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El Niño or El Peso?

Crisis, Poverty, and Income Distribution in the Philippines

In terms of its impact on poverty, the recent economic crisis in the Philippines was more of an El Niño phenomenon than a financial crisis.

Gaurav Datt
Hans Hoogeveen

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Summary findings

Using household survey data for 1998, Datt and Hoogeveen assess the distributional impact of the recent economic crisis in the Philippines. The results suggest that the impact of the crisis was modest, leading to a 5 percent reduction in average living standards and a 9 percent increase in the incidence of poverty—with larger increases indicated for the depth and severity of poverty.

The greater shock came from El Niño rather than through the labor market. The labor market shock was progressive (reducing inequality) while the El Niño shock was regressive (increasing inequality).

Not all households were equally vulnerable to the crisis-induced shocks. Household and community characteristics affected the impact of the shocks. Ownership of land made households more susceptible to the El Niño shocks; higher levels of education made households more vulnerable to wage and employment shocks.

The impact of the crisis was greater in more commercially developed communities. Occupational diversity within a household helped mitigate the adverse impact.

There is some evidence of consumption smoothing by the households affected by the crisis, but the poor were less able to protect their consumption, which is a matter of policy concern.

This paper—a product of the Poverty Reduction and Economic Management Sector Unit, East Asia and Pacific Region—is part of a larger effort in the region to better understand the social impact of the crisis. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Taranaki Mailei, room MC8-142, telephone 202-458-7347, fax 202-522-1557, email address tmailei@worldbank.org. Policy Research Working Papers are also posted on the Web at www.worldbank.org/research/workingpapers. The authors may be contacted at gdatt@worldbank.org or hhoogeveen@econ.vu.nl. October 2000. (38 pages)

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Gaurav Datt and Hans Hoogeveen[1]

World Bank
Washington D. C.

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1. Introduction

When devaluation of the Thai Baht in July 1997 marked the beginning of the Asian financial crisis, the Philippine economy was in relatively good shape. In the three years prior to the crisis, the Philippines was not only enjoying favorable economic growth, inflation had returned to manageable levels after the double digit rates of 1988-91, the Peso was stable against the US dollar, net international reserves had grown to comfortable levels, and the fiscal budget was in surplus. Poverty rates had been declining; for instance, the incidence of poverty declined from 32% in 1994 to 25% in 1997 (Balisacan 1999, 2000).[2]

Nonetheless, the Thai financial crisis was rapidly transmitted to the Philippine economy and large capital outflows instantly created downward pressure on the Peso. The *Bangko Sentral ng Pilipinas* (BPS) initially tried to defend the Peso but as foreign reserves were insufficient to counter the massive capital outflows, the Peso depreciated from P26.40/$ in June 1997 to P37.20/$ in December 1997 to a peak level of P42.66/$ in January 1998. To ease the pressure on the exchange rate the government raised interest rates. In tandem with the depreciating exchange rate, interest rate on 91 day treasury bills rose from 10.5% in the first half of 1997 to a high of 19.1% in January 1998. Net domestic credit stopped growing and there was a sharp decline in investment (by 17% during 1998).

With the setting in of the financial crisis by the last quarter of 1997, the Philippine economy stalled in 1998. Real GNP shrank by 0.5% in 1998 (Table 1). Per capita real GNP declined by 2.7%. The financial crisis was compounded by the worst drought in 30 years caused

[2] The decline in the poverty headcount was much less by official estimates, from 41% in 1994 to 37% in 1997, though most of the difference seems attributable to the use of per capita income rather than per capita consumption as the welfare indicator. See Balisacan 1999, for further details.

by the El-Niño beginning September 1997. This was reflected in the 1998 sectoral growth rates. Agriculture contracted the most, by 6.6%, while industrial production fell by 1.7%.

With the slowdown in output growth came the slowdown in employment. Unemployment rates increased to double-digit levels during 1998 (averaging 10.1% in 1998 against 8.7% in 1997). Inflation also accelerated to double-digit levels. With the plummeting of agricultural output, food prices increased even faster than the general level of prices (Figure 1). The crisis also reduced government revenues, which constrained public spending despite an overall counter-cyclical fiscal policy adopted by the government. And real per capita spending on the social services declined in 1998.

These macroeconomic developments raise a number of questions related to the potential impact of the crisis on living standards of the Filipino population. In this paper, we address the following four.

i) How large was the impact in terms of the effect on average living standards and measures of absolute poverty?

ii) How was the impact distributed across the population? What factors contributed to rendering some households more vulnerable to the adverse shock than others?

iii) How did the impact on household consumption compare with that on household incomes? Is there any evidence of consumption smoothing by households?

iv) Was the Philippines crisis more of an adverse weather phenomenon than a financial crisis? What was the relative contribution of the El-Niño shock to the total impact?

In addressing these questions, this paper limits its focus to the consumption or income dimension of the welfare impact. The crisis of course potentially affected other dimensions of

welfare, however their analysis remains beyond the scope of this paper.[3] The paper is organized as follows. The following section reviews what is known about the impact of the crisis in the Philippines. In the course of this review, we also make some methodological comments on related literature for other countries in the region. Sections 3 and 4 respectively describe the data and our methodology. Our results are presented in Section 5. The final section sums up with some concluding observations.

2. What do we know about the distributional impact of the crisis?

While it is generally believed that the Philippines escaped the worst of the regional financial crisis[4], relatively little is known about the distributional impact of the crisis (which for the Philippines turned out to be a combination of financial and weather-related shocks). One strand of work for other countries in the region has involved comparisons of distributional parameters, including measures of absolute poverty, based on household survey data before and after (or during) the crisis.[5] For the Philippines, the latest available household survey is the 1998 Annual Poverty Indicators Survey (APIS) conducted by the National Statistics Office (NSO).[6] Using these data in conjunction with data from the 1997 Family Income and Expenditure Survey (FIES), Reyes, de Guzman, Manasan and Orbeta (1999) reported that per capita income declined

[3] Some of the non-income effects may of course be mediated through changes in household incomes or consumption. An assessment of the income or consumption impact thus has some relevance for the potential magnitude of non-income effects too.

[4] See for instance, World Bank (1999).

[5] See, for instance, estimates in World Bank (2000). Some of this literature is also reviewed in Booth (1999). For recent estimates for Indonesia, see Suryahadi, Sudarno, Suharso, and Pritchett (1999).

[6] A second round of the APIS for 1999 was also recently fielded by the NSO, though data from this survey are not yet available.

by 3.6% in nominal terms and 12.1% in real terms.[7] However, as Reyes et al. acknowledge, even these before-after comparisons are problematic for the Philippines due to non-comparability of the income and consumption modules across the two surveys (see below for details). The before-after comparisons also run into the problem of a misspecified counterfactual. Even for a systemic shock, "before" estimates may not be a good approximation of the estimates "in the absence of a shock".

