24K Magic:
Evidence on Maternal Asset Ownership and Children's Long Term Outcomes in Indonesia

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Abstract

Household resource allocation in response to economic shocks is of central importance for policy makers, especially given widely documented evidence of gender biases. In this paper, I exploit a plausibly exogenous shock to maternal asset holdings in Indonesia to examine gender biases in resource allocation in the wake of the 1998 East Asian Financial Crisis. Using insights from anthropology, I separate assets in the hands of women from those controlled by men and interpret findings in the context of a household decision-making framework that allows preferences of parents to differ. Taking household-specific heterogeneity into account with fixed effects, I find significant evidence of efforts to shield male children from the effects of the crisis in both contemporaneous educational attainment and longer-term labor market outcomes, a remarkable trend given minimal evidence of a pro-son bias in Indonesia prior to the crisis. Finally, inferring preferences from maternal resource allocation, I find suggestive evidence of an old age security motive in women's investment decisions.

JEL Codes: D13, I0, J13, J16

Keywords: Intra-household resource allocation, economic shocks, bargaining, household assets, human capital

1. Introduction

In many developing country contexts, the threat of an economic shock is omnipresent – ranging from illness and crop loss to conflict and natural disaster. With limited access to insurance markets and, in some cases, credit markets, such shocks can have large and long-lasting impacts on population well-being. Particularly under these circumstances, in which resources are necessarily rationed among children, household behavior is of central importance to economists and policy makers who seek to advance development goals. Evidence across a wide range of geographies suggests that income shocks often generate unequal resource allocation patterns between male and female children.[1] Since investments in childhood health and education translate directly to an individual's prosperity in adulthood, these biases carry the potential to undermine long-term progress toward gender equality.[2]

A substantial body of theoretical and empirical work underscores the centrality of distinct preferences held by *individual* decision-makers within a household when analyzing patterns of investment in children.[3] Indeed, a large and growing literature makes clear that consumption, saving, and investment patterns differ depending on whether men or women control household resources. In particular, past findings suggest a clear link between the level and distribution of parental resources and children's human capital (Haveman and Wolfe, 1995; Acemoglu and Pischke, 2001; Cameron and Heckman, 2001), returns to attained education (Altonji and Dunn, 1996); and wages in adulthood (Behrman and Taubman, 1990; Zimmerman, 1992). Empirical analyses of distinct preferences over resource allocation typically exploit exogenous shocks to income streams or external resources available to one spouse, thus making it possible to identify

[1] Cameron and Worswick (2001) observe a decrease in educational expenditures in Indonesian families with girls, as compared to those with boys, following crop loss. Similarly, Jayachandran (2006) notes that negative pollution shocks in Indonesia have larger impacts on female child mortality, which parallels an infant mortality response to rainfall shocks identified by Rose (1999) in India. See Section 3 for a more extensive discussion.

[2] Gender equality is widely espoused as a development goal for a number of reasons. While it is justifiable on equity grounds alone, links between more equitable distributions of power within a household and children's long-term outcomes suggest that improvements in the relative status of women are desirable on efficiency grounds as well. See Duflo (2012) for a more extensive discussion.

[3] Models of household resource allocation have typically assumed a single decision-maker, a reasonable simplification if at least one of the following is true: (1) the household is controlled by a "dictator," whose preferences determine resource distribution (Becker, 1981); (2) all household members have identical preferences (Samuelson, 1956); or (3) as a modification of (2), all household members are perfectly altruistic. Unsurprisingly, given the implausibility of single decision-maker paradigms, these so-called *unitary* models of household behavior have been empirically rejected in settings across the world. See Alderman, Chiappori, Haddad, Hoddinott, and Kanbur (1995) for a discussion of the need to shift the "burden of proof" from unitary to collective models of decision-making.

the effect of a change in power on various household outcomes and draw inferences about individual preferences (Duflo, 2003; Duflo and Udry, 2004; Rangel, 2006). Many studies have found that women typically allocate greater shares of resources to children, a pattern that reflects either stronger altruistic tendencies or a greater reliance on children's support during periods of widowhood (Mencher, 1988; Thomas, 1990; Behrman, 1992; Rangel, 2006; Duflo, 2012).

In this paper, I exploit a plausibly exogenous shock to female-controlled assets in the context of the 1998 East Asian Financial Crisis to examine evidence of gender biases in resource allocation. Using detailed panel data from Indonesia, I use the sale of female-controlled gold jewelry between 1997 and 2000 to examine the relationship between maternal resources and evidence of efforts to insulate children from the negative effects of the crisis, as manifested in both short-term and long-term outcomes. That women largely control the acquisition and sale of gold in Indonesia, a well-documented finding in anthropological literature, is of particular importance for this analysis. The plausibly exogenous rise in the relative value of gold following the 1998 collapse of the Indonesian rupiah arguably increased a woman's bargaining power within the household, either by increasing the resources she controlled (when jewelry was liquidated) or by improving her options outside of marriage (Manser and Brown, 1980; McElroy and Horney, 1981). To this end, findings that identify the relationship between a household's sale of gold and children's outcomes may be plausibly interpreted as evidence of a mother's preferred distribution of resources.

I focus on one potential channel through which a resource shock and increased bargaining power for women in a household could prompt differential investment in male and female children. I use insights from theoretical models of intergenerational investment, collective household decision-making, and dynamic investments in household goods to sketch a model of multi-period household resource allocation that depends on bargaining power and tastes for savings/investment.[4] I assume that parental preferences for human capital investments are motivated, in part, by children's returns to human capital in adulthood. Noting demographic characteristics of women in Indonesia, including returns in the labor market and age differences with older spouses, I argue that these preferences ought to be more pronounced for particular women in the Indonesian context, for whom remittances from adult children represent crucial

[4] Primarily, I draw from Behrman and Deolalikar (1989, 1990); McElroy and Horney (1981); Behrman, Pollak, and Taubman (1982); Chiappori (1998); and Browning, Chiappori, and Weiss (2007). A more detailed discussion of relevant literature is included in Section 4.

financial support during periods of potential widowhood.[5] Although inevitable heterogeneity in tastes for savings/investment and risk necessitate empirical validation of any conjectures, I use a simple model of household decision-making with weighted individual preferences to hypothesize that households will shift investment toward children with higher wealth in adulthood – male children – when a woman's power increases.

Using data from a 17-year panel of individuals tracked through waves 2 (1997) to 5 (2014) of the Indonesian Family Life Survey (IFLS), I examine human capital attainment (years of completed education), labor market outcomes (probability of paid employment, annual earnings), and an indicator of overall wellbeing (adult household per capita expenditure) for individuals who were children at the time of the 1998 Financial Crisis. To avoid conflating the influence of household resources (assets, income, etc.) with the impact of gold ownership and sale, I divide this paper into two sequential analyses. First, I use data on household attributes and asset ownership in 1997 and 2000 to predict gold ownership and sale patterns within my analytical sample. To identify a plausibly causal relationship between measures of household gold holdings and long-term outcomes, with variation by sex and age, I employ a mother fixed-effects specification that compares outcomes among siblings. To the extent that the decision to sell gold is potentially correlated with unobserved household level characteristics, inclusion of a fixed-effect addresses concerns about endogeneity; other potential issues with asset measurement and unobserved household characteristics correlated with gold ownership are similarly swept out, providing a compelling case for causal interpretations of these results.

I find significant differences in both educational attainment and long-term labor market outcomes for male and female children in households that sold gold, which provides compelling evidence of resource allocation intended to, at the very least, shield male children from the effects of the financial crisis. My findings also underscore the importance of differentiating between a household's *potential* to smooth consumption in the event of a shock and evidence of *actual* consumption smoothing; specifications that use both measurements of gold assets lead to opposing conclusions about biases toward male and female children. Finally, using a set of stratifications along dimensions related to women's consumption security in old age, I find significant, positive benefits for male children associated with maternal gold ownership that

[5] An extensive literature in family economics and demography considers the existence of an "old age security motive" for investment in one's children. Caldwell, 1978 & 1982; and Boldrin and Jones, 2002 consider various versions of models that treat children as "investment" goods.

either compensate for or exceed the losses incurred by their sisters in magnitude; while it is impossible to disentangle causal pathways with certainty, more pronounced patterns of biased allocation toward sons among women with less stable sources of income in old age are consistent with an old-age security motive.

This paper makes several contributions to the empirical literature on asset shocks and household resource allocation. First, I document the impact of plausibly exogenous shocks during childhood on both contemporaneous outcomes and long-term labor market performance. Second, I exploit insights from anthropology, corroborated by evidence in my dataset, to separate assets in the hands of men from those controlled by women; I interpret findings in this paper in the context of a model of household decision-making, which allows mothers and fathers to have distinct preferences. Third, using a fixed effects model to address household-specific heterogeneity, I identify a plausibly causal link between the sale of female controlled gold jewelry and evidence of efforts to shield male children from the effects of the crisis, a remarkable trend given minimal evidence of a pro-son bias in Indonesia in the years preceding the crisis. Finally, inferring preferences from evidence of maternal resource allocation, I find suggestive evidence of an old age security motive that drives women's decisions to invest in sons over daughters.

The remainder of this paper proceeds as follows. Section 2 describes the Indonesian context, providing additional information about underlying gender dynamics and the 1998 Financial Crisis. Section 3 situates this paper within the context of existing literature. In Section 4, I discuss a simple theoretical framework of intergenerational investment and household bargaining, which outlines one pathway through which shifts in bargaining power predict gendered resource allocation in Indonesia. In Section 5, I describe the dataset used in this paper, and in Section 6, I outline my empirical strategy. Section 7 presents and discusses primary results, and Section 8 tests the existence of an old age security motive for investment in children. Section 9 discusses measurement error and extensions of this research, and Section 10 concludes.

2. Background

2a. Gender Relations in Indonesia

Lack of Son Preference

In many regions of the world, particularly South and East Asia, son preference is well-documented.[6] Sex selective abortion and unequal resource allocation to male and female children result in disparities in nearly every indicator of child wellbeing and human capital inequalities that persist into adulthood. Sex ratios are often used as evidence of "missing girls" in these populations; the proportion of young men exceeds what would be expected if male and female children faced normal chances of survival into adulthood (Bardhan and Klasen, 1999). Using 1993 and 1997 data from the Indonesian Family Life Survey (IFLS), Kevane and Levine (2000) argue that there exists little evidence to suggest that similar son preferences exist in Indonesia. Their results, which accord with a wide anthropological literature on gender in Indonesia, find no evidence for distorted sex ratios or discriminatory resource allocation among cohorts of children in 1993 and 1997.

Although Kevane and Levine acknowledge the difficulty of generalizing across the country, an archipelago composed of 13,000 islands, they note that there are no well-documented examples of explicit son preference in contemporary Indonesian society. Using the IFLS Community Survey (which is also used throughout this paper), they conclude that instances of traditional son preference appear to have fallen out of practice over time. They find no evidence to suggest excess female child mortality, malnourishment of female adults, or attempts to set fertility patterns around the birth of a male child in cohorts surveyed in 1993 and 1997.[7] Of particular relevance for this paper, Kevane and Levine document a narrowing of gaps in educational attainment and inheritance between male and female children between 1970 and 1997.

Labor Market Discrimination

Kevane and Levine note that, while there is no evidence to suggest a bias toward male children, labor market discrimination against and unequal treatment of adult women is pervasive. Although women informally manage finances in many Indonesian households, 93 percent of

[6] See, notably, Sen 1990, 1992.

[7] If the birth of a female child predicts the timing of the next birth, this is interpreted as evidence of a concerted effort to have a male child.

managers of formal enterprises are male, as are 98 percent of village leaders (Sullivan, 1994). Despite remarkable, sustained growth over the past three decades, accompanied by sweeping socioeconomic changes, the Indonesian female-male labor force participation ratio has remained around .6, a trend that Schaner and Das (2016) partially attribute to a persistent wage gap.

Gold Asset Ownership

Anthropological literature on the economics of Indonesian families identifies gold as an important store of value, which remains within the control of women. In addition to bringing *mas kwain* ("marriage gold") into new households upon marriage, women use even small savings – from household budgets, individual earnings, and winnings in a group lottery system – to buy gold jewelry (Papanek and Schwede, 1988; Gondowarsito, 1990; Wolf, 1991). Papanek and Schwede note that gold traders, who price jewelry by weight according to world commodity prices, are common across the country; this market access is confirmed by village leader reports compiled in the IFLS Community Survey. Most gold jewelry is either 18 or 22 karat and is easily liquidated in the event of an economic shock (Wolf, 1991).

2b. The 1998 Financial Crisis

In late 1997, the Indonesian rupiah began to weaken against the US dollar, falling from around Rp 2400/ USD to Rp 4800/USD by the end of the calendar year. Over three days in January 1998, the currency collapsed, dropping to Rp 16000/ USD, roughly 15 percent of its August 1997 value. The consumer price index increased by roughly 80 percent in 1998, and a drought associated with El Nino depressed agricultural output in the months preceding the financial crisis (Frankenberg et al., 2002). Inflation, high interest rates, and lack of access to functioning credit markets impacted real wages and consumption across the country, with devastating consequences for households across the income distribution. Real GDP fell by around 15 percent over the year, and real wages declined by nearly 40 percent in the formal sector.

Changes in household economic circumstances – including the value of accumulated assets – associated with the crisis represent arguably exogenous shocks. While the collapse of the Rupiah followed the collapse of the Thai Baht, the currency crisis was largely unanticipated in Indonesia. In June 1997, even as the Baht floundered, Indonesia had low inflation, a trade

surplus in excess of $900 million, and a stable banking sector; international leaders remained optimistic about the country's economic prospects in 1998.[8] By the end of 1998, however, inflation had reached 80 percent, with a 15 percent decline in economic growth.

While the value of all assets priced in Rupiah plummeted, the real value of gold, which is priced on the world market, increased four-fold. The crisis, then, served as an exogenous *positive* shock to the stock of accumulated gold assets. With 55 percent of households in a nationally representative survey reporting gold ownership in 1997 (50 percent in rural areas, 60 percent in urban), this increase in the relative value of gold provided a source of substantial potential liquidity for a majority of Indonesian households.[9] As a point of comparison, 25 percent of households reported owning any financial assets in 1997. Notably, within my analytical sample, 36 percent of households that reported any gold ownership in 1997 had sold all gold by 2000. Frankenberg et al. (2004) find that gold ownership in 1997 is predictive of a household's ability to maintain per capita expenditure during the financial crisis, with evidence suggesting that households used gold to maintain investments in children. However, evidence of the impact of the crisis on children, particularly male versus female children, is ambiguous (Cameron and Worswick, 2001; Thomas et al., 2001; Levine and Ames, 2003).

3. Literature Review

In this section, I situate this paper in three distinct, though related, strands of literature on household resource allocation. First, I discuss evidence of the contemporaneous and long-term consequences of gender biases in resource allocation following economic shocks. Next, I outline various motivations for parental distribution of resources between children, noting that potentially distinct motives may drive maternal and paternal behavior. Finally, I briefly consider past work on the relationship between individual asset holdings, intra-household bargaining power, and subsequent distribution of resources. A more extensive discussion of the theoretical models used in this paper is included in Section 4.

[8] See Frankenberg, Smith, and Thomas (2002) for a more extensive discussion of the circumstances surrounding the currency collapse.
[9] From the full Indonesian Family Life Survey, Wave 2 (1997) sample. IFLS 2 is representative of 83 percent of the Indonesian population.

Economic Shocks

A large and growing literature analyzes the disproportionate impact of economic shocks on short-term outcomes for female children. Cameron and Worswick (2001) observe a decrease in educational expenditures in Indonesian families with girls, as compared to those with boys, following crop loss. Similarly, Jayachandran (2006) notes that negative pollution shocks in Indonesia have larger impacts on female child mortality, which parallels an infant mortality response to rainfall shocks identified by Rose (1999) in India. Dreze and Sen (1989) summarize several studies that indicate that households privilege male children in times of scarcity across geographic regions, a process that Alderman and Gertler (1997) suggest is indicative of more income- and price-elastic demand for expenditures on female children, using evidence from Pakistani households.

There are comparatively few analyses that consider the relationship between gender biases in resource allocation after economic shocks and long-term outcomes, as this paper explores. Maccini and Yang (2007), in particular, provide suggestive evidence of a relationship between rainfall shocks during infancy and the socioeconomic status of Indonesian women. They interpret the positive effect of high rainfall in early life on long-term outcomes for adult women, but not men, as evidence of a gender bias in resource allocation.

A more extensive body of work focuses on relationships between general exposure to early-life shocks and outcomes in adulthood. Several key papers use plausibly exogenous shocks in the manner employed in this paper, in order to identify causality between early life exposure to an event and adulthood outcomes; notably, Almond (2006) exploits exposure to the 1918 influenza pandemic, Alderman et al. (2006) use exposure to civil unrest and drought, and Maccini and Yang (2007) use early life rainfall exposure.

In countries like Indonesia that lack a pronounced preference for sons, cultural explanations for gender biases in resource allocation are less compelling than in countries like India, where son-preference has been used to explain widespread population-level stunting (Jayachandran and Pande, 2017). Alderman and King (1998) discuss the theoretical bases for gender biases in resource allocation, which may occur in the absence of dominant cultural preferences for male children. In particular, they suggest that different rates of return on investments in children – either in terms of a child's ability to turn inputs into human capital or different rates of return on human capital in the labor market – may explain this bias.

Alternatively, they suggest that parents may have particular preferences for intra-family equality, which influence their willingness to ration scarce resources.

Parental Motivations for Investment in Children

Resource allocation decisions, particularly amidst economic shocks, necessarily reflect parental preferences and motivations for investment in children. An extensive literature considers whether children are best characterized as "consumption" goods (Becker and Barro, 1988; Barro and Becker, 1989), and thus serve to increase parental utility directly, or if they are more appropriately considered "investment" goods (Leibenstein, 1957; Neher, 1971; Caldwell, 1978 & 1982; Boldrin and Jones, 2002), and increase parental lifetime utility indirectly. Within the context of this paper, I assume that parents consider children "investments."

A number of motivations for investment in particular children have been identified in the literature, including old age security and altruism. Theoretical and empirical work in demography and economics has extensively considered old age security motives for investing in children. Individuals have children and invest resources in them, with the understanding that their children will remit income to them later in life (Willis, 1980). Before the introduction of social security in developed countries, it is widely recognized that children helped parents to maintain consumption patterns during retirement (see Chakrabarti et al., 1993, and references within). While children may have an incentive to follow through with these transfers to parents because they depend on parental assets (including land) for their own livelihoods, Ikkink, Tilburg, and Knipscheer (1999) use survey data to suggest that children who remit income may be attempting to set a precedent for their own children. Noting strong ties between parents and adult children in Indonesia and Malaysia, Frankenberg et al. (2002) find evidence of old age security motives for investment in children, alongside related motives for intergenerational transfers. However, Chakrabarti et al., 1993 note that expectations of remittances from adult children are insufficient to explain the extent of parental investment in children's resources across the income distribution, particularly for wealthy parents whose need for financial support in old age is limited; this recognition is consistent, broadly, with parental altruism.

