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Household Responses to the Financial Crisis in Indonesia
Longitudinal Evidence on Poverty, Resources, and Well-Being

Duncan Thomas and Elizabeth Frankenberg

12.1 Introduction

After almost three decades of sustained economic growth, Indonesia experienced a major economic and financial crisis in the late 1990s. Between 1970 and 1997, on average per capita gross domestic product (GDP) increased by almost 5 percent each year. In 1998, per capita GDP fell by about 15 percent, bringing the economy back to its level in 1994. The financial crisis was accompanied by dramatic shifts in the economic and political landscape in the country. (See, for example, Ahuja et al. 1997 and Cameron 1999 for descriptions.)

As indicated in figure 12.1, the Indonesian rupiah came under pressure in the last half of 1997 when the exchange rate began showing signs of weakness. It fell from around Rp2,400 per U.S. dollar to about Rp4,800 per U.S. dollar by December 1997. In January 1998, the rupiah collapsed. Over the course of a few days, the exchange rate lost over two-thirds of its value and fell to Rp15,000 per U.S. dollar. Although it soon recovered, by the middle of the year the rupiah had slumped back to the lows of January 1998. After June 1998, the rupiah strengthened, so that by the end of 1998 it stood at around Rp8,000 to the U.S. dollar and remained in the Rp8,000–

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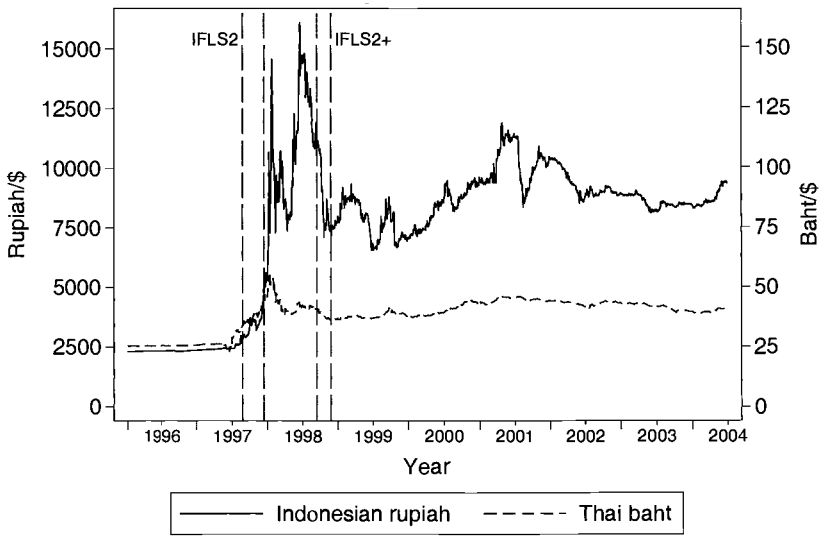

Fig. 12.1 Indonesian rupiah and Thai baht: 1996–2004 with timing of IFLS2 and IFLS2+

Rp10,000 range for the next five years. This is about one-quarter of its value prior to the onset of the crisis.

The East Asian financial crisis was presaged by the collapse of the Thai baht, which is also displayed relative to the U.S. dollar in figure 12.1. Two points are immediate. First, the collapse of the Indonesian rupiah was far greater than that of the baht. By the time the baht stabilized, it was worth about two-thirds of its precrisis level. Second, the baht did not display anything close to the same level of volatility as the rupiah. Declines in other currencies in the region were more muted than that of the baht. Even in the context of the East Asian crisis, the collapse of the Indonesian rupiah was very large and 1998 stands out as a year of extraordinary volatility and, therefore, tremendous uncertainty in the financial markets in Indonesia.

Interest rates in Indonesia behaved much like the exchange rate: they spiked in August 1997—when they quadrupled—and they remained extremely volatile for the remainder of the year. Chaos reigned in the banking sector. Several major banks were taken over by the Indonesian Bank Restructuring Agency. All of this turmoil wreaked havoc with both the confidence of investors and the availability of credit.

Prices of many commodities spiraled upward during the first three quarters of 1998. Annual inflation was estimated by the Central Statistical Bureau to be about 80 percent for 1998. Subsidies were removed on several goods—most notably rice, oil, and fuel. Food prices, especially staples, rose by about 20 percent more than the general price index, suggesting that

(net) food consumers were likely to be severely impacted by the crisis whereas food producers had some protection.

Simultaneously, Indonesia experienced dramatic transformation in the political sector. After over three decades as president, Suharto resigned in May 1998. Within days, the incoming president, Habibie, declared multiparty elections for the middle of 1999 and pledged reforms that were intended to revive political activity in the country.

Few Indonesians were untouched by the upheavals of 1998. For some, the turmoil was devastating. For others, it brought new opportunities. Exporters, export producers, and food producers probably fared far better than those engaged in the production of services and nontradables or those on fixed incomes. The crisis in Indonesia encompassed many dimensions, and individuals and families responded to it in a variety of ways. Precisely because of this complexity, empirical evidence is essential for untangling the combined impact of all facets of the crisis on the well-being of the population and also for deciphering how these impacts vary across socioeconomic and demographic groups. Research reported below provides some of that evidence.

Roubini and Setser (2004) discuss recent financial crises in emerging economies from a macroeconomic perspective. Prasad, Rogoff, Wei, and Kose (chap. 11 in this volume) discuss the relationship between financial globalization and growth. The macroeconomic research highlights the role of strong institutions, transparency, and good governance in harnessing the benefits of globalization. With these factors largely absent, the crisis in Indonesia was both large and relatively long lived. An examination of the impact of the Indonesian crisis thus provides insights into the effects of a major financial collapse on the well-being of the population.

Fallon and Lucas (2002) provide an excellent summary of the evidence on the effect of economic shocks on household poverty and well-being from a microeconomic perspective. Frankenberg, Thomas, and Beegle (1999) describe early evidence on the Indonesian crisis; those and other results are summarized in Poppele, Sudarno, and Pritchett (1999). Levinsohn, Berry, and Friedman (2003) explore the likely effects of the crisis using household budget data collected prior to the crisis. A discussion of some of the longer-term effects of the Indonesian crisis is contained in Strauss et al. (2004). Bresciani et al. (2002) contrast the impact of the crisis on farm households in Thailand and Indonesia. For other micro-level research about the impact of economic and financial crises on the well-being of households, see, inter alia, Maloney, Cunningham, and Bosch (2004), who discuss the Mexican crisis; Datt and Hoogeveen (2003) on the crisis in the Philippines; and Lokshin and Yemtsov (2004) on the Russian crisis.

This research uses longitudinal household survey data collected from the same households prior to the full brunt of the crisis unfolding in late

1997 and again a year later in 1998. The focus is on attempting to measure the magnitude of the crisis, identifying those demographic groups that were most severely affected by the crisis in the short run, and drawing out the implications for well-being in the longer term. An important contribution of this work is that a broad array of indicators of individual and household well-being are systematically examined. This provides a richer characterization of the impact of the crisis than is possible with a single indicator such as poverty or inequality. It also provides important insights into the ways in which individuals and households coped with the upheavals around the time of the crisis.

Data are drawn from the Indonesia Family Life Survey (IFLS), an ongoing broad-purpose longitudinal survey of individuals, households, and communities in Indonesia. Most of the results presented here rely on two waves of the survey: IFLS2, which was conducted in late 1997, and IFLS2+, which was conducted in late 1998. The latter survey was specially designed for this purpose. The well-being of individuals and households interviewed in 1998 is compared with their well-being from interviews conducted about a year earlier in 1997. Additional evidence is drawn from the 2000 wave of the IFLS.

The crisis affected the poorest, the middle-income households, and households in the upper part of the income distribution in Indonesia. While the precise magnitude of the crisis is subject to controversy, the crisis had a far-reaching effect on the purchasing power of the Indonesian population, and there were substantial increases in levels of poverty as the crisis unfolded.

It is very difficult to measure the impact of the crisis on expenditure-based indicators of poverty, for several reasons. First, measurement of the change in the value of real resources is not straightforward since the crisis was accompanied by high levels of inflation that varied substantially over time and space. Second, expenditures are measured at the household level and so are typically deflated by household size or some function of size and composition. One of the many ways in which individuals responded to the crisis was by households joining forces. This substantially complicates interpretation of expenditure-based poverty estimates.

In an effort to sidestep some of these issues, we turn to an examination of the household budget. The share of the budget spent on food, and especially staples, increased significantly, and these increases were largest for the poorest. To make room for these expenditures, purchases of semi-durables were delayed. To the extent that these delays were temporary, their welfare consequences are not clear. Expenditure-based poverty indicators are also complicated if households choose to delay expenditures so that current spending falls without a comparable decline in welfare.

Between 1997 and 1998, there were significant declines in the share of the budget spent on education, especially among the poorest, and in the share

spent on health. These declines in spending are reflected in reduced investments in human capital as indicated by lower levels of health care utilization, particularly for preventive care, and lower rates of school enrollment, particularly among young children in the poorest households. The evidence on health status suggests that overall general health and psychosocial health declined as the crisis unfolded while adults sought to protect the nutritional status of very young children by drawing down their own weight. By 2000, most of the reductions in human capital investments had been reversed, and so the longer-term consequences of these temporary reductions remain to be determined. It is possible that the longer-term welfare costs will be small.

Wages collapsed while labor supply increased slightly as households sought to shore up income. Since household income declined by substantially more than household expenditure, households must have depleted their assets. We discuss asset markets around the time of the crisis and identify gold as playing a key role in mitigating the impact of the crisis on spending.

The next section provides a description of the data and the IFLS sample. It is followed by the empirical evidence on the impact of the crisis. We begin with a discussion of the magnitude of the crisis as measured by changes in household expenditure. We describe the correlates of changes in levels of resources in order to provide a robust assessment of the characteristics of those population groups that were most deleteriously affected by the crisis. Several issues that complicate interpretation of changes in the level of household consumption are discussed. This leads to a discussion of the allocation of the budget to different commodities and the relationship between changes in those allocations and household characteristics. Special attention is paid to spending on health and education. These results are complemented with information on school enrollments and nutrition and health status to provide a fuller assessment of the impact of the crisis. We end with a discussion of the crisis on earnings and assets. The final section concludes.

12.2 Data

The IFLS is a large-scale integrated socioeconomic and health survey that collects extensive information on the lives of individuals, their households, their families, and the communities in which they live. The sample is representative of about 83 percent of the Indonesian population and contains over 30,000 individuals living in thirteen of the twenty-seven provinces in the country (as of 1993).

The IFLS is an ongoing longitudinal survey. The first wave was conducted in 1993–94 (IFLS1), with a follow-up in 1997–98 (IFLS2) and a special follow-up, designed for this project, in late 1998 (IFLS2+). This spe-

cial follow-up sampled 25 percent of the fuller IFLS sample and contains information on almost 10,000 individuals living in around 2,000 households. A full re-survey was conducted in 2000 (IFLS3), and the next wave is scheduled for 2007 (IFLS4). In this study, we draw primarily on interviews with the households surveyed in 1997 and 1998 in order to provide insights into the magnitude and distribution of the immediate impact of the economic and political turmoil in Indonesia.

A broad-purpose survey, IFLS contains a wealth of information about each household including consumption, assets, income, and family businesses. In addition, individual members are interviewed to obtain information on, inter alia, use of health care and health status; fertility, contraception, and marriage; education, migration, and labor market behavior; participation in community activities; interactions with non-coresident family members; and their role in household decision making. The IFLS also contains an integrated series of community surveys that are linked to the household survey; they include interviews with the community leader and head of the village women's group, as well as interviews with knowledgeable informants at multiple schools and multiple public and private health care providers in each IFLS community.

12.2.1 The IFLS Sample

The IFLS sampling scheme was designed to balance the costs of surveying the more remote and sparsely populated regions of Indonesia against the benefits of capturing the ethnic and socioeconomic diversity of the country. The scheme stratified on provinces, then randomly sampled within enumeration areas (EAs) in each of the thirteen selected provinces.[1] A total of 321 EAs were selected from a nationally representative sample frame used in the 1993 SUSENAS (a survey of about 60,000 households). Within each EA, households were randomly selected using the 1993 SUSENAS listings obtained from regional offices of the *Badan Pusat Statistik* (BPS). Urban EAs and EAs in smaller provinces were oversampled to facilitate urban-rural and Javanese–non-Javanese comparisons. A total of 7,730 households were included in the original listing for the first wave; 7,224 households (93 percent) were interviewed.[2]

The second wave of IFLS (IFLS2) was fielded four years later, between

1. The provinces include four on Sumatra (North Sumatra, West Sumatra, South Sumatra, and Lampung), all of Java, and four provinces from the remaining islands (Bali, West Nusa Tenggara, South Kalimantan, and South Sulawesi).