A different approach has been used for Thailand and Korea (Kakwani 1998, Kakwani and Prescott 1999) where the counterfactual level of an indicator of interest is constructed by obtaining a predicted value from past trends of the indicator up to the crisis. Thus, if y_t is the value of, say, the poverty indicator in the crisis period t, and y_t^* is its predicted value based on past trends, then a crisis index for the poverty indicator is defined as $((y_t^*/y_t) - 1)$ and it measures the percentage change in poverty due to the crisis. This approach, though unimplementable for the Philippines for lack of comparable post-crisis distributional data, is also methodologically problematic on two counts. First, it is not clear over what period should one estimate trends prior to the crisis, particularly so for a country such as the Philippines which has had a checkered history of booms and busts (Lim 1998). In the end, the choice of the estimation period often becomes an arbitrary expedient of data availability. Second, since the counterfactual is constructed using unconditional trends, the approach attributes a 100% of the departure from trend to the crisis, thus making no allowance for changes in other non-crisis determinants of living standards.

[7] There were some studies done before the APIS data became available in 1999. For instance, Reyes and Mandap (1999) used an existing CGE model to simulate the likely impact of the crisis on incomes. They found that the crisis would lead to a fall in average incomes of all deciles and an increase in the Gini ratio. No attempt was made to separate the El Niño from the financial crisis effects, nor were there any simulated effects on consumption. There were also studies undertaken by the World Bank and UNDP, and by Lim (June 1998). These studies were done shortly after the financial crisis and in the midst of the El Niño drought, and had to rely on secondary data to explore anticipated rather than actual effects.

There is also work on panel data-based analysis of the impact of the crisis for Indonesia. For instance, Beegle, Frankenberg and Thomas (1999) estimate how changes in per capita consumption and transitions into and out of poverty during 1997 and 1998 were related to a set of household and community covariates in 1997. Such panel data analysis however also comes with its own set of problems. First, a potential advantage of panel data is that we can eliminate potential bias due to any omitted observed or unobserved household level determinants of welfare, using household fixed or random effects. However, without an independent measure of the household-specific shock, the presumption is that everyone was hit by the crisis-induced shock, and this rules out the use of "difference-in-differences" estimation that has often been used in impact evaluation analysis.[8] Second, while panel data holds the promise of providing a direct measure of welfare change, there is also the thorny issue of measurement error. It is not clear how much of the observed change in household welfare or transitions into or out of poverty are signal rather than noise. Thus, even with panel data, empirical determination of the distributional impact of the crisis is not easily resolved.

There have also been estimates of self-rated poverty for the Philippines based on quarterly surveys conducted by the Social Weather Stations (Mangahas 1999). According to these surveys, the incidence of poverty[9] averaged 59% for the period 1996-97 while the average for 1998 was 61%. Similarly, Reyes et al. (1999) reported an increase in self-rated poverty from 40% just before the crisis to 43% in January 1999.[10] Quite apart from the use of a very different

[8] A useful discussion of the properties of this and other estimators commonly used in the impact evaluation literature can be found in Angrist and Krueger (1999).

[9] The incidence of self-rated poverty is not calculated using a pre-determined poverty line but by asking households where would they place their family on a card marked with the words "poor" and "nonpoor" and a line in between. See Mangahas (1999) for further details.

[10] This is however based on a much smaller survey of 430 households in 31 communities. The sample households were selected on the basis of spatial and sectoral categories using purposive rather than a probability sampling (Reyes et al. 1999).

concept of poverty, for reasons analogous to those mentioned above, it is unclear how of much of this increase could be attributed to the crisis.

As for work on the relative weights of the El Niño and financial components in the overall impact of the crisis, this has remained limited to the suggestion that the El Niño phenomenon may have had a greater impact than the financial crisis, based on sectoral employment and output information (Ponciano et al. 1998). Such a general statement could also be surmised from the sectoral growth rates presented in Table 1, which show a greater slump in the agricultural sector. However, this is no more than a conjecture since it can hardly be presumed that El Niño's effects were confined to the agricultural sector. Nor can it be presumed that the financial crisis affected only the non-agricultural economy. In addition, the distributional impact within each sector could also be quite diverse, which makes it difficult to assess the poverty impact of the two shocks from their contribution to the impact on sectoral output or employment levels.

3. Data

3.1. 1998 APIS survey: an opportunity?

The 1998 APIS survey was designed to be a longitudinal survey forming a panel with the 1997 FIES. 23,150 households (59.8% of the APIS sample) were thus common to both surveys. While these data could in principle provide us with a direct measure of welfare change, the potential usefulness of the longitudinal nature of these data was seriously impaired by problems of comparability of income and consumption across the two surveys. The comparability of income was impaired because the reference period used in the APIS is limited to a six-month period (from April to September 1998), while the FIES incomes relate to the full calendar year (January to December 1997). A partial-year recall of incomes introduces unknown seasonal

biases in the estimates of incomes, and has particularly serious implications for estimates of agricultural incomes and incomes from other self-employment which are best defined in annual terms. The comparability of consumption, on the other hand, was compromised by the use of a much shorter consumption module in the APIS.[11] The APIS uses a two-page module identifying only major categories of consumption while a detailed forty-page consumption module is used in the FIES with a detailed coverage of items within categories. A shorter consumption module generally introduces a downward bias in measured consumption levels (see, Jolliffe, 1999, for instance). Thus, *ex post* it is virtually impossible to separate out how much of any observed decline in consumption would be attributable to a real crisis-related welfare shock versus how much is simply on account of measurement error related to the use of a shorter module.

3.2. Direct self-reported measures of shock

In view of this problem, we explored other ways of ascertaining welfare impact of the crisis. Fortunately, a separate section of the APIS survey also included some direct questions on the crisis, where households were asked if they were adversely affected by the crisis in different ways. In particular, five potential shocks were identified. Households were asked: "During the past six months, did the following problems affect you and your family?"

i) increasing prices of food and other basic commodities,

ii) loss of job within the country,

iii) loss of job due to retrenchment of migrant/overseas workers of the family,

iv) reduced wages,

v) drought or "El Niño".

[11] There is some limited abbreviation of the income module too in the APIS, but for the most part, the income modules of FIES and APIS are comparable.

It is however not clear what is meant by being "affected by a problem". The allusion to being affected by a "problem" rather than just an "event" is indicative of the intent to elicit responses on potentially adverse impact. But all we have from the survey are yes/no responses from households; we have no measure of the intensity of the effect of any one of these shocks.

The relative frequency of different shocks is indicated in Table 2. Two key points are notable about the figures in Table 2.

First, virtually everyone – nine out of every ten persons – reported being affected by the price shock. However, a large share of the population was also hit by other shocks. For instance, about two-thirds of the population reported being hit by at least one of the other four shocks.