A related question in theoretical and empirical literature concerns whether, when parents invest in children, they do so in ways that compensate for or reinforce initial differences in endowment, which may include skills, biological characteristics (including sex), and general

markers of ability. Becker and Tomes (1976) and Tomes (1981) argue that parental investment behavior may serve to reinforce initial endowments, manifesting in resource allocations that exacerbate inequality and concentrate resources in a single child; this could be considered an *efficient* approach to investment. Griliches (1979) develops a theory for parental human capital investments intended to compensate for gaps in children's initial endowment bundles, suggesting an *equitable* approach. Both frameworks are empirically supported. Notably, Behrman, Rosenzweig, and Taubman (1994) find within-twin evidence on schooling and marriage market success that is consistent with reinforcing behavior. Behrman, Pollak, and Taubman (1982), in contrast, find evidence for some compensating behaviors in a similarly structured study on twins.

Given the range of potential motivations and allocation decisions associated with parental investment in children, most literature notes that empirical evidence is necessary to identify plausible mechanisms in specific contexts. It is widely acknowledged in literature that considers models of the household with multiple decision-makers, however, that motivations for investment in children need not be shared by mothers and fathers. Distinct demographic characteristics, including women's greater need for old age security in many developing country contexts, may influence these motivations; Rangel (2006) considers this in the Brazilian context and Duflo (2012) summarizes its application in regard to the global challenge of women's empowerment.

Intra-household Bargaining Power

One key challenge that limits analyses of intra-household decision-making power is the difficulty in distinguishing measures that are indicators of women's power – variables that are highly correlated with bargaining power – versus actual sources of power within the household. This makes it difficult to interpret results for outcomes like labor income, which is often highly correlated with women's decision-making power, but may in fact represent the outcome of a bargaining process around labor and leisure (Doss, 2005).

Doss (2013) argues that, in contrast to income and labor hours, assets represent a particularly clear source of bargaining power for several reasons. Many liquid assets – like gold jewelry, considered in this analysis – are brought into marriages and, thus, are not the outcome of

an intra-household bargaining process (Frankenberg et al. 2012).[10] Assets confer bargaining power within the household in two possible ways. When liquidated, they represent a source of individually controlled income; alternatively, they represent an "outside option" for women, an alternative to remaining in a marriage (Browning and Chiappori, 1998). Chiappori, Fortin, and Lacroix (2002) extend models of household decision-making to consider the existence of these distribution factors and, in doing so, predict sizable effects of changes in women's property holdings on household decision-making processes.

There is a key conceptual distinction between shocks to assets that are tangible and changes in more abstract forms of bargaining power. Examples of changes in bargaining power that are often cited include expansion of legal rights to alimony (Rangel, 2006) and expansion of legal rights to land titles (Field, 2003); while these arguably improve a woman's out options, they represent a change in potential holdings, which may never be realized. Analyses that consider liquid assets controlled by a single individual in a household, in contrast, provide more direct evidence of changes to actual, realized power.

Beegle, Frankenberg, and Thomas (2001) use a wife's perception of her share of assets – including housing, vehicles, appliances, jewelry, furniture and utensils – to consider the relationship between asset ownership and use of prenatal services. They find that a woman who owns a larger share of household assets is more likely to receive prenatal care and give birth in a medical facility, controlling for a range of other household economic factors like per capita expenditure. Quisumbing and Maluccio (2003) use assets at the time of marriage to analyze the expenditure patterns of households in Bangladesh, Ethiopia, Indonesia, and South Africa, finding that the distribution of liquid assets similarly influences household expenditure patterns.

[10] Anthropological evidence on the acquisition of gold assets over the course of a marriage in Indonesia suggests, similarly, that it is not the result of an explicit bargaining process. Papanek and Schwede (1988), Wolf (1991), and Sullivan (1994) suggest that women quietly use any excess cash to purchase small quantities of gold jewelry, rather than engaging in any negotiation with other household decision-makers.

4. Theoretical Framework

In this section, I describe a simple model of inter-generational investment in children's human capital that considers gender biases in allocation. I integrate insights about inter-generational investment, collective household decision-making, and dynamic investments in household goods from an extensive literature on household resource allocation. In particular, I follow Behrman and Deolalikar (1989, 1990), McElroy and Horney (1981), Behrman, Pollak, and Taubman (1982), Chiappori (1998), and Browning, Chiappori, and Weiss (2007).

I sketch a model of multi-period household resource allocation that depends on bargaining power and tastes for savings/investment. Using empirical evidence from Indonesia, this section also interprets the model's implications and generates hypotheses about resource distribution following a plausibly exogenous shock to assets during the 1998 Financial Crisis.

4a. Model

Without loss of generality, consider a household with two married decision makers.[11] To integrate considerations of gender biases in resource allocation between children, suppose that there is one male child (b) and one female child (g). Suppose that the household utility function W_t depends the utility of both members, $i = 1,2$. Let $\boldsymbol{c}_t$ be vector-valued and include time-dependent consumption of all household members; we separate consumption by individual to allow the possibility that sub-utility functions depend on more than one's own consumption, but place different weights on the value of non-self consumption. Likewise, let $\boldsymbol{\mu}_t$ and $\boldsymbol{\varepsilon}_t$ be vector-valued observed and unobserved household/individual characteristics that impact taste and, thus, utility. For example, $\boldsymbol{\mu}_t$ includes characteristics like household composition, demographic characteristics, educational attainment, and health status; for the purposes of this model, factors that may impact old-age security – including level of earning potential and age gaps with one's

[11] It is straightforward to generalize this model to a setting with more than two decision-makers. See Browning and Chiappori (1998) for an *n* decision-maker framework. However, since evidence from Indonesia suggests that the hypothesis of two household decision-makers is not rejected, I proceed with this simplification (LaFave and Thomas, 2017).

spouse – are of particular relevance. $\boldsymbol{\varepsilon}_t$ includes factors like consumption, altruism, and risk.[12] Finally, suppose that individual utility depends on children's human capital, H_b, H_g.

Each individual has a von Neumann-Morgenstern sub-utility function $U_{it}(\mathbf{c_t}, H_b, H_g, \boldsymbol{\mu_t}, \boldsymbol{\varepsilon_t})$, which is aggregated into the household utility function:

$$W_t = W_t[U_{1t}(\boldsymbol{c_t}, H_b, H_g, \boldsymbol{\mu_t}, \boldsymbol{\varepsilon_t}), U_{2t}(\boldsymbol{c_t}, H_b, H_g, \boldsymbol{\mu_t}, \boldsymbol{\varepsilon_t}), \lambda_{1t}(\pi, \xi), \lambda_{2t}(\pi, \xi)] \quad [1]$$

$\lambda_{1t}(\pi, \xi), \lambda_{2t}(\pi, \xi)$ are best interpreted as *weights* placed on an individual's preferences, which capture their bargaining power in the household. Weights λ are assigned at time t and depend on π, ξ, an individual's past, present, and future characteristics. Following Rubalcava et al. (2009), we denote those characteristics that are observed π, which include: age, education, assets, income, customs/traditions/norms, laws, and institutions. ξ represents those aspects of bargaining power that are unobserved, including attitudes toward altruism, intertemporal allocation, and risk. In this model, both π and ξ are assigned to individuals and are allowed to vary over time.

Suppose, also, that there is a human capital production function underlying this model. While there are many potential specifications of such a function, following Attanasio et al. (2017), suppose that θ_{t+1} denotes a child's human capital (abilities, skills, acquired knowledge, etc.) at time *t+1*.[13] Then, $\theta_{t+1} = f_{t+1}(\theta_t, I_{t+1}, P, X_t)$, where θ_t denotes the child's human capital at time t, I_{t+1} captures parental investments (in things like nutrition and formal education) between time *t* and *t+1*, P are parental skills, and X_t is a vector of household characteristics. For the purposes of this model, it suffices to recognize that such a function produces $\theta_{t+1} = \{H_b, H_g\}$ and relies on parental decisions about resource and time allocation that go beyond formal schooling.

[12] One could certainly make the argument that altruism manifests in observed quantities, including consumption. I abstract away from some of the more nebulous distinctions between consumption and observed/unobserved characteristics, as they go beyond the scope of this model.

[13] This formulation is intended only to acknowledge the *existence* of a human capital production function that underlies this model. Far more complex versions abound in the literature, stemming from Heckman (1971). For discussions that assume a linear production function with regard to initial child endowments, see Becker and Tomes (1976) and Pitt, Rosenzweig, and Hassan (1990). Alternatively, Behrman, Pollak, and Taubman (1982, 1986) assume a Cobb-Douglas production function.

Following Chiappori (1998, 1992, 1993), we will assume that preference weights λ_{it} sum to unity.[14] In this model with two decision-makers, then, denote the bargaining weight assigned to the female decision-maker λ_t, and let the male decision-maker's weight be denoted by$(1-\lambda_t)$. The total household utility function is given by:

$$W_t = (\lambda_{1t}(\pi,\xi))U_{1t}(c_t, H_b, H_g, \mu_t, \varepsilon_t) + (1-\lambda_{1t}(\pi,\xi))U_{2t}(c_t, H_b, H_g, \mu_t, \varepsilon_t) \quad [2]$$

This joint household utility function is maximized subject to an inter-temporal budget constraint. Suppose, for simplicity, that both decision-makers work in period one ($t=1$) and retire/no longer earn income in period two ($t=2$).

A Period 1 budget constraint is given by:

$$c_1 + P_b H_b + P_g H_g + a_1 \leq (1+r_1)a_0 + Y \quad [3]$$

where c_1 denotes Period 1 consumption, P_b, P_g are the prices of human capital for boys and girls, H_b, H_g are human capital investments for boys and girls, and a_1 are assets held at the end of Period 1. a_0 denotes assets held at the end of Period 0, which earn interest at a rate of r_1. Y is joint household (labor) income.

A Period 2 budget constraint is, similarly, given by:

$$c_2 + a_3 \leq (1+r_2)a_1 + \tau_b + \tau_g \quad [4]$$

where c_2 is Period 2 consumption, a_3 are assets held at the end of Period 2, and r_2 is the rate of return on assets during Period 2. τ_b is the total value of transfers received from the male child, and τ_g is the total value of transfers received from the female child. Suppose that for *i = b, g*,

$$\tau_i = f(H_i, \chi_i, \tilde{\mu}_i, \tilde{\varepsilon}_i)$$

where H_i is human capital and χ_b, χ_g denote *returns* to human capital for male and female children respectively. $\tilde{\mu}_i$ denotes observed characteristics (including individual and spousal wealth) that may impact an individual's transfer decisions, and $\tilde{\varepsilon}_i$ denotes unobserved

[14] This model makes no assumptions about the manner in which the two decision-makers arrive at a final allocation or, for that matter, whether the final allocation is efficient according to any standard.
For descriptions of bargaining processes versus repeated interactions, see Manser and Brown, 1980; McElroy and Horney, 1981; Lundberg and Pollak, 1993; Chiappori, 1988, 1992; and Browning and Chiappori, 1998.

characteristics (including tastes that may impact transfers to parents). Since τ_i is a function of both attained human capital and *returns* to human capital, pervasive gender discrimination in the Indonesian labor market suggests that, holding tastes constant between siblings, $\chi_b > \chi_g \Rightarrow \tau_b > \tau_g$.

If individuals die with no assets, then we assume $a_3 = 0$. Supposing that this is the case and allowing [3] and [4] to hold with equality yields the household's inter-temporal budget constraint:

$$c_2 = (1+r_2)\left[(1+r_1)a_0 + Y - c_1 - P_b H_b - P_g H_g\right] + \tau_b + \tau_g \quad [5]$$

From the household maximization problem, we can derive Period 1 demand for children's human capital:

$$H_b = H_b\left(\lambda_{1t}, Y, r_1, r_2, P_b, P_g, \tau_b, \tau_g, \chi_b, \chi_g, \mu, \varepsilon\right) \quad [6]$$

$$H_g = H_g\left(\lambda_{1t}, Y, r_1, r_2, P_b, P_g, \tau_b, \tau_g, \chi_b, \chi_g, \mu, \varepsilon\right) \quad [7]$$

That is, this model suggests that demand for a particular child's human capital is a function of: bargaining power, income, multi-period rates of return on assets, prices of children's human capital, returns to human capital, income transfer from adult children, and observed/unobserved decision-maker characteristics.

Typically, as Rubalcava et al. (2009) note, [6] and [7] can be difficult to estimate, as it is challenging both to identify and measure changes in *individual* power using *household* level data. I exploit a plausibly exogenous change in individually-held assets that accompanied the 1998 Financial Crisis in Indonesia to do so in this paper.

4b. Application in Indonesian Context

During the 1998 Financial Crisis, the collapse of Rupiah-priced assets and the relative increase in the value of gold jewelry represented a shock to household asset holdings that, given its unanticipated nature, was plausibly exogenous. Anthropological evidence on household asset holdings in Indonesia indicates that gold is purchased, controlled, and sold by women; thus, we can interpret this as a shock to the resources controlled by only one of the two decision-makers (Papanek and Schwede, 1988; Sullivan, 1994).

An increase in the value of gold assets could impact $\lambda_1(\pi,\xi)$ in two ways. If households chose to sell gold to finance consumption, these anthropological case studies suggest that resulting income remains female-controlled (Papanek and Schwede, 1988; Wolf, 1991; Sullivan, 1994). Alternatively, an increase in asset value improves a woman's alternatives to her current marriage, arguably increasing her willingness to use divorce as a threat in negotiations (McElroy and Horney, 1981) or transition into a "separate spheres," non-cooperative marriage (Lundberg and Pollak, 2003). While the latter case is more likely, given low divorce rates in Indonesia, the outcome remains the same. With a shock to assets, captured in π,

$$\lambda_{1'}(\pi,\xi) > \lambda_1(\pi,\xi) \Rightarrow 1-\lambda_{1'}(\pi,\xi) < 1-\lambda_1(\pi,\xi) \quad [8]$$

To aid in interpretation of this model, we can make several assumptions, based on empirical features of Indonesian human capital and labor markets. In particular, assume that $P_b = P_g$ and $\chi_b > \chi_g$. That is, while the prices of human capital are the same, labor market returns to human capital for male children exceed those of female children. Assuming similar tastes regarding transfers to elderly parents among siblings, along with identical cultural norms, $\chi_b > \chi_g \Rightarrow \tau_b > \tau_g$.

The change in preference weight $\lambda_1(\pi,\xi)$ is relevant for this analysis insofar as the two decision-makers have distinct preferences related to children's human capital investment. Arguably the most important potential difference between male and female preferences lies in tastes related to intertemporal allocation. With the exception of civil servants, there is little evidence to suggest a culture of "retirement" among men in Indonesia.[15] Instead, data on life expectancy and labor market performance suggest that, in general, men work until their deaths. In contrast, women likely have stronger preferences over Period 2 consumption for three reasons: (1) in a context with rampant labor market discrimination, a woman's independent wage-earning potential is low; (2) women live, on average, longer than men; and (3) spousal age gaps exacerbate this difference in life expectancy. In Indonesia, average life expectancy is 67 years for males and 71 for females. Using data from the Indonesian National Social and Economic Survey (SUSENAS), Utomo (2014) notes an average spousal age gap of 6.4 years in 1982 and 5.7 years

[15] Observations about retirement patterns come from work histories in IFLS waves 2 – 5.

in 1992.[16] Even if a woman's husband works until his death, so that he experiences only a Period 1, she must plan for a Period 2 with no independent earnings that lasts for the duration of her widowhood.

The budget constraints described above suggest that second period consumption depends on both children's wealth (functions of their human capital) and asset holdings. To the extent that women do hold their own assets in the form of gold jewelry, preferences over saving in gold versus investing in children may reflect both attitudes toward risk (captured in ξ) and respective rates of return, r_t, χ_b, and χ_g. Given the volatility of gold prices, especially as compared to returns on investments in children, even slight risk aversion may indicate investment in children. Tastes for risk, included in ε, however, capture any such variation.

Educational attainment for women rose substantially during the Suharto regime (1967 - 1998) in Indonesia, with nearly full primary school enrollment at the time of the financial crisis (Kevane and Levine, 2000). Pre-crisis, then, suppose that $H_b = H_g$, with levels set at a point where the marginal benefit of each investment is equal to its marginal cost for parents.

Post-crisis, the increase in women's bargaining power, with an attendant increase in control of resources, suggests that allocations should shift so that their preferences are better represented. If women prefer an equitable distribution of resources among their children or prefer to invest in daughters (tastes captured in ε), then we expect that $H_b = H_g$ or $H_b < H_g$. However, to the extent that women are motivated by Period 2 consumption, an old age security motive, higher returns to human capital in the labor market for male children suggest that mothers should disproportionately favor investments in their sons ($H_b > H_g$).

The remainder of this paper will seek to validate these hypotheses empirically. As discussed in Section 4 and in the context of this model above, insights into which parental investment strategies are employed ultimately constitutes a set of empirical questions. To test for evidence of the investment strategies described in this section, I will employ stratifications that consider subpopulations in which maternal resource allocation is most plausibly motivated by a desire for old-age security. In particular, I will stratify my analytical sample according to

[16] The median age gap for individuals included in this sample is 5 years. This may reflect the influence of a national family planning campaign launched in the 1980s, which endorsed a 5-year male/female age gap at the time of marriage.

rural/urban designation, size of spousal age gap, and women's educational attainment (as a proxy for independent labor market potential), subsamples in which a desire for wealth transfers from adult children may be more pronounced.