2. The IFLS1 exceeded the goal of a final sample size of 7,000 completed households. The assumed nonparticipation rate of about 10 percent was based on BPS experience. Approximately 2 percent of households refused and 5 percent were not found. In about two-thirds of those not found, no interview was obtained because either the building was vacated (14 percent), the household refused (25 percent), or no one was at home (29 percent). Other households were not interviewed due to a demolished building, illness, or an inability to locate the building.

August 1997 and early January 1998 (vertical dashed lines in figure 12.1). The goal was to recontact all 7,224 households interviewed in IFLS1. If during the course of the fieldwork we discovered that any household member had moved, we obtained information about their new location and followed them as long as they resided in any of the thirteen IFLS provinces. This means that, by design, we lose households that have moved abroad or to a non-IFLS province; they account for a very small proportion of our households (<1 percent) and are excluded because the costs of finding them are prohibitive.

Large-scale longitudinal household surveys remain rare in developing countries, and there is considerable skepticism that they can be fielded without suffering from high attrition because of the distances that need to be traveled and the lack of communication infrastructure. A respondent is typically not a phone call away. By the standard of most longitudinal surveys, the four-year hiatus between IFLS1 and IFLS2 is long, which probably compounds this difficulty.

Results from IFLS2 suggest that high attrition is not inevitable: 93.3 percent of the IFLS1 households were recontacted and successfully reinterviewed. Excluding those households in which everyone has died (usually single-person households), the success rate is 94 percent.[3]

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

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

By design, IFLS2+ readministers many of the IFLS1 and IFLS2 questions so that comparisons across rounds can be made for characteristics of households and individuals (although some submodules were cut to reduce costs). The key dimension in which the survey was scaled down is sample size. Using all of the original 321 IFLS EAs as our sampling frame, we drew the IFLS2+ sample in two stages. First, to keep costs down, we decided to revisit seven of the thirteen IFLS provinces: North Sumatra, South Sumatra, Jakarta, West Java, Central Java, West Nusa Tenggara, and South Kalimantan. These provinces were picked so that they spanned the full spectrum of socioeconomic status and economic activity in the

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

fuller IFLS sample. Second, within those provinces, we randomly drew 80 EAs (25 percent of the full IFLS sample) with weighted probabilities in order to match the IFLS sample as closely as possible. These weights were based on the marginal distributions of sector of residence (urban or rural), household size, education level of the household head, and quartiles of per capita expenditure (measured in 1993). The IFLS2+ sample is representative of the entire IFLS sample, and our purposive sampling has, in fact, achieved a very high level of overall efficiency—74 percent relative to a simple random sample. This is very good given that the sample size is only 25 percent of the original sample.

Counting all the original households in IFLS1 (whether or not they were interviewed in IFLS2) as well as the split-offs in IFLS2, there are 2,066 households in the IFLS2+ target sample. The turmoil in Indonesia during 1998 made relocating and interviewing these households particularly tricky. Fortunately, the combination of outstanding field-workers, the experience of IFLS2, and the willingness of our respondents to participate meant that we achieved an even higher success rate than in IFLS2. As is shown in the first row of panel A of table 12.1, over 95 percent of the target households were reinterviewed; excluding those households that are known to have died by 1998, the household completion rate increases to over 96 percent.

12.2.2 Attrition in IFLS2+

From a scientific point of view, it is important to retain all the original respondents in our target sample, even if they were not interviewed in IFLS2. Our target sample therefore includes the (approximately) 6 percent of households in the IFLS2+ EAs that were not interviewed in 1997. In 1998, we successfully contacted over 60 percent of those households. However, for the purposes of this study, the households of central interest are those that were interviewed in both 1997 and 1998, since only for these households can we contrast their lives now with their lives a year ago. These are the households that form the analytic sample used in the rest of this study. Restricting ourselves to these 1,934 households, as shown in the second row of panel A of table 12.1, over 98 percent of the households were reinterviewed. The remainder of panel A of table 12.1 provides reinterview rates by province of residence prior to the crisis. The completion rate exceeds 95 percent in every province, and in one province, West Nusa Tenggara, we reinterviewed every IFLS2 household.[4]

4. It is useful to put these numbers into perspective by contrasting them with other longitudinal surveys. The Panel Study of Income Dynamics began as an annual survey in 1968 in the United States. In it, 88 percent of respondents were reinterviewed in the second round and 85 percent in the third wave. The Health and Retirement Survey has a two-year hiatus between each wave; 91 percent of respondents were reinterviewed in the second wave and 92 percent in the third wave. The China Health and Nutrition Survey interviewed 3,795 households in eight provinces in China in 1989 and reinterviewed 95 percent of those in 1991 and then 91 percent in 1993. The comparable reinterview rates in the IFLS are 94 percent, 95 percent, and 95 percent after four, five, and seven years, respectively.

Table 12.1 IFLS2+: Household attrition

Sample	Target no. of households	No. of households interviewed	% households interviewed	
			All	Alive
A. Household completion rates				
All IFLS households	2,066	1,972	95.5	96.3
All IFLS2 households	1,934	1,903	98.4	98.5
By province				
North Sumatra	213	208	97.7	97.7
South Sumatra	289	283	98.0	99.0
Jakarta	181	178	98.3	98.3
West Java	318	312	98.1	98.1
Central Java	452	445	98.5	98.9
West Nusa Tenggara	295	295	100.0	100.0
South Kalimantan	186	182	97.9	97.9

			Interviewed in 1998		
	All households (1)	Alive in 1998 (2)	All (3)	In origin (4)	New location (5)
B. Characteristics of all households and reinterviewed households					
Per capita expenditure	78.69	78.69	75.26	72.67	111.59
(Rp000)	(2.99)	(3.02)	(2.69)	(2.68)	(12.8)
Food share	53.76	53.63	53.62	53.53	55.40
	(0.38)	(0.38)	(0.38)	(0.38)	(1.62)
Household size	4.51	4.54	4.57	4.62	3.82
	(0.05)	(0.05)	(0.05)	(0.05)	(0.19)
Age of household head	45.95	45.75	45.81	46.07	41.76
	(0.33)	(0.33)	(0.33)	(0.33)	(1.44)

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

While we succeeded in keeping attrition low in the survey, it is important to recognize that the households that were not recontacted are not likely to be random. To provide some sense of the magnitude of the problem, we can compare the observed characteristics (measured in 1993) of the households that were recontacted with the target sample of all IFLS households. Results for some key household characteristics are reported in panel B of table 12.1. The differences between the full sample of IFLS households in the EAs included in IFLS2+ (column [1]), households in which at least one 1993 member was still alive (column [2]), and the households that were reinterviewed in 1997 and again in 1998 (column [3]) is, in all cases, small and not significant. Households that were not reinterviewed tend to have

slightly higher levels of per capita expenditure (PCE), lower food shares, and fewer members than the full sample.

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

The majority of longitudinal household surveys in developing countries have not attempted to follow households that move out of the community in which they were interviewed in the baseline. In the IFLS, we did attempt to follow movers. Had we followed the strategy of simply interviewing people who still live in their original housing structure, we would have reinterviewed approximately 83 percent of the IFLS1 households in IFLS2 and only 77 percent of the target households in IFLS2+ rather than the 96 percent that we did achieve. Thus, movers contribute about 20 percent to the total IFLS2+ sample, and they are extremely important in terms of their contribution to the information content of the sample. This is apparent in the last two columns of panel B of table 12.1, which present the characteristics (measured in 1993) of households that were found in the original location in 1997 and 1998 (column [4]) and movers (column [5]). Mover households are smaller and younger, and they had higher expenditures in 1993.[5] Given that our goal is to examine the impact of the crisis on expenditures of households, the fact that movers have expenditures that are 50 percent higher than stayers indicates the critical importance of following movers in order to interpret the evidence. Had we not attempted to follow movers, we would have started out with a substantially biased sample. (For a fuller discussion of attrition in IFLS along with a discussion of the costs and benefits of tracking movers in longitudinal surveys, see Thomas, Smith, and Frankenberg 2001.)

12.3 Results

We turn now to a description of the changes between 1997 and 1998 experienced by the households that were interviewed in IFLS2 and IFLS2+; attention is restricted to households for which we have complete information on expenditure, household composition, and location.[6] Drawing on household expenditures, we describe the magnitude of the crisis and present some evidence on the characteristics of the households and communi-

5. These differences are all significant; the relevant *t*-statistics are 4.1, 3.4, and 3.8, respectively.

6. The expenditure module was not completed in either IFLS2 or IFLS2+ by twenty households (1 percent of the sample).

ties that have been most affected by the crisis. This is followed by an analysis of changes in the allocation of the household budget among goods, placing particular emphasis on the relationship with household demographic composition prior to the crisis. Spending on education and health is highlighted, and so we turn next to evidence on school enrollments and nutrition and health status. We end with a discussion of the impact of the crisis on wages, household income, and asset depletion.

12.3.1 Household Expenditure

To put the magnitude of the crisis in perspective, we begin with household expenditure patterns.[7] Mean total monthly household expenditure in 1997 is reported in the first column of table 12.2: it is close to Rp1 million. Inflation for 1998 is estimated to be around 80 percent. It is thus important to deflate expenditures in 1998 so that they are comparable with 1997; we use a province-specific index based on urban price data from BPS.[8] Real monthly expenditure for the same households is reported in the second column of the table. The mean of the difference in expenditure (1998–1997) is reported in the third column. On average, total household expenditure has declined by about 10 percent. A similar comparison is drawn for changes in monthly PCE: it has declined, on average, by about 25 percent, which is both very large and significant. Looking at median expenditure, the story is strikingly different. It has remained stable during this period.

Essentially all the changes in the distribution of PCE have occurred in the bottom and top quartiles of the distribution, as is shown in the box-and-whisker plots in figure 12.2. The PCE of households in the top of the

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

8. To this end, 1998 expenditures in urban areas are deflated using a province-specific price deflator based on the BPS price indexes reported for forty-five cities in Indonesia matched to the provinces included in the sample. (The simple average of the price index is used for provinces with more than one city.) Price indexes for August, September, October, and November 1998 are used, deflating all 1998 expenditures to December 1997. The inflation rates are increased by an additional 5 percent in rural areas based on IFLS estimates of the difference in the increase in prices in the sectors. The urban inflation rates are given in appendix table 12A.1.

Table 12.2 **IFLS households expenditure: 1997, 1998, and changes (all households and households stratified by sector of residence)**

	Total household expenditure			Per capita expenditure			Poverty rate	
	1997 (1)	1998 (2)	Δ (3)	1997 (4)	1998 (5)	Δ (6)	1997 (7)	1998 (8)
A. BPS forty-five city price index								
All Indonesia								
Mean	921	823	–98	246	186	–60	11.0	13.8
Standard error	(79)	(22)	(77)	(18)	(5)	(17)	(1.5)	(1.8)
Median	544	557	18	131	129	–4		
Standard IQR	(15)	(16)	(13)	(4)	(4)	(3)		
Sector of residence								
Urban								
Mean	1,227	944	–283	319	211	–108	9.2	12.0
Standard error	(184)	(41)	(181)	(41)	(10)	(40)	(2.3)	(2.6)
Median	620	593	–12	141	134	–8		
Standard IQR	(26)	(28)	(21)	(7)	(6)	(5)		
Rural								
Mean	705	703	–2	194	160	–34	12.4	16.2
Standard error	(33)	(24)	(27)	(8)	(5)	(7)	(2.1)	(2.5)
Median	481	503	14	127	120	–5		
Standard IQR	(19)	(19)	(16)	(5)	(4)	(4)		
B. BPS-adjusted estimates of inflation using IFLS prices								
All Indonesia								
Mean	921	668	–253	246	151	–95	11.0	19.9
Standard error	(79)	(19)	(77)	(18)	(4)	(17)	(1.5)	(2.1)
Median	544	446	–69	131	104	–23		
Standard IQR	(15)	(13)	(12)	(4)	(3)	(3)		
Sector of residence								
Urban								
Mean	1,227	822	–405	319	184	–135	9.2	15.8
Standard error	(184)	(35)	(181)	(41)	(9)	(40)	(2.3)	(3.0)
Median	620	519	–81	141	116	–21		
Standard IQR	(26)	(25)	(20)	(7)	(5)	(5)		
Rural								
Mean	705	560	–146	194	128	–66	12.4	23.0
Standard error	(33)	(19)	(27)	(8)	(4)	(7)	(2.1)	(2.8)
Median	481	399	–66	127	95	–24		
Standard IQR	(19)	(15)	(15)	(5)	(4)	(4)		

Notes: There are 1,883 households, of which 797 are urban and 1,096 are rural. All expenditure estimates are converted to annual equivalents in thousands of rupiahs. 1998 estimates are expressed in terms of December 1997 prices. Columns (1)–(3) use province-specific price indexes based on the forty-five city price indexes published by BPS. Rural estimates assume inflation in rural areas is 5 percent higher than in urban areas as suggested by the IFLS community-level data. Columns (4)–(6) use a combination of BPS and IFLS prices. IFLS estimates of inflation for all IFLS2+ provinces are about 15 percent higher than BPS estimates; the IFLS also estimates that rural inflation is about 5 percent higher than urban inflation. The BPS forty-five city price indexes have been converted to province-specific price indexes, which have been inflated by an additional 14 percent in urban areas and 16 percent in rural areas to generate the IFLS estimates of inflation. Poverty rates are for the population. IQR = interquartile range.

