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Weathering the Storm: The Impact of the East Asian Crisis on Farm Households in Indonesia and Thailand

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This article assesses the impact of the East Asian financial crisis on farm households in two of the region's most affected countries, Indonesia and Thailand, using detailed household-level survey data collected before and after the crisis began. Although the nature of the shocks in the two countries were similar, the impact on farmers' income (particularly on distribution) was quite different. In Thailand, poor farmers bore the brunt of the crisis, in part because of their greater reliance on the urban economy, than did poor farmers in Indonesia. Urban-rural links are much weaker in Indonesia. Farmers in both countries, particularly those specializing in export crops, benefited from the currency devaluation. Although there is some evidence that the productivity of the smallest landholders declined over the period in question, it is difficult to attribute this directly to the financial crisis. At least in Thailand, a rural credit crunch does not seem to have materialized.

Now that the East Asian financial crisis has waned, its impact on two of the region's most affected countries, Indonesia and Thailand, can be more readily assessed. Agriculture is the major employer in these economies, yet little is known about how farm households weathered the crisis. Hyperbolic news reports notwithstanding, many farmers surely benefited from the exchange rate depreciation. Other effects of the crisis, however, may not have been so sanguine. Overall, one would expect considerable variation in the impact of the crisis within the rural sector. Of particular interest to policymakers, given the implications for the design of safety net programs and balanced rural development, is how the rural poor fared relative to better-off households. This article uses detailed household survey data from Indonesia and Thailand collected before and after the onset of the 1997 financial crisis to explore its effect on farm production and income, especially its differential impact on the poor.

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Framework for the Study

Both the similarities and the differences between the Indonesian and Thai cases are instructive. In both cases a currency collapse triggered a recession in the urban labor market, although it was more severe in Indonesia. Because farm households' exposure to these shocks varied across the two countries, the impact on incomes and particularly on the distributions of income was decidedly different. To make this argument more precise, consider the main channels through which crises like that of 1997 are transmitted to the countryside.

First there is currency depreciation, leading to higher prices for tradable commodities, such as rice and tree crop products. Against this increase in farm revenue is, all else equal, the higher cost of tradable inputs, most notably fertilizer. The net impact of the depreciation on farm income, given that the most important factors of agricultural production (land and labor) are nontraded, will typically be positive. Of course, farmers growing crops destined for domestic markets may receive a double blow: higher input prices and lower output prices because of the depressing effect of the recession on domestic demand.

After the devaluation, firms have difficulty servicing their debt denominated in foreign currency. A labor market recession, concentrated in urban areas, ensues. The impact on farm households depends on their ties to the urban economy, particularly to the hardest-hit sectors of that economy. If temporary rural-urban migration and remittances to rural families are pervasive, the recession will have a substantial negative effect on farm household income. Strong rural-urban linkages could also induce a fall in rural wages, which would only benefit those (perhaps few) farm households that are net hirers of labor.[1] The main point, however, is that the extent of labor market integration is decisive for transmission to the countryside. Also of possible importance for the distribution of labor market impacts across rural households is whether the recession affected unskilled workers more than skilled workers.

A secondary effect of recession and the consequent fall in cash income from off-farm employment is a reduction in a household's ability to purchase agricultural inputs, which would in turn reduce farm income. A related channel of crisis transmission is credit. The credit crunch that took hold after the onset of the crisis may have stifled the supply of rural lending, just as the demand was increasing due to a drying up of household cash reserves. The result may have been further pressure on the ability to purchase cash inputs.

As this discussion makes clear, a farm household's exposure or vulnerability to a crisis is complex and multifarious, depending on its positions in output, input, labor, and credit markets. Are poorer farm households more vulnerable? Perhaps so, because they tend to depend more heavily on wage income and less on cash-cropping. Yet poor farm households may be less dependent on the *urban* labor market than their richer counterparts and hence more insulated from the effects of recession. Indeed,

the much greater extent to which rural households in Thailand depend on off-farm income, largely from urban sources, is one of the striking contrasts between Thailand and Indonesia.

The East Asian financial crisis, particularly Indonesia's experience, has already spawned considerable literature. Fallon and Lucas (also in this volume) review crisis experiences in several countries, but present no new evidence. For Indonesia, Suryahadi, Suharso, and Sumarto (2000); Frankenberg, Thomas, and Beagle (1999); Skoufias, Suryahadi, and Sumarto (1999); and Skoufias (2000) examine changes in household expenditures or poverty indices since the onset of the crisis. Levinsohn, Berry, and Friedman (1999) infer such changes using data on precrisis expenditures and on changes in consumer prices (see Boothe 2000 for an overview). The picture that emerges from these studies is that urban areas, particularly on Java, were hit harder than rural areas, though poverty rose everywhere (see especially Skoufias 2000 on this point).

For Thailand, Kittiprapas and Intaravitak (2000) and the World Bank (2000a) analyze pre- and postcrisis expenditure data, and World Bank (2000b) and Kakwani (1998) investigate changes in employment and earnings based on labor force surveys (see next section). Knowles, Pernia, and Racelis (1999) examine both sources of evidence. The analyses of expenditure data yield somewhat different conclusions, with Kittiprapas and Intaravitak (2000) reporting almost no change in overall poverty (though a slight amelioration in income inequality) and the World Bank (2000a) indicating an increase in poverty concentrated in rural areas.