5. Data

5a. Dataset

I use data from the Indonesian Family Life Survey (IFLS), an ongoing longitudinal survey with detailed information on income, assets, education, health, and household composition for individuals, households, and extended families. The 1993 baseline included 22,000 members from 7,224 households and created a sample that was representative of 83 percent of the population. Individuals who were included in the baseline sample, as well as any co-resident family members, were re-interviewed in 1997 (IFLS 2), 2000 (IFLS 3), 2007 (IFLS 4), and 2014 (IFLS 5).[17]

IFLS is particularly well suited to analyses that consider individual and household outcomes over time, as a consequence of its tracking protocols. In IFLS 2, baseline household members were tracked outside of their original households, provided that they remained in one of the 13 original provinces surveyed. Beginning with IFLS 3, individuals who moved between waves were tracked to all 27 Indonesian provinces. Crucially, IFLS surveyors attempt to find every *individual* who is a panel respondent, including children who were born after 1993, resulting in a 12-fold increase in the sample size between 1993 and 2007. For my analysis, this makes it possible to follow individuals who were children in early waves of the survey into their own split-off households after marriage in later waves, with detailed information on their educational attainment, health status, work history, and asset ownership at seven-year intervals. Thomas et al. (2001) argue that claims about population representative attributes are tenuous in panel surveys in which movers are not tracked, as observed and unobserved characteristics systematically differ for movers and non-movers.

Additionally, IFLS surveyors attempt to find every surviving baseline respondent in each wave of the survey, regardless of whether they completed previous waves. As a consequence of this strategy, baseline re-contact rates in IFLS exceed those observed in other large population-

[17] See Frankenberg and Karoly (1995), Frankenberg and Thomas (2000), Strauss et al. (2004), and Strauss et al. (2009) for more detailed descriptions of IFLS waves.

representative surveys. As a point of comparison, 90.6 percent of surviving baseline respondents were re-interviewed in IFLS 4, while the Panel Study of Income Dynamics had roughly 50 percent attrition after 15 years (Thomas et al., 2012).

I use data from IFLS waves 2, 3, 4, and 5 to consider children's long-term outcomes in the wake of the 1998 East Asian Financial Crisis. IFLS 2 is ideally suited for documenting asset ownership immediately before the crisis, as it was fielded between 1997 and 1998, with primary data collection complete by the time the exchange rate dropped in late 1997. Individuals who were children during IFLS 2 are at least 17 years old by IFLS 5 and, thus, have completed nearly all of their education, with most already in the labor market. To construct variables used throughout this paper, I use data from both individual and household-level modules on household characteristics, expenditure, asset ownership, household decision-making, education, and employment history. Additionally, to provide context for assumptions and findings, I integrate insights from the IFLS Community Survey, a survey instrument administered to local leaders in each IFLS community. This component of the survey includes information about local customs and norms (traditional and contemporary), access to markets, local health and education resources, and community-level attitudes toward various social practices.

5b. Construction of Analytical Sample

To consider short-term patterns of gold sale during the financial crisis and children's long-term outcomes, I constructed analytical samples of individuals who were either (1) married adults in IFLS 2 and IFLS 3, whose children were tracked into adulthood; or (2) these tracked children, for whom parental asset information and long-term outcomes are available. Sample (1) is composed of 5394 adults in 2682 households, with 5573 associated children in Sample (2). To employ specifications with mother fixed-effects, I dropped 927 children without siblings, resulting in a sample of 4646 children from 1756 households.[18]

To be included in Sample (1), individuals must have been members of a married male-female couple who were both interviewed in IFLS 2 and IFLS 3 (and, thus, co-resident during both surveys); be biological parents to each other's children, according to the IFLS 2 roster; and

[18] Parents of only children are, on average, younger than parents in the unrestricted sample (2.54 years younger for males, 2.04 years for females, $p < .001$). Additionally, only children have households with lower per capita expenditure (16 percent lower, $p < .001$) and fewer resident adults (.35 fewer, $p < .001$). For all other household/family-level variables of interest, however, there is no significant difference between only children and the full sample.

have at least one child who was surveyed in either IFLS 4 (2007) or IFLS 5 (2014).[19] All children whose parents fit these criteria were included in Sample (2). As this analysis focuses on intra-household decision-making, with male/female married couples as the object of analysis, I restrict my focus to households where both parents were present during the financial crisis and resource allocation to non-biological children was not an issue.[20]

5c. Variables of Interest

Asset Data

IFLS is unusual among broad-purpose household surveys that assess asset wealth in that information about household holdings is collected from multiple individuals, providing internal checks on asset values. Specifically, each household member above age 15 is separately asked to report ownership and values of holdings within a set of asset classes. These include owner-occupied houses, other houses/buildings, and land (*illiquid assets* in this paper) and livestock, vehicles, appliances, financial assets, jewelry (gold), furniture, and miscellaneous items (*liquid assets*).

Because individuals are asked to respond to asset modules separately, there exist discrepancies in reported values, which likely reflect both measurement error and unequal implicit "ownership" of certain assets. To construct the variables that aggregate household asset ownership - total household assets, liquid assets, illiquid assets - I use a wife's estimate of gold asset value and a husband's estimate of all other assets if the two values are not equal.[21]

Anthropological literature and gold market access suggest that women's estimates of gold value are, in fact, quite well reported. IFLS community survey data indicates that there is a gold seller within 30 minutes of every IFLS community (Frankenberg et al., 2002). Papanek and Schwede (1988) report that women routinely convert cash savings into gold jewelry in order to add to a household pool of savings (Sullivan 1994). While other assets are infrequently

[19] For households in Bali, in which multiple women were listed as spouses of the same husband, I considered the individual who was categorized in survey modules as "spouse of household head" the relevant wife for this analysis; in all cases, this individual also had the earliest listed year of marriage.

[20] While the latter restriction had a negligible impact on sample size - impacting 4 of roughly 2700 couples - restricting the sample to include only co-resident married couples creates a clearly selected sample. As decision-making within a two-individual household is at the heart of the theoretical framework underlying this paper, I make no attempts to relax this restriction. See Thomas, Beegle, and Frankenberg (2000) for a more extensive discussion of labor market transitions and migration during the 1998 Financial Crisis.

[21] For 43 households in 1997 and 25 households in 2000, total household assets are reported as "0." Each was assigned the respective median of total household assets; an indicator for zero reported assets is included in all models that include total household assets.

purchased or assessed, the frequency with which women interact with gold markets suggests familiarity with weight-to-value conversions for household gold holdings.

Comparison of gold asset values reported by men and women in this sample hints at the presence of a "separate purses" system for household assets and finances. Given that gold asset estimates provided by women are most likely to be accurate, discordant jewelry value estimates by husbands and wives in IFLS 2 and IFLS 3 indicate that men are systematically under-reporting household holdings; in fact, in 27 percent of families in this sample in 1997 and 21 percent in 2000, women report non-zero gold ownership, while men report that the household does not own gold. Although household asset data inevitably includes some noise, anthropological evidence suggests that women's estimates are likely to be quite accurate.[22]

Gold assets are reported in Indonesian Rupiah at the time of the survey. To create easily interpretable measures of asset holdings, I convert Rupiah-valued gold holdings into troy ounces and grams of gold, using survey month and historical commodity price data.[23] This conversion allows me to calculate various quantities of gold that were sold and purchased between 1997 and 2000, using a variable *goldchange* which subtracts grams of gold in 2000 from grams of gold in 1997. I also calculate *goldshare,* the relative value of gold assets compared to total household assets in a given wave.

Given the tendency for extreme values of data to exert undue influence in ordinary least squares (OLS) regression, I transform all asset variables used in this analysis in two ways. All asset variables (liquid assets, illiquid assets, total household assets, jewelry value, and jewelry grams/ounces) are winsorized at the 5th and 95th percentiles (Ruppert, 2006). Although this addresses the most extreme outliers in the data, the wide distribution for reported assets continues to pose a problem for an empirical strategy that uses OLS.

The typical approach to address extreme values in the dependent variable, a logarithm transformation, is poorly suited for many variables of interest in this paper as the log function is undefined when the dependent variable takes a value that is either zero or negative. Some households report "0" values for all categories of assets and 1134 households report purchasing

[22] To address any remaining concerns about measurement error, I consider several alternative strategies in Section 8. I re-run analyses in this paper using men's reports of household gold holdings, thus generating plausible lower bounds on coefficient estimates. Additionally, noting that the error in men's reports may be orthogonal to the error in women's reports, I consider an alternative specification that instruments for a woman's gold value estimate with her husband's estimate.

[23] Historical gold prices, reported in Indonesian Rupiah, were obtained from the World Gold Council's database of monthly gold prices.

gold between 1997 and 2000 (so that *goldchange* is negative). Instead, I apply an inverse-hyperbolic-sine (IHS) transformation to the data, which for variable *y* is defined as:[24]

$$\log\left(y_i + (y_i^2 + 1)^{1/2}\right)$$

This transformation is approximately equal to $\log(2y_i) = \log(y_i) + \log(2)$, for all but extremely small values of y. As such, it can be interpreted, approximately, as a logarithmic dependent variable.[25]

For analyses that consider only the amount of gold owned in either 1997 or 2000, conditional on any gold ownership, all values are necessarily greater than or equal to zero, so log transformations are used for ease of interpretation.

Analyses throughout this paper use indicator and continuous variables that capture gold ownership and sale. Indicator variables include: *Gold Own, 97* (takes a value of 1 if the household owned any gold in 1997); *Sold All Gold* (takes a value of 1 if the household reported non-zero gold holdings in 1997 and zero in 2000); and *Sold 25p/50p/75p Gold* (take values of 1 if the household reports selling more than 25 percent, 50 percent, or 75 percent of 1997 gold holdings, respectively, between 1997 and 2000). To provide information about the absolute value of gold sold, I use *Log* and *IHS, Amount of Gold in 97* (selecting an appropriate transformation depending on whether analyses condition on any gold ownership); *IHS: Gold Change* (IHS-transformed *goldchange* variable); and *Change, Gold Share* (*Gold Share, 97* minus *Gold Share, 00*; values are multiplied by 100 to yield percentage values rather than proportions, for ease of interpretation in regression output).

Outcomes

I consider four long-term outcomes for children in this paper, which reflect childhood investments in human capital and capture ability to remit income to elderly parents: years of

[24] For a more extensive discussion, see: Burbidge et al., 1988; MacKinnon et al., 1990; Pence, 2006.

[25] For example, if the dependent variable is *IHS-goldchange* and the independent variable is "Owned Financial Assets, 97," a coefficient of -0.121 tells us that people who owned financial assets in 1997 sold approximately 12 percent less gold during between 1997 and 2000.

Regressions involving the IHS transformation throughout this paper were also run using a square-root (with retained signs) transformation applied to asset variables. Results were robust to the change in transformation. The IHS transformation is used in all reported results for ease of interpretation.

attained education; probability of employment (paid work in the week preceding the survey); annual earnings; and current (adult) household log-per capita expenditure (PCE).[26]

Years of Completed Education is a continuous variable that ranges from 0 to 16 years of education within this sample.

Probability of working is captured by an indicator variable, which takes a value of 1 if an individual reported that their primary activity in the week preceding the survey was paid employment.

Given seasonal variation in income that is commonplace in Indonesia, I use estimates of *annual earnings* instead of reported wage or weekly earnings. While annual earnings conditional on paid work (i.e. non-zero earnings) may be the appropriate outcome in contexts that consider the actual functioning of a labor market, my objective in this case is to consider differences in adult wealth and well being across age categories and sexes. In this sample, 60 percent of males engaged in work for pay in the week preceding the survey, while only 32 percent of females did. Especially given well-documented labor market discrimination in Indonesia, the sample of women who do participate in the labor market is non-random and highly selected (Schaner and Das, 2016). In fact, in this sample, while both years of education and 1997 household log PCE predict labor force participation for women, neither is a significant predictor of labor force participation for men. Thus, I include zeroes in my measurement of annual earnings, in order to directly capture wealth in adulthood. Since zero values are included, this outcome is IHS-transformed.

Noting the limitations of earnings measurements that include zeroes, I also consider *log PCE* of an individual's 2014 household as an adulthood outcome. For individuals who are married, log PCE captures the wealth of their spouses, a key component of wealth in adulthood.[27] For all individuals, log PCE is a proxy for various measures of wellbeing, including income and consumption.

Table 1 reports descriptive statistics for key household characteristics in the fixed effects sample, both pooled and stratified by whether the household was rural or urban in 1997. I include

[26] See Deaton and Case (1987) for a discussion of approaches to the analysis of household expenditures and wellbeing. Given wide seasonal variation in income and challenges associated with the measurement of consumption, per capita expenditure often provides one of the most informative descriptions of household welfare in developing country contexts.

[27] In Section 9, I discuss characteristics of spouses and marriage market outcomes in greater detail as alternative ways of measuring an individual's success in adulthood beyond his/her own labor market performance.

basic household characteristics (household composition; rural/urban proportions; average educational levels of fathers and mothers), as well as summary statistics for children's educational attainment, probability of working, and IHS-annual earnings. Unsurprisingly, parents in rural households are less educated than their urban counterparts. Children in rural areas have lower average attained education, with lower earnings in the labor market in adulthood.

Table 2 includes summary statistics for asset variables, including various measures of gold ownership in 1997 and 2000, used throughout this paper. While gold sale trends appear quite similar between rural and urban regions, rural households hold lower absolute values of liquid assets than their urban counterparts. That rural households have larger illiquid asset holdings instead is consistent with inclusion of farmland and farm machinery in the calculation of illiquid assets.

6. Empirical Strategy

6a. Predicting Family Gold Ownership, Sale Patterns

To provide context for the identifying variation that drives the remainder of this analysis, I begin with simple multivariate regressions intended to identify factors that predict pre-crisis gold ownership and sales between 1997 and 2000. Seven outcomes of interest are regressed on a vector of carefully selected household and family characteristics.[28]

Explanatory variables in all regressions include mother/father years of education; mother/father ages, discretized to address the presence of outliers; an indicator for urban households in 1997; and, when not perfectly collinear, continuous variables that capture log-PCE, IHS-transformed liquid assets, and IHS-transformed illiquid assets. Given evidence that households used gold to finance investment in children and this paper's hypothesis - that this investment was unequally distributed between male and female children - I include interactions between number of male/female children and household log PCE. A positive interaction term would suggest that, with higher PCE, the association between, for example, the number of male children and gold sales between 1997 and 2000 is stronger.

Additionally, in order to consider the relationships between various types of family assets before and during the crisis, I include indicator variables for whether a family owned any

[28] I distinguish between *households,* which include all individuals present in a house and listed on the IFLS rosters, and "nuclear" *families*, which include parents and their (shared) biological children. As households in Indonesia are often multi-generational, the distinction between household-level and family-level variables is important.

financial assets in 1997 and whether they sold all financial assets during the crisis. Since the value of financial assets, priced in Rupiah and at the center of the financial collapse, plummeted, ownership and sale of these assets is less important as a source of potential consumption smoothing and more relevant as a control variable, intended to disentangle gold ownership from overall access to resources.

As asset values may reflect total household holdings, rather than ownership within a family, household composition is of particular importance. I include continuous variables that capture detailed household composition, by age and sex. Additionally, past research indicates that household composition often shifts as a consequence of economic shocks; individuals may choose to co-reside to exploit economies of scale associated with consumption or migrate for labor opportunities (Hamoudi and Thomas, 2014; Thomas and Frankenberg, 2007). To address changes in gold ownership that may be attributable to changes in household composition, I include a control variable, *Change in Number of Adults, 97 to 00*, that captures this potential shift in living arrangements.

First, I estimate four linear probability models with binary dependent variables: *Owned Gold in 97*, *Sold All Gold, Sold 25 pct of Gold*, and *Sold 50pct of Gold*. Gold sale variables are calculated using the change in total grams of gold reported between 1997 and 2000. As the error term in a linear probability model is, by definition, heteroskedastic, all four models are estimated with robust standard errors, clustered at the *kecamatan*.[29] I include *kecamatan*-fixed effects, using a household's 1997 location, in all four models. Coefficients, then, are interpreted as conditional on both the vector of additional explanatory variables and a household's location in 1997. This addresses both regional variation in gold ownership patterns and region-specific characteristics of financial shocks in 1997.

I also consider three continuous outcome variables *Log: Amount of Gold, 1997*; *IHS, Gold Change*; and *Change: Gold Share.* The same explanatory variables are used, and all models are estimated by OLS with *kecamatan*-clustered standard errors and *kecamatan*-fixed effects.

[29] A *kecamatan* is a county-equivalent administrative unit.

6b. Children's Long Term Outcomes

My primary objective is to identify the relationship between household gold asset holdings during childhood and long-term wealth-related outcomes. I consider four outcomes of interest, which reflect childhood investments in human capital and individual ability to remit income to elderly parents: years of attained education, probability of employment, annual earnings, and log-PCE of adult household. In particular, I am interested in variation in outcomes by sex and age.

Denote a generic outcome of interest y_i. Let $gold_i$ be a measure of gold ownership/sale, $male_i$ be an indicator for sex, and $\boldsymbol{age_i}$ be a vector of indicator variables of age categories. I consider three measurements of gold ownership and sale: (i) whether any gold was owned in 1997; (ii) an IHS-transformed measurement of the amount of gold owned in 1997, thus allowing for the inclusion of zero values; and (iii) the change in share of gold between 1997 and 2000. While (i) and (ii) capture a household's *potential* ability to smooth consumption using gold resources, (iii) captures the actual sale of assets. $\boldsymbol{age}_i$ includes *Age 5-7 in 97*, *Age 8-10 in 97*, and *Age 11+ in 97*; coefficients, then, are interpreted relative to the omitted category *Age 0-4 in 97.*

A preliminary specification, estimated by OLS, would take the form:

$$y_i = \alpha \mathbf{age_i} + \gamma gold_i + \delta \mathbf{age_i} * male_i + \theta \mathbf{age_i} * gold_i + \zeta male_i * gold_i + \pi \mathbf{age_i} * male_i * gold_i + \psi \mathbf{X_i} + \mu_i + \varepsilon_i \quad [9]$$

where $\mathbf{X_i}$ is a vector of family/household level controls, including: *urban 97,* whether a household was urban/rural in 97; parents' ages in 1997; parents' education levels in 1997; log total assets in 1997; and log PCE in 1997. μ_i is a *kecamatan*-level fixed effect, and ε_i is the error term. In keeping with Bertrand et al. (2004), robust standard errors are clustered at the *kecamatan*- level.