Second, most households reported being affected by more than one shock. For instance, less than 30% of the population was reportedly affected by only a single shock. If one were to disregard the price shock, which was experienced by virtually everyone, less than 3% of the population reported being affected by a single shock only. The multiplicity of shocks reported by the households reflects both the multidimensional nature of the crisis as well as multiple sources of income within the household.

3.3. Alternative specifications of the shock variable

The universal nature of the price shock makes the identification of its impact virtually impossible using a single cross-sectional data. The size of the sub-sample not affected by the price shock is far too small to construct a credible control group. On the other hand, the shock due to loss of migrant or overseas job is experienced by relatively few households accounting for less than 5% of the population. We thus decided to focus on two main categories of shocks for our analysis: the *labor market shock* applying to households who experienced either reduced

wages or a loss of job within the country or overseas (this combines shocks ii, iii and iv above); and the *drought or El-Niño shock* (shock v above). Further, given that some households experienced both types of shocks, we eventually identified *three* mutually exclusive categories of shocks, viz., (1) labor market shock alone, (2) El-Niño shock alone, and (3) joint labor market and El-Niño shock. Using these definitions, we find that about 9% of the population (8% of sample) was affected by the labor market shock, about 40% (39% of sample) by the El-Niño shock, and about 19% (18% of sample) was affected by both. Altogether, the three shocks account for more than two-thirds of the Filipino population (Table 2). In the following, we attempt to identify separate effects of these three shocks on household living standards.

4. Methodology

Our basic model for assessing the impact of the crisis is straightforward. Household living standards, measured by their per capita consumption, are determined by a number of household attributes and the attributes of the communities they live in. They are also determined by their exposure to crisis-related economic shocks, leading to the following characterization:

$$\text{(1)} \quad \ln C_j = \beta' X_j + \gamma^L S_j^L + \gamma^E S_j^E + \gamma^{LE} S_j^{LE} + \varepsilon_j$$

where C_j is the average consumption per person in household j, X_j is a set of household characteristics and other determinants of household j's per capita consumption, $S^{()}{}_j$ are binary variables indicating if the household experienced crisis-related shocks, and ε_j is a random disturbance term. As discussed above (section 3), three measures of shock are distinguished: the labor market shock (S^L), the El-Niño shock (S^E), and both (S^{LE}).

Consumption per capita is adjusted for spatial cost of living differentials and is expressed in 1998 Manila prices using spatial price indices estimated by Balisacan (1999). The vector X_j

controls for a large number of potential determinants of household consumption that are briefly described below.

i) *Household demographics:* This includes linear and quadratic terms in family size, and household composition variables including number of adult (ages 15-60) male and female members, number of children below 7 years of age, and number of children in the age group 7-15.

ii) *Characteristics of household head:* This includes indicator variables for female headship and marital status (being single, divorced or widowed), as well as linear and quadratic terms in age of the household head.

iii) *Education:* This includes average completed years of schooling of adult household members and a quadratic term in the same. We experimented with separating out male and female average years of schooling and also using dummy variables for each successive year of schooling. This did not significantly improve upon the simple quadratic specification in average years of schooling, and hence we decided to stick to that specification in the interest of limiting the number of interaction terms with the shock variables in an augmented model discussed later.

iv) *Occupational characteristics:* Occupational background of household members is represented by a set of binary variables for different occupational sectors they were employed in. The binary variables take a value of unity if there is at least one household member working in a given sector, zero otherwise.[12] Ten sectors are distinguished: agriculture, fishery and forestry; mining and quarrying; manufacturing; electricity, gas

[12] We prefer this to a specification in terms of the number of members in each occupational category because the latter is more likely to be responsive to a shock than the affiliation of at least one member to an occupational category. All occupational variables relate to a household member's primary job or business during the first three months of the survey, i.e. April-June 1998.

and water; construction; in wholesale or retail trade; transport, storage, communication; finance, real estate, business services; community, social, and personal services; and other occupations. A variable representing employment diversity within the household is also included; this is defined as the number of distinct occupational sectors in which the household members were employed. We later examine the extent to which such diversity works as a risk-management strategy. We also include a dummy variable for households who report producing any food for self-consumption.

v) *Land, electricity, social network, public assistance:* We include binary variables for household's ownership of land (data on the amount of land owned are not available), and its use of electricity which is included as a proxy for other income-generating endowments of the household. We also include a binary variable indicating household membership of cooperatives or NGOs; this mimics social capital variables that have sometimes been suggested to be important both as a determinant of household living standards as well as a mechanism to insure against bad times.[13] We also include an indicator variable for households who were recipients of assistance from the government, including receiving a scholarship or agricultural extension services, or being a beneficiary of the housing or the land reform program.

vi) *Community or barangay characteristics:* Here, we include three indices based on *barangay* or community-level data: one for infrastructure capital, one for community social capital, and one for commercial capital. The infrastructure capital index is constructed as an average of binary variables indicating the presence in the barangay of a phone, a telegraph, postal services, a laid-out street pattern and access to national roads.

[13] Following Putnam's (1993) influential study, there has been a large literature that has sought to tie both individual and community-oriented notions of social capital to economic success in various forms.

The community social capital index is constructed as an average of binary variables pertaining to the presence of a town hall, a community hall, a church, or a park in the barangay. The commercial capital index is constructed by adding barangay-level variables on the number of financial institutions, industrial establishments and stores and dividing by 30 (the highest number attained[14]).

Summary statistics on the model variables can be found in Annex Table 1.

In order to capture any omitted (observable as well as unobservable) provincial/sectoral level determinants of consumption, we also allow for strata fixed effects where 168 strata are identified by the rural and urban sectors of individual provinces.

In the simple construct of model (1), the γ-parameters yield measures of the impact of the crisis on household living standards. For instance, an estimated value of –0.05 for γ^L implies that the exposure to labor market shock alone reduces per capita consumption by 5%. However, model (1) also carries the implication that a given shock has the same proportional impact on consumption for all households affected by that shock. This seems an overly strong assumption. Presumably, a shock may hit some households more severely than others, and similarly, some households may be better able to protect their living standards than others when hit by a particular shock. For instance, the impact of a wage shock may depend on the education level of the workers and the effect of drought may depend on the ownership of land. In general, the impact of the shock would be expected to be a function of the characteristics and circumstances faced by the household. This consideration leads us to an augmented version of model (1) where we interact shock variables with a set of household and community characteristics (Z_j):

[14] For each of these three indicators, the APIS questionnaire records the actual number if less than 10, and records 10 if there are 10 or more of them in the *barangay*.

$$\textbf{(2)} \quad \ln C_j = \beta' X_j + \gamma^L S_j^L + \gamma^E S_j^E + \gamma^{LE} S_j^{LE} + \delta^{L\prime} Z_j S_j^L + \delta^{E\prime} Z_j S_j^E + \delta^{LE\prime} Z_j S_j^{LE} + u_j$$

The interaction terms could also be interpreted as indicative of how the returns to specific characteristics are altered by the shocks related to the crisis.[15] The vector of interacted characteristics, Z_j, could be the same as the set of determinants of consumption, X_j. However, in the interest of maintaining a more parsimonious specification, we limit Z_j to a subset of X_j.[16] In particular, we allow the effects of shocks to depend on the households' endowments of labor, land and human capital; we thus include the number of adult male and female members, the average years of education of adult members, and the ownership of land. We also allow the shocks to depend on households' social network and employment diversity, as measures of their risk-management abilities. And finally, we allow the shocks to depend on the community-level indices of infrastructure, social and commercial capital. Thus, each one of the three shocks was interacted with this set of nine variables.