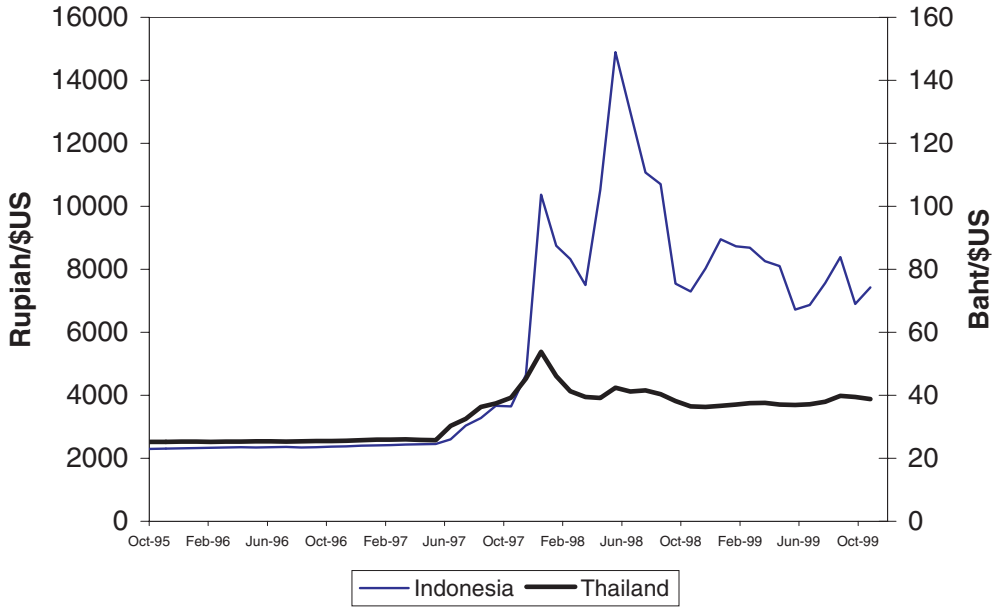
None of these studies for either country differentiates between farm and other households. Thus, this article fills a gap in the literature by providing detailed information on changes in agricultural production and in sources of income of farm households and by focusing on the distribution of crisis impacts *within* rural areas. Although Levinsohn, Berry, and Friedman (1999) also ask whether the rural poor in Indonesia were hurt more than the rich (their answer appears to be "no"), they use a very different approach that relies on changes in consumer prices rather than data on pre- or postcrisis income. Skoufias (2000), meanwhile, looks only at changes in the *distribution* of income in rural areas using pre- and postcrisis expenditure data.

Having established a framework for thinking about the crisis impacts and having situated the present investigation in the broader crisis literature, this article next examines the data. But before turning to this analysis, it is worth laying out the key stylized facts of the crisis, especially as they relate to agriculture.

Stylized Facts about the Crisis

The most spectacular macroeconomic symptom of the crisis was the currency devaluation (figure 1). In July 1997, the Thai baht was allowed to float, giving way to a

Figure 1. Monthly Market Exchange Rates, Rupiah and Baht



Source: IMF, *International Financial Statistics,* various years.

devaluation that ended several years of relative exchange rate stability. In August 1997, Indonesia followed suit, and the rupiah plummeted even more dramatically than the baht, settling at less than a third of its precrisis value against the U.S. dollar. Consumer price inflation surged in both countries, but again much more dramatically in Indonesia, as did nominal interest rates. Private domestic credit contracted sharply as well. Real gross domestic product per capita fell about 10 percent in Thailand and 13 percent in Indonesia from 1997 to 1998, although the agricultural sector fared relatively well in both countries.

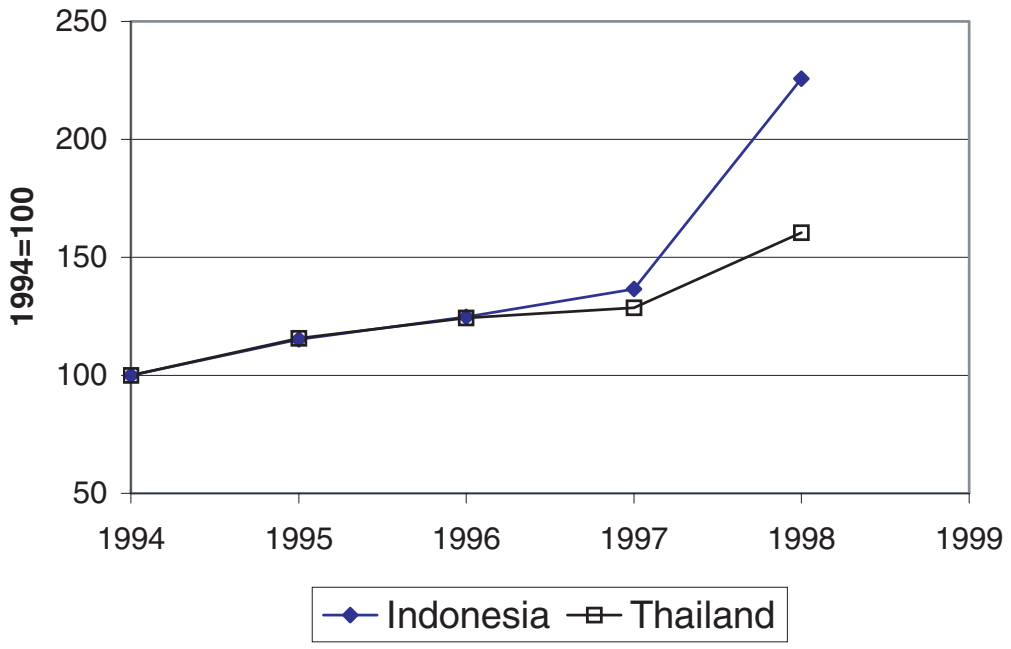
Recent analyses of labor force surveys reveal the impact of the crisis on the labor market. For Thailand, Kakwani (1998) shows that recession in the construction sector and, to a lesser extent, in manufacturing severely affected unskilled urban workers. Kittiprapas and Intaravitak (2000) report that between February 1997 and February 1999 unemployment in Thailand rose from 2.2 percent to 5.2 percent, and underemployment (less than 30 hours work per week) increased from 5.5 to 7.6 percent. Bangkok saw the biggest increase in unemployment, but rural areas were also affected. Real wages fell 3.8 percent (see also World Bank 2000b).