$\hat{\boldsymbol{\pi}} = \left[\widehat{\pi_1}, \widehat{\pi_2}, \widehat{\pi_3}\right]$ are the coefficients of interest, which capture the relationship between a one-unit increase in the relevant gold variable for a male in a particular age category on y_i. $\hat{\pi}_i$ can be given a causal interpretation of the impact of gold ownership for a 5-7 year old male on y_i only if $\mathbb{E}(age_i * male_i * gold_i \varepsilon_i) = 0$. In particular, however, it seems unlikely that $\mathbb{E}(gold_i \varepsilon_i) = 0$, since gold ownership may proxy various measures of household resources and affluence - including things that are highly correlated with prosperity but difficult to measure,

including parental intelligence, parenting ability, household environment, etc. If this condition does not hold, results from this ordinary least squares specification are plagued by endogeneity and impossible to interpret properly.[30]

Following Case and Paxson (2008), we can decompose ε_i to justify a specification that will yield plausibly causal estimates. Suppose that $\varepsilon_i = h\xi_i + \epsilon_i$, where ϵ_i is the random component of the error (orthogonal to $gold_i$) and $h\xi_i$ is the portion correlated with $gold_i$. Then, $p\lim\hat{\pi} = \pi + p\lim(gold'gold)^{-1}gold'\varepsilon$, which implies that:

$$\widehat{\pi}_{1_i} \xrightarrow{p} \pi_i + \frac{h(\sigma_{\xi gold_i})}{\sigma^2_{gold_i}} \quad [10]$$

where π_i is the actual premium from gold ownership, $\sigma_{\xi gold_i}$ is the covariance between measures of gold ownership and other household characteristics that impact our outcomes of interest, and $\sigma^2_{gold_i}$ is the variance of *gold*. $\frac{h(\sigma_{\xi gold_i})}{\sigma^2_{gold_i}}$ is the projection of household characteristics onto *gold*.

This additional term $\frac{h(\sigma_{\xi gold_i})}{\sigma^2_{gold_i}}$ is a problem to the extent that we are unable to measure and control for these characteristics ξ_i. A mother fixed-effect, however, functionally includes ξ_i because difference equations are specified between births to the same mother; this controls for characteristics of a mother that are time-invariant, including family-level factors like parental ability, intelligence, genetic inputs, household environment, and wealth effects that impact all children.

Restricting my sample to households with more than one child, I employ the following fixed-effects specification, which addresses the endogeneity problem identified in Equation [9]:

$$y_i = \alpha\mathbf{age}_i + \delta\mathbf{age}_i * male_i + \theta\mathbf{age}_i * gold_i + \zeta male_i * gold_i + \pi\mathbf{age}_i * male_i * gold_i + \psi\mathbf{resources}_i * male_i + mother_i + \varepsilon_i \quad [11]$$

Because the equation now includes a mother fixed-effect, I do not include either *kecamatan*-fixed effects or household-level controls. However, I do include interaction terms between household illiquid assets and log-PCE with a male indicator variable, in order to address the possibility that gold remains a proxy for overall household wealth; sex provides a source of

[30] I include results from the standard OLS regression with no mother fixed effects in Appendix A.

within-household variation. Since it is reasonable to assume that market characteristics, local customs/traditions, and regional demographic practices likely result in correlated error terms, I cluster standard errors at the *kecamatan* level.[31]

The specification now controls for time-invariant household-level characteristics that are potentially correlated with *gold.* If we consider the decomposition of the error term, $\varepsilon_i = h\xi_i + \epsilon_i$, we note that the inclusion of a mother-fixed effect means that $h\xi_i = 0$. Thus, $\frac{h(\sigma_{\xi gold_i})}{\sigma^2_{gold_i}} = 0$ and $\widehat{\pi_{1_i}} \xrightarrow{p} \pi_i$.

A mother-level fixed effect serves a secondary purpose in this model. In order to consider the amount of gold held by a household in 1997 and the amount of gold sold between 1997 and 2000, I converted rupiah-valued estimates of "gold jewelry" into troy ounces (and the more easily interpreted grams) using world prices for gold. While world commodity prices provide estimates for pure (24 karat) gold, "gold jewelry" value includes gold at all levels of purity. In contrast to most Western gold sellers, who rarely sell pure gold, it is highly likely that very wealthy households do, in fact, purchase 24k gold; however, the ubiquity of gold ownership across the income distribution and the price structures for lower karat (purity) gold – coupled with anthropological evidence documenting 18 and 22 karat gold holdings in many Indonesian households – suggest that households in other income percentiles are likely holding less valuable gold alloys (Wolf, 1991). While this conversion from value-to-weight of gold introduces clear measurement error in a model without mother fixed-effects, this error is swept out in within-household models and serves only to shift the intercept of the relevant difference equation.

With a mother fixed-effect, then, $\widehat{\pi_{1_i}}$ can plausibly be interpreted as a *causal* effect of gold (for males in a particular age group) on an outcome of interest.

[31] Certainly, there is reason to consider clustering at lower levels in this model. While there is no theoretical basis for clustering at the level of the fixed-effect, I replicated the analyses discussed in Section 7 with errors clustered by mother. Significance coefficients were robust to this modified specification.

7. Primary Results, Discussion

7a. Predicting Family Gold Ownership, Sale Patterns

Results on gold ownership and sale patterns are reported in Tables 3 and 4.

Factors that predict any gold ownership in 1997 (Table 3, Column 1) are largely unsurprising and are consistent with the Indonesian context. Women older than 30 were significantly less likely to own gold as compared with women under age 20; coefficients are twice the magnitude for women who were over 40 compared to those between 30 and 40. As women are gifted gold at the time of marriage, that female gold ownership might peak immediately after marriage is intuitively reasonable. Additionally, older women are more likely to have marriage-age daughters, for whom *mas kwain* ("marriage gold") transfers are necessary. Households with more female children were significantly less likely to own gold, consistent with this pattern of gold transfers to daughters at marriage. Similarly, households with more adult women were significantly more likely to own gold, likely reflecting these same gold ownership and acquisition patterns. Gold ownership is, unsurprisingly, significantly correlated with both log PCE and ownership of financial assets, consistent with the idea that gold is a proxy for overall household resources.

Similar patterns are observed when we consider total grams of gold owned in 1997 (Table 3, Column 3), though notably, women's ages and number of female daughters are insignificant. Coefficients on parents' education, number of female adults, log PCE, illiquid asset ownership, and financial asset ownership are large and significant, providing further evidence to confirm that gold ownership is related to household male/female composition and functions as a proxy for household resources.

While gold ownership pre-crisis is an interesting predictor of children's long-term outcomes, it captures *potential* consumption smoothing ability. Table 3, Column 3 and Columns 1-4 in Table 4, in contrast, consider factors that predict *actual* consumption smoothing, assuming that the sale of gold was used to finance family consumption. Table 4, Column 1 suggests that households that sold all gold during the financial crisis were less affluent, with lower overall gold holdings, pre-crisis. As household illiquid asset holdings and women's years of completed education increase, the likelihood that the household sold all gold decreases.

For all outcomes capturing sale of gold, in fact, the likelihood that the household sold gold decreases as women's education increases. This is consistent with well-documented labor market

responses to the crisis (Thomas and Frankenberg, 2007). As the value of household assets and pre-crisis income streams collapsed, women increasingly entered the labor force. In fact, in 27 percent of households in this sample, women who were not formally working in 1997 had entered the labor force by 2000. The existence, then, of an additional income stream may have offset the need to sell gold in order to finance consumption. While labor force entry for women occurred at all levels of household income (using 1997 proxies), women with more education likely entered with higher wages, thus increasing the ease of consumption smoothing and decreasing the need to liquidate assets.

For all five gold-sale outcomes, urban households were significantly more likely to sell gold between 1997 and 2000. This is consistent with the differential economic impact of the crisis on food-producing and non-food-producing regions. An increase in the price of rice by around 120 percent, with food prices doubling across the board, posed a hardship for families whose assets and incomes collapsed. Data from the IFLS Community Survey and Frankenberg et al. (2002) suggest that this actually represented an upward shift in the relative status of rice producers.

7b. Children's Long Term Outcomes

Years of Education

Results from a fixed-effects specification with children's years of completed education as an outcome are reported in Table 5. For all results in the remainder of this section, coefficients of interest are the triple interactions between male, an age category, and a household measure of gold ownership. Relevant coefficients – corresponding with $\hat{\boldsymbol{\pi}} = [\hat{\pi}_1, \hat{\pi}_2, \hat{\pi}_3]$ - are in marked in bold text in Tables 5 – 11. Two-way interactions between gold ownership and age - $\hat{\boldsymbol{\theta}} = [\hat{\theta}_1, \hat{\theta}_2, \hat{\theta}_3]$ - provide helpful context, as they capture the effect of gold ownership for female children in a given age group in a household, without the additional premium $\hat{\boldsymbol{\pi}}$ received by their brothers. These coefficients are italicized in Tables 5 – 11.

Columns 1 and 2 use two measures of pre-crisis holdings as the *gold* variable – an indicator capturing whether the household owned any gold and an IHS-transformed measure of gold grams (allowing for zero values) respectively. In both columns, household gold ownership for children older than age 8 actually appears to result in biases that favor female children over their brothers. There is a significant premium associated with household gold ownership for all children older than age 8 (two-way interaction terms) – representing a nearly one year increase in

total educational attainment – that is almost entirely erased for male children (three-way interaction terms). While this negative impact for boys is significant only for 8-10 year olds in Column 1, the signs and magnitudes of coefficients for all age groups in both Columns 1 and 2 suggest a gender bias that favors female children. Given that the average child in this sample completes 11 years of formal education, coefficients of this magnitude are striking, especially when juxtaposed with the magnitudes of economically significant results in this literature – in which impacts of under .2 years are considered noteworthy (Duflo, 2000; Maccini and Yang, 2007).

This result is consistent with Levine and Ames (2003), who find that girls actually fared better than boys between 1997 and 1999, using educational attainment as a primary outcome. Levine and Ames suggest that this pattern may reflect a long-term upward trend in female school enrollment, which households with more substantial resources were able to maintain between 1997 and 1999 despite the crisis.

One limitation of this specification is that it obscures considerable variation in the income distribution and, thus, likely heterogeneity in resource allocation decisions. I explore this challenge in greater detail in Section 8, by considering various stratifications of this sample. For women in more affluent households, for whom an old age security motive is less pressing, other motivations may encourage investment in the education of female children over male children. In particular, an extensive literature describes patterns of parental investment in children that are motivated by an effort to compensate for gaps in children's initial endowments (Griliches, 1979; Behrman, Pollak, and Taubman, 1992; Pitt, Rosenzweig, and Hassan, 1990). To the extent that sex is a component of a child's initial endowment and that gender biases penalize girls in the Indonesian labor market, parents with less pressing needs for remittances from adult children may choose to concentrate investments in female children in order to compensate for inevitable labor market inequalities.

Comparison of Columns 1 and 2 with Column 3 makes clear the importance of differentiating between *potential* consumption smoothing ability and evidence of *actual* asset sale. Certainly, there is a clear distinction between households that held any assets in 1997 and households that liquidated resources between 1997 and 2000 to smooth consumption; conflating *ability* with *need* to smooth consumption may confuse distinct populations and their corresponding resource allocation motivations, although all specifications include additional

controls for measures of household resources. Column 3 uses a change in a household's gold share between 1997 and 2000 as evidence of gold sale.[32] Coefficients on three-way and two-way interaction terms of interest are opposite in sign (and comparable in magnitude, with unit conversions) to those in Columns 1 and 2. Two-way interaction terms suggest negative impacts on educational attainment for female children, which increase as gold sales increase. Signs and magnitudes on the triple interaction term for male children in all age groups, however, suggests that boys were not only shielded from the negative consequences but actually received a net positive educational premium over their sisters. For males over age 11 in gold owning households, this benefit is substantial; a ten percent increase in the *Change-Gold Share* variable (that is: a 10 percent decrease in gold share from 1997 to 2000) is associated with an additional .5 years of education for older male children in gold-selling households – which is particularly sizable when compared to the .2 year decrease in attained education expected for their female siblings.

These results are largely consistent with trends in qualitative and quantitative literature that analyze the impact of the crisis: particularly in regard to educational attainment, households concentrated resources in male children (Cameron and Worswick, 2001; Thomas et al., 2001). The nature of this specification makes it impossible to identify a specific pathway through which household bargaining translated into investment in children. However, the context of the model in Column 3 – which focuses on households that felt compelled to liquidate assets between 1997 and 2000, rather than households that held assets in 1997 – is more consistent with the theoretical framework outlined in Section 4, which considers differential investment in children motivated by economic necessity. Interaction terms in these specifications between sex and other markers of household resources (per capita expenditure and illiquid asset holdings) decrease the likelihood that gold is functioning as a proxy for overall resource holdings. Our ability to link the sale of female-controlled assets to markedly different outcomes for male and female children, then, provides highly suggestive evidence of women's preferences for resource allocation.

[32] The variable *change_goldshare* and other similarly calculated measures of asset sale – including *IHS-Gold Change,* which is calculating using grams rather than rupiah-valued asset shares – are highly correlated ($\rho \approx .6$).

Probability of Employment

Results that consider probability of employment as an outcome are reported in Table 6. Trends in magnitudes and signs of coefficients mirror those observed for educational attainment, a reassuring finding given the theoretical link between human capital inputs and employment prospects. Similarly to the findings in Table 5, specifications that use pre-crisis gold holdings (Columns 1 and 2) as the asset measurement of interest suggest that while there was a positive impact on likelihood of employment for female children in households that owned gold before the financial crisis, this effect is almost entirely eliminated for male children. While the signs and relative magnitudes of coefficients in Column 1 (indicator variable for gold ownership) align with those in Column 2, only results that consider actual value of gold owned pre-crisis are significant. In particular, for 8-10 year old female children in gold-owning households in 1997, a one percent increase in the number of grams of gold owned is associated with a seven percent increase in the probability of paid employment, a finding that is significant at a 1 percent level. However, an additional, significant negative premium associated with being male effectively eliminates the benefit of gold ownership for boys. This trend reverses, as in the case of educational attainment, when we consider *Change-Gold Share* as the gold variable of interest. With the exception of the two-way interaction for 8-10 year olds, results are not significant in Column 3. However, the magnitudes and signs on two- and three-way interactions suggest that, as with educational attainment, male children were largely shielded from the negative consequences of the crisis on their sisters' likelihoods of employment, with short-term investment decisions translating into labor market success in adulthood.

Notably, however, results are less pronounced in this model (i.e. smaller magnitudes on two- and three-way interactions, which are less frequently significant) than in the educational attainment specification. This is unsurprising, given conceptual distinctions between the two outcomes. While educational attainment requires only that individuals sit in classrooms for a given number of years – often required by law and custom – employment more accurately reflects ability.[33] While educational attainment may be a better indicator of household investment priorities, labor market outcomes capture an individual's ability to convert those inputs into economically important outcomes. That trends persist, from contemporaneous investment in

[33] The existence of a divide between "schooling" and "learning" is widely discussed. See *The Rebirth of Education: Schooling Ain't Learning* (Pritchett, 2013) for a detailed discussion.

children's education to employment nearly 15 years later, is remarkable. As this specification allows us to link maternal resource allocation decisions to these long-term indicators, this continued divergence in outcomes captures evidence of the enduring consequences of short-term consumption smoothing strategies for children.

Earnings

Results on individual earnings, reported as an IHS-transformed variable with zeroes included for individuals with no paid employment, are reported in Table 7. Noting that IHS-transformed earnings and gold grams, as well the scaled variable *Change, Gold Share*, are interpreted in terms of percentage point changes, the magnitude of coefficients relating gold ownership in the late 1990s to children's earnings in 2014 is striking. Trends in gender differences parallel those observed in Tables 5 and 6. Positive earnings consequences for female children in households that owned gold in 1997 are countered by negative premiums for male children (Columns 2 and 3). Column 1 suggests that, while there is a 293 percent earnings benefit for 8-10 year old female children in households that owned gold in 1997, male children in these households face an additional comparable (significant) negative premium of 233 percent. Results for other age categories (Column 1) and in a specification that uses actual asset holdings in 1997 (Column 2) suggest similarly large differences between earnings for male and female children. As discussed in Section 6, pervasive gender discrimination and social norms that constrain female labor force participation mean that women who have non-zero annual earnings are highly selected, as compared to males in the labor force. It is unsurprising that these differences are observed in households that owned more gold in 1997, given that household income and per capita expenditure in 1997 function as strong predictors of female labor force participation in adulthood.

Results in Column 3, which consider *Change, Gold Share,* suggest a pattern similar to that observed in Tables 5 and 6, with negative earnings consequences for female children in households that increase as the amount of gold sold increases. While coefficients are insignificant on three-way interaction terms, the signs and magnitudes of these results suggest that, in this domain as well, male children were insulated from the consequences of the crisis at the expense of female children in the household. This is particularly evident among 8 to 10 year olds.

Section 8c.2 discusses alternatives to individual income as outcomes, including joint income of an individual and their spouse, which may arguably provide a better indication of welfare in adulthood. As Section 8c.2 will discuss in greater detail, the relative youth of this sample of individuals makes it difficult to consider marriage market outcomes without focusing analysis on a highly selected sample of individuals with early age of marriage.

Per Capita Expenditure

Results that consider per capita expenditure as an outcome are reported in Table 7. In contrast to Tables 4, 5, and 6, coefficients in Column 1 (gold indicator) and Column 2 (grams of gold in 1997) suggests that gold ownership in 1997 is associated with *lower* 2014 per capita expenditure for female children in all age groups, with compensatory positive premiums for only male children. However, with the exception of a negative impact on log-PCE for 5-7 year olds that increases as 1997 gold asset holdings increase, results in all three columns are small in magnitude and statistically insignificant from zero. Section 8c.2 discusses alternative measurements of long-term welfare in greater detail, many of which likely contain more pertinent information about individual welfare than log-PCE. Log-PCE, though widely considered a particularly illustrative measure of household wellbeing, lacks information about individual-level outcomes, though may capture more information about spousal characteristics than other outcomes considered in this paper.

8. Testing the Old Age Security Motive

As discussed in Section 4, an old age security motive for resource allocation among children should be most evident in households where women's Period 2 consumption is almost entirely reliant on remittances from adult children. This may include women with substantially older husbands who, as a consequence, face a much longer period of widowhood. Additionally, rural/land-owning women, who have no expectation of inheriting a husband's pension, and women with low levels of education, who have limited independent wage-earning potential, may be similarly dependent on transfers from adult children during periods of widowhood. If an old age security motive drives resource allocation, we expect to see large, significant premiums associated with being male in households that sold gold between 1997 and 2000. I consider three stratifications of my analytical sample: (i) rural versus urban; (ii) households with women whose

husbands are 8 or more years older, versus households with smaller male/female age gaps [34]; and (iii) households where a mother's education is above, versus below, the sample median – 6 years.

One may be interested in not only whether distinct resource allocation patterns are evident in stratifications of the pooled sample, but also whether coefficients are significantly different between groups in these stratifications. Results from this test are included in Appendix Table B1.