In estimating models (1) and (2), we treat the crisis-related shocks as exogenous to households' current living standards. This seems a reasonable assumption. The financial or weather-related shock was much in the nature of *fait accompli* at the household level, and thus arguably exogenous to household living standards. One could however argue that there is endogeneity due to the self-reported shocks being measured with error. We later comment on our attempts to relax this assumption.

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[15] The introduction of several interaction terms also makes for a flexible functional form which brings this approach closer to matching techniques often used in impact evaluation studies, where a control group is generated conditional on observable characteristics (Heckman, Ichimura, and Todd 1998).

[16] We did experiment with interacting the shock variables with full set of variables in the X vector. However, this generated a very large number of highly insignificant interaction terms, which tended to make the model predictions conditional on the absence of the shocks quite imprecise. Even as an encompassing model, the full-interaction model permitted several data-consistent restricted forms, which made this an unpromising specification search

5. Results

The estimated models are shown in the first panel of Table 3. In general, the models fit the data well and explain between 56-58% of the variation in log consumption. The signs and magnitudes of most of the estimated parameters for the determinants of household living standards are reasonable. The estimated parameters for these determinants also appear to be quite robust across the different specifications presented in Table 3.

As for the effects of crisis-induced shocks, the ordinary least squares estimates of model (1) indicate that the labor market shock had a 12% negative impact on per capita consumption of households affected by that shock alone, the El-Niño shock reduced the consumption of those affected by 5%, while households who were affected by both shocks suffered a negative impact on their consumption of the order of 9%. The smaller effect of the joint shock relative to the single labor market shock may appear strange, but it is entirely consistent with the possibility that those hit by the single labor market shock were hit harder than those affected by both shocks. As mentioned before, model (1) is quite restrictive in imposing a constant proportionate impact for all households affected by a given shock. Even if this gives a reasonable estimate of the average impact, this specification is clearly unsuitable for exploring how the impact of the crisis was differentiated across the population, and hence would also be unsuitable for examining the impact on poverty and other distributional indicators.

The estimates of model (2) relax this restrictive assumption by interacting each of the three shock variables with a number of household and community attributes (as discussed above in section 4). Table 3 presents two sets of estimates for model (2). The second set of estimates is obtained by pruning the model down to eliminate highly insignificant interaction terms after statistically testing for their joint significance (see F-test reported at the bottom of Table 3). The

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strategy. At the expense of being somewhat ad hoc, we instead opted for an a priori specification of interaction

estimates of the pruned model are more efficient and we use them for assessing the distributional impact of the crisis.

5.1. What made for lesser or greater impact?

The estimates of interaction terms in model (2) suggest some interesting patterns of how household and community attributes influenced the impact of crisis-related shocks on household living standards.

Labor market shock. The highly significant negative parameter on average years of education shows that the labor market shock significantly reduces the returns to education. The impact on consumption is greater at higher levels of education. The negative parameters on the adult male and female members, though not significant, are also interpretable as reducing the returns to household labor endowments. The coefficient on employment diversity is not significant, but its positive sign points to a mitigating effect on the impact of the shock. However, the adverse impact of the labor market shock increases significantly with the community's level of commercial development. This is quite plausible since the more commercially-developed communities, by virtue of their superior integration with the rest of the economy, are also likely to be more exposed to shocks associated with macroeconomic and financial crises. It is also notable that the ownership of land is not a significant factor influencing the impact of the labor market shock.

El-Niño shock. Not surprisingly, the adverse impact of this shock increases significantly with the ownership of land. The household's educational endowment on the other hand does not seem to have a bearing on the impact of this weather-related shock. The significant negative coefficient on the household social network indicates that the El-Niño shock significantly eroded the beneficial effects of such networks, rather than these networks being able to protect

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terms that appeared reasonable in behavioral terms.

household living standards (possibly reflecting the covariate nature of the shock). A similar effect is also observed for community social capital. However, a greater degree of employment diversity within the household does protect its living standards against the El-Niño shock.

Joint labor market and El-Niño shock. As may be expected, the results for the joint occurrence of both shocks are somewhere in-between those of the individual shocks. The adverse impact of the joint shock increases with the level of education, the ownership of land, and the level of community's commercial development. It decreases with the diversity of employment within the household.

5.2. Impact on poverty and inequality

The estimates of model (2) are used to derive the impact of the shocks and hence the counterfactual consumption of households in the absence of the crisis. For households who were not affected by any of the three shocks, the impact of the shocks is by definition zero and their counterfactual consumption is the same as their actual consumption. For those affected, the shocks' impact is measured as the difference between predicted consumption conditional on not being affected by the shocks and the unconditional predicted consumption. The pre-crisis or counterfactual consumption (C_j^*) is thus derived as actual consumption (C_j) *minus* the impact of the shocks. Thus,

$$\textbf{(3)} \quad C_j^* = C_j - \left[\exp\left(\ln \hat{C}_j \middle| S_j^{(\cdot)} = 0\right) - \exp\left(\ln \hat{C}_j\right)\right]$$

where the term in the square bracket measures the impact of the crisis-related shocks. Strictly speaking, the impact is measured as the maximum of the estimate in the square brackets and zero. There is no guarantee that the estimated parameters of the model would yield a negative impact on consumption for all households reportedly affected by the crisis. In general, we found that a larger number of interaction terms in the model tended to generate a larger number of

cases of positive impact. And this turned out be an important reason for using estimates based on the pruned interaction model (which is also related to the pruned model being more efficient).[17] Using the pruned model estimates in Table 3, the impact turned out to be positive for 1115 (or 4.4%) of the 25,079 households affected by the three shocks. The impact for these households was set to zero.[18]

A brief comment on the issue of measurement error is pertinent here. It is arguable that the self-reported shocks are measured with error, which makes the shock variables endogenous in models (1) and (2). A potential solution is the use of instrumental variable (IV) estimation. In particular, we constructed instrumental variables as cluster means of the shock variables leaving out the current household. These are plausible instruments insofar as a household is more likely to report a shock if many others in the neighborhood are also reporting that shock, but others being affected by the shock should not affect this household's living standard except through the household's self-reported shock. We thus estimated the consumption models using these instrumental variables. The IV estimates of model (1) are shown in Table 3. The estimated parameters for variables other than the shock variables turned out to be very close to the ordinary least squares estimates. For the shock variables there were some notable differences. While the IV and OLS estimates for the El-Nino shock parameter were very similar (-0.05 and –0.06 respectively), the IV estimates of the impact of the labor market and the joint El Nino-labor market shocks were much lower in absolute terms (in fact not significantly different to zero). Rather than an attenuation bias expected in case of a simple random measurement error, the

[17] This was also a consideration in estimating a single model for rural and urban sectors. Our experiments with estimating separate models for rural and urban sectors, which effectively doubled the number of interaction terms ran into the same problem of inefficient estimates with a large number of cases of positive impact. We do however allow for sectoral effects on consumption through the strata fixed effects, as discussed above.