For Indonesia, the National Labor Force Surveys showed only a small increase in the unemployment rate, from 4.7 percent to 5.5 percent from 1997 to 1998, al-

though the National Socioeconomic Survey showed a larger increase, from 5.0 percent to 6.8 percent. By contrast, the drop in measured real wages was staggering—about 36 percent in urban areas and 32 percent in rural areas—largely reflecting the surge in inflation and stagnant nominal wages. No doubt the decline was partly a short-run phenomenon; some nominal wage catch-up would be expected in 1998–99. Data from the Farmer Terms of Trade survey (see following discussion) indicate a modest rise in real agricultural wages during 1999, but information on wages for urban sector employment is unavailable.

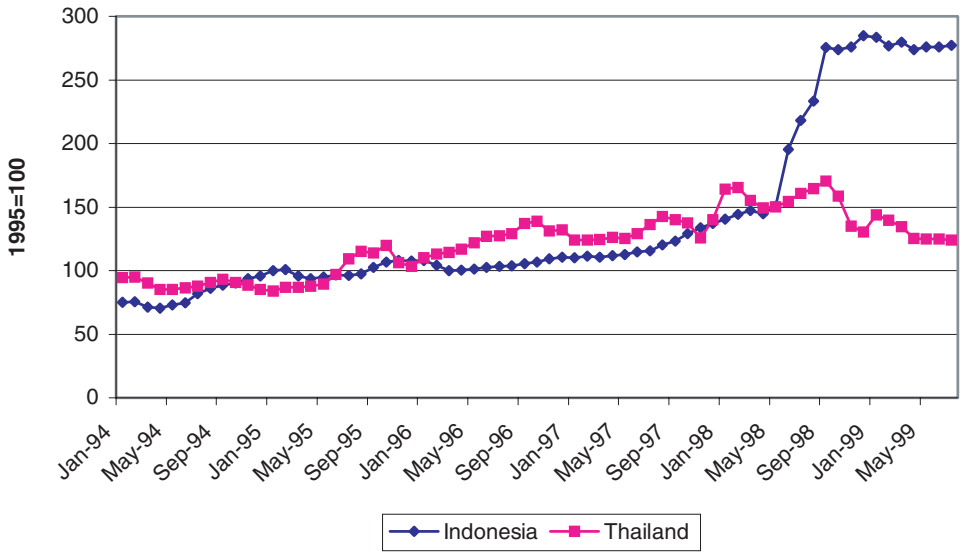
The currency devaluation translated directly into higher prices to farmers for tradable commodities. Average farmgate prices rose 29 percent in Thailand and 81 percent in Indonesia during 1996–98,[2] roughly mirroring the 68 percent depreciation of the rupiah and 20 percent depreciation of the baht between July 1997 and December 1998 (figure 2). Rice is the most important staple food and a major source of crop income for Indonesian and Thai farmers. Nominal growth in rice prices outstripped inflation in both countries between the onset of the crisis and the end of 1998 (figure 3), though prices settled down by mid-1999, so that the increase over precrisis levels was about the same as for other domestic consumer products. Thus, there was

Figure 2. Farmgate Price Indices, Indonesia and Thailand (1994 = 100)



Source: Farmer Terms of Trade survey collected by the Central Statistical Bureau for Indonesia and from Office of Agricultural Economics data for Thailand.

Figure 3. Farmgate Rice Prices, Indonesia and Thailand (1995 = 100)

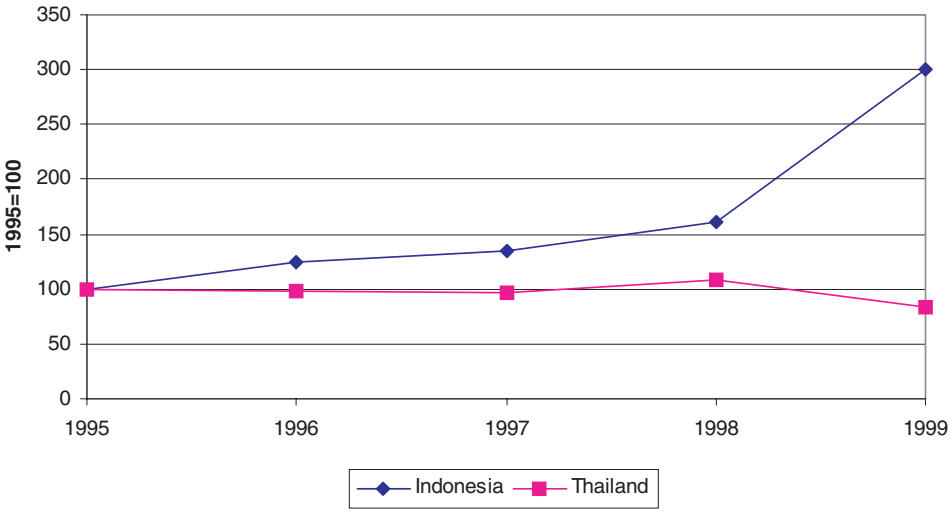


Source: Farmer Terms of Trade Survey data for Indonesia; Ministry of Agriculture and Cooperatives for Thailand.

little change in the relative price of rice for consumers, whereas for the surplus producer, the situation was vastly improved in Indonesia and only temporarily improved in Thailand. Rice prices in Indonesia shot up further in late 1999, but this change came in response to government reforms. It should also be noted that in Thailand international increases in the price of rice were not fully transmitted to the farmgate (Bresciani and others 2000).

Consider what happened to the nominal prices of urea, the fertilizer most commonly used by rice producers in the two countries (figure 4). Government subsidies and falling world prices limited the increase in domestic fertilizer prices during the crisis. In Indonesia, the price of urea rose only 22 percent from the third quarter of 1997 to the same period in 1998. However, fertilizer prices spiked upward after they were liberalized in the food marketing reforms of November 1998. The price of urea more than doubled in the six months from the third quarter of 1998 to the first quarter of 1999. Similarly, in Thailand, the increase in the price of urea in 1997–98 was less than the rate of currency depreciation, due in part to the 19 percent decline in international urea prices in U.S. dollar terms (World Bank 1999). As a result, many farmers enjoyed a significant improvement in terms of trade as commodity price increases outpaced the rise in fertilizer prices.