Results from these regressions, which use *Change, Gold Share, 97 to 00* as the measure of asset sales and *Years of Completed Education, 2014, Probability of Paid Employment,* and *Individual Earnings, 2014* as outcomes of interest are reported in Tables 8, 9, and 10. Results of tests to determine whether coefficients are significantly different across stratifications (i.e. whether a coefficient in the "rural" specification is significantly different from the same coefficient in the urban specification) are reported in Appendix B.

Years of Completed Education, 2014 is arguably the most direct reflection of household investments and, thus, the best test of an old age security motive for maternal resource allocation. As the human capital production function discussed in Section 4 notes, however, other factors – including parental time investment and skills – may also impact a child's human capital acquisition in ways that are not captured by years of attained education. Thus, I consider the two labor market outcomes in order to consider, albeit indirectly, investments in characteristics that may not be evident in years of attained education alone. In all three tables, Columns 1 and 2 consider differences between households that were rural versus urban in 1997, Columns 3 and 4 consider spousal age gaps above (and below) 8 years, and Columns 5 and 6 consider female education above and below the sample median.

Rural households in Indonesia, with income derived from cultivation of land, lack the old age security of a formal pension plan. In these communities in particular, with no culture of male retirement, women are largely left without sources of income during periods of widowhood. Section 4, thus, suggests that women should invest more resources in children with the greatest ability to remit income; that is, in Indonesia, we should expect to see evidence of pronounced, preferential investments in the human capital of male children. Columns 1 and 2 in Tables 8, 9, and 10 provide evidence of this bias. Unequal resource allocation is most evident when years of attained education are treated as the outcome variable of interest (Table 8). Premiums for male

[34] The median age gap is 5 years. I chose 8 years, the 75th percentile in this sample, for this stratification.

children are large, positive, and significant. Comparison of coefficient sizes on three-way interactions for male children in gold-owning rural households with coefficient magnitudes on two-way interactions suggests that male children not only were *shielded* from the negative impacts of the crisis that harmed their sisters, but actually received net improvements in educational attainment. Coefficients that capture educational attainment for urban households, in contrast, are not significantly different from zero for any interaction term of interest. While results for rural versus urban households are insignificant when probability of paid employment is the outcome of interest (Table 9), Column 1 of Table 10 suggests that the consequences of preferential investment in male children endured into adulthood, manifesting in adult earnings patterns; while coefficients on three-way interaction terms are insignificant, they remain positive, in contrast to negative and significant coefficients on two-way interactions between age and *Change, Gold Share,* which correspond with negative impacts on female children.

Similar patterns are evident when I stratify my analytical sample based on the size of the spousal age gap. Section 4 suggests that, much like rural women, women with much older husbands must consider a greater threat of consumption insecurity in old age, as they face much longer periods of widowhood. Results in Columns 3 and 4 of Tables 8, 9, and 10 mirror those observed for the preceding stratification and similarly support an old age security motive for resource allocation. With years of completed education as the outcome of interest, coefficients on three-way interaction terms are positive (though insignificant), in contrast to negative terms on two-way age/gold-share interaction terms that, for individuals over age 7 in 1997, are significant. This similarly suggests remarkable shielding of educational attainment for male children, consistent with biases in resource allocation. While a similar trend is observed for 5-7 year old children of parents with smaller age gaps (i.e. evidence of attempts to protect the educational attainment of male children), there is no additional evidence of such a pattern for children in other age categories. When we consider stratifications based on spousal age gap, there are no significant results related to the probability of employment in adulthood for children of parents in either category. The results for annual earnings in adulthood, however, suggest opposing gender biases for male and female children depending on the size of the spousal age gap. Columns 3 and 4 in Table 10 suggest that male children in households that sold gold earn significantly more than their female siblings, if their father is at least 8 years older than their mother. In contrast, in households with narrower male-female age gaps, we observe an opposing

trend: there is a negative earnings premium associated with being male for children who were under age 11 in 1997 in families that sold gold, as compared to their female siblings. In fact, the negative premium for male children effectively cancels out the positive overall effect of gold sales for all children in the family.

Finally, I consider stratifications of my sample based on mother's education. As women with lower education are likely to have more limited labor market opportunities, particularly in old age, we expect that any old age security motive for investing in children is most pronounced among less educated women. It is worth noting that fertility is much higher among women with less education, so there are more than twice as many children with mothers whose education falls below the median than above. Results, reassuringly, remain consistent with those observed in the previous stratifications. In Table 8, significant results are largely concentrated in the sample of low education mothers; Column 5 provides evidence, consistent with both theory and previous stratifications, of insulation of male children from the effects of the financial crisis. While there are negative impacts on attained education for children between 5-7 and older than 11 in households that sold gold between 1997 and 2000, premiums associated with being male in these households of equal magnitude indicate nearly complete shielding of male children.

When we consider the probability of paid employment (Table 9), all coefficients of interest are insignificant and extremely close to zero for low education mothers (Column 5). However, children over age 8 with high education mothers whose households sold gold during the financial crisis are significantly less likely to work (Column 6). This may reflect the extent to which the crisis impacted these households. Given strong correlations between parental education and other markers of affluence, we expect that households with higher education mothers are comparatively affluent. If these relatively wealthy households were liquidating gold assets during the financial crisis, this may reflect particularly dire circumstances. It may be reasonable to suppose, then, that the consequences of this period impacted their children's prospects in ways that educational attainment cannot capture. There are no significant relationships between gold sales/gender and children's earnings in 2014.

Particularly in the Indonesian context (see Section 2), in which there is limited evidence of preferential treatment toward sons but abundant evidence suggesting pervasive gender discrimination in the labor force, these stratifications provide suggestive evidence of an old age security motive that is driving investments in children. While the nature of these specifications

makes it impossible to definitively disentangle causal mechanisms, we can interpret maternal decisions about individually controlled assets as evidence of underlying preferences. Pronounced biases toward male children in resource allocation among women with the most pressing needs for Period 2 consumption, then, provide suggestive evidence of preferences consistent with the framework outlined in Section 4.

9. Extensions

9a. Measurement Error

9a.1. Bounding Coefficients

Asset data, in both developing and developed country contexts, is notoriously noisy. Although anthropological literature suggests that Indonesian women are well aware of the market price of gold, given the frequency with which they both buy and sell jewelry, measurement error remains inevitable. Noting that men surveyed about gold asset value in this sample seem to systematically underreport total holdings, I exploit this as a source of a lower bound on coefficients estimates. While the primary analysis in this paper assumes that women provide accurate estimates of gold value, I consider an alternative specification in which female reported gold values in all gold variables are replaced with male-reported values. To do so, I create 3 male-gold asset variables: an indicator variable that captures whether, according to a man, a household owns gold; total male-reported grams of gold in 1997; and a variable that captures the change in male-reported gold share between 1997 and 2000. Raw asset values are winsorized at the 5th and 95th percentiles and are otherwise calculated in the manner described in Section 5. I replace gold share estimates with the sample median for the 9 cases in 1997 for which gold as a share of total assets exceeds 1. For the purposes of this exercise, I report results only for years of completed education in Table 11.

There is some evidence (see Section 9a.2, below) to suggest that women's estimates of gold holdings may be underestimates. Nonetheless, given the sets of asset values available for this analysis, coefficient estimates in the primary analysis that employs women's estimates are plausible upper bounds. Given systematic underreporting by men, results in Table 11 serve as a reasonable lower bound. The signs and magnitudes of coefficients in Columns 1 and 2, which consider gold ownership in 1997, mirror the results in the primary analysis, which is reassuring. Column 2 suggests, similarly and with significant results, a resource allocation bias toward

female children, which increases as 1997 gold holdings increase. Results in Column 3 are not significantly different from zero for any relevant coefficient.

Insofar as men's reports of gold holdings include more sizable measurement error than women's, that coefficient estimates are attenuated (biased toward zero) is wholly unsurprising. The lack of stark differences in results when we shift to this version of the gold asset variable, however, is reassuring.

9a.2. Instrumenting for Female-Gold Values

Measurement error models are typically treated as a special case of models with endogenous regressors. If appropriately chosen instruments are used for mis-measured variables, the resulting coefficient estimates are arguably consistent. To address measurement error in female-reported gold variables, we should obtain consistent coefficient estimates on relevant asset variables if we employ an instrument that (i) is strongly correlated with female-reported gold (i.e. satisfies the "relevance" condition for instruments) and (ii) has measurement error that is either equal to zero or orthogonal to the error in female-gold estimates (i.e. satisfies a version of the "exclusion" condition).

To formalize the justification for the use of an instrument in this case, suppose that x_i denotes *reported* female gold, while x^*_i is the true value of gold assets. If we were to employ the true value x^*_i in a generic specification $y_i = \alpha + \beta x^*_i + \varepsilon$, we assume that $\mathrm{E}(x^*\varepsilon) = 0$. However, x^* is observed with an additive, independent measurement error $\eta \sim (0, \sigma^2_\eta)$ such that $x = x^* + \eta$. We can, then, reformulate the regression of *y* on *x* as: $y = \alpha + \beta x + u$, where $u = \varepsilon - \beta\eta$.

If there exists some instrument *w* such that $\mathrm{E}(wx) \neq 0$ and $\mathrm{E}(wu) = 0$, then β is consistent. Alternatively, a valid instrument can take the form $w_i = x^*_i + v_i$, where v_i is another *independent* measurement error. If w_i is mean independent of (ε_i, η_i), but is correlated with $x = x^* + \eta$, then w_i is a valid instrument for x_i.

Consideration of discrepancies in gold reports in this sample suggest that, while the error in men's estimates may be random, female error is not wholly random. In particular, discrepancies between male and female estimates are significantly more likely when women complete asset modules alone, a pattern that may be attributable to an anchoring bias.

Alternatively, given the number of households in which men and women disagree about whether they own *any* gold at all, this may reflect the existence of concealed assets. Indeed, women who complete the asset module alone report owning 15 percent more gold in 1997 (p = .017), with significance on this coefficient disappearing when controls are added for husband's education and *kecamatan.* Certainly, whether a woman completes the asset module alone and whether she chooses to conceal assets from other members of her household is non-random. It is, however, also reasonable to assume that there is some random component of the error in her estimates. In contrast, simple regressions intended to consider male gold against a host of demographic characteristics reveal no such patterns, suggesting that errors in male gold reports may be considered random.

Let female gold be denoted by x_i and male gold by w_i. η is the additive measurement error in a report x^*, and suppose that v_i is *random* error in men's estimates. Then w_i is mean independent of (ε_i, η_i). If the relevance condition, tested by the first-stage of a two stage least squares (2SLS) specification, is satisfied, then w_i is a valid instrument for x_i. Using the three measurements of asset holdings described in Section 5, I instrument for (i) whether a household owned any gold in 1997; (ii) the weight (grams) of gold holdings in 1997; and (iii) the change in the household's share of gold between 1997 and 2000, all using husband's reports of gold holdings. For the fixed effects specification described in Section 5, I create a total of 21 instruments (seven per specification), representing each interaction of a female-reported gold variable with age and sex characteristics of interest. F-statistics calculated for instruments in the three specifications indicate that the criterion established by Stock and Yogo (2005) is satisfied, with F-statistics greater than 10.[35]

For the purposes of this exercise, I report results in Table 12 only for years of completed education. Gold ownership, captured in an IHS-scaled continuous variable, predicts significantly higher levels of attained education for female children older than age 7 in 1997. All other interaction coefficients of interest are not significantly different from zero. The signs of

[35] I obtained these statistics using STATA's *xtoverid* command, which calculates F-statistics for a weak instruments test. F-statistics for all instruments used in this specification exceed 300. *xtoverid* also calculates the relevant statistic for the Sanderson-Windmeijer multivariate F test of excluded instruments (Sanderson and Windmeijer, 2016), which builds on a modified F test for models with instrumental variables models with multiple endogenous regressors proposed in Angrist and Pischke (2009). According to this test, instruments used in this specification similarly satisfy the relevance criterion.

coefficients are, however, consistent with findings in the primary specification, which is reassuring.

The lack of significant results in this instrumental variables specification of the model could indicate one of several issues. First, if male gold is a valid instrument for female gold *and* there is substantial error within female estimates, the process through which the "endogenous" component of female gold is eliminated may reduce the predictive power of the variable; then, we have reason to be skeptical of the results presented previously in this paper. More plausibly, the error term in male gold is correlated with the measurement error in female gold; it is reasonable to suppose that lower levels of male education are associated with both non-random female errors (including potential attempts to conceal asset holdings) and higher variance in male estimates of gold ownership. If η and v_i have non-zero correlation, then introduction of an instrument may serve only to increase the noise in asset estimates, resulting in attenuated coefficient estimates, comparable to those noted in 9a.1.

9b. Future Research

Future analyses should consider additional robustness checks, as well as other measurements of adulthood outcomes that are more descriptive than labor market participation and earnings. Additionally, although all models in this paper controlled for various indicators of household affluence, exploiting intra-household sex variation to include these controls in fixed effects models, to address concerns about gold functioning as a proxy for affluence, distinct trends observed when gold *ownership* versus *sale* were considered suggest that gold variables may continue to capture time-varying aspects of household status. A more extensive vector of controls that capture other aspects of household wealth and resources, which may be currently captured by gold sales, may be helpful.

9b.1. Potential Placebo Tests

There are several placebo tests that ought to be included in future iterations of this paper. First, a falsification test that uses IFLS 1 and IFLS 2, in place of IFLS 2 and IFLS 3, would consider a period of time of during which there was no exogenous shock to asset holdings.

Without the widespread sale of gold to finance consumption, prompted by the 1998 Financial Crisis, or the shift in bargaining power that accompanied the crisis, we would expect to see results that are insignificant, with magnitudes close to zero for all coefficients of interest.

Another clever placebo test, which may be possible with future waves of IFLS data, would use attained adult height as an outcome variable. Case and Paxson (2008) note that attained height captures very early investments made in children, with patterns of stunting set by age 5. Then, while resource shocks *before* age 5 may result in stunting (failure to reach linear growth potential), shocks later in childhood and adolescence will not be reflected in attained adult height. If we consider a dataset that includes complete information on final adult height and exclude those individuals who were under age 5 at the time of the financial crisis, we should expect small, statistically insignificant coefficients on asset variables – indicating no relationship between household gold ownership and adult height for children over age 5. The presence of significant results would indicate that Equation [11] is misspecified.

Although IFLS collects height data, the information available for my analytical sample is incomplete; if this analysis were conducted with the selected subsample for which I have height data, it would be impossible to disentangle null results due to the placebo test result from null results generated by selection biases.

9b.2. Marriage Market Outcomes

While human capital attainment and labor market performance capture important dimensions of children's long-term outcomes, they remain an incomplete representation of wealth and well-being. Particularly in an analysis that considers the existence of an old age security motive for investments, children's *marriage market* outcomes – characteristics of spouses and married households – are particularly interesting. An extensive literature considers marriage matching as a strategy for household insurance, with hypergamy ("marrying up") for daughters representing another manifestation of a consumption smoothing and old age security decision made by parents (Rosenzweig and Stark, 1989; Behrman, Rosenzweig, and Taubman, 1994). An individual's success in the marriage market captures their ability not only to turn human capital attainment into desirable marriage market characteristics but, often, their family's ability and willingness to negotiate terms of a marriage.

Ideally, I would consider labor market characteristics of a spouse (probability of employment, earnings) alongside joint household income. Features in IFLS make it possible to consider other features of the marriage market, including the value of assets that individuals bring into a marriage, relative socio-economic characteristics of an individual and their spouses' families, and indicators of power and decision-making in married households.

However, at the present, my sample is too young for such an analysis. In IFLS 5, 61 percent of females were married and 36 percent of males, consistent with data on age at marriage (Utomo, 2014). For the reasons discussed in Section 6, there is little information to be gained from interpreting specifications in this paper that lack a mother fixed-effect. Since households in IFLS 5 with more than one married child are clearly non-randomly selected, there is little value in attempting to interpret fixed effects model results. IFLS 6, eventually, will provide information on these individuals after the majority of males and females are married, thus allowing for this type of analysis.

10. Conclusion

Household responses to disruptions to the economic status quo reflect the preferences and bargaining weights of their decision-makers. Given the ubiquity of economic shocks in developing country contexts, with limited insurance and credit markets to mitigate financial losses, economists and policymakers alike can benefit from detailed understandings of these resource allocation decisions in crises.

Using a 17-year panel of household survey data from Indonesia, I find evidence to suggest that, even in the absence of cultural preferences for sons, maternal resource allocation following the 1998 Financial Crisis overwhelmingly favored male children. Consideration of children's long-term outcomes suggests that this bias in short-term resource allocation translated into pronounced labor force participation and earnings gaps between male and female children in households that sold gold between 1997 and 2000.

The results in this paper are important for several reasons. First, they establish a link between gendered resource allocation following a plausibly exogenous asset shock and long-term outcomes. Second, they utilize insights from anthropology to motivate a framework of intra-household decision-making and intergenerational investment, which allows mothers and fathers to have distinct preferences; evidence of maternal resource allocation can then be

interpreted as evidence of a mother's preferences. Using a fixed effects model to address household-specific heterogeneity, relationships between the sale of female-controlled gold jewelry and children's outcomes are plausibly causal and suggest that women preferred to invest in male children in a climate of economic uncertainty. Drawing on theoretical insights and employing several stratifications, I find suggestive evidence of an old age security motive underlying women's decisions to invest in sons over daughters. In sum, these results underscore the importance of careful dissection of household decision-making processes amidst economic shocks, to understand the sources of power, motivations for resource allocations, and manifestations of preferences. When household balances of power shift and resource constraints are imposed, household behavior may no longer reflect dominant social patterns, with potentially long-term consequences for population wellbeing.

TABLE 1: DESCRIPTIVE STATISTICS, HOUSEHOLD ATTRIBUTES & CHILD OUTCOMES

	Full Sample	**Rural**	**Urban**
Adults	*n = 2,682*	*n = 1,552*	*n = 1,129*
Total household members, 97	5.93	5.82	6.08
	[2.05]	[1.92]	[2.21]
Father, Years of Education	6.61	5.4	8.27
	[4.27]	[3.97]	[4.12]
Mother, Years of Education	5.66	4.59	7.13
	[4.04]	[3.69]	[4.05]
Urban, 97	0.421		
Children			
Years of Attained Education	10.69	10.05	11.63
	[3.43]	[3.51]	[3.08]
Probability of Employment	0.446	0.445	0.449
	[.497]	[.496]	[.497]
IHS: Annual Earnings	16.79	16.64	17.01
	[1.95]	[2.00]	[1.87]

Note: Standard deviations in brackets
IHS Annual Earnings applies the IHS transformation (roughly equivalent to a logarithmic transformation) to an annual earnings variable.