[18] This makes negligible difference to the results. For instance, not setting these positive impacts to zero lowers the mean impact on consumption by P16 per person per year, from P1387 to P1361, both amounting to virtually the same proportion of counterfactual consumption, i.e. 4.9%.

results suggest the opposite if anything. We may thus be dealing with a more complex pattern of endogeneity in self-reported shocks.

However, the IV estimates of model (2) with interaction terms did not appear credible on two counts. First, some of the marginal effects turned out to be too large. For instance, the marginal effect of commercial development on the impact of the labor market shock was a negative 61%. Larger marginal effects are of course consistent with measurement error, but the IV effects appeared too large to be credible. Secondly, the IV estimates also generated a large number of cases with a positive impact of the crisis on living standards, accounting for as much as 25% of all crisis-affected households, which again appeared highly implausible. (We interpret a large number of positive impacts ultimately as a sign of model misspecification.) For these reasons, we decided not to use the IV estimates at the risk of some potential bias due to measurement error. If the IV estimates of model (1) are any guide, there may be some upward bias in our estimated impact.

We thus use counterfactual consumption based on ordinary least squares estimates of the (restricted) interaction model (2) to assess the impact on poverty and inequality. We use the FGT class of poverty measures and a number of inequality measures including Theil's T index and the generalized entropy measures (see Foster, Greer and Thorbecke, 1984, and Cowell, 1995). For the poverty measures, we use the provincial poverty lines developed by Balisacan (1999).[19] Table 4 summarizes the key results.

The results indicate a modest impact of the crisis. There is a negative effect on mean consumption of about 5%. This may be compared with the 2% decline in real per capita GNP,

[19] In effect, we use the Manila poverty line of P11,677 per person per year corresponding to a nutritional norm of 2000 calories per person per day and allowing for basic nonfood expenditure (see Balisacan 1999 for further details). The provincial poverty lines have in fact already been used above to express nominal consumption of all households into 1998 Manila prices.

but a 2% increase in per capita personal consumption, between 1997 and 1998 estimated from the national accounts (NSCB, 1999). The impact on the headcount index is of the order of about 9% (an increase from 29.1% to 31.7%), while the poverty gap index is about 11% higher due to the crisis, and similarly, the squared poverty gap index is indicated to be about 13% higher. The effects on living standards and poverty are of course larger for the crisis-affected population.

The measured magnitude of the impact of the crisis on poverty of course also depends on the poverty line. To examine this, we plot in Figure 2 how the entire cumulative distribution function (CDF) shifted as a result of the crisis. The Figure plots the difference between the actual ("post-crisis") and counterfactual ("pre-crisis") CDFs against log per capita consumption. Thus, for instance, at the poverty line, we can read off a value of 2.6, which confirms the result in Table 4 that the crisis induced an increase in the headcount index by 2.6% points. But the key point that Figure 2 shows is that the impact of the crisis could have been significantly higher or lower depending upon where the poverty line is drawn. This comes out even more strongly in Figure 3 where we plot the *ratio* of the actual-to-counterfactual distribution functions. Again, while at the poverty line we have used, the crisis appears to induce about a 9% increase in the headcount index (as noted above), the *percentage* impact could be much higher for lower poverty lines (up to 16% if the poverty line were halved), and much lower for higher poverty lines (falling down to 3% if the poverty line were doubled).

The crisis appears to have had little effect on measures of overall inequality (Table 4). With the exception of the third-degree generalized entropy measure, the impact ranges between less than 1% and 2.5%.

We also looked at whether the shock was progressive, i.e. whether the absolute impact as a proportion of pre-crisis (counterfactual) consumption was an increasing function of pre-crisis

consumption.[20] We find that the total (absolute) impact is progressive (inequality reducing), i.e. proportionate impact is positively related to pre-crisis consumption. However, this masks the contrasting effects of the labor market and El-Niño shocks. The former is *progressive* (proportionate impact increasing in pre-crisis consumption), while the latter is *regressive* (proportionate impact declining in pre-crisis consumption). This is consistent with the notion that the labor market shock affected the relatively better-off wage earners more severely, while the impact of the impact of the drought was heavier on the relatively poorer agriculture-based households. The impact of the joint labor market-El Niño shock is found to be neither progressive nor regressive.

Finally, does the introduction of interaction terms into the model make an appreciable difference to the estimated impact? The results on this, though mixed, do not suggest a large discrepancy. Using model (1) the impact on mean consumption is estimated at 4% relative to 5% with the interaction model, while the effects on the incidence, depth and severity of poverty are estimated at 10, 13 and 16% respectively relative to 9, 11 and 13% with the interaction model. The small magnitude of the discrepancy is probably due to two factors. First, the crisis-affected households are the same across the two methodologies and hence their place in the overall distribution is also the same across the two methodologies. Second, while the methodologies do differ in their determination of marginal impacts for affected households, the magnitude of these marginal impacts is relatively small. Thus, in the end even when marginal effects are allowed to vary by household characteristics, it makes little difference to the overall impact. These results may however be somewhat peculiar to our data set, and in general we would caution against a model imposing uniform impact across households.

[20] This is done by running a simple (tobit) regression of the absolute shock as proportion of pre-crisis consumption on log of pre-crisis consumption.

5.3. El-Niño or El-Peso?

We also looked into relative contributions of the three shocks to the total impact on mean consumption and poverty. This is also shown in Table 4. The labor market shock alone accounted for about a quarter of the total impact on mean consumption, the El-Niño shock alone contributed 38% and remaining 36% was attributable to the joint labor market-El Niño shock. We are unable to decompose the last component for the joint shock any further, and thus the shares for the individual shocks can be interpreted as lower bounds for the labor market and El Niño shocks. Hence, by these estimates, the contribution of the labor market shock was somewhere between 26-62% while that of El Niño was somewhere between 38-74%.