Figure 4. Nominal Prices of Urea, Indonesia and Thailand (1995 = 100)



Source: For Indonesia, the Farmer Terms of Trade input price series from Central Statistical Office. For Thailand, Ministry of Agriculture and Cooperatives; 1999 price is average for January–July.

Evidence on Crisis Impacts from Household Survey Data

To assess the rural impacts of the crisis, data collection efforts were initiated in Indonesia and Thailand in mid-1999. The samples and the content of the questionnaires had to match a suitable baseline precrisis survey to allow for comparison.[3] Both the Indonesian and Thai surveys ask about land use, crop and livestock production, input use, off-farm income sources, assets, and so forth. Panel data spanning the crisis period are available for about 1,600 rural households in each country.[4] In Thailand, the same 400 villages were sampled in each year, though not necessarily the same households. This does not affect the analysis in this article.

Both surveys have broad regional coverage, but neither is nationally representative—six provinces are surveyed in Indonesia (Central and East Java, Lampung, North and South Sulawesi, and West Nusa Tenggara) and three regions in Thailand (North, Northeast, and Central). (Representativeness within the regions or provinces covered is addressed in the following.) The Indonesian sample covers all rural households, about a fifth of them landless. This group is probably just as representative of the nonlandowning population of Indonesia as the rest of the sample is of the landowning population.

The Thai sample is restricted to households that own land. The consequences of not sampling landless households can be assessed from information in the nation-

ally representative Socioeconomic Survey (SES) for 1998, which collects information on household land ownership. The SES data indicate that about a third of rural households in the North, Northeast, and Central regions do not own land. But real per capita expenditures are almost 60 percent higher for this "landless" group than for landowning households, suggesting that the rural households overlooked by the Thai agricultural survey are, at least on average, not poor. Nevertheless, some of the landless rural poor have clearly been left out, a caveat to be kept in mind throughout the discussion of the analysis and findings.

It is tempting to view any changes that occurred between the baseline surveys—covering 1994–95 in Indonesia and 1995–96 in Thailand—and the follow-up surveys, covering 1998–99, as reflecting the impact of the crisis. However, both countries experienced robust growth right up until mid-1997, which could mask any crisis-induced downturn or exaggerate an upturn. Some of the effects of the crisis, such as the increase in rice prices immediately following the 1997 devaluation, were transitory and would have already dissipated by the time of the follow-up survey. Indeed, much of the 1995–99 increase in rice prices in Thailand (see figure 3) took place before July 1997 and cannot be attributed to the crisis. Also, the main effects of the El Niño drought were felt in 1997–98. In short, caution is required in drawing inferences about the impact of the crisis from these data. It would be more precise to refer to changes during the *crisis period*.

Choosing the right welfare-ranking criterion is critical for comparing crisis period impacts among poor and nonpoor farmers in each country. A common approach is to use per capita expenditures or income in the baseline period. The risk of misclassification is considerable, however, because of the large transitory component of expenditures and income and the low precision with which they are measured.

The approach taken here is to group households by quintiles according to per capita landholdings adjusted for land fertility. Landholdings are generally measured more precisely than consumption or income, and as the principal household asset in these samples, land is a good indicator of wealth. However, the value of land varies, especially by region, due to differences in fertility. To account for these regional differences, landholdings are adjusted by each region's average rice yield in the base year normalized by the rice yield in the highest yield region (Central Java in Indonesia and the Central region in Thailand). Multiplying landholdings by this indicator of relative yield creates a measure of fertility-adjusted landholdings. For example, the average yield in North Thailand is almost 90 percent that of the central region, and the Northeast average yield is about 60 percent. Thus, a household in the North with one hectare per capita is placed in the same effective landholdings quintile as a household in the central region with 0.6 hectare per capita. For Indonesia, nonlandowning households are lumped into the lowest adjusted landholding quintile. As mentioned, many of these "landless" households are truly landless laborers, but some also engage in business activities and are not poor.

A final methodological issue is the choice of deflator. For Thailand, where crisis-induced inflation was not so severe and regional markets are well integrated, the national consumer price index (CPI) is used. For Indonesia, the choice of deflator is more complicated because of the high postcrisis inflation and the geographic fragmentation of the country (Suryahadi, Suharso, and Sumarto 2000; Frankenberg, Thomas, and Beagle 1999). The province-specific rural CPI is used, based on the Farmer Terms of Trade survey data collected by the Central Statistical Office. This index more reliably captures changes in rural prices than, for example, the national CPI series, which is based on a sample from urban areas.

Changes in Total Household Income

Real household income is the sum of farm income (see the following discussion), off-farm labor earnings, business income, and government and private transfers. Table 1 reports median real per capita income in the two survey rounds and changes in medians across rounds for each of the adjusted landholdings quintiles. Census-weighted figures are reported to account for the fact that the size of the sample in each region does not reflect the true regional share of the rural population. For example, households on Java are underrepresented in the Indonesian sample. Thus observations are weighted by the actual regional or province share in the rural population divided by the sample share.

Two striking income results emerge. First, rural incomes appear to have risen faster in Indonesia than in Thailand, despite the greater severity of the crisis in Indonesia. However, this finding may be partly explained by the fact that the Indonesian surveys span nearly one extra year of precrisis growth than the Thai surveys. In addition, because the largest portion of agricultural revenues in Indonesia are earned at the end of the rainy season in March, which is near the close of the one-year survey recall period, deflating by average annual prices overstates real incomes. Further,

Table 1. Median Real Per Capita Income by 1995 Fertility-Adjusted Landholdings Quintile, Indonesia and Thailand

	Indonesia (thousands of 1994–95 rupiah)			*Thailand (1995–96 baht)*		
Quintile	*1994–95*	*1998–99*	*Change (percent)*	*1995/96*	*1998/99*	*Change (percent)*
1 (poorest)	341	357	4.5	12,351	9,909	–19.8
2	304	447	47.2	11,850	9,410	–20.6
3	306	455	48.7	12,356	14,602	18.2
4	379	579	52.6	14,463	16,113	11.4
5 (richest)	577	667	15.6	16,041	26,902	67.7

Note: See text for explanation of quintile adjustments.