TABLE 2: ASSET OWNERSHIP IN 1997 AND 2000

	Full Sample	**Rural**	**Urban**
Total HH Assets, Log 97	6.29	6.05	6.65
	[1.55]	[1.42]	[1.66]
Liquid HH Assets, IHS 97	3.52	3.13	4.11
	[3.00]	[2.89]	[3.07]
Illiquid HH Assets, IHS 97	5.78	5.9	5.61
	[2.83]	[2.33]	[3.44]
Owned Gold in 1997 (proportion)	0.6	0.56	0.66
Grams Gold, 1997	7.47	5.87	9.66
	[10.0]	[8.72]	[11.2]
Grams Gold, 2000	8.44	6.97	10.4
	[12.6]	[11.1]	[14.1]
Sold 25p Gold (proportion)	0.419	0.4	0.447
Sold 75p Gold (proportion)	0.275	0.267	0.286
Change, Gold Share: 97 to 00 (proportion)	0.008	0.008	0.008
	[.091]	[.093]	[.087]

Note: Standard deviations in brackets
Transformations are applied to assets valued in Rp0'000.
Households are assigned "0" values if liquid household assets or illiquid household assets are not reported. Households are assigned the sample median of *total* household assets are reported as "0."

TABLE 3: PREDICTING HOUSEHOLD GOLD OWNERSHIP AND SALE (I)

	Own Jewelry 97	Gold Grams 97	IHS Gold Change
M: Between 30 and 40 yo	0.0134	0.737	-0.0167
	(0.0415)	(0.727)	(0.177)
M: Over 40 yo	-0.00758	1.131	0.221
	(0.0560)	(1.029)	(0.222)
F: Between 30 and 40 yo	-0.0502**	0.472	-0.228*
	(0.0243)	(0.765)	(0.133)
F: Over 40 yo	-0.128***	1.038	-0.370**
	(0.0303)	(0.921)	(0.179)
Yrs Ed, Father	0.00575*	0.227**	-0.0259*
	(0.00295)	(0.0905)	(0.0138)
Yrs Ed, Mother	0.000621	0.295***	-0.0563***
	(0.00363)	(0.0671)	(0.0191)
Num. Male Adults, 97	0.0148	0.0343	0.0370
	(0.0125)	(0.299)	(0.0635)
Num. Female Adults, 97	0.0299***	1.620***	-0.176**
	(0.00951)	(0.371)	(0.0770)
Num. Male Children, 97	0.0166*	0.537	-0.0246
	(0.00938)	(0.341)	(0.0526)
Num. Female Children, 97	-0.0270**	0.281	0.0767
	(0.0120)	(0.477)	(0.113)
Num. Female Kids x Log PCE 97		0.0649	-0.0367
		(0.347)	(0.0635)
Num. Male Kids x Log PCE 97		0.118	-0.0162
		(0.227)	(0.0368)
Urban, 1997	-0.0119	0.379	0.206**
	(0.0265)	(0.601)	(0.0994)
Log Per Capita Exp., 97	0.0926***	4.023***	-0.0662
	(0.0128)	(0.945)	(0.117)
IHS, Liquid Assets 97			0.400***
			(0.0198)
IHS, Illiquid Assets 97		0.343***	-0.0426**
		(0.116)	(0.0196)
Owned Financial Assets, 97	0.137***	1.810***	-0.0940
	(0.0225)	(0.520)	(0.169)
Change in Number Adults, 97 to 00			-0.172**
			(0.0688)
Sold All Financial Assets, Crisis			0.314
			(0.246)
Constant	0.385***	-7.995***	-0.583*
	(0.0545)	(1.385)	(0.291)
Observations	2,638	1,673	2,147
R-squared	0.132	0.268	0.197
Kecamatan FE	YES	YES	YES

Dependent variables in this specification are various measurements of gold holdings between 1997 and 2000.
Robust standard errors, clustered at kecamatan, are given in parentheses.
IHS Gold Change applies the IHS transformation to (Grams 97 – Grams 00).
*** p<0.01, ** p<0.05, * p<0.1

TABLE 4: PREDICTING HOUSEHOLD GOLD OWNERSHIP AND SALE (II)

	Sold All Gold	Sold 25p Gold	Sold 75p Gold	Change Gold Share
M: Between 30 and 40 yo	0.0213	0.00118	-0.0112	0.000342
	(0.0344)	(0.0494)	(0.0524)	(0.0106)
M: Over 40 yo	0.0162	0.00927	0.0103	0.00164
	(0.0483)	(0.0671)	(0.0642)	(0.0123)
F: Between 30 and 40 yo	0.0363	-0.0331	-0.00923	-0.00884
	(0.0312)	(0.0347)	(0.0335)	(0.00641)
F: Over 40 yo	0.0479	-0.0394	-0.0333	-0.0178**
	(0.0481)	(0.0498)	(0.0461)	(0.00719)
Yrs Ed, Father	-0.00187	-0.00387	-0.00410	-0.000679
	(0.00347)	(0.00336)	(0.00306)	(0.000623)
Yrs Ed, Mother	-0.00721**	-0.0123**	-0.0103***	-0.000643
	(0.00322)	(0.00468)	(0.00353)	(0.000794)
Num. Male Adults, 97	0.00474	0.0257*	0.0238	0.00400*
	(0.0172)	(0.0130)	(0.0191)	(0.00216)
Num. Female Adults, 97	0.00319	-0.0235	-0.0214	0.00383
	(0.00902)	(0.0183)	(0.0158)	(0.00235)
Num. Male Children, 97	0.00160	-0.0182	-0.0118	-0.00485*
	(0.0218)	(0.0236)	(0.0198)	(0.00265)
Num. Female Children, 97	0.0316	0.0690**	0.0701**	0.00183
	(0.0225)	(0.0304)	(0.0285)	(0.00286)
Num. Female Kids x Log PCE 97	-0.00320	-0.0290*	-0.0269*	-0.00178
	(0.0131)	(0.0150)	(0.0156)	(0.00137)
Num. Male Kids x Log PCE 97	-0.00393	0.00708	-0.00204	0.00248
	(0.00965)	(0.0118)	(0.00875)	(0.00231)
Urban, 1997	0.0327	0.0818***	0.0750***	-0.00703*
	(0.0288)	(0.0300)	(0.0267)	(0.00358)
Log Per Capita Exp., 97	0.0320	0.00271	0.0277	0.00202
	(0.0191)	(0.0331)	(0.0242)	(0.00499)
IHS, Illiquid Assets 97	-0.00918**	-0.0110*	-0.00944*	-0.0142***
	(0.00379)	(0.00573)	(0.00527)	(0.00131)
Owned Financial Assets, 97	-0.0683**	-0.0363	-0.0887***	-0.00233
	(0.0321)	(0.0418)	(0.0306)	(0.00428)
Gold Grams, 97	-0.00674***	0.00612***	0.000173	
	(0.00101)	(0.00150)	(0.00138)	
Change in Number Adults, 97 to 00	-0.0114	-0.0344**	-0.0291***	0.00232
	(0.0116)	(0.0158)	(0.0107)	(0.00271)
Sold All Financial Assets, Crisis	0.0696**	0.103**	0.153***	0.00150
	(0.0301)	(0.0477)	(0.0389)	(0.00759)
Constant	0.302***	0.677***	0.485***	0.0654***
	(0.0634)	(0.0872)	(0.0746)	(0.0151)
Observations	1,673	1,673	1,673	2,147
R-squared	0.092	0.077	0.080	0.223
Kecamatan FE	YES	YES	YES	YES

Dependent variables in this specification are various measurements of gold holdings between 1997 and 2000.
Change, Gold Share is calculated as *Gold Share, 97 – Gold Share, 00.*
Robust standard errors, clustered at kecamatan, are given in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

TABLE 5: YEARS, COMPLETED EDUCATION (2014) VS. GOLD OWNERSHIP/SALE

	Asset: *Owned* Gold, 97	**Asset: Gold *Grams (IHS)*, 97**	**Asset: Change, Gold Share (97 - 00)**
Gold Own / M / 5 - 7 in 97	0.19		
	[0.386]		
Gold Own / M / 8 - 10 in 97	-0.812*		
	[0.481]		
Gold Own / M / 11+ in 97	-0.028		
	[0.326]		
Gold Own / 5 - 7 in 97	0.24		
	[0.303]		
Gold Own / 8 - 10 in 97	1.083***		
	[0.394]		
Gold Own / 11+ in 97	0.778***		
	[0.239]		
IHS Gold Grams, 97 / M / 5-7 in 97		0.033	
		[0.128]	
IHS Gold Grams, 97 / M / 8-10 in 97		-0.272	
		[0.198]	
IHS Gold Grams, 97 / M / 11+ in 97		-0.072	
		[0.117]	
IHS Gold Grams, 97 / 5-7 in 97		0.15	
		[0.105]	
IHS Gold Grams, 97 / 8-10 in 97		0.402***	
		[0.140]	
IHS Gold Grams, 97 / 11+ in 97		0.386***	
		[0.088]	
Change, Gold Share /M/5 - 7 in 97			0.043
			[0.026]
Change, Gold Share /M/8 - 10 in 97			0.036
			[0.025]
Change, Gold Share /M/11+ in 97			0.053**
			[0.020]
Change, Gold Share / 5 - 7 in 97			-0.028*
			[0.014]
Change, Gold Share / 8 - 10 in 97			-0.008
			[0.018]
Change, Gold Share / 11+ in 97			-0.029**
			[0.012]
Gold Own / M	0.236		
	[0.273]		
IHS Gold Grams, 97 / M		0.063	
		[0.109]	
Change, Gold Share / Male			-0.025
			[0.017]
5 - 7 in 97	0.114	0.05	0.296**
	[0.234]	[0.205]	[0.140]
8 - 10 in 97	-1.019***	-0.923***	-0.346*
	[0.305]	[0.278]	[0.195]
11+ in 97	-1.304***	-1.389***	-0.790***
	[0.260]	[0.244]	[0.177]
Male	-0.593*	-0.589*	-0.446
	[0.348]	[0.345]	[0.345]
Male / 5 - 7 in 97	0.146	0.212	0.196
	[0.294]	[0.218]	[0.192]
Male / 8 - 10 in 97	1.275***	1.150***	0.744***
	[0.330]	[0.341]	[0.177]
Male / 11+ in 97	0.835***	0.925***	0.720***
	[0.305]	[0.240]	[0.185]
Sqrt Illiquid Assets, 97 x Male	0.003	0.003	0.004
	[0.004]	[0.004]	[0.004]
Ln Pce, 97 x Male	-0.196	-0.174	-0.191
	[0.148]	[0.156]	[0.151]
Constant	10.965***	10.955***	10.950***
	[0.094]	[0.097]	[0.093]
Observations	4,594	4,594	4,594
R-squared	0.037	0.04	0.033
Number of Mothers	1,739	1,739	1,739
Mother FE	YES	YES	YES

The outcome variable is years of completed education, a long-term outcome for children in this sample. The age category "0-4" is excluded.
Robust errors, clustered at kecamatan, are given in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

TABLE 6: PROBABILITY OF EMPLOYMENT VS. GOLD OWNERSHIP/SALE

	Asset: *Owned* Gold in 97	Asset: *Amount* of Gold in 97	Asset: Change, Gold Share (97 to 00)
Gold Own / M / 5 - 7 in 97	-0.0332		
	[0.0819]		
Gold Own / M / 8 - 10 in 97	-0.0793		
	[0.0572]		
Gold Own / M / 11+ in 97	-0.0128		
	[0.0964]		
Gold Own / 5 - 7 in 97	0.0131		
	[0.0591]		
Gold Own / 8 - 10 in 97	0.0489		
	[0.0338]		
Gold Own / 11+ in 97	0.0413		
	[0.0532]		
IHS Gold Grams, 97 / M / 5-7 in 97		-0.0427	
		[0.0281]	
IHS Gold Grams, 97 / M / 8-10 in 97		-0.0547**	
		[0.0210]	
IHS Gold Grams, 97 / M / 11+ in 97		-0.0374	
		[0.0272]	
IHS Gold Grams, 97 / 5-7 in 97		0.0477**	
		[0.0196]	
IHS Gold Grams, 97 / 8-10 in 97		0.0716***	
		[0.0098]	
IHS Gold Grams, 97 / 11+ in 97		0.0575***	
		[0.0152]	
Change, Gold Share /M/5 - 7 in 97			-0.0014
			[0.0060]
Change, Gold Share /M/8 - 10 in 97			0.0054
			[0.0054]
Change, Gold Share /M/11+ in 97			0.0001
			[0.0043]
Change, Gold Share / 5 - 7 in 97			-0.0001
			[0.0044]
Change, Gold Share / 8 - 10 in 97			-0.0059*
			[0.0032]
Change, Gold Share / 11+ in 97			-0.0031
			[0.0026]
Gold Own / M	-0.088		
	[0.0558]		
IHS Gold Grams, 97 / M		-0.0109	
		[0.0166]	
Change, Gold Share / Male			-0.0008
			[0.0037]
5 - 7 in 97	0.1351***	0.0731**	0.1401***
	[0.0405]	[0.0340]	[0.0288]
8 - 10 in 97	0.0744*	0.0029	0.1093***
	[0.0386]	[0.0335]	[0.0314]
11+ in 97	0.0605	0.0001	0.0854***
	[0.0486]	[0.0457]	[0.0307]
Male	0.1951***	0.1335**	0.1772**
	[0.0607]	[0.0635]	[0.0662]
Male / 5 - 7 in 97	0.0412	0.0827*	0.0239
	[0.0454]	[0.0433]	[0.0426]
Male / 8 - 10 in 97	0.1586***	0.1908***	0.1123***
	[0.0470]	[0.0436]	[0.0298]
Male / 11+ in 97	0.1727**	0.2216***	0.1660***
	[0.0773]	[0.0653]	[0.0455]
Sqrt Illiquid Assets, 97 x Male	-0.0011	-0.0008	-0.0015
	[0.0010]	[0.0011]	[0.0011]
Ln Pce, 97 x Male	0.0309	0.0409	0.0145
	[0.0307]	[0.0273]	[0.0301]
Constant	0.2383***	0.2390***	0.2404***
	[0.0187]	[0.0196]	[0.0192]
Observations	4,596	4,596	4,596
R-squared	0.1	0.1037	0.0975
Number of Mothers	1,739	1,739	1,739
Mother FE	YES	YES	YES

The outcome variable is an indicator variable that takes a value of 1 if the individual worked for pay in the week preceding the survey.
The age category "0-4" is excluded.
Robust standard errors, clustered at *kecamatan*, are reported in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 7: IHS: OWN EARNINGS, PAST YEAR VS. GOLD OWNERSHIP/SALE

	Asset: *Owned* Gold in 97	Asset: *Amount* of Gold in 97	Asset: Change, Gold Share (97 to 00)
Gold Own / M / 5 - 7 in 97	-0.184		
	[1.228]		
Gold Own / M / 8 - 10 in 97	-2.333*		
	[1.318]		
Gold Own / M / 11+ in 97	-0.152		
	[1.433]		
Gold Own / 5 - 7 in 97	1.044		
	[0.963]		
Gold Own / 8 - 10 in 97	2.935**		
	[1.136]		
Gold Own / 11+ in 97	2.009*		
	[1.091]		
IHS Gold Grams, 97 / M / 5-7 in 97		-1.056***	
		[0.385]	
IHS Gold Grams, 97 / M / 8-10 in 97		-1.374***	
		[0.362]	
IHS Gold Grams, 97 / M / 11+ in 97		0.033	
		[0.331]	
IHS Gold Grams, 97 / 5-7 in 97		1.258***	
		[0.407]	
IHS Gold Grams, 97 / 8-10 in 97		2.063***	
		[0.304]	
IHS Gold Grams, 97 / 11+ in 97		1.032***	
		[0.330]	
Change, Gold Share /M/5 - 7 in 97			0.064
			[0.119]
Change, Gold Share /M/8 - 10 in 97			0.126
			[0.083]
Change, Gold Share /M/11+ in 97			0.061
			[0.100]
Change, Gold Share / 5 - 7 in 97			-0.037
			[0.066]
Change, Gold Share / 8 - 10 in 97			-0.107**
			[0.049]
Change, Gold Share / 11+ in 97			-0.014
			[0.069]
Gold Own / M	-0.32		
	[1.053]		
IHS Gold Grams, 97 / M		0.3	
		[0.308]	
Change, Gold Share / Male			0.001
			[0.057]
5 - 7 in 97	1.743**	0.543	2.395***
	[0.800]	[0.683]	[0.594]
8 - 10 in 97	-0.173	-1.290*	1.731**
	[0.827]	[0.713]	[0.686]
11+ in 97	-0.455	-0.716	0.792
	[0.989]	[0.851]	[0.542]
Male	1.895**	1.234	1.963*
	[0.917]	[0.903]	[0.983]
Male / 5 - 7 in 97	1.938	3.376***	1.760*
	[1.196]	[0.922]	[0.929]
Male / 8 - 10 in 97	5.447***	5.992***	3.929***
	[0.865]	[0.761]	[0.731]
Male / 11+ in 97	5.087***	4.950***	4.868***
	[1.147]	[0.833]	[0.809]
Sqrt Illiquid Assets, 97 x Male	-0.032	-0.031	-0.026
	[0.023]	[0.025]	[0.022]
Ln Pce, 97 x Male	0.187	0.209	-0.028
	[0.508]	[0.432]	[0.497]
Constant	5.450***	5.431***	5.441***
	[0.380]	[0.412]	[0.397]
Observations	4,596	4,596	4,596
R-squared	0.121	0.13	0.12
Number of Mothers	1,739	1,739	1,739
Mother FE	YES	YES	YES

The outcome variable is a measure of total earnings in the preceding year, which is allowed to take a value of 0 if an individual did not work for pay. An inverse hyperbolic sine transformation is applied to the earnings variable .
The age category "0-4" is excluded.
Robust standard errors, clustered at kecamatan, are reported in parentheses
*** p<0.01, ** p<0.05, * p<0.1