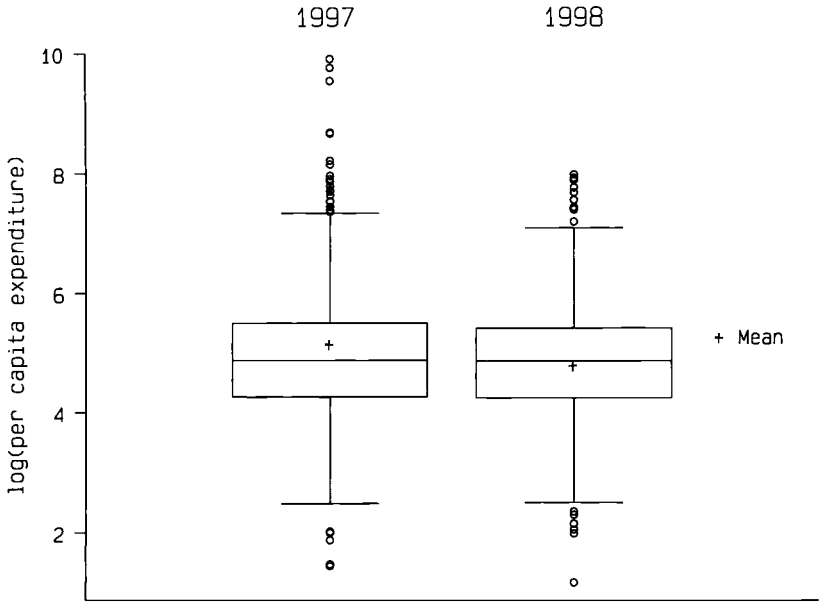

Fig. 12.2 Distribution of lnPCE, box-and-whisker plot

distribution is substantially lower in 1998, relative to 1997; the bottom tail has moved much less in absolute terms, although there is a suggestion that PCE among the very poorest is lower in 1998, relative to 1997. This is reflected in panel A of table 12.2, which indicates that the poverty rate has increased from 11 percent to about 14 percent.[9]

Figure 12.2 suggests that inequality as measured by PCE has declined during the period. This is confirmed by estimates of the standard deviation of the logarithm of PCE (which has fallen from 0.94 to 0.86) and is depicted in the Lorenz curves in figure 12.3. They indicate that the decline in inequality can be attributed to two factors: the reduction in PCE at the top of the distribution and the reduction in the mean of PCE.

We conclude that there has been a substantial shift in the structure of the distribution of expenditure, with the center of the distribution remaining relatively stable, the right tail being substantially truncated between 1997 and 1998, and the left tail becoming fatter. These facts are illustrated in panel A of figure 12.4, which is a nonparametric estimate of the density of

9. The appropriate definition of the poverty line is controversial. Province- and sector-specific poverty lines have been chosen in terms of PCE so that estimated poverty rates in IFLS2 correspond with the BPS province- and sector-specific poverty rates for 1996. Thus, the 11 percent poverty rate is constructed to match the official rate.

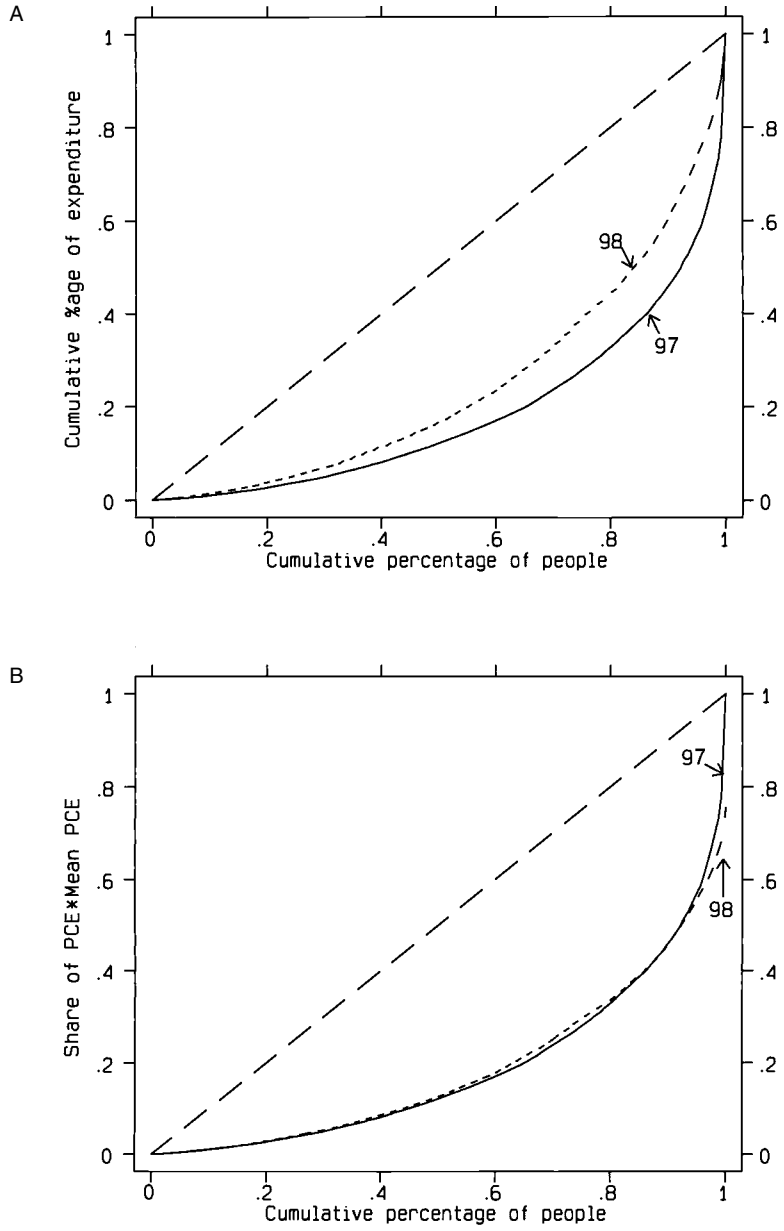

Fig. 12.3 Distribution of PCE: *A*, PCE Lorenz curves, 1997 and 1998; *B*, PCE generalized Lorenz curves, 1997 and 1998

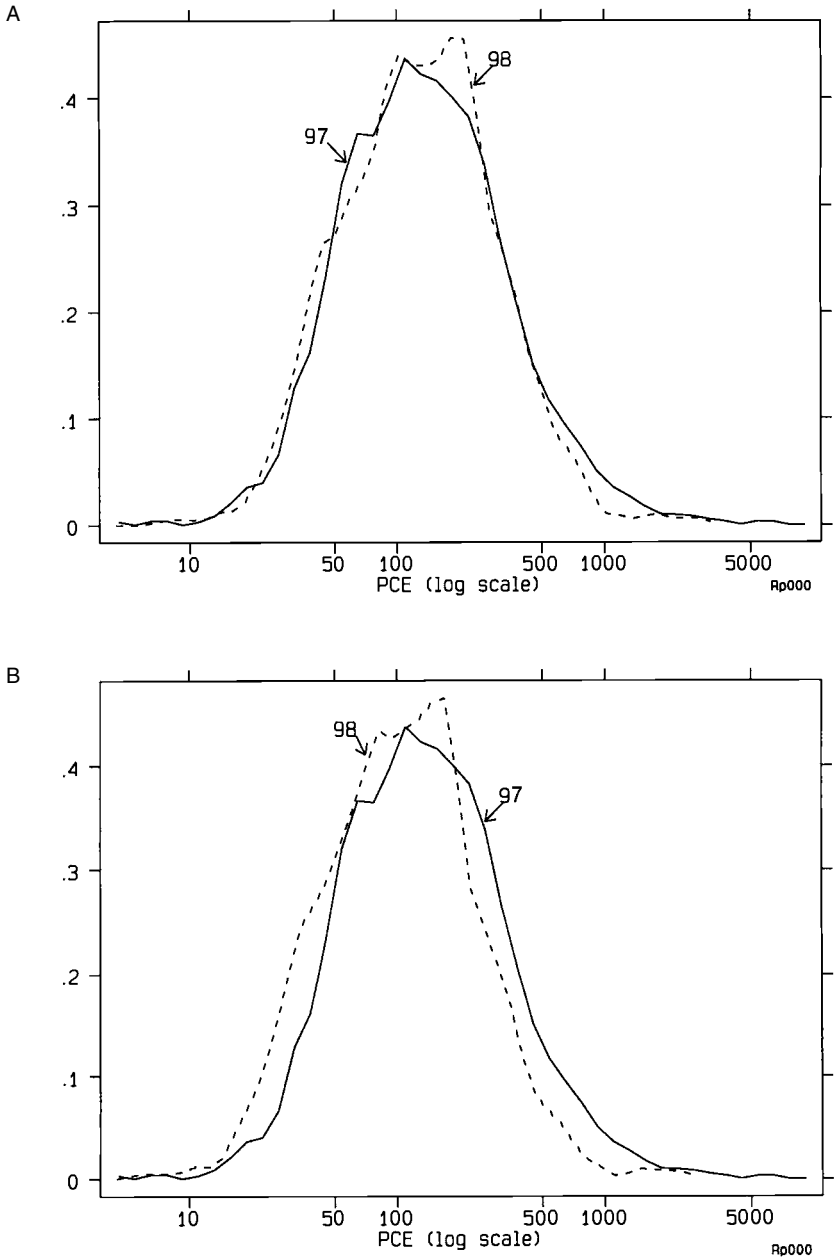

Fig. 12.4 Per capita expenditure distribution, 1997 and 1998: *A*, BPS inflation rate; *B*, BPS-adjusted inflation rate

PCE. It indicates that the poor, the middle class, and the better-off have all been affected by this crisis.[10]

12.3.2 Urban and Rural Differences in Expenditure

The second part of panel A of table 12.2 distinguishes those households that were living in an urban area in 1997 from those living in a rural area prior to the crisis. Description of the within-sector distribution of resources in 1998 requires taking into account migration across sectors. The goal here is to highlight the differential impact of the crisis on households depending on their location prior to the crisis. Recall that net food producers and producers of exported goods were insulated from bearing the brunt of the collapse of the rupiah. Net food producers and producers of agricultural goods for export are more likely to have been rural.

The data are consistent with this prediction. Relative to rural households, expenditures of households living in urban areas in 1997 were more seriously affected by the crisis. On average, total household expenditure fell by nearly 25 percent, PCE declined by 34 percent, and the poverty rate increased by 30 percent. In contrast, among households in rural areas, total household expenditure did not decline on average; PCE is estimated to have declined by 18 percent, although the impact on the poorest was about the same as among urban households since the poverty rate also rose by 30 percent in rural areas.

12.3.3 Changes in Living Arrangements

Since, on average, total household expenditure declined less than PCE, the size of the average household increased between 1997 and 1998. One response to the crisis was adjustment in living arrangements, as family members moved in together to exploit economies of scale of consumption. The increase in household size was greater among households in rural areas, which reflects both the effect of households joining together within the rural sector and the migration of individuals from urban areas to join households in rural areas. Specifically, individuals from the poorest urban households migrated to join households in rural areas where the cost of living was lower and where there were more opportunities to earn income. Frankenberg, Smith, and Thomas (2003) show that urban households at the bottom of the precrisis PCE distribution tended to lose household members, that household size tended to increase across the entire PCE distribution in rural areas, and that the increase in household size tended to rise with precrisis PCE in both rural and urban areas.

Thus, changes in PCE between 1997 and 1998 can be attributed to two factors: a decline in levels of resources and a change in household size. In

10. The nonparametric estimate of the density of PCE is based on an Epanechikov kernel with a 10 percent bandwidth.

the literature, changes in PCE have been interpreted as indicative of changes in well-being. Putting aside the impact of changes in household composition on changes in the distribution of resources within households and among members of different demographic groups, equating changes in PCE with changes in well-being is fraught with potential difficulties. Specifically, if household size and composition change in response to shocks and if these changes are correlated with the changes in expenditure, then changes in PCE will not in general be good indicators of changes in well-being. For example, part of the decline in PCE at the top of the distribution can be attributed to an increase in household size among these households. In addition, recall that poverty rates are estimated to have increased by around 30 percent in both the rural and urban areas. Part of the increase in poverty in rural areas is due to the increase in household size, whereas the estimated rise in urban poverty is smaller than it would have been without the loss of household members. Conclusions in the literature about the impact of shocks on poverty and well-being that fail to take into account the fact that both resources and living arrangements might change together are potentially seriously misleading. These results highlight the importance of treating economic resources and demographic composition of households as jointly determined.