Source: Data for Indonesia are from the 1994–95 and 1998–99 PATANAS surveys; data for Thailand are from the 1995–96 and 1998–99 Ministry of Agriculture and Cooperatives OAC farm household surveys.

because Indonesian inflation was very high in 1999 and much higher than in Thailand, 1999 income (and hence 1995–99 income growth) may be overstated in the Indonesian case.

Second, the relative effect of the crisis on the poorer farmers differs considerably in Thailand and Indonesia. In Thailand, the poorest two quintiles suffered large real income losses, whereas the richest households enjoyed spectacular income gains over the period. Confidence in this finding is bolstered by results showing a similar pattern in per capita consumption expenditures—available in the Thai survey, but not the Indonesian (table 2). Again, the top adjusted landholding quintile in Thailand did extremely well, but the bottom quintiles experienced large declines in real consumption.

The distribution of income gains is far more equitable in Indonesia, with no clear pattern emerging. The bottom landholding quintile appears to gain the least over the 1995–99 period, but recall that some of these households are not poor; indeed 1995 median income in this quintile is higher than that of quintiles two and three.

So, although the crisis period was far from disastrous for farm households overall, it did exacerbate income inequality among farm households in Thailand, but not in Indonesia. The question is why. The answer would seem to lie in a more fine-grained decomposition of income.

Changes in Farm and Nonfarm Income

A starting point in explaining the different experiences of rural households in Thailand and Indonesia is looking at how they earn their income. In Thailand, the median share of farm income (defined as the value of crop production minus variable costs and land rent plus net income from livestock and fishponds) in total income increases steadily by quintile, from lowest to highest: 30 percent, 41 percent, 47 percent, 63 percent, and 75 percent. The Indonesian sample includes households that

Table 2. Median Real Per Capita Expenditure by 1995 Fertility-Adjusted Landholdings Quintile, Thailand (1995–96 baht)

Quintile	*1995/96*	*1998/99*	*Change (percent)*
1 (poorest)	7,222	6,121	–15.2
2	7,760	5,852	–24.6
3	8,235	7,358	–10.7
4	9,520	8,507	–10.6
5 (richest)	11,360	13,723	20.8

Note: See text for explanation of quintile adjustments.

Source: 1995–96 and 1998–99 Ministry of Agriculture and Cooperatives farm household surveys.

do not own a farm, so the pattern of farm income shares by increasing landholdings quintile is more stark: 0 percent, 44 percent, 92 percent, 82 percent, and 99 percent.

The fact that the poor, as defined here, are less reliant on farming has profound implications for the distributional impact of the crisis. Richer farm households in these samples are highly exposed to agricultural output and input price shocks; poorer farm households have comparatively greater exposure to labor market shocks. During the crisis period, output and fertilizer prices moved in a direction favorable to farmers, while the labor market performed badly. Incomes of the poor, therefore, would be expected to suffer more than those of the rich. As will be seen, however, the reality is somewhat more complex.

In Indonesia, per capita farm income increased during the crisis, but with no clear pattern across adjusted landholdings quintiles (table 3). The growth in farm income for the first quintile, which consists of all households that owned no land in 1995, is due to the initiation of agricultural production. Surprisingly, nonfarm income also grew substantially from 1995 to 1999, driven by growth in business income on Java and labor income on the outer islands. Though some of this income growth may have occurred before the crisis, its magnitude is remarkable in light of the massive real wage declines reported earlier. Evidently, urban-rural linkages are weak in Indonesia. Only the lowest landholdings quintile did not enjoy growth in nonfarm income; the data actually show a considerable decline for this group. Because this quintile derives all its income from nonfarm sources, it naturally performed the worst in total income growth.

Table 3. Median Real Per Capita Farm Income and Nonfarm Income by 1995 Fertility-Adjusted Landholdings Quintile, Indonesia and Thailand

	Indonesia (thousands of 1994–95 rupiah)			*Thailand (1995–96 baht)*		
Quintile	*1994–95*	*1998–99*	*Change (percent)*	*1995–96*	*1998–99*	*Change (percent)*
Real per capita farm income						
1 (poorest)	0.0	6.3	—	2,350	1,473	–37.3
2	48.2	124.5	158.3	3,784	3,277	–13.4
3	175.9	177.7	1.0	4,362	5,490	25.9
4	218.4	324.0	48.4	6,098	7,346	20.5
5 (richest)	410.9	421.1	2.5	6,540	15,957	144.0
Real per capita nonfarm income						
1 (poorest)	311.0	276.7	–11.0	7,700	6,710	–12.9
2	166.8	188.3	12.9	6,200	4,927	–20.5
3	21.4	132.9	520.4	5,858	6,453	10.2
4	41.7	89.4	114.7	4,710	5,725	21.6
5 (richest)	0.0	79.6	—	5,050	5,457	8.1

Note: See text for explanation of quintile adjustments.

Source: Data for Indonesia are from the 1994–95 and 1998–99 PATANAS surveys; data for Thailand are from the 1995–96 and 1998–99 Ministry of Agriculture and Cooperatives farm household surveys.

In Thailand, off-farm income also declined for the lowest quintiles, and so did farm income. It is unclear why farm income declined only for the poorest households. There was no noticeable change in cultivation patterns (the issue of input use is taken up below). However, the question may be of limited practical significance since these households derive a small proportion of their income from farming their own land. For the upper income quintiles, the situation is reversed, with both farm and off-farm income rising. Why off-farm income increased for larger landholders is also a bit of a puzzle. Perhaps these households obtain more of their nonfarm income from skilled labor and small-scale business activities, which were less affected by the recession in Thailand.

