1).

			Urban			Rural		
	PCE %ile		0-100	0-50	51-100	0-100	0-50	51-100
	Sex	Age						
age-sex group dummies	M	0-6	-0.176	-0.197	-0.0452	0.0946	0.0221	0.494
			(0.167)	(0.214)	(0.242)	(0.188)	(0.215)	(0.396)
	F	7-12	-0.418**	-0.557**	0.0790	-0.0916	-0.266	0.599
			(0.188)	(0.220)	(0.315)	(0.231)	(0.281)	(0.404)
	M	7-12	-0.424***	-0.558***	-0.00828	-0.0504	-0.215	0.645
			(0.160)	(0.193)	(0.273)	(0.167)	(0.188)	(0.391)
	F	13-18	-0.548***	-0.532**	-0.383	-0.655***	-1.069***	0.586
			(0.171)	(0.210)	(0.284)	(0.195)	(0.224)	(0.415)
	M	13-18	-0.501***	-0.695***	0.0685	-0.363**	-0.716***	0.658
			(0.171)	(0.216)	(0.294)	(0.183)	(0.214)	(0.424)
age-sex group × log (total assets)	M	0-6	-0.0799	-0.0458	-0.105	0.187**	0.217**	0.0975
			(0.0528)	(0.0743)	(0.0821)	(0.0806)	(0.101)	(0.121)
	F	7-12	0.0560	0.0637	0.0665	0.0775	0.114	-0.201
			(0.0518)	(0.0793)	(0.0613)	(0.0733)	(0.103)	(0.124)
	M	7-12	0.0681	0.0733	0.0571	0.194**	0.229**	0.0198
			(0.0484)	(0.0737)	(0.0604)	(0.0750)	(0.0995)	(0.105)
	F	13-18	0.00808	0.0606	-0.0613	0.266***	0.242**	0.0955
			(0.0554)	(0.0861)	(0.0636)	(0.0777)	(0.105)	(0.0983)
	M	13-18	0.110**	0.152*	0.0224	0.266***	0.227**	0.138
			(0.0542)	(0.0887)	(0.0643)	(0.0737)	(0.104)	(0.106)
age-sex group × household has gold	M	0-6	0.210	0.352	-0.182	-0.299	-0.350	-0.510
			(0.209)	(0.271)	(0.296)	(0.228)	(0.279)	(0.405)
	F	7-12	0.468**	0.637**	-0.100	-0.135	-0.214	-0.494
			(0.225)	(0.278)	(0.326)	(0.266)	(0.339)	(0.431)
	M	7-12	0.372**	0.513**	-0.0762	-0.329	-0.309	-0.811*
			(0.188)	(0.236)	(0.283)	(0.222)	(0.281)	(0.416)
	F	13-18	0.437**	0.384	0.272	-0.110	0.0654	-0.975**
			(0.201)	(0.260)	(0.290)	(0.235)	(0.284)	(0.435)
	M	13-18	0.359*	0.559**	-0.193	-0.336	-0.201	-0.993**
			(0.207)	(0.273)	(0.319)	(0.241)	(0.307)	(0.423)
Constant			8.626***	8.437***	8.933***	8.188***	8.072***	8.289***
			(0.0620)	(0.0737)	(0.0970)	(0.0731)	(0.0978)	(0.115)
R-squared			0.030	0.022	0.091	0.039	0.049	0.041
Observations			5,247	3,257	1,990	6,761	4,206	2,555
Households			1,807	1,093	714	2,245	1,331	914

Table 5: Models include household fixed effects. Total assets and gold ownership are measured at the household level, and 0 to 6 year old females form the excluded group. Total assets are also centered to the median within each column. Standard errors included in parentheses are robust heteroskedasticity and intra-kecamatan correlations. (*** p< 0.01, ** p< 0.05, * p< 0.1).

		Percentile of total assets				
Sex	Age	10	25	50	75	90
M	0-6	-0.257	-0.0736	0.0953	0.251	0.399*
		(0.234)	(0.197)	(0.189)	(0.206)	(0.240)
F	7-12	-0.238	-0.161	-0.0913	-0.0265	0.0350
		(0.221)	(0.214)	(0.229)	(0.259)	(0.296)
M	7-12	-0.416**	-0.225	-0.0497	0.112	0.266
		(0.178)	(0.157)	(0.167)	(0.199)	(0.241)
F	13-18	-1.157***	-0.895***	-0.654***	-0.432**	-0.221
		(0.218)	(0.193)	(0.195)	(0.220)	(0.256)
M	13-18	-0.865***	-0.602***	-0.362**	-0.139	0.0717
		(0.189)	(0.171)	(0.181)	(0.211)	(0.251)

Table 6: Predicted years of education relative to 0-6 year old females from model (2) at different percentiles of asset holdings. Predictions for households that do not own gold in 1997. Standard errors in parentheses generated by means of the bootstrap. (*** p< 0.01, ** p< 0.05, * p< 0.1).

		Percentile of total assets				
Sex	Age	10	25	50	75	90
M	0-6	-0.557**	-0.373**	-0.204*	-0.0479	0.100
		(0.229)	(0.160)	(0.111)	(0.0992)	(0.127)
F	7-12	-0.373*	-0.296**	-0.226**	-0.161	-0.0999
		(0.209)	(0.150)	(0.112)	(0.108)	(0.134)
M	7-12	-0.745***	-0.554***	-0.378***	-0.216*	-0.0626
		(0.221)	(0.164)	(0.130)	(0.126)	(0.150)
F	13-18	-1.267***	-1.005***	-0.764***	-0.542***	-0.331**
		(0.238)	(0.177)	(0.138)	(0.129)	(0.149)
M	13-18	-1.201***	-0.938***	-0.698***	-0.475***	-0.264*
		(0.225)	(0.169)	(0.133)	(0.128)	(0.149)

Table 7: Predicted years of education relative to 0-6 year old females from model (2) at different percentiles of asset holdings. Predictions for households that own gold in 1997. Standard errors in parentheses generated by means of the bootstrap. (*** p< 0.01, ** p< 0.05, * p< 0.1)