12.3.4 Sensitivity to Estimates of Inflation Rate

Interpretation of evidence based on expenditures is further complicated in the presence of inflation. The price indexes available from BPS are based only on urban markets, and so it is implicitly assumed that inflation in the urban and rural sectors are the same. We can test that assumption using data reported in the IFLS community surveys. Those surveys collect information on ten prices of standardized commodities from up to three local stores and markets in each community; in addition, prices for thirty-nine items are asked of the Ibu PKK (leader of the local women's group) and knowledgeable informants at up to three *posyandus* (health posts) in each community. Using those prices, in combination with the household-level expenditure data, we have calculated EA-specific (Laspeyres) price indexes for the IFLS communities for 1997 and 1998. We estimate that in our EAs rural inflation is about 5 percent higher than urban inflation, and estimates reported for rural households in panel A of table 12.2 take this into account.

In an environment of rapidly changing prices, estimation of the inflation rate is not easy. In the BPS estimates, there is substantial heterogeneity in inflation across the forty-five cities that are included in the calculation of the national rate, ranging between 50 percent and 90 percent. See Levinsohn, Berry, and Friedman (2003) for a discussion. With this in mind, we have attempted to estimate the inflation rate that would be implied by the price data reported in IFLS for the EAs included in IFLS2+. Because we

do not have a complete set of prices in IFLS, we have matched the IFLS prices with subaggregates reported by BPS and compared the implied inflation rates for this subset of commodities. Using the IFLS data, we estimate inflation between the rounds of the survey to be about 15 percent higher than the BPS rate. While it is important to emphasize that IFLS is not designed to collect the detailed data necessary to calculate price indexes, this difference gives us pause. It might arise if our EAs are drawn from relatively high inflation areas, or it may reflect bias in either the BPS or IFLS estimates of inflation (or both). The difference, however, is large and suggests that it would be prudent to provide some assessment of likely bounds for the impact of the crisis by contrasting estimates of expenditure-based indicators using the BPS forty-five city inflation estimates and IFLS estimates of inflation.

To this end, we have explored the implications of the difference in the estimates of inflation both for the magnitude of the crisis and for the identification of who has been most seriously impacted by the crisis. Maintaining the 5 percent gap between rural and urban inflation implied by the IFLS, we have adjusted the BPS province-specific price indexes to match the IFLS inflation rate; specifically, we have inflated urban prices by an additional 14 percent and rural prices by an additional 16 percent. We refer to these as BPS-adjusted prices. Clearly, the higher inflation rates shift the entire real PCE distribution to the left. (See panel B of figure 12.4.) As shown in panel B of table 12.2, not only is there a decline in mean PCE of around 40 percent, but also the median declines by around 20 percent. There is a very substantial increase of around 80 percent in the fraction of the population below the poverty line, which rises to nearly 20 percent for the country as a whole.

In our judgment, it is likely that reality lies between these two extremes.[11] In a world of very high and variable inflation, estimates of well-being based exclusively on PCE (or income) may be seriously misleading if inflation estimates are available for only a small number of geographic units. Moreover, there are some conceptual concerns that are extremely difficult to address even with very good price data. The inflation rate that is relevant for a particular household will depend on its consumption patterns, which may not be the same as those of the average household, which is what is used in the construction of indexes. Specifically, poorer households typically spend a greater fraction of their budget on food; since the rate of in-

11. It is extremely difficult to estimate inflation when prices change as rapidly as they have in Indonesia in 1998. Based on other evidence in the IFLS, we conjecture that the IFLS-based estimates of inflation are biased upward. We do not have enough information in the market-based surveys to use those data alone, so we have combined them with information obtained from the PKK and *posyandu* informants, who appear to have overstated price increases. However, we have no reason to suppose that this overstatement is greater for rural than for urban households, and so in the absence of a better source for rural prices, we are inclined to rely on the IFLS estimate that rural inflation is slightly higher than urban inflation.

crease in food prices is about 20 percent higher than the overall inflation rate, price changes for the poor are likely to be higher than price changes for middle-income households. People are likely to substitute away from commodities that become relatively expensive, in which case inflation rates based on a fixed bundle of goods will tend to overstate actual inflation. If the poorest households have less scope for substitution than other households (say, because most of their budget is spent on staples), they are likely to be more severely affected by price increases than households that are better off.

While the magnitude of the impact of the crisis on expenditure-based measures is very sensitive to assumptions about inflation, the evolution of poverty after the crisis is not. By 2000, the level of poverty (as measured by the fraction below a fixed real poverty line) was below the level in 1997, and this inference is robust to the choice of poverty line. Moreover, over half the population that was judged poor in 1997 was no longer in poverty by 2000, and, by the same token, half the poor in 2000 were not deemed to be poor in 1997 (Strauss et al. 2004). There is not only substantial mobility into and out of poverty but also considerable variation in the decline and growth of resources across the entire distribution of PCE. We turn next to an assessment of the socioeconomic and demographic characteristics associated with changes in PCE around the time of the crisis.

12.3.5 Correlates of Changes in lnPCE

As a first step in putting the issue of measuring inflation into the background, we turn to an examination of the covariates that are associated with changes in lnPCE between 1997 and 1998 in a multivariate context. To the extent that these covariates are not related to price changes, we can interpret the regression coefficients as providing descriptive information about the types of households and communities that have been most seriously impacted by the crisis. Results are summarized in table 12.3. A negative coefficient indicates that lnPCE in 1998 is lower than lnPCE in 1997. Estimates of standard errors are robust to arbitrary forms of heteroskedasticity and permit within-cluster correlations in unobservables.

Estimates are presented separately for households in the urban and rural sectors. For each sector, regressions reported in the first two columns are based on the BPS inflation rates, the third column repeats the second regression using estimates of changes in lnPCE based on the adjusted inflation rate, and the fourth column includes a community-level fixed effect that sweeps out all fixed (and additive) community-level heterogeneity, including prices. The results in this column should, therefore, be robust to different estimates of the rate of inflation.

The first set of covariates is measured at the community level. They indicate that communities in which the main activity is agriculture (in rural areas) and those that have a higher fraction of households operating farm

Table 12.3 **Changes in ln(per capita expenditure) between 1997 and 1998: Correlates associated with Δln(PCE)**

	Urban				Rural			
	Official inflation (1)	Official inflation (2)	Adjusted inflation (3)	Community fixed effects (4)	Official inflation (5)	Official inflation (6)	Adjusted inflation (7)	Community fixed effects (8)
Community characteristics								
Mean lnPCE	—	–0.177	–0.143	—	—	–0.149	–0.095	—
		[1.79]	[1.41]			[0.90]	[0.60]	
Standard deviation lnPCE	—	–0.308	–0.307	—	—	0.274	0.295	—
		[2.05]	[1.79]			[1.34]	[1.48]	
Main activity = agriculture (1)	—	—	—	—	0.311	0.312	0.290	—
Trading	0.061	0.128	0.079	—	0.408	0.44	0.438	—
	[0.73]	[1.46]	[0.82]		[2.08]	[2.13]	[2.22]	
Services	–0.387	–0.289	–0.176	—	—	—	—	—
	[2.59]	[2.51]	[1.64]					
Construction	0.054	0.069	0.101	—	0.029	0.025	0.070	—
	[0.58]	[0.92]	[1.28]		[0.5]	[0.42]	[1.23]	
Military camp	0.105	0.168	0.071	—	–0.114	–0.102	–0.064	—
	[0.65]	[1.14]	[0.45]		[1.13]	[1.06]	[0.65]	
Fraction of households owning								
Nonfarm business	–0.289	–0.362	–0.23	—	–0.278	–0.295	–0.301	—
	[1.15]	[1.63]	[0.96]		[1.37]	[1.38]	[1.31]	
Farm business	0.525	0.464	0.459	—	0.152	0.126	0.126	—
	[2.36]	[2.11]	[2.09]		[1.15]	[0.97]	[1.00]	
Accessible by road all year (1)	0.238	0.22	0.222	—	–0.482	–0.515	–0.496	—
	[1.7]	[1.61]	[1.59]		[4.00]	[4.02]	[4.34]	
Kecamatan capital (1)	–0.053	–0.083	–0.055	—	–0.201	–0.242	–0.240	—
	[0.55]	[0.97]	[0.57]		[2.81]	[2.7]	[2.9]	
Province								
North Sumatra (1)	0.237	0.067	–0.007	—	–0.419	–0.370	–0.405	—
	[1.73]	[0.43]	[0.04]		[3.68]	[3.26]	[3.78]	
South Sumatra (1)	0.281	0.194	0.225	—	0.226	0.173	0.247	—
	[1.61]	[1.36]	[1.41]		[2.02]	[1.35]	[1.97]	

Jakarta (1)	0.216	0.134	0.095	—	0.182	0.257	0.308	—
	[1.56]	[1.02]	[0.61]		[0.7]	[0.97]	[1.17]	
Central Java (1)	0.251	0.148	0.139	—	–0.103	–0.075	–0.082	—
	[1.68]	[1.15]	[0.91]		[0.87]	[0.68]	[0.75]	
West Nusa Tenggara (1)	0.175	0.065	–0.010	—	–0.150	–0.140	–0.059	—
	[1.06]	[0.41]	[0.05]		[1.23]	[1.09]	[0.44]	
South Kalimantan	0.121	0.034	0.005	—	–0.232	–0.161	–0.160	—
	[0.85]	[0.27]	[0.03]		[1.73]	[0.95]	[1.09]	
Household composition: number of each gender and age years								
Males 0–4	0.046	0.032	0.003	0.078	0.108	0.106	0.118	0.106
	[0.67]	[0.48]	[0.04]	[1.03]	[1.58]	[1.55]	[1.67]	[1.54]
Females 0–4	0.139	0.119	0.158	0.129	0.062	0.059	–0.001	–0.007
	[1.92]	[1.60]	[2.11]	[1.69]	[0.79]	[0.76]	[0.02]	[0.10]
Males 5–9	0.026	0.023	0.009	0.019	0.137	0.135	0.124	0.122
	[0.36]	[0.33]	[0.13]	[0.26]	[2.6]	[2.61]	[2.61]	[2.09]
Females 5–9	0.029	0.025	0.012	0.024	0.019	0.022	0.019	0.008
	[0.35]	[0.32]	[0.15]	[0.33]	[0.31]	[0.34]	[0.28]	[0.13]
Males 10–14	–0.043	–0.05	–0.104	–0.025	0.002	–0.005	0.013	0.000
	[0.55]	[0.64]	[1.35]	[0.39]	[0.05]	[0.12]	[0.28]	[0.00]
Females 10–14	–0.011	–0.019	–0.002	–0.021	0.053	0.049	0.044	0.021
	[0.17]	[0.28]	[0.03]	[0.35]	[1.09]	[1.01]	[0.89]	[0.34]
Males 15–24	0.025	0.023	0.021	0.066	0.033	0.033	0.03	0.056
	[0.45]	[0.43]	[0.42]	[1.63]	[1.01]	[1.03]	[0.89]	[1.17]
Females 15–24	0.152	0.146	0.118	0.147	0.098	0.098	0.113	0.072
	[3.04]	[2.89]	[2.33]	[3.1]	[1.60]	[1.60]	[1.89]	[1.39]
Males 25–64	0.048	0.048	0.048	0.09	0.044	0.043	0.02	0.042
	[0.89]	[0.93]	[0.82]	[1.35]	[0.49]	[0.48]	[0.23]	[0.54]
Females 25–64	0.183	0.172	0.158	0.136	0.204	0.202	0.226	0.251
	[2.85]	[2.54]	[2.25]	[2.44]	[2.57]	[2.56]	[2.99]	[3.84]
Males ≥65	0.047	0.046	0.115	0.03	0.021	0.021	0.026	0.051
	[0.33]	[0.32]	[0.77]	[0.21]	[0.16]	[0.16]	[0.20]	[0.40]
Females ≥65	0.073	0.072	0.206	0.033	0.102	0.099	0.086	0.065
	[0.75]	[0.72]	[1.94]	[0.32]	[0.98]	[0.94]	[0.83]	[0.65]

(*continued*)

Table 12.3 (continued)

	Urban				Rural			
	Official inflation (1)	Official inflation (2)	Adjusted inflation (3)	Community fixed effects (4)	Official inflation (5)	Official inflation (6)	Adjusted inflation (7)	Community fixed effects (8)
Household characteristics								
Age of head	–0.001	0.001	–0.002	–0.002	0.001	0.001	0.001	0.001
	[0.12]	[0.15]	[0.42]	[0.52]	[0.38]	[0.42]	[0.38]	[0.35]
Head is male (1)	–0.015	–0.038	–0.037	–0.037	–0.059	–0.051	–0.053	–0.063
	[0.12]	[0.31]	[0.28]	[0.33]	[0.45]	[0.39]	[0.42]	[0.57]
Education of head	–0.01	–0.004	–0.006	–0.011	–0.008	–0.007	–0.01	–0.006
	[1.14]	[0.38]	[0.61]	[1.2]	[0.78]	[0.67]	[0.95]	[0.63]
Intercept	–0.824	0.394	0.19	–0.324	–0.151	0.369	–0.238	–0.418
	[2.61]	[0.78]	[0.37]	[1.57]	[0.59]	[0.5]	[0.34]	[2.36]
F (Community fixed effects)	—	—	—	1.761	—	—	—	1.818
				(0.00)				(0.00)
F (all covariates)	7.33	11.98	6.09	2.21	12.43	12.24	19.67	2.35
	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
R^2	0.081	0.093	0.082	0.058	0.074	0.077	0.085	0.022
R^2 within community	—	—	—	0.043	—	—	—	0.034
R^2 between community	—	—	—	0.373	—	—	—	0.091
No. of observations	797				1,096			

Notes: Dependent variable is lnPCE – lnPCE97. *t*-statistics, in brackets under regression estimates, and *p* values, in parentheses below test statistics, are robust to heteroskedasticity and within EA correlations. West Java is the excluded province. (1) represents indicator variable that takes the value of 1 if condition is true and zero otherwise.

businesses (in urban areas) have, relative to other communities, had a positive income innovation over the last year. This suggests these communities are net food producers and that, on average, they have benefited from the increase in the relative price of foods over the last year. Rural communities that are primarily trading have also received a positive income innovation, although this is more than offset if the community is accessible by road throughout the year. Innovations have been especially negative in rural areas that serve as the kecamatan capital;[12] these areas have concentrations of civil servants, and the nominal incomes of most government workers have increased only slightly over the last year, so their real incomes have declined dramatically. Rural communities in North Sumatra have fared especially poorly, whereas those in South Sumatra appear to be doing slightly better than West Java, the excluded province.[13]

Among rural households, apparently those living in remote, agricultural communities have been most protected from the deleterious impact of the crisis. This is plausible given that the crisis is to a large extent financial and these communities are likely to have the least interaction with monetized sectors of the economy.