The main lesson to be drawn from patterns of income changes is that farm households in Thailand that were most reliant on off-farm income experienced the biggest percentage decline in this income. Though this was also true in Indonesia, the magnitude of the shock to off-farm income was apparently much smaller, with fewer repercussions for rural income inequality. Clearly, it is not simply the extent of income diversification that exposes households to urban-based recessions but also the nature of the diversification. In Thailand, much off-farm income is earned outside the village and in sectors that suffered badly during the crisis, such as construction. In the Indonesian sample, however, the sources of off-farm income were not as closely tied to crisis-affected sectors; nearly a third of households had nonagricultural business income, and more than half the individuals reporting off-farm labor income earned it in agriculture.

Data on remittances speak to the relatively strong links between urban and rural sectors in Thailand and their importance during the crisis (table 4).[5] About a quarter of farm households receive remittances, presumably from out-of-village sources,

Table 4. Median Real Net Remittances by 1995 Fertility-Adjusted Landholdings Quintile, Thailand (1995–96 bhat)

Quintile	*1995–96*	*1998–99*	*Change (percent)*
1 (poorest)	5,000	2,165	–56.7
2	4,500	2,952	–34.4
3	3,333	2,666	–20.0
4	3,000	2,733	–8.9
5 (richest)	2,550	3,590	40.8

Notes: Households with positive net remittances only. The 1995–96 survey did not break out data on remittance. A special module attached to the 1999 survey asked about remittances received or sent during the 1995–96 and the 1998–99 crop years.

Source: 1998–99 Ministry of Agriculture and Cooperatives farm household survey.

though not necessarily from urban areas. Among households with positive net remittances, most suffered a downturn in remittances, with the poor especially hard hit. As is the case with off-farm income and possibly for the same reasons, the richest farm households experienced an increase in net remittances. These income gains may also be largely of precrisis origin.

Further support for urban-rural linkage in Thailand comes from migration patterns, which appear to have responded to the crisis-induced recession. A retrospective migration questionnaire included in the Thai survey found that annual migration into rural areas increased considerably after the onset of the crisis period, although the numbers involved are still too small to suggest a major return migration to the countryside (see Bresciani and others 2000 for more details).

Changes in Crop Production

For most farming households, the biggest effect of the crisis was a shift—sometimes massive—in the price of tradable commodities relative to nontradables. To understand the impact of this shift on farm income it is necessary to trace its effects through the production process. An interesting contrast between Thailand and Indonesia is the much greater reliance of Thai farmers on rice and consequently the greater homogeneity within the country in agricultural production activities. Well over 80 percent of the Thai households surveyed in each year cultivated rice, and rice accounted for more than half their crop sales.[6] On Java, Indonesia's rice basket, the production value share of rice is comparable to that in Thailand, but for the Indonesian sample as a whole the (census-weighted) rice share is only about 17 percent.

Despite the (transitory) increase in rice prices, no dramatic changes occurred in cropping patterns in Thailand between the two surveys. Obviously, the scope for substitution into rice (or other export crops) is limited in Thailand. In Indonesia, by contrast, there appears to be some scope for crop substitution in response to changing relative prices and other conditions.

Summary statistics on crop composition for the Indonesian sample shed some light on substitution (table 5). Farm households (that is, excluding business owners with no crop income in at least one survey year) are grouped by primary crops grown: rice, dryland crops, tobacco and sugarcane, and tree crops. Dryland crops include all grains other than rice and vegetables (potatoes, maize, shallots, cabbage, cassava, garlic, soybeans) and are grouped because of the high degree of substitutability in production between many of these crops. Most dryland crops show limited responsiveness to world prices, with the exception of shallots and soybeans. Dryland crop farmers are mostly found in the middle three landholdings quintiles.

Tobacco and sugarcane are combined because they represent the two largest cash crops produced primarily for the domestic market. At that time, all sugar was marketed through official channels with farmgate prices set according to a complicated

Table 5. Crop Composition, Indonesia

	Share of farm households growing commodity (percent)			*Mean area planted (hectares)*		
Commodity group	*1994–95*	*1998–99*	*Change (percent)*	*1994–95*	*1998–99*	*Change (percent)*
Rice	46.4	48.5	4.7	0.364	0.487	33.7
Dryland crops	47.1	55.2	17.1	0.412	0.757	83.6
Tobacco and sugarcane	14.2	8.7	–38.6	0.082	0.065	–21.0
Tree crops	50.6	57.1	12.8	0.471	0.560	19.0

Source: 1994–95 and 1998–99 PATANAS surveys.

formula that had no direct relationship with the world price. Tobacco production in Indonesia is contracted exclusively by domestic (Kretek) cigarette manufacturers and is not exported. Although there are no restrictions on cigarette imports, higher prices for imports are unlikely to have raised prices for Kretek cigarettes very much.

Most tree crops are tradable, and many experienced a large jump in price after the onset of the crisis. The tree crops with the greatest value of production in 1995 were coffee, cocoa, pepper, coconut, vanilla, and cloves. Tree crop farmers are concentrated in the higher landholdings quintiles.

There was a modest increase in the number of households growing rice, but a large jump in area planted to rice (see table 5). Both the number of households and the area under dryland crop production also grew considerably, coming partly from a 32 percent rise in the number of households growing corn. Some households may have shifted to corn production as a more reliable source of income during the 1997–98 El Niño drought. Many households withdrew from tobacco and sugarcane production, as might be expected, and average area planted declined as well. There was also an increase in households growing tree crops. These findings are generally consistent with the changes in relative output prices over the crisis period.

Farm income per capita grew robustly for tree farmers and rice growers, but that for dryland crops and tobacco and sugar growers stagnated or declined (table 6). Thus, as expected, export orientation of farmers is a powerful determinant of their success in weathering the crisis.