The contribution of the El-Niño shock to the total impact is higher for the poverty measures. For instance, this shock alone contributed about 46% to the increase in the headcount index. For the poverty gap and the squared poverty gap measures, more than half the impact is on account of the El-Niño shock alone, while the labor market shock alone contributed only about 10-11%. About one-third of the total impact is attributable to the joint El Niño-labor market shock. If one were to split this joint shock in proportion with the shares of the individual shocks, the contribution of the El-Niño shock to the depth and severity of poverty would be upwards of 80%.

5.4. Income vs. consumption impact

The analysis of crisis impact presented thus far has been in terms of household consumption. The APIS also collected data on household incomes which offers us an opportunity to compare income and consumption impacts. In particular, a smaller consumption shock (in absolute terms) would be consistent with the idea of consumption smoothing, i.e., households at least partially protecting their consumption against income shocks through such

means as dissaving, borrowing or sale of assets. We thus re-estimated models (1) and (2) with log income per capita as the dependent variable. The results are shown in the second panel of Table 3.

There are notable points of similarity between the income and consumption models. With few exceptions, the parameter estimates for the non-shock variables in the income models are highly comparable with the corresponding estimates in the consumption models. Similarly, the IV estimates of model (1)[21] display a pattern analogous to that observed for the consumption model, indicating comparable impact for the El Niño shock, but significantly smaller impacts for the labor market and the joint labor market-El Niño shocks relative to the ordinary least squares estimates. While these similarities are important, of greater interest are the points of difference between the income and consumption models, to which we turn below.

The estimates of model (1) without the interaction terms indicate proportionate income impacts for affected households that are larger (in absolute terms) than the corresponding consumption impacts: 17, 8 and 15% as against 11, 5 and 9% for the labor market, El Niño, and the joint labor market-El-Niño shocks respectively. Does this finding of a larger income impact carry over to the more general model (2) specification with interactions?

The estimates for the interaction model after pruning highly insignificant interaction terms are also shown in Table 3. While the estimates for a number of interaction terms are similar across income and consumption models, there are some differences, suggesting that income and consumption vulnerability are affected somewhat differently by household/community attributes. For instance, while the El Niño shock significantly reduced the positive effect of membership of a co-operative or NGO on consumption, it had no such effect on income. On the other hand, co-

[21] Estimated using the same instruments as in the consumption model, viz., "left-out" cluster means of the shock variables.

operative/NGO membership seems to reduce the income impact of the joint labor market-El Niño shock, but does not have this effect on consumption. Do these differences translate into a significant difference in the overall effect on mean incomes and income-based poverty and inequality measures (relative to mean consumption and consumption-based poverty measures)? Table 5 suggests only small differences. The effect on mean income is of the order of -7% compared with -5% for mean consumption. The impact on income poverty is correspondingly larger: an increase of 12, 16 and 18% in income-based H, PG and SPG measures, as against a 9, 11 and 13% increase in corresponding consumption-based measures.[22] Incidentally, the El Niño shock still accounts for the bulk of the total impact on average incomes as well as income poverty (Table 5).

The relatively modest difference in the impacts on income and consumption-based measures of living standards and poverty, which are averages for the population as a whole (including those not affected by the shocks), may nonetheless hide some consumption smoothing by those affected by the shock. To examine this, we directly compare the income and consumption impacts for affected households. This is done in Figure 4, which plots the consumption impact as a proportion of counterfactual income against the income impact also expressed as a proportion of counterfactual income. It turns out that for nearly three-fourths of the affected households, the estimated consumption impact is smaller than the estimated income impact. The graph in Figure 4 also shows a non-parametric regression line of the consumption impact on the income impact, which lies below the 45° line, implying smaller consumption impacts. For the affected households, the mean consumption impact turns out to be 73% of the mean income impact. However, the median ratio of consumption to income shock amongst the

[22] Note that for the income-based poverty measures, the poverty line is calibrated to yield the same headcount index as obtained with per capita consumption as the measure of welfare.

affected population was 64%. The evidence thus suggests that despite the relatively limited magnitude of the shock, the affected households did resort to actions aimed at smoothing their consumption.

Did the poor resort to greater or lesser consumption smoothing than the non-poor? The *median* consumption to income shock ratio for the income-poor and nonpoor (using counterfactual income per capita as the welfare measure) were 67% and 63% respectively. However, the *mean* ratios (with a 2% trim of the tails at each end) for these groups were 94% and 78% respectively; while the overall mean consumption/income shock ratio (with the 2% trim) was 83%. The results thus point to the more limited ability of the poor to maintain their consumption in the face of crisis-induced income shocks.

6. Conclusion

The following key findings emerge from our analysis of the distributional effects of the economic crisis in the Philippines. The impact of the crisis was modest relative to what has been estimated for other crisis-affected countries in the region. By our estimates, the crisis caused a 5% reduction in average living standards. It led to an increase in the incidence of poverty by about 9%, and in the depth and severity of poverty by 11% and 13% respectively. And the impact on measures of overall inequality was minimal. However, in assessing the estimated effects on poverty, it is important to bear in mind that our results could underestimate the full impact of the crisis to the extent they do not factor in the effects of the price shock reported by nearly 90% of the population. On the other hand, there may also be an element of overestimation of the impact on account of potential measurement error in the self-reported shocks.

Our results also suggest that in terms of the poverty impact the crisis in the Philippines was more of an El-Niño phenomenon than a financial crisis. We find that the largest share of the overall impact on poverty is attributable to the El-Niño shock, its share ranging between 47-57% of the total impact on measures of incidence, depth and severity of poverty. Another one-third of the total impact is attributable to the joint effects of the El-Niño and labor market shock, while the labor market shock by itself only accounts for 10-17% of the total poverty impact. Given that El-Niño is a recurrent phenomenon in the Philippines occurring every 3-4 years, our findings have relevance beyond the most recent crisis.

We find that the estimated impact on poverty is sensitive to the choice of the poverty lines. The proportional impact on poverty incidence, for instance, declines over a wide range of poverty lines, which also suggests greater proportionate impact on measures of ultra poverty. We also find that while the labor market shock was progressive (inequality reducing), the El Niño shock was regressive (inequality increasing).

Not all households were equally vulnerable to the crisis-induced shocks. We find that while ownership of land made households more susceptible to the El-Niño shock (which is unsurprising), higher levels of education made them more vulnerable to wage and employment shocks. The impact of the crisis also increased with the level of commercial development of the community. The crisis also dampened the positive effects on living standards of households' social network (such things as membership of co-operatives and NGOs) and community social capital (such things as a town hall, a church, a park or library in the community). However, we also find evidence that occupational diversity within the household helped mitigate the adverse impact of crisis-related shocks.