In the urban sector, communities that produce services (which are typically nontradable) have seen their incomes decline more than those in other areas. There is also a suggestion that poorer communities and communities with greater inequality have experienced relatively large negative income innovations. This suggests that poor urban communities—and the poorest households within them—may be worthy of special attention. These inferences, however, should be tempered by the fact that the significance of the effects of the services indicator and the community-level measures of PCE is, at best, marginal when we use the adjusted inflation rates. Getting inflation right is a substantive and serious concern.

The second part of table 12.3 reports the relationship between changes in lnPCE and household characteristics prior to the crisis. The estimates are remarkably robust to assumptions about the inflation rate, including the community fixed effects model in columns (4) and (8), which permits an arbitrary rate of change of the price level in each community.

The age of the household head, education of the head, and whether the head is male are not correlated with the impact of the crisis. This is, perhaps, surprising given that these characteristics are likely to be associated with higher levels of assets and, therefore, would be expected to be related to smoothing of consumption over time. The value of most assets collapsed

12. By way of comparison, a kecamatan is smaller than a country but larger than a zip code in the United States.

13. We observed a very substantial increase in migration rates out of North Sumatra between 1997 and 1998, with a large fraction of the movers relocating in neighboring Riau, which, relatively speaking, had been a boom area during the crisis because of oil, fishing, and lumber production for export.

with the economy. There were two exceptions: land and, most notably, gold, the price of which is set in world terms, so its value increased over threefold. Most gold is owned by women, and its ownership is not strongly associated with age or education. In contrast with characteristics of the head, household size in 1997 is associated with protection from the impact of the crisis: PCE has declined least in households that were larger in 1997. Not all household members are equal. In both the rural and the urban sector, households that contain more prime-age women (twenty-five to sixty-four years old) have seen the smallest declines in PCE; in the urban sector, the presence of more younger women (fifteen to twenty-five years old) in the household is also correlated with smaller declines in PCE. This is likely to be a reflection of an increase between 1997 and 1998 in the labor supply of these women.

This inference can be tested directly. In each wave of the IFLS, adult individuals are asked about their time allocation. Among prime-age adults, almost all men (99 percent) were working in both years, but among women there was a substantial increase in the fraction who reported themselves as working (from 70 percent to 83 percent), and this difference (or change) is significant (t-statistic = 8.9). The difference-in-difference (the gap in the change in participation rates between men and women) is both large (12 percent) and significant (t-statistic = 7.4). Many people in Indonesia work in family enterprises, and those enterprises have absorbed all the new entrants or reentrants into the labor force. Between 1997 and 1998, there has been a decline in the probability that a prime-age man is working for pay (from 91 percent to 87 percent) and no change in the probability a prime-age woman is working for pay (42 percent). This difference-in-difference (4 percent) is also significant (t-statistic = 2.1). We conclude that there has been a significant shift in the allocation of time, with prime-age women playing a bigger role in both family enterprises and in paid work. This is true in both the rural and the urban sector.

Among younger adults (fifteen to twenty-four) the story is quite different. Both males and females are more likely to be working and to be working for pay in 1998, relative to 1997. This is to be expected for life-course reasons alone. There are no significant differences in the rate of take-up of work between males and females except for one instance: among urban households, fifteen- to twenty-year-old males are 4 percent less likely to have taken on work that pays between 1997 and 1998, relative to a fifteen- to twenty-year-old female (and this effect is marginally significant: t-statistic = 1.8). See Smith et al. (1999) for a more detailed discussion of labor market responses during the crisis, along with other evidence that corroborates these interpretations.

Per capita expenditure appears to have been protected in those urban households with more young girls (zero to four years old) and in rural households with more young boys (zero to nine years old, particularly five

to nine years old). It is unlikely that these children are going out to work; rather, the estimates suggest that women with young children have attempted to keep household income from falling, presumably because they would like to protect their children from the deleterious impact of real income declines. While the gender differences between urban and rural households are intriguing, they are not significant, and so we do not want to make too much of them.

12.3.6 Household Budget Shares

We have noted above that the financial crisis was accompanied by large changes both in the absolute price level and in relative prices. We have also noted that interpretation of changes in (real) lnPCE is complicated by the uncertainty revolving around the changes in prices that households face. The analyses presented above are silent about the effects on household well-being of changes in relative prices. To address this issue, we turn to the allocation of the household budget to goods.

Table 12.4 reports the mean share of the household budget spent on fifteen commodity groups in 1997 and 1998 along with the change in the share (columns [3] and [7] for urban and rural households, respectively) and the change as a percentage of the 1997 share (columns [4] and [8] for urban and rural households, respectively). The BPS inflation rates are used throughout this section. Clearly changes in budget shares capture the impact of both changes in purchasing power and changes in relative prices.

Estimates of ordinary least squares (OLS) regressions that describe the relationship between changes in budget shares and household characteristics are reported in table 12.5. In order to put inflation into the background, the regressions include a community-level fixed effect. The covariates in the regressions, which are all measured in 1997, fall into three groups: income (which is entered as a spline in lnPCE with a knot at median PCE), household composition, and the demographic characteristics of the household head. In this section, we focus on changes in budget shares and their association with household income. A discussion of the links between budget shares and household composition is deferred to the next subsection.

Food accounts for more than half the budget of the average household in Indonesia, and the food share increased significantly (by about 5 percentage points) between 1997 and 1998. According to Engel's law (which says that household welfare is inversely related to the food share), the average Indonesian household is substantially worse off in 1998 than prior to the onset of the crisis. In 1988, urban households spent 60 percent of their budget on food, and rural households spent 80 percent of their budget on food.

To a large extent the increase in the food share reflects an increase in the allocation of expenditure to staples (primarily rice). Among urban house-

Table 12.4 **IFLS expenditure shares: Urban and rural sectors**

	Urban households				Rural households			
	1997 (1)	1998 (2)	Change (3)	%Δ (4)	1997 (5)	1998 (6)	Change (7)	%Δ (8)
Food	58.96	63.95	4.99	8	76.17	80.84	4.68	6
			(0.86)				(0.62)	
Staples	12.99	20.61	7.62	59	30.58	39.39	8.81	29
			(0.77)				(0.90)	
Meat	12.69	10.40	–2.29	–18	12.46	9.74	–2.72	–22
			(0.58)				(0.58)	
Dairy	3.66	3.74	0.08	2	2.67	2.64	–0.02	–1
			(0.32)				(0.22)	
Oil	1.93	2.89	0.96	50	2.70	2.48	–0.22	–8
			(0.14)				(0.20)	
Vegetables	8.91	8.51	–0.39	–4	11.47	12.94	1.48	13
			(0.45)				(0.52)	
Alcohol/tobacco	4.08	5.74	1.66	41	4.43	4.04	–0.39	–9
			(0.80)				(0.30)	
Household goods	8.17	6.80	–1.37	–17	3.59	3.17	–0.41	–12
			(0.31)				(0.16)	
Transport	3.15	3.20	0.40	1	1.80	1.51	–0.29	–16
			(0.28)				(0.18)	
Clothing	2.94	2.48	–0.46	–16	2.20	1.50	–0.69	–32
			(0.11)				(0.09)	
Housing	10.77	9.14	–1.63	–15	6.14	4.82	–1.32	–21
			(0.59)				(0.36)	
Recreation	2.58	2.05	–0.53	–21	1.83	1.70	–0.12	–7
			(0.22)				(0.16)	
Health	1.73	1.49	–0.24	–14	1.16	0.69	–0.47	–40
			(0.20)				(0.12)	
Education	4.91	4.51	–0.40	–8	2.38	1.81	–0.56	–24
			(0.27)				(0.13)	
No. of observations	797				1096			

Notes: Change is share in 1998 – share in 1997. Standard errors (in parentheses) are below change. %Δ is change as percentage of 1997 share.

holds, the staple share has increased by over 50 percent (to account for one-fifth of the total budget), and in rural households it has increased by 30 percent (to account for two-fifths of the total budget). These are very large increases. They are partially offset by a significant reduction (of about 20 percent) in the share of the budget spent on meat. Taken together, the results indicate a decline in the quality of the diet of the average Indonesian.

The estimates of income effects at the top of table 12.5 provide insights into how these changes are distributed across households. In both the urban and the rural sector, food shares have increased the most for the poorest. For households below median PCE in 1997, the increase in the food

Table 12.5 Changes in budget shares

	Food			Nonfood			
	Food (1)	Staples (2)	Meat (3)	Alcohol and tobacco (4)	Clothing (5)	Health (6)	Education (7)
A. Urban households							
ln(PCE) (spline)							
Below median	–5.512	0.782	–4.278	2.643	1.038	–0.51	–0.483
	[2.24]	[0.36]	[2.6]	[1.37]	[3.13]	[0.9]	[0.62]
Above median	–0.075	–3.728	3.533	0.062	0.579	–0.353	1
	[0.05]	[2.68]	[3.4]	[0.05]	[2.76]	[0.99]	[2.02]
Household composition: number of each gender and age (years)							
Males 0–4	–1.429	–0.692	–0.809	–1.33	0.069	–0.766	0.907
	[0.71]	[0.39]	[0.6]	[0.85]	[0.26]	[1.67]	[1.42]
Females 0–4	3.419	1.061	0.859	0.015	–0.184	–0.624	0.393
	[1.68]	[0.58]	[0.63]	[0.01]	[0.67]	[1.34]	[0.61]
Males 5–9	1.772	–2.503	0.026	0.332	0.092	–0.237	–0.28
	[0.91]	[1.44]	[0.02]	[0.22]	[0.35]	[0.53]	[0.45]
Females 5–9	1.04	1.091	–1.262	–1.265	0.161	0.356	0.259
	[0.53]	[0.62]	[0.95]	[0.82]	[0.6]	[0.79]	[0.41]
Males 10–14	–2.054	–1.359	–1.518	0.673	0.555	0.672	–0.317
	[1.22]	[0.9]	[1.35]	[0.51]	[2.44]	[1.74]	[0.59]
Females 10–14	1.601	0.21	0.151	–0.742	–0.37	0.042	–1.049
	[1.02]	[0.15]	[0.14]	[0.6]	[1.75]	[0.12]	[2.11]
Males 15–19	–0.738	–0.616	0.784	–0.358	0.15	–0.332	2.466
	[0.56]	[0.53]	[0.89]	[0.35]	[0.85]	[1.11]	[5.91]
Females 15–19	0.173	0.372	0.645	–0.686	0.627	–0.192	–0.773
	[0.11]	[0.27]	[0.62]	[0.56]	[2.97]	[0.54]	[1.55]
Males 20–24	–1.481	1.927	–2.868	–0.394	–0.107	0.018	–0.398
	[0.73]	[1.06]	[2.11]	[0.25]	[0.39]	[0.04]	[0.62]
Females 20–24	0.79	–3.238	1.826	–1.116	0.53	0.102	–0.803
	[0.39]	[1.79]	[1.35]	[0.71]	[1.95]	[0.22]	[1.25]
Males 25–39	–2.008	–1.729	–2.292	–1.737	0.233	0.134	–0.492
	[1.19]	[1.15]	[2.03]	[1.31]	[1.02]	[0.35]	[0.92]
Females 25–39	–0.826	0.107	1.322	–0.539	–0.173	0.139	–0.111
	[0.48]	[0.07]	[1.14]	[0.4]	[0.74]	[0.35]	[0.2]
Males 40–54	1.058	0.751	–0.111	1.092	–0.107	0.175	–0.611
	[0.42]	[0.33]	[0.07]	[0.55]	[0.31]	[0.3]	[0.76]
Females 40–54	0.155	–1.394	0.68	–3.385	0.166	0.188	–0.639
	[0.07]	[0.71]	[0.46]	[1.97]	[0.56]	[0.37]	[0.92]
Males 55–64	–3.916	–0.091	–0.342	1.103	–0.599	1.121	–0.802
	[1.06]	[0.03]	[0.14]	[0.38]	[1.21]	[1.33]	[0.69]
Females 55–64	1.605	0.576	–0.423	–0.929	0.067	0.275	–0.249
	[0.57]	[0.23]	[0.23]	[0.42]	[0.18]	[0.43]	[0.28]
Males ≥65	1.398	0.66	–1.714	–3.506	–0.181	–0.322	1.071
	[0.34]	[0.18]	[0.63]	[1.1]	[0.33]	[0.34]	[0.83]
Females ≥65	–4.119	–0.464	0.447	–1.149	0.207	0.53	0.667
	[1.55]	[0.2]	[0.25]	[0.55]	[0.58]	[0.87]	[0.79]