Given the status of rice as the main staple crop in both countries, changes in rice yields during the crisis period warrant consideration. Of particular interest is whether the drying up of off-farm income (especially in Thailand) and any rural credit crunch had deleterious effects on production. In Indonesia, rice yields fell for all but the highest landholdings quintile, and the decline was most severe for the poor (table 7). Evidently, the increase in farm income for rice growers as a group was due to higher rice prices rather than improved yields. The larger decline in yields for the poor may indicate that they faced more production constraints than their better-off counterparts. Thai farmers saw a modest overall increase in rice yields, but as in Indonesia the dis-

Table 6. Median Real per Capita Farm Income by Cropping Group, Indonesia
(thousands of 1994–95 rupiah)

Primary commodity group	*N*	*1994–95*	*1998–99*	*Change (percent)*
Rice	362	153	201	31.2
Dryland	296	208	210	1.1
Tobacco and sugarcane	126	215	184	–14.4
Trees	289	189	274	44.5

Source: 1994–95 and 1998–99 patanas surveys.

tribution of these production gains was inequitable. Households in the upper quintiles reaped higher yields, and the poorest cultivators saw their yields decline, as is consistent with the pattern of farm income changes reported in table 3. Again, this is tantalizing evidence that the crisis impeded the ability of the smallest farmers to produce efficiently, perhaps because credit constraints bind more stringently for these households.

However, other factors might have been at work as well. Drought may have had a differential impact on smaller farmers because of unequal access to reliable irrigation. The greater availability of hired farm labor, and therefore depressed agricultural wages, could have raised productivity on larger farms. The regional distribution of poor farmers does not appear to explain the finding for Thailand because there are at least as many poor farmers in the sample from the North, where yields rose, as there are from the Northeast, where yields fell.

A look at the use of fertilizer, the main cash input for rice production, might provide further insight. A significant fall in fertilizer use for poor farmers, concomitant with a decline in yields, would be compelling evidence of a cash squeeze. For Indonesia, a quantity index for different fertilizer types was constructed. For Thailand, only

Table 7. Median Rice Yields by 1995 Fertility-Adjusted Landholdings Quintile, Indonesia and Thailand
(tons per hectare)

	Indonesia			*Thailand*		
Quintile	*1994–95*	*1998–99*	*Change (percent)*	*1995–96*	*1998–99*	*Change (percent)*
1 (poorest)	3.448	2.879	–16.5	2.169	1.800	–16.9
2	3.750	3.200	–14.7	2.306	2.188	–5.2
3	3.045	2.800	–8.1	1.950	2.188	12.1
4	2.993	2.800	–6.5	1.888	2.013	6.5
5 (richest)	2.371	2.500	5.4	1.750	2.231	27.6
All	2.973	2.857	–3.9	2.000	2.081	4.1

Source: Data for Indonesia are from the 1994–95 and 1998–99 PATANAS surveys; data for Thailand are from the 1995–96 and 1998–99 Ministry of Agriculture and Cooperatives farm household surveys.

the household's total expenditure on fertilizer is available and is reported here in nominal terms because nominal fertilizer prices changed only slightly between the two survey periods.

Overall, the evidence is mixed. Fertilizer use declined for all but the bottom and top quintiles in Indonesia (table 8). For the bottom group, the increase was due to the initiation of crop cultivation since the 1995 survey. Perhaps the November 1998 price reform was responsible for the general decline in fertilizer use, but it is difficult to conclude that the poor were differentially affected. Suggestive, though, is the fact that the top landholding quintile was the only one to experience both an increase in fertilizer intensity and an increase in rice yield.

In Thailand, farmers in all quintiles increased their use of fertilizer, as inferred from the fact that their nominal expenditures increased while the price remained nearly constant. The poorest farmers increased their expenditures the least, but the difference in growth of fertilizer intensity is not enough to explain why yields fell on poor farms and rose on richer farms. In any event, the crisis certainly did not precipitate a contraction in fertilizer use in Thailand.

Finally, for Thailand at least, it is possible to assess the importance of the credit channel in propagating the crisis to rural areas (for Indonesia, credit data are not included in the precrisis baseline survey). Data on the total value of outstanding loans per household do not reveal a rural credit crunch, as debt remained fairly steady, or increased, in real terms (table 9). Although supply and demand factors cannot be distinguished with these data, no major contraction in the supply of loans could have occurred without a fall in the real value of debt, for which evidence is lacking. Moreover, changes in credit availability cannot explain differences in performance of poor and nonpoor farmers in Thailand because there is no strong pattern in changes in debt by landholding quintile. About a quarter of farm households with outstanding debt before the crisis

Table 8. Fertilizer Expenditure by 1995 Fertility-Adjusted Landholdings Quintile, Indonesia and Thailand

	Indonesia (thousands of real 1994–95 rupiah per hectare)[a]			*Thailand (baht per hectare)*		
Quintile	*1994–95*	*1998–99*	*Change (percent)*	*1995–96*	*1998–99*	*Change (percent)*
1	0.0	90.1	—	875	1,000	14.3
2	152.6	124.4	–18.5	656	800	21.7
3	146.6	109.3	–25.5	544	719	32.1
4	125.0	96.3	–23.0	488	700	42.8
5	49.3	54.4	10.4	494	625	27.4

[a]Deflator is a Laspeyeres index based on urea and trisodium phosphate price series.

Source: Data for Indonesia are from the 1994–95 and 1998–99 PATANAS surveys; data for Thailand are from the 1995–96 and 1998–99 Ministry of Agriculture and Cooperatives farm household surveys. Fertilizer price series (for Indonesia) are from Farmer Terms of Trade data, Central Statistical Office.