TABLE 8: LOG PCE, CURRENT HOUSEHOLD (2014) VS. GOLD OWNERSHIP/SALE

	Asset: *Owned* Gold in 97	**Asset: *Amount* of Gold in 97**	**Asset: Change, Gold Share (97 to 00)**
Gold Own / M / 5 - 7 in 97	0.14		
	[0.134]		
Gold Own / M / 8 - 10 in 97	0.07		
	[0.089]		
Gold Own / M / 11+ in 97	0.025		
	[0.134]		
Gold Own / 5 - 7 in 97	-0.146		
	[0.102]		
Gold Own / 8 - 10 in 97	-0.03		
	[0.091]		
Gold Own / 11+ in 97	-0.047		
	[0.115]		
IHS Gold Grams, 97 / M / 5-7 in 97		0.06	
		[0.044]	
IHS Gold Grams, 97 / M / 8-10 in 97		0.032	
		[0.042]	
IHS Gold Grams, 97 / M / 11+ in 97		-0.034	
		[0.050]	
IHS Gold Grams, 97 / 5-7 in 97		-0.058**	
		[0.028]	
IHS Gold Grams, 97 / 8-10 in 97		-0.028	
		[0.034]	
IHS Gold Grams, 97 / 11+ in 97		-0.002	
		[0.036]	
Change, Gold Share /M/5 - 7 in 97			-0.001
			[0.005]
Change, Gold Share /M/8 - 10 in 97			0.001
			[0.007]
Change, Gold Share /M/11+ in 97			-0.005
			[0.004]
Change, Gold Share / 5 - 7 in 97			0.001
			[0.004]
Change, Gold Share / 8 - 10 in 97			0.001
			[0.004]
Change, Gold Share / 11+ in 97			0.003
			[0.003]
Gold Own / M	-0.126		
	[0.077]		
IHS Gold Grams, 97 / M		-0.043	
		[0.028]	
Change, Gold Share / Male			-0.001
			[0.004]
5 - 7 in 97	0.133	0.128**	0.041
	[0.081]	[0.059]	[0.045]
8 - 10 in 97	0.067	0.09	0.047
	[0.085]	[0.076]	[0.049]
11+ in 97	0.08	0.053	0.049
	[0.093]	[0.075]	[0.045]
Male	0.079	0.042	0.027
	[0.054]	[0.049]	[0.035]
Male / 5 - 7 in 97	-0.084	-0.089	0.004
	[0.098]	[0.087]	[0.053]
Male / 8 - 10 in 97	-0.002	-0.006	0.041
	[0.081]	[0.085]	[0.063]
Male / 11+ in 97	-0.007	0.055	0.011
	[0.114]	[0.101]	[0.061]
Sqrt Illiquid Assets, 97 x Male	0.002	0.003	0.002
	[0.002]	[0.002]	[0.002]
Ln Pce, 97 x Male	-0.018	-0.009	-0.026
	[0.033]	[0.030]	[0.032]
Constant	4.292***	4.294***	4.295***
	[0.029]	[0.028]	[0.028]
Observations	4,312	4,312	4,312
R-squared	0.007	0.009	0.006
Number of Mothers	1,678	1,678	1,678
Mother FE	YES	YES	YES

The outcome variable is a log transformation applied to per capita expenditure of an individual's 2014 (adult) household.
The age category "0-4" is excluded.
Robust standard errors clustered at *kecamatan* are reported in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

TABLE 9: OLD AGE TEST – YEARS OF EDUCATION (2014) VS. GOLD OWNERSHIP/SALE

	Rural	Urban	Age Gap > 7	Age Gap </= 7	Female Ed < Median	Female Ed >/= Median
Change, Gold Share /M/5 - 7 in 97	0.074*	-0.036	0.026	0.041	0.059*	-0.021
	[0.040]	[0.024]	[0.089]	[0.028]	[0.033]	[0.049]
Change, Gold Share /M/8 - 10 in 97	0.051	0.001	0.141	0.006	0.043	0.007
	[0.035]	[0.044]	[0.086]	[0.022]	[0.037]	[0.033]
Change, Gold Share /M/11+ in 97	0.075**	0.022	0.085	0.039	0.055**	0.061
	[0.030]	[0.027]	[0.063]	[0.026]	[0.025]	[0.044]
Change, Gold Share / 5 - 7 in 97	-0.042*	0.002	-0.003	-0.032**	-0.044**	0.021
	[0.022]	[0.017]	[0.042]	[0.015]	[0.019]	[0.033]
Change, Gold Share / 8 - 10 in 97	-0.026	0.028	-0.078**	0.009	0.001	-0.027**
	[0.021]	[0.018]	[0.036]	[0.019]	[0.022]	[0.013]
Change, Gold Share / 11+ in 97	-0.045**	-0.004	-0.038*	-0.025	-0.032**	-0.036
	[0.022]	[0.013]	[0.021]	[0.021]	[0.012]	[0.042]
Change, Gold Share / Male	-0.038	-0.01	-0.067	-0.009	-0.037**	0.002
	[0.026]	[0.013]	[0.045]	[0.019]	[0.018]	[0.027]
5 - 7 in 97	0.143	0.536**	-0.157	0.421***	-0.085	1.264***
	[0.179]	[0.201]	[0.295]	[0.150]	[0.161]	[0.113]
8 - 10 in 97	-0.688***	0.331	-0.571*	-0.274	-0.824***	0.949***
	[0.181]	[0.266]	[0.323]	[0.194]	[0.223]	[0.230]
11+ in 97	-1.152***	-0.223	-1.156***	-0.650***	-1.148***	0.384
	[0.206]	[0.276]	[0.344]	[0.199]	[0.171]	[0.351]
Male	-0.278	-1.324***	-0.61	-0.352	-0.474	-1.038
	[0.492]	[0.382]	[0.530]	[0.371]	[0.383]	[0.619]
Male / 5 - 7 in 97	0.168	0.286	0.058	0.253	0.441*	-0.401**
	[0.274]	[0.264]	[0.409]	[0.217]	[0.227]	[0.178]
Male / 8 - 10 in 97	0.934***	0.3	0.501	0.811***	1.052***	-0.078
	[0.237]	[0.336]	[0.459]	[0.213]	[0.212]	[0.307]
Male / 11+ in 97	0.879***	0.513	0.501	0.776***	0.802***	0.432
	[0.294]	[0.357]	[0.538]	[0.233]	[0.218]	[0.486]
Sqrt Illiquid Assets, 97 x Male	-0.002	0.007	0.007	0.002	0.005	0.004
	[0.006]	[0.006]	[0.008]	[0.005]	[0.008]	[0.004]
Ln Pce, 97 x Male	-0.178	0.164	-0.014	-0.249	-0.244	0.181
	[0.251]	[0.136]	[0.219]	[0.177]	[0.178]	[0.250]
Constant	10.472***	11.658***	10.929***	10.958***	10.385***	12.541***
	[0.103]	[0.135]	[0.189]	[0.092]	[0.109]	[0.088]
Observations	2,774	1,820	1,147	3,447	3,354	1,240
R-squared	0.039	0.061	0.054	0.035	0.041	0.1
Number of Mothers	1,020	719	437	1,302	1,239	500
Mother FE	YES	YES	YES	YES	YES	YES

The outcome variable is years of completed education in 2014.
Columns 1 and 2 split the sample by rural/urban designation in 1997. Columns 3 and 4 stratify by the size of the child's parents' age difference (8+ versus smaller than 8). Columns 5 and 6 stratify the sample at the median level of educational attainment for a mother, 6 years.
Robust standard errors, clustered at *kecamatan*, are reported in parentheses
*** p<0.01, ** p<0.05, * p<0.1

TABLE 10: OLD AGE TEST – PROBABILITY OF EMPLOYMENT (2014) VS. GOLD OWNERSHIP/SALE

	Rural	Urban	Age Gap > 7	Age Gap </= 7	Female Ed < Median	Female Ed >/= Median
Change, Gold Share /M/5 - 7 in 97	-0.002	-0.001	-0.006	0.001	-0.002	-0.008
	[0.007]	[0.009]	[0.009]	[0.007]	[0.006]	[0.010]
Change, Gold Share /M/8 - 10 in 97	-0.002	0.015	0.001	0.008	0.002	0.01
	[0.006]	[0.009]	[0.014]	[0.007]	[0.005]	[0.012]
Change, Gold Share /M/11+ in 97	-0.004	0.005	-0.01	0.003	-0.001	0.009
	[0.004]	[0.006]	[0.009]	[0.007]	[0.004]	[0.009]
Change, Gold Share / 5 - 7 in 97	-0.002	0.002	-0.003	0	0	0.001
	[0.005]	[0.005]	[0.006]	[0.006]	[0.005]	[0.008]
Change, Gold Share / 8 - 10 in 97	-0.004	-0.009*	-0.009	-0.006	-0.003	-0.015***
	[0.004]	[0.005]	[0.008]	[0.004]	[0.003]	[0.005]
Change, Gold Share / 11+ in 97	-0.002	-0.006	-0.002	-0.003	-0.001	-0.022**
	[0.002]	[0.004]	[0.003]	[0.004]	[0.002]	[0.008]
Change, Gold Share / Male	0.002	-0.004	0.011*	-0.005	-0.001	0.003
	[0.005]	[0.005]	[0.007]	[0.005]	[0.004]	[0.005]
5 - 7 in 97	0.100**	0.202***	0.171**	0.128***	0.108***	0.219***
	[0.039]	[0.044]	[0.066]	[0.029]	[0.036]	[0.059]
8 - 10 in 97	0.077*	0.162***	0.051	0.126***	0.047	0.279***
	[0.040]	[0.042]	[0.073]	[0.035]	[0.035]	[0.049]
11+ in 97	0.069	0.106**	0.044	0.092***	0.052	0.171***
	[0.045]	[0.042]	[0.060]	[0.029]	[0.033]	[0.050]
Male	0.123	0.238*	0.245***	0.145**	0.093	0.342***
	[0.081]	[0.118]	[0.088]	[0.071]	[0.069]	[0.123]
Male / 5 - 7 in 97	0.090*	-0.077	-0.079	0.06	0.064	-0.063
	[0.046]	[0.073]	[0.069]	[0.051]	[0.049]	[0.096]
Male / 8 - 10 in 97	0.194***	-0.019	0.183**	0.092*	0.159***	0.003
	[0.036]	[0.061]	[0.083]	[0.047]	[0.041]	[0.080]
Male / 11+ in 97	0.237***	0.064	0.210**	0.158***	0.202***	0.065
	[0.061]	[0.068]	[0.083]	[0.053]	[0.048]	[0.088]
Sqrt Illiquid Assets, 97 x Male	-0.003*	-0.001	-0.002	-0.001	0	-0.003
	[0.001]	[0.002]	[0.002]	[0.001]	[0.001]	[0.002]
Ln Pce, 97 x Male	0.043	0.002	-0.018	0.025	0.041	-0.032
	[0.034]	[0.055]	[0.044]	[0.031]	[0.035]	[0.060]
Constant	0.255***	0.222***	0.256***	0.239***	0.269***	0.164***
	[0.026]	[0.025]	[0.049]	[0.019]	[0.024]	[0.029]
Observations	2,776	1,820	1,147	3,449	3,356	1,240
R-squared	0.111	0.087	0.13	0.094	0.1	0.125
Number of Mothers	1,020	719	437	1,302	1,239	500
Mother FE	YES	YES	YES	YES	YES	YES

The outcome variable is an indicator that takes a value of 1 if the individual engaged in work for pay in the week preceding the survey.
Columns 1 and 2 split the sample by rural/urban designation in 1997. Columns 3 and 4 stratify by the size of the child's parents' age difference (8+ versus smaller than 8).
Columns 5 and 6 stratify the sample at the median level of educational attainment for a mother, 6 years.
Robust standard errors, clustered at *kecamatan*, are reported in parentheses
*** p<0.01, ** p<0.05, * p<0.1

TABLE 11: OLD AGE TEST – IHS-TRANSFORMED ANNUAL EARNINGS VS. GOLD OWNERSHIP/SALE

	Rural	Urban	Age Gap > 7	Age Gap </= 7	Female Ed < Median	Female Ed >/= Median
Change, Gold Share /M/5 - 7 in 97	0.088	0.041	0.459*	-0.043**	0.068	-0.018
	[0.131]	[0.031]	[0.247]	[0.019]	[0.090]	[0.068]
Change, Gold Share /M/8 - 10 in 97	0.092	0.007	0.435*	-0.061***	0.052	-0.053
	[0.139]	[0.031]	[0.220]	[0.020]	[0.078]	[0.070]
Change, Gold Share /M/11+ in 97	0.128	-0.055	0.391*	-0.038	0.05	0.06
	[0.137]	[0.036]	[0.226]	[0.030]	[0.085]	[0.103]
Change, Gold Share / 5 - 7 in 97	-0.081	-0.007	-0.221	0.029**	-0.039	0.018
	[0.077]	[0.013]	[0.143]	[0.013]	[0.051]	[0.058]
Change, Gold Share / 8 - 10 in 97	-0.091	0.006	-0.221*	0.039**	-0.034	0.052
	[0.089]	[0.020]	[0.115]	[0.019]	[0.046]	[0.062]
Change, Gold Share / 11+ in 97	-0.127*	0.048	-0.220*	0.019	-0.036	-0.058
	[0.074]	[0.036]	[0.125]	[0.025]	[0.046]	[0.087]
Change, Gold Share / Male	-0.108	0.017	-0.390*	0.049**	-0.062	0.031
	[0.139]	[0.017]	[0.215]	[0.019]	[0.083]	[0.069]
5 - 7 in 97	0.511	-0.364	1.754	-0.134	0.171	0.243
	[0.531]	[0.405]	[1.417]	[0.241]	[0.424]	[0.703]
8 - 10 in 97	1.174**	0.697**	2.632**	0.694**	0.709	1.444**
	[0.574]	[0.320]	[1.154]	[0.305]	[0.421]	[0.627]
11+ in 97	0.327	0.255	2.162*	-0.115	0.328	-0.111
	[0.495]	[0.241]	[1.149]	[0.202]	[0.334]	[0.805]
Male	0.512	0.265	2.452*	-0.041	0.093	2.090*
	[0.436]	[0.469]	[1.389]	[0.283]	[0.448]	[1.210]
Male / 5 - 7 in 97	0.055	0.274	-1.598	0.402	0.318	-0.479
	[0.570]	[0.554]	[1.570]	[0.298]	[0.482]	[0.736]
Male / 8 - 10 in 97	-0.501	-0.548	-2.399**	-0.231	-0.281	-0.8
	[0.625]	[0.463]	[1.148]	[0.358]	[0.515]	[0.693]
Male / 11+ in 97	0.768	-0.018	-1.292	0.740***	0.411	0.959
	[0.461]	[0.270]	[1.100]	[0.238]	[0.363]	[0.892]
Sqrt Illiquid Assets, 97 x Male	0.007	0.004	0.002	0.005	0	0.01
	[0.011]	[0.007]	[0.011]	[0.007]	[0.008]	[0.011]
Ln Pce, 97 x Male	-0.211	0.18	-0.045	0.068	0.141	-0.720*
	[0.193]	[0.215]	[0.305]	[0.198]	[0.168]	[0.421]
Constant	15.888***	16.500***	14.572***	16.445***	16.122***	16.237***
	[0.453]	[0.176]	[1.055]	[0.135]	[0.312]	[0.540]
Observations	1,365	988	601	1,752	1,716	637
R-squared	0.087	0.087	0.228	0.059	0.058	0.136
Number of Mothers	809	599	350	1,058	1,009	399
Mother FE	YES	YES	YES	YES	YES	YES

The outcome variable is a measure of total earnings in the preceding year, which is allowed to take a value of 0 if an individual did not work for pay. An inverse hyperbolic sine transformation is applied to the earnings variable.

Columns 1 and 2 split the sample by rural/urban designation in 1997. Columns 3 and 4 stratify by the size of the child's parents' age difference (8+ versus smaller than 8). Columns 5 and 6 stratify the sample at the median level of educational attainment for a mother, 6 years.
Robust standard errors, clustered at *kecamatan*, are reported in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 12: MEASUREMENT ERROR – YEARS, ATTAINED EDUCATION (2014) USING MALE GOLD ESTIMATES

	Asset: *Owned* Gold in 97	**Asset: *Amount* of Gold in 97**	**Asset: Change, Gold Share (97 to 00)**
Gold Own / M / 5 - 7 in 97	0.001		
	[0.431]		
Gold Own / M / 8 - 10 in 97	-0.572		
	[0.523]		
Gold Own / M / 11+ in 97	0.089		
	[0.315]		
Gold Own / 5 - 7 in 97	0.22		
	[0.264]		
Gold Own / 8 - 10 in 97	0.445		
	[0.441]		
Gold Own / 11+ in 97	0.212		
	[0.285]		
IHS Gold Grams, 97 / M / 5-7 in 97		-0.024	
		[0.172]	
IHS Gold Grams, 97 / M / 8-10 in 97		-0.167	
		[0.188]	
IHS Gold Grams, 97 / M / 11+ in 97		0.079	
		[0.095]	
IHS Gold Grams, 97 / 5-7 in 97		0.159	
		[0.095]	
IHS Gold Grams, 97 / 8-10 in 97		0.256*	
		[0.150]	
IHS Gold Grams, 97 / 11+ in 97		0.198**	
		[0.086]	
Change, Gold Share /M/5 - 7 in 97			-0.014
			[0.037]
Change, Gold Share /M/8 - 10 in 97			0.012
			[0.029]
Change, Gold Share /M/11+ in 97			0.005
			[0.019]
Change, Gold Share / 5 - 7 in 97			-0.002
			[0.017]
Change, Gold Share / 8 - 10 in 97			0.003
			[0.015]
Change, Gold Share / 11+ in 97			0.013
			[0.022]
Gold Own / M	0.186		
	[0.278]		
IHS Gold Grams, 97 / M		-0.014	
		[0.091]	
Change, Gold Share / Male			0.007
			[0.014]
5 - 7 in 97	0.152	0.068	0.271*
	[0.193]	[0.172]	[0.144]
8 - 10 in 97	-0.576**	-0.664***	-0.351*
	[0.260]	[0.233]	[0.192]
11+ in 97	-0.931***	-1.064***	-0.817***
	[0.226]	[0.218]	[0.182]
Male	-0.565	-0.522	-0.479
	[0.372]	[0.362]	[0.349]
Male / 5 - 7 in 97	0.263	0.291	0.245
	[0.265]	[0.220]	[0.189]
Male / 8 - 10 in 97	1.047***	0.967***	0.763***
	[0.293]	[0.266]	[0.180]
Male / 11+ in 97	0.748***	0.697***	0.753***
	[0.262]	[0.219]	[0.204]
Sqrt Illiquid Assets, 97 x Male	0.003	0.004	0.004
	[0.004]	[0.004]	[0.004]
Ln Pce, 97 x Male	-0.184	-0.157	-0.188
	[0.150]	[0.153]	[0.156]
Constant	10.960***	10.954***	10.951***
	[0.093]	[0.095]	[0.094]
Observations	4,594	4,594	4,594
R-squared	0.031	0.035	0.032
Number of Mothers	1,739	1,739	1,739
Mother FE	YES	YES	YES