Our results also suggest that despite the relatively small magnitude of the overall impact of the crisis, households did try to protect their consumption. For three-fourths of the affected

households, consumption impacts were smaller in magnitude than the income impacts; the median consumption impact was about one-third lower, while the mean consumption impact was about four-fifths of the income impact. This points to a limited ability of households to smooth consumption in face of income shocks, which is a matter of policy concern. Of even greater concern is the evidence that the ability of the poor to protect their consumption was more limited than that of the nonpoor.

Table 1: Macro-economic indicators, by quarter: 1997-1998

	1997					1998				
	Q1	*Q2*	*Q3*	*Q4*	*Average*	*Q1*	*Q2*	*Q3*	*Q4*	*Average*
Output growth (% per year):										
Agriculture	4.9	1.8	0.4	4.1	2.9	-3.6	-11.5	0.0	-1.2	-6.6
Industry	5.1	7.6	6.4	5.6	6.1	1.3	-1.5	-0.7	-1.9	-1.7
Services	6.1	5.7	5.6	4.6	5.5	4.9	3.6	-3.1	-7.8	3.5
Gross Domestic Product	5.5	5.6	4.9	4.8	5.2	1.6	-0.8	-0.7	-1.9	0.1
Gross National Product	5.4	5.3	5.2	5.3	5.3	2.0	-0.3	0.0	-1.2	-0.5
Unemployment rate (%)	7.7	10.4	8.7	7.9	8.7	8.4	13.3	8.9	9.6	10.1
Inflation (% per year)	4.7	4.5	4.9	5.8	5.0	7.0	9.6	10.5	10.6	9.4
Exchange rate (Peso/$)	26.3	26.4	29.8	35.4	29.5	40.7	39.4	42.9	40.6	40.9
Net foreign reserves (million $)	10268	10065	8261	7456	9013	6990	8418	7970	8004	7845

Note: The figures for inflation, exchange rate and net foreign reserves are quarterly mean calculated from of monthly data.
Source: National Statistical Coordination Board and Bangko Sentral ng Pilipinas (BSP).

Table 2: The incidence of crisis-related economic shocks

Crisis-related shocks	*Percent of sample households affected*	*Percent of population affected*
Price shock	89.9	91.4
Domestic employment shock	18.4	20.3
Overseas/migrant employment shock	4.32	4.93
Wage shock	15.5	16.7
Drought/El-Niño shock	56.6	59.8
Price shock only	28.2	26.0
Domestic employment shock only	0.16	0.16
Overseas/migrant employment shock only	0.02	0.02
Wage shock only	0.23	0.19
Drought/El Niño shock only	2.36	2.28
Hit by at least one of the five shocks	93.0	94.4
Hit by at least one of the four shocks other than the price shock	64.8	68.4
Labor market shock (regardless of the price shock)	8.1	8.6
El-Niño shock (regardless of the price shock)	39.0	40.4
Both El-Niño and labor market shocks (regardless of price shock)	17.6	19.4

Source: Calculated from 1998 APIS data.

Table 3: The estimated consumption and income models (1998 APIS)

	Dep. variable: Log consumption per person								Dep. variable: Log income per person					
	Model (1) OLS		Model (1) IV		Model (2) OLS		Model (2) restricted		Model (1) OLS		Model (1) IV		Model (2) restricted	
	Param.	t-stat	Param.	t-stat	Param.	t-stat	Param.	t-stat	Param.	t-stat	Param.	t-stat	Param.	t-stat
At least one adult household member														
- in agriculture, fishery or forestry	-0.1113	-6.73	-0.1088	-6.43	-0.1115	-6.75	-0.1111	-6.71	-0.0041	-0.20	-0.0005	-0.02	-0.0035	-0.18
- in mining or quarrying	0.0607	1.45	0.0573	1.38	0.0544	1.30	0.0558	1.33	0.2480	5.01	0.2446	4.98	0.2469	4.96
- in manufacturing	-0.0170	-1.00	-0.0214	-1.26	-0.0164	-0.96	-0.0150	-0.88	0.2195	10.76	0.2151	10.50	0.2226	10.92
- in electricity, gas or water	0.1769	5.59	0.1768	5.54	0.1755	5.57	0.1765	5.59	0.4380	13.13	0.4370	13.06	0.4406	13.27
- in construction	-0.0991	-5.85	-0.1083	-6.34	-0.1007	-5.96	-0.0994	-5.87	0.1737	8.39	0.1652	7.92	0.1739	8.41
- in wholesale or retail	0.0144	0.87	0.0128	0.77	0.0146	0.88	0.0155	0.94	0.2214	11.14	0.2199	11.04	0.2234	11.23
- in transport, storage, communication	-0.0348	-2.06	-0.0375	-2.22	-0.0345	-2.04	-0.0336	-1.99	0.1889	9.20	0.1863	9.07	0.1915	9.33
- in finance, real estate, business services	0.1301	5.80	0.1313	5.82	0.1295	5.78	0.1306	5.82	0.3607	14.08	0.3615	14.07	0.3626	14.15
- in communal, social, personal services	0.0384	2.35	0.0370	2.26	0.0363	2.22	0.0375	2.29	0.3214	16.14	0.3196	16.00	0.3212	16.12
Produces food for own consumption	-0.1181	-10.97	-0.1194	-11.01	-0.1179	-10.96	-0.1177	-10.98	-0.1203	-10.48	-0.1203	-10.44	-0.1202	-10.49
Urban household	0.0686	1.05	0.0752	1.19	0.0695	1.07	0.0702	1.08	0.0587	0.92	0.0640	1.04	0.0634	1.00
Member of a cooperative or NGO	0.2584	18.97	0.2566	18.84	0.3125	13.40	0.2945	17.30	0.2203	14.86	0.2195	14.82	0.2030	12.39
Beneficiary of government assistance (extension service/scholarship/housing/land reform)	0.2162	4.86	0.2143	4.82	0.2249	5.06	0.2249	5.06	0.1230	2.54	0.1216	2.50	0.1251	2.59
Owns land	0.1428	13.24	0.1476	13.60	0.1716	8.15	0.1738	9.06	0.0870	7.12	0.0919	7.46	0.1486	6.11
Family size	-0.2939	-28.65	-0.2958	-28.64	-0.2956	-28.86	-0.2952	-28.84	-0.2954	-25.57	-0.2965	-25.55	-0.2970	-25.76
Family size squared	0.0104	23.48	0.0105	23.40	0.0105	23.76	0.0105	23.82	0.0101	20.29	0.0102	20.20	0.0102	20.71
Head of household is female	0.0922	7.17	0.0914	7.08	0.0933	7.26	0.0920	7.15	0.1160	7.59	0.1151	7.52	0.1155	7.57
Age of head of household	0.0122	8.00	0.0119	7.85	0.0121	7.98	0.0121	7.97	0.0109	6.56	0.0107	6.43	0.0109	6.56
Age of head of household squared*100	-0.0001	-6.76	-0.0001	-6.56	-0.0001	-6.72	-0.0001	-6.71	-0.0001	-5.85	-0.0001	-5.69	-0.0001	-5.86
Avg. years of education of adult household members	-0.0627	-13.09	-0.0639	-13.34	-0.0621	-11.49	-0.0605	-12.65	-0.0656	-11.71	-0.0665	-11.88	-0.0625	-11.13
Avg. years of education of adult household members squared	0.0100	32.20	0.0101	32.59	0.0101	31.94	0.0100	32.29	0.0105	29.63	0.0106	29.89	0.0105	29.83
No of children between 1-6 years	-0.0099	-1.09	-0.0096	-1.05	-0.0096	-1.05	-0.0097	-1.06	-0.0022	-0.20	-0.0024	-0.23	-0.0016	-0.15
No of children between 7-14 years	0.0384	4.33	0.0389	4.39	0.0382	4.31	0.0381	4.31	0.0311	3.05	0.0311	3.05	0.0309	3.03
No of male adults (at least 15 years)	0.1005	11.00	0.0996	10.85	0.1074	10.43	0.1020	11.08	0.1326	12.39	0.1313	12.24	0.1335	12.47
No of female adults (at least 15 years)	0.1047	10.86	0.1050	10.83	0.1087	10.22	0.1090	11.09	0.1183	10.75	0.1180	10.69	0.1215	10.97
Head of household is single	0.0217	1.19	0.0211	1.15	0.0212	1.17	0.0209	1.15	-0.0046	-0.22	-0.0054	-0.26	-0.0057	-0.28
Head of household is widow(er)	-0.1153	-8.86	-0.1170	-8.96	-0.1155	-8.88	-0.1143	-8.80	-0.1218	-7.74	-0.1234	-7.84	-0.1209	-7.71
Head of household is divorced	-0.1556	-6.43	-0.1575	-6.50	-0.1566	-6.49	-0.1563	-6.47	-0.1366	-4.74	-0.1383	-4.79	-0.1376	-4.78