Table 9. Total Loans per Household by 1995 Fertility-Adjusted Landholdings Quintile, Thailand (1995/96 baht)

Quintile	*1995–96*	*1998–99*	*Change (percent)*
1 (poorest)	24,500	25,088	2.4
2	25,000	25,000	0.0
3	20,000	26,000	30.0
4	25,000	25,000	0.0
5 (richest)	30,000	33,990	13.3

Source: 1995–96 and 1998–99 Ministry of Agriculture and Cooperatives farm household surveys.

obtained government credit (roughly equal across quintiles). This share changes little in 1998–99, which is consistent with the view that the state Bank of Agriculture and Cooperatives maintained its lending operations throughout the crisis period.

Conclusions and Policy Implications

There is a temptation to generalize about the impact of the East Asian 1997 financial crisis on farm households. Perhaps the main lesson of this analysis is that doing so is fraught with peril. The impacts of the crisis were varied even within countries and all the more so across countries. The net effect of the crisis on household income depends on a broad range of factors; no simple economic classification of households will necessarily capture the differences in exposure to the set of shocks that constituted the crisis.

Nevertheless, classifying households by landholdings, a relatively fixed characteristic, yields useful insights, subject to the aforementioned caveats. The evidence suggests that the smallest farmers and landless households in Indonesia and Thailand bore the brunt of the crisis, but larger farmers fared quite well. The crisis generally depressed the labor market and improved the profitability of export crop cultivation. Small and landless farmers derive most of their income from off-farm sources rather than their own cultivation, and the reverse is true for larger farmers. Evidence from Indonesia supports the view that export orientation determines farmers' exposure to positive price shocks. Evidence from Thailand corroborates the importance of exposure to negative urban labor market shocks.

The household survey data also provide clues about how agricultural production was affected during the crisis. In Indonesia, where there is more scope for crop substitution than in Thailand, some substitution out of domestically marketed crops seems to have taken place. There is also evidence that profits and yields declined for

the poorest farmers while rising for the better-off farmers. It is difficult to pinpoint the exact cause. Changes in fertilizer use alone (possibly due to increased cash constraints) are probably not large enough to explain the difference. More research is needed to trace the links between off-farm income and farm production decisions and outcomes.

One can envision two types of rural policy responses to the crisis and to the prospect of future recessions more generally: changes in agricultural policy and changes in social policy targeted to rural areas. During the crisis period, the macroeconomic environment was favorable to agriculture, as this article has made abundantly clear. It could perhaps be argued that farmers would have benefited more, for example, had increases in the international price of rice been fully transmitted to the farmgate in Thailand or had the fertilizer price reform been phased in more gradually in Indonesia. But such initiatives would not have helped the poorest farmers very much, because they are not the main beneficiaries of agricultural policy. Similarly, various support policies, such as targeted and temporarily subsidized credit, would not have greatly benefited the landless or smaller landholders.

Change in social policy, by contrast, is worth careful examination. The evidence presented here, particularly that from Thailand, refutes the view held by some policymakers that the smallholder sector can absorb low-skilled labor dislocated by urban unemployment. Most of these workers are associated with farms too small to make productive use of them. Indeed, real per capita expenditures fell most precipitously for Thai households with the smallest landholdings. Temporary social programs targeted to the rural poor, perhaps using landholdings as a targeting criterion, could be effective in providing support for households adversely affected by recession. Such programs are lacking in Thailand (World Bank 2000; Kittiprapas and Intaravitak 2000) and are poorly targeted in Indonesia (Suryahadi, Suharso, and Sumarto 1999; Gilligan, Jacoby, and Quizon 2000), so there is considerable room for improvement.

It bears emphasis that the situation in rural areas of Thailand and Indonesia is fluid. Indeed, there is evidence from Thailand of a recent downturn in agricultural prices just as the urban economy is picking up (Kittiprapas and Intaravitak 2000). If so, some of the crisis impacts identified here may be at least partly reversed. This is not to argue for inaction, but only to suggest that a focus on immediate measures to deal with the 1997 crisis may be misplaced. A more considered medium- and longer-term policy focus would perhaps be on increasing the access of the rural poor to off-farm employment through improved rural infrastructure and other measure and on upgrading the skills of the rural labor force through better education.

Notes

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1. A more subtle effect on the rural labor market would go in the opposite direction. Improved farmer terms of trade could raise the demand for agricultural labor and thereby raise rural wages, at least in the short run, where the supply of agricultural labor is not perfectly elastic.

2. Though the price index for Thailand is a national average, in the Indonesian case it is an average of the rural producer price indices for the six provinces included in the Indonesian sample. The primary crops are rice, soybeans, cassava, coffee, pepper, and cloves.

3. More details on the data sets can be found in Gilligan, Jacoby, and Quizon (2000) for Indonesia and in Bresciani and others (2000) for Thailand. In Indonesia, the 1999 survey built on the long running PATANAS panel collected by the Center for Agricultural Socio-Economic Research. In Thailand, the 1999 survey followed a subsample of the 1996 farm household survey collected by the Ministry of Agriculture and Cooperatives. The Mekong Environment and Resource Institute assisted in this effort.

4. In the first stage of the Indonesian sampling scheme, villages were chosen to be consistent with the primary crops, topography, and cropping patterns of the region, with an eye toward capturing the diversity of Indonesia's cropping arrangements. In the second stage, 50 households were randomly selected from each village, so any errors in obtaining a truly representative sample were made at the stage of identifying villages.

5. Though remittances are included in the measure of household income reported above, it is not possible to isolate remittances based on the information in the income module. However, a special module attached to the second survey did ask questions about remittances received or sent during the 1995–96 and the 1998–99 crop years. Given the retrospective nature of the data, though, net remittance income is likely to be imprecisely measured, especially for the 1995–96 crop year. In particular, respondents may have difficulty distinguishing remittances from off-farm earnings of resident family members.

6. Another important crop (and export) in northeast Thailand is tapioca for processors (23 percent of the total cash sales). In the north, corn for animal feed is the next most important commercial crop after rice (6 percent of total cash sales), while in the central region sugarcane for processors is the second most important commercial crop (26 percent of total cash sales).

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