(*continued*)

Table 12.5 (continued)

	Food			Nonfood			
	Food (1)	Staples (2)	Meat (3)	Alcohol and tobacco (4)	Clothing (5)	Health (6)	Education (7)
Age of head	0.103	–0.065	0.005	0.061	–0.002	–0.048	–0.046
	[0.99]	[0.70]	[0.07]	[0.75]	[0.11]	[2.03]	[1.40]
Head is male (1)	–1.786	–1.544	2.889	0.023	0.834	–0.646	–0.603
	[0.58]	[0.56]	[1.40]	[0.01]	[2.00]	[0.91]	[0.61]
Education of head	0.347	0.424	–0.252	0.011	–0.059	–0.006	0.000
	[1.49]	[2.04]	[1.62]	[0.06]	[1.89]	[0.11]	[0.00]
Intercept	26.881	7.998	15.196	–10.543	–6.088	4.631	4.303
	[2.17]	[0.72]	[1.84]	[1.09]	[3.65]	[1.63]	[1.09]
Joint tests							
F (Community fixed effects)	1.826	1.794	0.928	0.881	1.058	0.512	1.961
	(0.00)	(0.00)	(0.63)	(0.73)	(0.36)	(1.00)	(0.00)
F (all covariates)	1.12	0.92	1.48	0.78	2.38	0.98	2.71
	(0.32)	(0.57)	(0.07)	(0.76)	(0.00)	(0.49)	(0.00)
F (equal effects across gender)							
0-to-4-year-olds	3.15	0.52	0.84	0.40	0.48	0.05	0.35
	(0.08)	(0.47)	(0.36)	(0.53)	(0.49)	(0.82)	(0.55)
5-to-9-year-olds	0.07	2.15	0.49	0.55	0.04	0.89	0.38
	(0.79)	(0.14)	(0.48)	(0.46)	(0.85)	(0.35)	(0.54)
10-to-14-year-olds	2.74	0.63	1.28	0.67	9.67	1.56	1.09
	(0.10)	(0.43)	(0.26)	(0.41)	(0.00)	(0.21)	(0.30)
15-to-19-year-olds	0.21	0.32	0.01	0.05	3.25	0.10	26.91
	(0.64)	(0.57)	(0.92)	(0.83)	(0.07)	(0.76)	(0.00)
20-to-24-year-olds	0.56	3.63	5.35	0.09	2.43	0.01	0.18
	(0.45)	(0.06)	(0.02)	(0.76)	(0.12)	(0.90)	(0.67)
R^2	0.019	0.028	0.04	0.019	0.066	0.03	0.069
R^2 within community	0.035	0.029	0.046	0.025	0.071	0.031	0.081
R^2 between community	0.022	0.131	0.002	0.006	0.123	0.00	0.267
	B. Rural households						
ln(PCE) (spline)							
Below median	–7.266	–9.695	–3.233	3.452	1.178	0.769	1.546
	[5.49]	[4.92]	[2.52]	[5.50]	[6.90]	[2.90]	[5.90]
Above median	–1.802	–2.299	0.025	0.927	0.765	–0.232	0.627
	[1.26]	[1.08]	[0.02]	[1.36]	[4.14]	[0.81]	[2.21]
Household composition: number of each gender and age (years)							
Males 0–4	–1.095	–1.974	–0.479	1.186	–0.03	0.07	0.233
	[0.76]	[0.92]	[0.35]	[1.74]	[0.16]	[0.24]	[0.82]
Females 0–4	–3.281	–1.673	–1.791	0.895	0.197	0.161	0.327
	[2.25]	[0.77]	[1.27]	[1.29]	[1.05]	[0.55]	[1.13]
Males 5–9	0.225	0.748	–1.536	0.873	0.096	0.077	–0.070
	[0.19]	[0.43]	[1.34]	[1.56]	[0.63]	[0.32]	[0.30]
Females 5–9	–1.121	0.159	–1.939	–0.386	0.127	–0.106	0.305
	[0.88]	[0.08]	[1.57]	[0.64]	[0.77]	[0.41]	[1.21]

Table 12.5 (continued)

	Food			Nonfood			
	Food (1)	Staples (2)	Meat (3)	Alcohol and tobacco (4)	Clothing (5)	Health (6)	Education (7)
Males 10–14	0.19	–0.739	1.203	0.758	–0.097	0.189	–0.400
	[0.16]	[0.41]	[1.03]	[1.32]	[0.62]	[0.78]	[1.67]
Females 10–14	0.124	–0.28	0.894	0.888	0.183	–0.073	–0.056
	[0.1]	[0.15]	[0.76]	[1.53]	[1.16]	[0.3]	[0.23]
Males 15–19	0.413	–0.147	1.665	0.723	0.171	0.281	–0.615
	[0.32]	[0.08]	[1.35]	[1.19]	[1.04]	[1.10]	[2.43]
Females 15–19	0.585	–0.935	0.103	–0.216	0.129	0.157	–0.175
	[0.48]	[0.51]	[0.09]	[0.37]	[0.81]	[0.64]	[0.72]
Males 20–24	–1.236	–0.3	–2.472	–0.397	–0.473	–0.585	–0.076
	[0.73]	[0.12]	[1.50]	[0.49]	[2.16]	[1.72]	[0.23]
Females 20–24	–1.98	–1.127	0.48	0.998	0.273	0.205	0.118
	[1.14]	[0.43]	[0.28]	[1.21]	[1.21]	[0.59]	[0.34]
Males 25–39	–0.759	–1.063	–0.658	–0.472	–0.124	–0.008	0.169
	[0.43]	[0.4]	[0.38]	[0.56]	[0.54]	[0.02]	[0.48]
Females 25–39	–1.483	–2.656	0.904	0.03	–0.145	–0.053	–0.318
	[0.9]	[1.08]	[0.56]	[0.04]	[0.68]	[0.16]	[0.97]
Males 40–54	2.203	1.731	1.006	–1.126	–0.325	–0.449	–0.406
	[0.97]	[0.51]	[0.46]	[1.05]	[1.11]	[0.99]	[0.90
Females 40–54	–2.574	–2.007	1.547	0.615	0.221	0.287	0.135
	[1.43]	[0.75]	[0.89]	[0.72]	[0.95]	[0.80]	[0.38]
Males 55–64	1.884	3.124	–2.253	–0.628	–0.062	–0.568	–0.410
	[0.66]	[0.73]	[0.81]	[0.46]	[0.17]	[0.98]	[0.72]
Females 55–64	0.917	–3.746	2.682	–0.770	–0.160	0.249	0.562
	[0.43]	[1.17]	[1.29]	[0.76]	[0.58]	[0.58]	[1.32]
Males ≥65	–0.253	3.888	–1.13	0.333	0.159	–0.301	0.551
	[0.08]	[0.84]	[0.38]	[0.23]	[0.40]	[0.48]	[0.90]
Females ≥65	–5.909	–6.045	–1.275	–0.137	0.571	–0.213	0.631
	[2.71]	[1.86]	[0.6]	[0.13]	[2.03]	[0.49]	[1.46]
Age head	0.012	–0.043	0.005	0.003	–0.009	0.003	–0.002
	[0.16]	[0.4]	[0.06]	[0.1]	[0.93]	[0.21]	[0.16]
Head is male (1)	–2.226	–6.531	1.455	–0.967	0.365	0.514	0.224
	[0.88]	[1.72]	[0.59]	[0.8]	[1.11]	[1.01]	[0.44]
Education of head	0.458	0.706	0.076	–0.117	–0.049	–0.044	–0.018
	[2.35]	[2.43]	[0.40]	[1.26]	[1.94]	[1.12]	[0.46]
Intercept	40.797	60.338	9.85	–15.921	–6.097	–4.189	–7.751
	[5.74]	[5.7]	[1.43]	[4.72]	[6.65]	[2.94]	[5.51]
Joint tests							
F (Community fixed effects)	1.431	1.88	1.565	1.047	1.256	0.605	1.78
	(0.03)	(0.00)	(0.01)	(0.39)	(0.11)	(0.99)	(0.00)
F (all covariates)	2.98	2.02	1.09	2.67	5.87	0.79	4.45
	(0.00)	(0.00)	(0.35)	(0.00)	(0.00)	(0.74)	(0.00)
F (equal effects across gender)							
0-to-4-year-olds	1.35	0.01	0.52	0.11	0.88	0.06	0.06
	(0.24)	(0.91)	(0.47)	(0.74)	(0.35)	(0.81)	(0.8)

(*continued*)

Table 12.5 (continued)

	Food			Nonfood			
	Food (1)	Staples (2)	Meat (3)	Alcohol and tobacco (4)	Clothing (5)	Health (6)	Education (7)
5-to-9-year-olds	0.72	0.06	0.07	2.80	0.02	0.33	1.42
	(0.4)	(0.8)	(0.79)	(0.09)	(0.88)	(0.57)	(0.23)
10-to-14-year-olds	0.00	0.04	0.04	0.03	1.80	0.65	1.16
	(0.97)	(0.85)	(0.84)	(0.87)	(0.18)	(0.42)	(0.28)
15-to-19-year-olds	0.01	0.08	0.76	1.14	0.03	0.11	1.43
	(0.93)	(0.78)	(0.38)	(0.29)	(0.86)	(0.74)	(0.23)
20-to-24-year-olds	0.09	0.05	1.47	1.37	5.29	2.45	0.15
	(0.77)	(0.83)	(0.23)	(0.24)	(0.02)	(0.12)	(0.70)
R^2	0.058	0.028	0.019	0.052	0.115	0.016	0.083
R^2 within community	0.063	0.044	0.024	0.057	0.117	0.018	0.091
R^2 between community	0.004	0.141	0.014	0.099	0.103	0.009	0.175

Notes: Dependent variable-share$_{98}$ – share$_{97}$. *t*-statistics, in brackets under regression estimates, *p*-values, in parentheses below test statistics, are robust to heteroskedasticity and within EA correlations. West Java is excluded province.

share declines as PCE increases; above median PCE, there is no link between the change in the food share and PCE. A similar pattern emerges for staples in rural areas. In urban areas, the staple share has increased by the same amount for all households below median PCE, and only among those households with PCE above median does the increase in the staple share decline as PCE increases. Thus, the increase in the price of rice has had its biggest impact on the shares of those who were poorest prior to the crisis.

It would be premature to conclude that the poorest are necessarily the worst off since some of these households are likely to be rice producers. Both their total expenditure and the share of the budget spent on rice, staples, and food will have increased, simply because of the increase in the price of rice, even if they neither buy nor sell any rice.

There is some evidence along these lines when we turn to meat shares, which have, on average, declined. The decline is greatest for the median household—in both the rural and the urban sector—with the poorest having protected their budgets allocated to meat. In the urban sector, the meat share rises with PCE among those households with PCE above the median. The results underscore the fact that the impact of the crisis on household well-being is both complex and nuanced.

Alcohol and tobacco account for about 5 percent of the budget of the average household. In urban areas, the share spent on these commodities has increased, and the increase is the same across the entire PCE distribution. Among rural households, the poorest have cut back on the allocation to these goods, which account for proportionately more of the budget in 1998, relative to 1997, among those at the top of the PCE distribution.

Since food shares have increased, nonfood shares must have declined. The share of the budget spent on household goods (such as furniture and kitchen equipment), clothing, housing, and recreation have decreased in both the urban and the rural sector. The declines are greatest for the poorest; this is demonstrated for clothing in table 12.5. These might all be thought of as expenditures that can be delayed without serious immediate consequences and so may serve as a natural mechanism for smoothing consumption in the face of a negative income innovation.