The outcome variable is years of attained education (2014). All gold variables are replaced by male-equivalent estimates.
Coefficients should be interpreted as plausible lower bounds on the results in Table 5.
Robust standard errors, clustered at *kecamatan,* are reported.
*** p<0.01, ** p<0.05, * p<0.1

TABLE 14: MEASUREMENT ERROR – YEARS, ATTAINED EDUCATION (2014) USING MALE GOLD INSTRUMENT

	Asset: *Owned* Gold in 97	Asset: *Amount* of Gold in 97	Asset: Change, Gold Share (97 to 00)
Gold Own / M / 5 - 7 in 97	0.026		
	[0.774]		
Gold Own / M / 8 - 10 in 97	-0.985		
	[0.868]		
Gold Own / M / 11+ in 97	0.176		
	[0.596]		
Gold Own / 5 - 7 in 97	0.382		
	[0.485]		
Gold Own / 8 - 10 in 97	0.761		
	[0.732]		
Gold Own / 11+ in 97	0.381		
	[0.529]		
IHS Gold Grams, 97 / M / 5-7 in 97		0.033	
		[0.128]	
IHS Gold Grams, 97 / M / 8-10 in 97		-0.272	
		[0.198]	
IHS Gold Grams, 97 / M / 11+ in 97		-0.072	
		[0.117]	
IHS Gold Grams, 97 / 5-7 in 97		0.15	
		[0.105]	
IHS Gold Grams, 97 / 8-10 in 97		0.402***	
		[0.140]	
IHS Gold Grams, 97 / 11+ in 97		0.386***	
		[0.088]	
Change, Gold Share /M/5 - 7 in 97			0.037
			[0.181]
Change, Gold Share /M/8 - 10 in 97			0.071
			[0.155]
Change, Gold Share /M/11+ in 97			0.051
			[0.107]
Change, Gold Share / 5 - 7 in 97			-0.033
			[0.091]
Change, Gold Share / 8 - 10 in 97			-0.014
			[0.069]
Change, Gold Share / 11+ in 97			0.011
			[0.054]
Gold Own / M	0.346		
	[0.516]		
IHS Gold Grams, 97 / M		0.063	
		[0.109]	
Change, Gold Share / Male			-0.032
			[0.102]
5 - 7 in 97	0.021	0.05	0.283*
	[0.335]	[0.205]	[0.148]
8 - 10 in 97	-0.817*	-0.923***	-0.352*
	[0.438]	[0.278]	[0.188]
11+ in 97	-1.058***	-1.389***	-0.830***
	[0.355]	[0.244]	[0.173]
Male	-0.638	-0.589*	-0.441
	[0.426]	[0.345]	[0.389]
Male / 5 - 7 in 97	0.251	0.212	0.224
	[0.493]	[0.218]	[0.278]
Male / 8 - 10 in 97	1.347**	1.150***	0.729***
	[0.526]	[0.341]	[0.205]
Male / 11+ in 97	0.698*	0.925***	0.739***
	[0.421]	[0.240]	[0.217]
Sqrt Illiquid Assets, 97 x Male	0.003	0.003	0.004
	[0.004]	[0.004]	[0.004]
Ln Pce, 97 x Male	-0.208	-0.174	-0.197
	[0.161]	[0.156]	[0.153]
Constant	10.965***	10.955***	10.962***
	-0.096	-0.097	-0.089
Observations	4,594	4,594	4,594
Number of Mothers	1,739	1,739	1,739
Mother FE	YES	YES	YES

The outcome variable is years of attained education (2014). Male gold estimates are used to instrument for female gold estimates. Results from a first stage regression suggest that all instruments satisfy Stock and Yogo's test for relevance (i.e. F> 10).
Robust standard errors, clustered at *kecamatan,* are reported.
*** p<0.01, ** p<0.05, * p<0.1

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Appendix

Appendix tables A1 – A4 include results from the primary specification in this paper, run without the inclusion of a mother fixed-effect. Household controls are discussed in Section 5. Each model includes *kecamatan*-fixed effects, with standard errors clustered at *kecamatan.* See Section 5 for a discussion of the limitations of this strategy.

Table A1: Years of Completed Education, OLS

Table A2: Probability of Employment, OLS

Table A3: IHS-Annual Earnings, OLS

Table A4: Log PCE, OLS

In Appendix Table B1, I consider whether coefficients on variables of interest in stratified regressions, intended to test the existence of an old age security motive, are significantly different from zero. Results are presented from three fully interacted models, which consider the three stratifications in Section 8.

Table A1: Years of Completed Education, OLS vs. Gold Ownership/ Sale

5 - 7 in 97	0.183	0.605***	0.484***
	[0.294]	[0.189]	[0.149]
8 - 10 in 97	-0.995***	-0.109	0.0281
	[0.296]	[0.248]	[0.191]
11+ in 97	-0.832***	-0.231	-0.245
	[0.289]	[0.188]	[0.187]
Owned Jewelry in 97	-0.158		
	[0.200]		
Male	-0.971***	-0.637***	-0.540***
	[0.189]	[0.131]	[0.133]
Gold Own / M	0.502***		
	[0.175]		
Male / 5 - 7 in 97	0.233	0.163	0.0604
	[0.338]	[0.206]	[0.204]
Male / 8 - 10 in 97	1.691***	0.788**	0.591**
	[0.374]	[0.296]	[0.223]
Male / 11+ in 97	0.675**	0.504**	0.497**
	[0.304]	[0.219]	[0.209]
Gold Own / 5 - 7 in 97	0.257		
	[0.378]		
Gold Own / 8 - 10 in 97	1.296***		
	[0.356]		
Gold Own / 11+ in 97	0.705**		
	[0.341]		
Gold Own / M / 5 - 7 in 97	-0.131		
	[0.445]		
Gold Own / M / 8 - 10 in 97	-1.371***		
	[0.431]		
Gold Own / M / 11+ in 97	-0.166		
	[0.323]		
Sold More than 75 pct of gold		-0.271	
		[0.170]	
Sold 75p Gold / Male		0.201	
		[0.242]	
Sold 75p Gold / 5 - 7 in 97		-0.572	
		[0.369]	
Sold 75p Gold / 8 - 10 in 97		0.533	
		[0.447]	
Sold 75p Gold / 11+ in 97		-0.15	
		[0.363]	
Sold 75p Gold /M/5 - 7 in 97		-0.0832	
		[0.444]	
Sold 75p Gold /M/8 - 10 in 97		-0.662	
		[0.604]	
Sold 75p Gold /M/11+ in 97		0.13	
		[0.429]	
Change in Gold Share, 97 to 00			0.0164*
			[0.00937]
Change, Gold Share / Male			-0.0310***
			[0.0103]
Change, Gold Share / 5 - 7 in 97			-0.0279**
			[0.0110]
Change, Gold Share / 8 - 10 in 97			0.00741
			[0.0168]
Change, Gold Share / 11+ in 97			-0.0151
			[0.00971]
Change, Gold Share /M/5 - 7 in 97			0.0540***
			[0.0199]
Change, Gold Share /M/8 - 10 in 97			0.00921
			[0.0254]
Change, Gold Share /M/11+ in 97			0.0325**
			[0.0153]
Constant	6.068***	6.094***	5.958***
	[0.374]	[0.263]	[0.267]
Observations	5,480	4,380	4,380
R-squared	0.335	0.335	0.333
Kecamatan FE	YES	YES	YES
Mother FE	NO	NO	NO
Number of Mothers			

Robust standard errors in parentheses. Controls include urban/rural in 97, parents' ages, parents' education, log total assets in 97, log pce in 97.
*** p<0.01, ** p<0.05, * p<0.1

Table A2: Probability of Employment, OLS vs. Gold Ownership/ Sale

5 - 7 in 97	0.127***	0.172***	0.147***
	[0.0333]	[0.0288]	[0.0246]
8 - 10 in 97	-0.00974	0.128***	0.113***
	[0.0291]	[0.0313]	[0.0243]
11+ in 97	0.0125	0.101***	0.0727***
	[0.0365]	[0.0275]	[0.0239]
Owned Jewelry in 97	-0.011		
	[0.0265]		
Male	0.145***	0.117***	0.130***
	[0.0230]	[0.0349]	[0.0283]
Gold Own / M	0.00192		
	[0.0391]		
Male / 5 - 7 in 97	0.0587	0.0223	0.017
	[0.0521]	[0.0421]	[0.0392]
Male / 8 - 10 in 97	0.261***	0.145***	0.126***
	[0.0483]	[0.0349]	[0.0232]
Male / 11+ in 97	0.224***	0.196***	0.204***
	[0.0538]	[0.0371]	[0.0272]
Gold Own / 5 - 7 in 97	0.0107		
	[0.0496]		
Gold Own / 8 - 10 in 97	0.151***		
	[0.0348]		
Gold Own / 11+ in 97	0.0781*		
	[0.0461]		
Gold Own / M / 5 - 7 in 97	-0.0472		
	[0.0816]		
Gold Own / M / 8 - 10 in 97	-0.184***		
	[0.0598]		
Gold Own / M / 11+ in 97	-0.0245		
	[0.0726]		
Sold More than 75 pct of gold		0.0254	
		[0.0537]	
Sold 75p Gold / Male		0.049	
		[0.0610]	
Sold 75p Gold / 5 - 7 in 97		-0.0909	
		[0.0765]	
Sold 75p Gold / 8 - 10 in 97		-0.0676	
		[0.0829]	
Sold 75p Gold / 11+ in 97		-0.112	
		[0.0685]	
Sold 75p Gold /M/5 - 7 in 97		-0.023	
		[0.0881]	
Sold 75p Gold /M/8 - 10 in 97		-0.0419	
		[0.0975]	
Sold 75p Gold /M/11+ in 97		0.0359	
		[0.0727]	
Change in Gold Share, 97 to 00			-0.00144
			[0.00184]
Change, Gold Share / Male			0.00277
			[0.00211]
Change, Gold Share / 5 - 7 in 97			0.000567
			[0.00209]
Change, Gold Share / 8 - 10 in 97			-0.00247
			[0.00229]
Change, Gold Share / 11+ in 97			0.000403
			[0.00220]
Change, Gold Share /M/5 - 7 in 97			-0.00375
			[0.00340]
Change, Gold Share /M/8 - 10 in 97			0.00526
			[0.00400]
Change, Gold Share /M/11+ in 97			-0.00185
			[0.00251]
Constant	0.301***	0.297***	0.310***
	[0.0393]	[0.0444]	[0.0439]
Observations	5,482	4,382	4,382
R-squared	0.11	0.104	0.103
Kecamatan FE	YES	YES	YES
Mother FE	NO	NO	NO
Number of Mothers			

Robust standard errors in parentheses. Controls include urban/rural in 97, parents' ages, parents' education, log total assets in 97, log pce in 97.
*** p<0.01, ** p<0.05, * p<0.1

Table A3: IHS-Annual Earnings, OLS vs. Gold Ownership/ Sale

5 - 7 in 97	2.949***	3.585***	3.192***
	[0.746]	[0.535]	[0.552]
8 - 10 in 97	0.221	2.994***	2.708***
	[0.710]	[0.628]	[0.430]
11+ in 97	0.614	2.383***	1.989***
	[0.799]	[0.587]	[0.461]
Owned Jewelry in 97	-1.097*		
	[0.600]		
Male	1.741**	1.183	1.542**
	[0.693]	[0.757]	[0.693]
Gold Own / M	-0.301		
	[0.877]		
Male / 5 - 7 in 97	0.489	0.876	1.094
	[1.144]	[0.898]	[0.777]
Male / 8 - 10 in 97	4.784***	3.774***	3.296***
	[0.775]	[0.818]	[0.636]
Male / 11+ in 97	4.265***	4.072***	4.169***
	[1.024]	[1.057]	[0.841]
Gold Own / 5 - 7 in 97	-0.206		
	[0.875]		
Gold Own / 8 - 10 in 97	2.678***		
	[0.835]		
Gold Own / 11+ in 97	1.432*		
	[0.792]		
Gold Own / M / 5 - 7 in 97	1.045		
	[1.217]		
Gold Own / M / 8 - 10 in 97	-1.824*		
	[1.065]		
Gold Own / M / 11+ in 97	0.462		
	[1.037]		
Sold More than 75 pct of gold		0.0156	
		[0.718]	
Sold 75p Gold / Male		1.101	
		[0.985]	
Sold 75p Gold / 5 - 7 in 97		-1.855	
		[1.334]	
Sold 75p Gold / 8 - 10 in 97		-1.452	
		[1.319]	
Sold 75p Gold / 11+ in 97		-1.734	
		[1.166]	
Sold 75p Gold /M/5 - 7 in 97		1.291	
		[1.342]	
Sold 75p Gold /M/8 - 10 in 97		-1.074	
		[1.528]	
Sold 75p Gold /M/11+ in 97		0.752	
		[1.522]	
Change in Gold Share, 97 to 00			0.00371
			[0.0247]
Change, Gold Share / Male			-0.00256
			[0.0264]
Change, Gold Share / 5 - 7 in 97			-0.0951***
			[0.0280]
Change, Gold Share / 8 - 10 in 97			-0.0853**
			[0.0386]
Change, Gold Share / 11+ in 97			-0.0133
			[0.0419]
Change, Gold Share /M/5 - 7 in 97			0.0853
			[0.0556]
Change, Gold Share /M/8 - 10 in 97			0.0988**
			[0.0439]
Change, Gold Share /M/11+ in 97			0.0255
			[0.0519]
Constant	5.089***	4.936***	5.069***
	[0.702]	[0.929]	[0.922]
Observations	5,482	4,382	4,382
R-squared	0.128	0.13	0.129
Kecamatan FE	YES	YES	YES
Mother FE	NO	NO	NO
Number of Mothers			

Robust standard errors in parentheses. Controls include urban/rural in 97, parents' ages, parents' education, log total assets in 97, log pce in 97.
*** p<0.01, ** p<0.05, * p<0.1

Table A4: Log PCE, OLS vs. Gold Ownership/ Sale

Gold Own / M / 5 - 7 in 97	-0.0824		
	[0.101]		
Gold Own / M / 8 - 10 in 97	-0.194		
	[0.168]		
Gold Own / M / 11+ in 97	-0.0125		
	[0.116]		
Gold Own / 5 - 7 in 97	-0.0209		
	[0.0662]		
Gold Own / 8 - 10 in 97	0.117*		
	[0.0646]		
Gold Own / 11+ in 97	0.00542		
	[0.102]		
5 - 7 in 97	0.0132	-0.0337	-0.00119
	[0.0363]	[0.0348]	[0.0418]
8 - 10 in 97	-0.0566	-0.0575	0.0172
	[0.0620]	[0.0549]	[0.0452]
11+ in 97	-0.0203	-0.0657	-0.017
	[0.0795]	[0.0659]	[0.0512]
Male	-0.0344	-0.0728	0.0139
	[0.0724]	[0.0634]	[0.0498]
Gold Own / M	0.0737		
	[0.0641]		
Male / 5 - 7 in 97	0.0604	0.106	0.0108
	[0.0818]	[0.0823]	[0.0488]
Male / 8 - 10 in 97	0.151	0.162*	0.0286
	[0.117]	[0.0817]	[0.0549]
Male / 11+ in 97	0.061	0.144*	0.0499
	[0.0923]	[0.0837]	[0.0653]
IHS Gold Grams, 97 / M / 5-7 in 97		-0.0653	
		[0.0441]	
IHS Gold Grams, 97 / M / 8-10 in 97		-0.0882*	
		[0.0474]	
IHS Gold Grams, 97 / M / 11+ in 97		-0.0593	
		[0.0447]	
IHS Gold Grams, 97 / 5-7 in 97		0.0225	
		[0.0257]	
IHS Gold Grams, 97 / 8-10 in 97		0.0500**	
		[0.0232]	
IHS Gold Grams, 97 / 11+ in 97		0.0314	
		[0.0315]	
IHS Gold Grams, 97 / M		0.0552**	
		[0.0210]	
Change, Gold Share /M/5 - 7 in 97			8.77E-05
			[0.00503]
Change, Gold Share /M/8 - 10 in 97			-0.000856
			[0.00575]
Change, Gold Share /M/11+ in 97			0.00164
			[0.00422]
Change, Gold Share / 5 - 7 in 97			0.00154
			[0.00250]
Change, Gold Share / 8 - 10 in 97			0.00215
			[0.00262]
Change, Gold Share / 11+ in 97			0.002
			[0.00305]
Change, Gold Share / Male			-0.00429
			[0.00297]
Constant	3.322***	3.379***	3.308***
	[0.104]	[0.107]	[0.109]
Observations	4,248	4,248	4,248
R-squared	0.22	0.221	0.219
Kecamatan FE	YES	YES	YES
Mother FE	NO	NO	NO

Robust standard errors in parentheses. Controls include urban/rural in 97, parents' ages, parents' education, log total assets in 97, log pce in 97.
*** p<0.01, ** p<0.05, * p<0.1

Table B1: SIGNIFICANT DIFFERENCES BETWEEN COEFFICIENT ESTIMATES									
	Rural vs Urban			**Size of Age Gap**			**Level of Education**		
Outcome	*Education*	*Employment*	*Earnings*	*Education*	*Employment*	*Earnings*	*Education*	*Employment*	*Earnings*
Change, Gold Share /M/5 - 7 in 97	***					**			
Change, Gold Share /M/8 - 10 in 97						**			
Change, Gold Share /M/11+ in 97						*			
Change, Gold Share / 5 - 7 in 97	*					*	*		
Change, Gold Share / 8 - 10 in 97	**			**		**		**	
Change, Gold Share / 11+ in 97			*			*		**	
Change, Gold Share / Male					*	**			
5 - 7 in 97		*		*			***		
8 - 10 in 97	***						***	***	
11+ in 97	***					*	***	**	
Male						*		**	
Male / 5 - 7 in 97							***		
Male / 8 - 10 in 97		***					***		
Male / 11+ in 97		*							
Sqrt Illiquid Assets, 97 x Male									
Ln Pce, 97 x Male									*

To determine whether the differences between coefficients from stratified regressions, presented in Tables 9, 10, and 11, are significantly different from zero, I ran a fully-interacted version of each model in place of the stratified specification. If interaction terms in this model are significant, this indicates a significant difference between coefficients in the stratifications. I report the significance levels on these interaction terms only in the table above.

For example, (***) in the "Change, Gold Share /M/5 - 7 in 97" row in Column 1 above indicates that the coefficients on this variable are significantly different ($p < .01$) between the rural and urban samples, with years of education as the outcome of interest.

Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$