This evidence provides a third reason for being cautious about interpreting changes in PCE as indicative of changes in welfare. Depending on expectations regarding the longevity of the crisis, it may be optimal for households to defer spending on some goods and thus reduce PCE in the current period. This realignment of the budget over the short term may not have a large impact on welfare. Of course, interpretation of this behavior is quite different if the spending cuts are permanent.

12.3.7 Investments in Human Capital

We turn next to investments in two important dimensions of human capital—health and education. Evidence from household budget data discussed here will be complemented below with additional individual-specific information on schooling, health status, and health care use. Between 1997 and 1998, there were substantial reductions in the share of the budget spent on health and education services. Health expenditures include the cost of preventive and curative visits to private or public health facilities as well as the costs of drugs and medications. Education expenditures include the costs of tuition and fees at schools, uniforms and transport for schools, and the costs of materials required at school.

In the urban sector, the decline in the health share is evenly distributed across the PCE distribution, but the education share has been cut most by those in the bottom half of the distribution. For example, among households in the bottom quartile of PCE, the education share has been cut by 20 percent (and this cut is significant).

In the rural sector, the share of the budget spent on health has declined by 40 percent; the share spent on education has declined by a quarter. These are both significant. Moreover, the declines are concentrated among the poorest. Households in the bottom quartile of PCE have cut the share of their budget spent on education by 50 percent, which is both very large and significant.

While neither health nor education accounts for a large fraction of the total budget, it is potentially troubling that the cuts tend to be concentrated among the poorest. Moreover, reductions in these expenditures may portend deleterious consequences for particular demographic subgroups. Cuts in education expenditures, for example, will probably affect those who are of school age and have little impact on adults or very young house-

hold members. Reducing the share of the budget spent on health is likely to have its biggest impact on young children, pregnant women, and the elderly. With this in mind, we turn next to examine the relationship between changes in budget shares and household composition and continue to focus on expenditures associated with investments in human capital.

12.3.8 Human Capital, Household Budget Shares, and Household Composition

The regressions in table 12.5 include controls for the number of household members in each of nine age groups, stratified by gender.[14] The key finding among urban households pertains to education expenditures. The shares are higher in households with more fifteen- to nineteen-year-old males, but this is not true for households that have more females in that age group. The difference between the male and female effects is significant. Additional adolescent females (ten to fourteen years old) in the households are associated with significantly lower education shares. Thus, young men (aged fifteen to nineteen) stand out as the only group associated with increases in education shares.

While the regression estimates do not identify who benefits from higher shares, two interpretations suggest themselves. First, households that have more young working-age men may be able to maintain their income by having these men enter the labor force; the rest of the household benefits from this additional income by increasing shares of commodities that are income elastic. That interpretation does not have much appeal since there is no evidence that any other shares are correlated with the presence of males in this age group. If the males are bringing income to the household, one would expect that income to be distributed to more goods than only education services. Moreover, this explanation does not provide a reason to expect the presence of teenage females to be associated with lower education shares, as is observed.

An alternative explanation is that it is these young men who are benefiting from the higher education shares and their sisters are making room for them in the household budget by having less spent on their own schooling. Two pieces of evidence provide some evidence in support of this interpretation. As discussed above, there is evidence that in the urban sector more young women have entered the labor market than young men between 1997 and 1998. Fifteen- to nineteen-year-old women are associated with higher shares spent on clothing—possibly in order to find or keep employment.

The issue is explored further in table 12.6, which is based on the same

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

Table 12.6 **Changes in education shares: Interactions between household composition and lnPCE**

	Urban		Rural	
Household composition: number of each gender and age	Direct effect (1)	Interaction with lnPCE (2)	Direct effect (3)	Interaction with lnPCE (4)
Males 0–4	–1.439	1.205	–0.347	0.177
	[0.75]	[1.39]	[0.31]	[0.50]
Females 0–4	–0.143	0.307	0.53	–0.06
	[0.09]	[0.42]	[0.47]	[0.17]
Males 5–9	–1.909	0.63	–1.059	0.345
	[1.03]	[0.80]	[1.16]	[1.20]
Females 5–9	–0.681	0.617	0.83	–0.126
	[0.41]	[0.86]	[0.79]	[0.39]
Males 10–14	–4.824	2.036	–2.903	0.807
	[3.12]	[3.18]	[3.19]	[2.96]
Females 10–14	–3.894	1.387	–2.302	0.672
	[2.97]	[2.56]	[2.46]	[2.52]
Males 15–19	7.747	–2.376	–2.36	0.540
	[5.74]	[3.96]	[2.15]	[1.68]
Females 15–19	2.529	–1.551	–0.545	0.116
	[1.65]	[2.40]	[0.51]	[0.37]
Males 20–24	–2.887	1.059	0.16	–0.076
	[1.55]	[1.40]	[0.12]	[0.19]
Females 20–24	–4.157	1.446	0.66	–0.177
	[1.95]	[1.61]	[0.49]	[0.45]
Males 25–39	0.038	–0.05	0.373	–0.105
	[0.03]	[0.10]	[0.31]	[0.29]
Females 25–39	–0.952	0.331	–1.591	0.384
	[0.62]	[0.56]	[1.26]	[1.05]
Males 40–54	–0.643	0.24	–0.437	–0.027
	[0.33]	[0.31]	[0.33]	[0.07]
Females 40–54	–5.017	1.749	0.404	–0.084
	[2.77]	[2.54]	[0.30]	[0.22]
Males 55–64	0.628	–0.413	0.894	–0.388
	[0.25]	[0.43]	[0.58]	[0.90]
Females 55–64	–1.21	0.324	1.268	–0.222
	[0.62]	[0.43]	[0.86]	[0.53]
Males ≥65	1.075	0.097	1.233	–0.233
	[0.40]	[0.11]	[0.81]	[0.55]
Females ≥65	0.589	–0.145	1.767	–0.343
	[0.26]	[0.16]	[1.25]	[0.85]

Notes: Dependent variable is share on education$_{98}$ – share on education$_{97}$. *t* statistics (in brackets) robust to heteroskedasticity and within EA correlations. Direct effect is measured for household at bottom of PCE distribution. Mean(lnPCE) – min(lnPCE) = 2.5 in urban sector, 3.4 in rural sector; max(lnPCE) – mean(lnPCE) = 5 in urban sector, 3.8 in rural sector.

education share regression expanded to include an interaction between lnPCE and each of the household composition covariates. The estimates are standardized so that the direct effect (in columns [1] and [3]) is the effect of more members in each demographic group on education shares for the poorest household.

Among the poorest, education shares are significantly higher if there are more males aged fifteen to nineteen, and this effect declines with expenditure. In poor households, additional females in this age group are associated with higher education shares, although the effect is much smaller than it is for males, and it is not significant. (The difference between the male and female estimated effect is significant.) Thus, the poor are not choosing to spend more on the schooling of the young men in the household while cutting education expenses for their sisters in the same age group: they are spending more on males while maintaining resources for both males and females to remain in school. Rather, the evidence indicates that among the poorest households, it is younger males *and* females (ten to fourteen years old) who are making room for the education expenses of their older siblings. Low-income households with more children in this age group have lower education shares. These (negative) effects are large and significant at the bottom of the PCE distribution, but they disappear as PCE increases, indicating that the poorest children are probably paying a very large price in terms of forgone education opportunities.

The interaction between lnPCE and the number of females aged fifteen to nineteen in table 12.6 is negative and significant. This indicates that the lower education shares associated with additional fifteen- to nineteen-year-old females in the household (in table 12.5) is important among higher-PCE households. It is apparently young women in these households who are less likely to be in school and, as noted above, more likely to be joining the labor force.

The links between household consumption and household composition are markedly different in the rural sector. Food shares (and staple shares) are lower in households with more older women and female infants. This suggests that older women are either cutting their own consumption or searching out ways to cut the fraction of the budget spent on food (say, by preparing less expensive foods or preparing more food at home). Whereas education shares are higher among urban households with more males aged fifteen to nineteen, in the rural sector, additional males in this age group are associated with lower education shares. Additional females in this age group have no impact on education shares.

Turning to the interactive model in table 12.6, we see the same pattern for younger children that is observed in the urban sector: education shares are substantially and significantly reduced in low-PCE households that have more ten- to fourteen-year-old children. The cuts are the same for male and female children, and the magnitude of the cut declines as PCE in-

creases. Furthermore, in rural households, there is a suggestion that education shares are lower if there are more young boys (five to nine years old) in the household.

Summarizing these results, there have been substantial reductions in the share of the household budget allocated to schooling between 1997 and 1998. The reductions are concentrated among the poorest households. The regression results suggest that poor households in both urban and rural areas are investing less in the schooling of their young children (ten to fourteen years old), and urban households are allocating resources to protect the schooling of adolescent males.

12.3.9 School Enrollment and the Crisis

We turn next to individual-level information on human capital in an effort to address some of the difficulties associated with interpreting changes in household-level expenditure to infer the impact of the crisis—specifically, the confounding impact of inflation and changes in household size and composition.

Thomas et al. (2004) examine school enrollment rates for school-age children in both IFLS and SUSENAS and report that the pattern of changes in enrollments between 1997 and 1998 are consistent with the inferences discussed above based on expenditure patterns. School enrollment declined most for young children and those from the poorest households. Among young urban children, those in the poorest households were less likely to be enrolled in 1998 if they had older siblings living in the household. The converse holds as well—older children in low-resource households were more likely to be in school if they had younger siblings. The evidence indicates that poor households have sought to protect their investments in the schooling of older children at the expense of the education of their younger children. In contrast, enrollment rates did not change significantly among children in households that are better off.

Why would poor households protect the education of older children at the expense of younger siblings? There are at least two potential reasons. First, in Indonesia, returns to primary schooling are low, whereas returns to secondary schooling are much higher. Keeping those children who were already in secondary school at the time of the crisis enrolled in school is likely to yield a bigger payoff than keeping a child in primary school. Second, if an older child leaves school, it is unlikely that that child will return to school later in life. In contrast, delaying the start of school for younger children by a year—or even disrupting their schooling for a year—is unlikely to preclude their enrollment in school in the future. Many Indonesian children start school at age seven or eight, and there is considerable movement in and out of school among young children.

Thus, if poor households who have faced a large, negative income shock did not have the resources to keep all children at school and if these house-

holds anticipated that the crisis would be short-lived—or that financial assistance for primary school education would be forthcoming in the future—it would make good sense to allocate resources toward maintaining the education of older children, even at the cost of the schooling of younger children. In addition to liquidity constraints, the discussion suggests the influence on behavioral responses to the crisis of expectations regarding its longevity, expectations regarding the future availability of support for schooling (or other forms of support). Clearly, if in the longer term young children did not enroll in school or performed poorly in school because of the disruptions to their education, these children will probably pay the price of the crisis throughout their lives.

The evidence on the long-term impact on school enrollments is unambiguous. By 2000, enrollment rates at all ages were higher than in 1997, especially among young children. The increase in enrollments is greatest for young children from poor households. This is, at least in part, a reflection of the social safety net that sought to reduce the costs of attending school by providing resources directly to publicly funded schools in lieu of their collecting school fees and providing scholarships for poor children to attend school. The jury is still out on whether there was any long-term impact of the disruption on learning and performance in the labor market.

12.3.10 Use of Health Care, Health Status, and the Crisis

The share of the budget allocated to health declined in both urban and rural areas, and especially deep cuts were recorded among the poorest rural households. This may reflect delaying—or forgoing—health care visits, which, if they are preventive, may not have a deleterious impact on the health of the average Indonesian in the longer term. It may also reflect switching from private care to subsidized public health care. In fact, there was considerable concern in Indonesia that public health services would be overwhelmed by increased demand for their services at a time when resources were very constrained because public health budgets had been determined in nominal terms prior to the crisis, and with very high inflation, real budgets had been decimated.

Evidence from IFLS suggests that lower spending is primarily due to reduced use of health care, which declined by around 30 percent between 1997 and 1998. Overall, these declines were largely in the public sector, where declines in service quality were substantial, as indicated by, for example, reduced drug availability. Part of the decline among young children can be attributed to a reduction in preventive care visits, particularly among children in poor households, which is potentially very troubling.

Putting aside preventive care visits, it is possible that the reduction in health care visits indicates that respondents felt their health status had improved. We turn next to exploit the richness of information on health contained in the IFLS, which includes biomarker assessments along with mul-

tiple self-reported indicators. We focus on three domains of health: nutrition, psychosocial health, and general health.

Nutritional status is a commonly used yardstick for measuring general health status. Among young children, height for age is a longer-run indicator of health, and weight for height a more short-run indicator. They are not only correlated with a broad array of health status indicators, but height is predictive of future health and also socioeconomic status as an adult. Among adults, weight or body mass index (BMI, which is weight divided by height squared in kg/m^2) has been shown to be predictive of mortality and morbidity (Strauss and Thomas, 1998).

There is little evidence that either height for age or weight for height of young children worsened significantly between 1997 and 1998. However, sample sizes are small among the youngest and arguably most vulnerable children, and there is a suggestion that, while not significant, weight for height among very young children is lower after the crisis. Height for age, on the other hand, is remarkably robust to the crisis for all young children.

Moreover, changes in the nutritional status of young children are trivial relative to changes in the weight of adults. Specifically, on average, BMI declined by around 2 percent for adults aged twenty-five and older, with the declines being greatest among older adults, females, and the poorest. For example, among women aged forty-five and older who had no education, BMI declined by nearly 4 percent.[15] Whereas in 1997 BMI was below 18.5 for 19 percent of these women, by 1998 the fraction had increased by nearly 50 percent to 27 percent of older women with no education. The decline in weight likely reflects the combination of two factors: increased energy output associated with greater work output and reduced energy intake due to the relative increase in the price of food. These results, in combination with the evidence on child nutrition, suggest that adults literally tightened their belts to protect the nutritional status of the next generation.

Why might adults have done that? Height is thought to be especially vulnerable during the first three years of life, and reduced growth during that period has been shown to affect attained height as an adult. In turn, greater height as an adult has been associated with improved health and greater economic and social prosperity. In contrast, the welfare effects of declines in adult weight, particularly temporary declines in adult weight, are more ambiguous except for those whose BMI was low in 1997. On average, by 2000, adult weight and BMI were no different from their levels in 1997. However, among older women with no education, the decline in BMI was not temporary and persisted to at least 2000. We conclude that families

15. Since height is fixed for prime-age adults, these estimates can be interpreted as indicative of weight declines among prime-age respondents. We use BMI rather than weight because BMI conditions on the stature of the respondent. Very low levels (below 18.5) have been shown to be associated with elevated risk of morbidity and mortality.

borrowed against the nutritional status of older adults in an effort to protect the health and nutrition of the next generation.

Hemoglobin status is measured in the home with blood from a pin prick. It is an indicator of iron status, which is associated with fatigue, work capacity, and susceptibility to disease. Hemoglobin levels improved between 1997 and 1998, particularly among those who were iron deficient in 1997. This probably reflects the impact of a change in diet, since rice consumption retards the absorption of iron in other goods, and, as noted above, people substituted away from rice because of the increase in its relative price.

Questions about psychosocial health were asked of adults. These markers were significantly worse around the time of the onset of the crisis in 1998, relative to before the crisis, and the effect persisted through 2000. For example, in 1993, around 17 percent of adults aged twenty-five and older reported themselves as being prone to bouts of sadness.[16] This fraction was 35 percent in 1998 and essentially the same in 2000. The fraction of adults who reported suffering from anxiety more than doubled from 7 percent in 1993 to 19 percent in 1998 and rose to 21 percent in 2000. These declines in psychosocial health are evident for males and females, the poorest and the better off, and for rural and urban dwellers.

All adult respondents also provided an assessment of their own overall general health status on a four-point scale. In contrast with nutritional status and psychosocial well-being, this indicator of health did not change between 1997 and 1998. It is not entirely clear how to interpret the indicator. It may indicate that respondents' perceptions of their own health did not change. Or it may reflect changes in what a respondent deems to be "good" or "poor" health, possibly as the health of the respondent's reference group changes.

With this concern in mind, IFLS incorporated a protocol that has not been widely adopted in socioeconomic surveys: after completing a battery of physical health assessments on each respondent, the health worker provided his or her own evaluation of each respondent's overall general health on a nine-point scale. The health worker, a trained nurse or doctor, measured anthropometry, hemoglobin from blood, blood pressure, lung capacity, and mobility and communicated with the respondents about their health but did not participate in the interviews that asked respondents to evaluate their own health. It is important to note that health worker evaluations are likely to be influenced by many more factors than health alone, including, perhaps, socioeconomic status.

According to the health workers, among respondents who were living in rural areas prior to the crisis, the health of both children and adults was significantly worse after the onset of the crisis in 1998, relative to their

16. Psychosocial questions were not asked in the 1997 wave of the survey.

health prior to the crisis in 1997. By 2000, the health workers judged the health of these respondents to be significantly improved relative to their health prior to the crisis. The health of urban respondents was no worse in 1998 than it was prior to the crisis, and by 2000 their health status was significantly improved relative to 1997.

The evidence of the impact of the crisis on health status highlights two important methodological issues. First, health is multidimensional, and the crisis did not have the same impact on all dimensions of health. Second, health measurement is not straightforward, and reliance on a single indicator may be seriously misleading. Moreover, biomarkers provide an important set of information that complements self-reported health status.

Overall, the evidence on human capital investments indicates that as the crisis unfolded, several dimensions of education and health were deleteriously affected, with the poorest and most vulnerable paying the biggest price in several important dimensions of human capital. However, permanent declines in physical health and education are difficult to detect, suggesting that households, families, and possibly communities adopted strategies that successfully mitigated longer-term negative consequences of the crisis on these indicators of well-being.

12.3.11 Earnings and the Crisis

We turn next to explicitly discuss two potentially important dimensions in which individuals and households likely respond to offset the impact of an economic shock on spending. We first summarize evidence on earnings and then turn to the depletion of assets.

Although Indonesia's economic crisis was accompanied by dire predictions of massive unemployment, the evidence is to the contrary (Smith et al. 2002). Between 1997 and 1998, there was a small decline in the fraction of the population working in the market wage sector (about 2 percent), which was more than offset by an increase in self-employed work. As noted above, the increase in labor force participation is, to a large extent, explained by a rise in the fraction of prime-age women who worked in family businesses.

The drama of the crisis is instead reflected in the collapse of real hourly earnings, which set the country back at least ten years in terms of wage levels. Between 1997 and 1998, real hourly earnings fell by around 40 percent for urban workers. This breathtaking decline is recorded for males and females, for market-sector workers, and for the self-employed. Declines of a similar magnitude are recorded for females who were working in the rural sector and for males working for a wage in rural areas. In stark contrast, real hourly earnings of self-employed males in rural areas remained essentially stable. This reflects the combination of two factors: increases in the price of agricultural output (particularly rice) and an increase in unpaid family labor on farm businesses (Smith et al. 2002; Thomas, Beegle, and Frankenberg 2003).

The combination of substantially lower wages and slight increases in labor supply suggest that individuals and households were doing everything they could to shore up income. Nonetheless, many households experienced very large declines in earnings. In urban areas, household income declined by around 40 percent on average. In rural areas, the decline was around 20 percent on average.

12.3.12 Wealth and the Crisis

Since household spending declined less than income, households must have depleted assets to mitigate the impact of the crisis on consumption. The IFLS pays considerable attention to the measurement of wealth, and only a very small fraction of households reported that they owned no assets in 1997. Much of the wealth of households was in farm and nonfarm businesses, housing, and land, which are not very liquid; with the collapse of the banking sector, markets for these assets were substantially curtailed. Liquid assets like cash and stock market investments are not likely to have been good buffers since their values plummeted as the crisis unfolded, the stock market collapsed, inflation soared, and bank deposits were frozen. There is, however, one asset that stands out as being critically important: gold.

Gold is more widely held than financial assets, and in 1997 well over half the households owned at least some gold. Gold is held by rural and urban households as well as by households across the entire distribution of PCE. Gold is widely and readily traded—the average distance to a gold trader in rural areas is less than the average distance to a bank. Key for the Indonesian crisis is that the price of gold is set in world terms, and so as the rupiah collapsed, the value of gold in terms of rupiah rose. Gold owned prior to the crisis was an important source of resources to buffer the impact of the crisis. Almost one-half of households who owned gold in 1997 had sold all of it by 1998—and it was the poorest who were most likely to sell gold. Regression evidence indicates that the gold was used to protect spending on health and education (Frankenberg, Smith, and Thomas 2003).

Depleting assets leaves these households vulnerable if they do not replenish these resources and if there are future shocks. In fact, there have been several major shocks since the financial crisis. These include the 2002 Bali bombing, which resulted in a collapse of tourism to that island, and the 2004 Indian Ocean tsunami, which devastated the coastal areas of Aceh and North Sumatra.

12.4 Conclusions

In the mid-nineties, Indonesia was often cited as a remarkable success, as it had emerged from being one of the poorest nations three decades be-

fore to being on the cusp of joining the middle-income countries. In early 1998, the tables were turned and Indonesia was in the midst of a serious economic and political crisis.

When the government was negotiating for assistance from the International Monetary Fund and international donors, there were dire predictions that the poverty rate in Indonesia would increase fivefold, turning back three decades of progress. Although the crisis in Indonesia was large and far-reaching, those predictions were simply wrong. Poverty did increase by perhaps 50 percent, although precise measurement of the magnitude of the impact is far from straightforward for at least three important reasons.

First, poverty is typically measured in terms of PCE levels. If household size and composition change in response to the crisis, then it is difficult to interpret changes in PCE as indicative of changes in well-being. It has been suggested that expenditure should be adjusted with equivalence scales. Putting aside important theoretical issues that arise with defining equivalence scales, the specification of the scales is not trivial. They need to take into account not only differences in need across demographic groups but also economies of scale associated with different household sizes and compositions. There is no consensus in the literature on how to define such scales.

Second, expenditure is the outcome of choices by individuals and households. In the face of a major shock to resources, it may be optimal to delay spending on semidurables. This will reduce expenditure—and potentially increase poverty—without necessarily having a substantial impact on well-being. This suggests examining the allocation of the budget across goods.

Third, financial crises are often accompanied by high and volatile inflation. Estimating inflation in these contexts is both difficult and very demanding of data. Without good estimates of location- and group-specific inflation, it is very difficult to estimate changes in poverty with any confidence.

This research has highlighted the practical importance of each of these issues in the context of the Indonesian crisis. In so doing, it has exploited the richness of the longitudinal data in the IFLS to examine the impact of the crisis on a broad array of indicators of well-being. The analyses provide insights into the coping mechanisms that individuals and households have adopted to mitigate the deleterious impact of the crisis.

The empirical evidence in the IFLS suggests that the crisis resulted in a dramatic decline in the standard of living, as indicated by reduced levels of consumption, increases in the share of the budget spent on food, cuts in investments in human capital, lower levels of income, and the spending down of assets. Although the effects of the crisis were felt by individuals and

households across the entire income distribution—the poorest, the middle-income groups, and those who were better off—the impacts on each indicator also varied substantially across the income distribution. In some cases, such as wages, the crisis was an equal-opportunity destroyer. In other cases, such as school enrollment of young children, the poorest paid the heaviest price. The effects also varied across space. Households living in communities that were net food producers were protected from the brunt of the crisis, benefiting from the increase in the relative price of food, particularly rice. Similarly, exporters and those who produced for the export market benefited from the collapse of the rupiah.

Several safety-net programs were implemented in response to the crisis, and some appear to have been successful. Subsidized food was distributed to many communities. Scholarships and free public schooling were implemented about a year after the crisis began, and there were subsequently substantial increases in school enrollments, particularly among the poorest. Similar subsidies for preventive health care visits and basic drugs might have arrested the decline in use of health care.

There is evidence that the safety nets were not especially well targeted—particularly the subsidized food program (Frankenberg, Thomas, and Beegle 1999). Moreover, many of the safety-net mechanisms were implemented well after the crisis began. Developing the information infrastructure to enable rapid implementation of well-targeted safety nets would probably be a profitable investment.

The evidence from the IFLS has also highlighted the manifold ways in which individuals, households, communities, and public policies responded to the crisis to mitigate its deleterious impact in the longer term. Households combined to exploit economies of scale of consumption and budgets were reallocated to provide for immediate needs. Individuals moved from urban to rural areas, where there were more employment opportunities and prices were lower; workers moved to the production of food and goods for export. Older adults tightened their belts to protect the nutritional status of young children; young children did not go to school while their older siblings stayed in school. Assets, especially gold, were sold off to smooth the impact of the crisis, particularly on human capital investments. A picture emerges of remarkable resilience of individuals and households in the face of a major economic and political crisis that carried with it tremendous uncertainty.

Appendix

Table 12A.1 Inflation rate (relative to December 1997)

Province	August	September	October	November
North Sumatra	68.2	78.2	76.7	77.9
West Sumatra	74.6	85.1	81.7	85.1
South Sumatra	76.4	87.7	85.4	85.0
Lampung	79.6	86.9	86.2	86.2
Jakarta	68.6	74.1	72.9	71.7
West Java	61.5	67.4	68.1	67.0
Central Java	61.4	67.6	67.3	68.1
East Java	69.2	76.7	76.4	76.0
Yogyakarta	78.8	83.4	83.6	85.0
Bali	62.7	70.5	71.3	73.8
West Nusa Tenggara	73.5	82.9	85.1	89.0
South Kalimantan	63.2	74.0	74.1	72.7
South Sulawesi	70.0	77.1	77.0	78.3

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