	Dep. variable: Log consumption per person								Dep. variable: Log income per person					
	Model (1) OLS		Model (1) IV		Model (2) OLS		Model (2) restricted		Model (1) OLS		Model (1) IV		Model (2) restricted	
	Param.	t-stat	Param.	t-stat	Param.	t-stat	Param.	t-stat	Param.	t-stat	Param.	t-stat	Param.	t-stat
Household has electricity	0.2578	27.01	0.2571	26.98	0.2581	27.11	0.2581	27.10	0.2161	19.63	0.2154	19.57	0.2145	19.51
Social capital index	-0.0043	-0.12	-0.0083	-0.23	0.0210	0.41	0.0190	0.48	0.0041	0.14	0.0018	0.06	0.0573	1.63
Infrastructure capital index	0.1384	4.70	0.1299	4.41	0.1201	2.76	0.1360	4.61	0.1413	4.91	0.1334	4.66	0.1371	4.77
Commercial capital index	0.1041	3.33	0.1072	3.43	0.1210	2.86	0.1231	3.76	0.1159	4.14	0.1185	4.21	0.0997	3.17
Diversity of employment	0.0597	3.69	0.0609	3.75	0.0437	2.46	0.0406	2.31	-0.0618	-3.17	-0.0602	-3.08	-0.0853	-4.20
Shock variables:														
Labor market shock: S(L)	-0.1190	-9.29	-0.0141	-0.25	0.1070	1.91	0.1238	2.49	-0.1657	-12.19	-0.0454	-0.84	0.1072	2.24
El Niño shock: S(E)	-0.0502	-5.11	-0.0639	-2.71	-0.0481	-1.35	-0.0351	-1.32	-0.0756	-6.90	-0.0918	-3.72	-0.0930	-3.18
Joint lab. Market-El Niño shock: S(LE)	-0.0924	-7.54	-0.0204	-0.84	0.0337	0.70			-0.1468	-11.96	-0.1056	-4.49		
S(L)*Avg. years of education of adult household members					-0.0202	-4.31	-0.0215	-4.93					-0.0217	-4.70
S(L)*No of male adults (at least 15 years)					-0.0167	-1.60	-0.0113	-1.19						
S(L)*No of female adults (at least 15 years)					-0.0143	-1.33	-0.0147	-1.45					-0.0226	-2.01
S(L)*Diversity of employment					0.0253	1.56	0.0263	1.63						
S(L)*Member of a cooperative or NGO					-0.0411	-0.98								
S(L)*Owns land					-0.0022	-0.05							-0.0957	-1.80
S(L)*Social capital index					0.0358	0.55								
S(L)*Infrastructure capital index					0.0359	0.57								
S(L)*Commercial capital index					-0.1382	-2.16	-0.1092	-2.54					-0.0767	-1.82
S(E)*Avg. years of education of adult household members					0.0027	0.95								
S(E)*No of male adults (at least 15 years)					-0.0083	-1.17								
S(E)*No of female adults (at least 15 years)					0.0015	0.19								
S(E)*Diversity of employment					0.0257	2.34	0.0287	2.96					0.0408	3.78
S(E)*Member of a cooperative or NGO					-0.1098	-3.91	-0.0877	-3.75						
S(E)*Owns land					-0.0356	-1.49	-0.0395	-1.77					-0.0782	-2.93
S(E)*Social capital index					-0.0855	-1.46	-0.0691	-1.58					-0.1034	-2.18
S(E)*Infrastructure capital index					0.0077	0.15								
S(E)*Commercial capital index					0.0347	0.64							0.0620	1.62
S(LE)*Avg. years of education of adult household members					-0.0108	-2.90	-0.0095	-3.53					-0.0184	-6.67
S(LE)*No of male adults (at least 15 years)					-0.0087	-1.07								

	Dep. variable: Log consumption per person								Dep. variable: Log income per person					
	Model (1) OLS		Model (1) IV		Model (2) OLS		Model (2) restricted		Model (1) OLS		Model (1) IV		Model (2) restricted	
	Param.	t-stat	Param.	t-stat	Param.	t-stat	Param.	t-stat	Param.	t-stat	Param.	t-stat	Param.	t-stat
S(LE)*No of female adults (at least 15 years)					-0.0150	-1.60	-0.0139	-1.67						
S(LE)*Diversity of employment					0.0195	1.50	0.0259	2.28					0.0280	2.41
S(LE)*Member of a cooperative or NGO					-0.0309	-0.91							0.0818	2.56
S(LE)*Owns land					-0.0454	-1.56	-0.0473	-1.75					-0.0798	-2.43
S(LE)*Social capital index					0.0009	0.01							-0.0890	-2.18
S(LE)*Infrastructure capital index					0.0497	0.83								
S(LE)*Commercial capital index					-0.1001	-1.49	-0.0669	-1.73						
Number of observations		38710		38710		38710		38710		38585		38585		38585
Number of estimated parameters		233		233		263		249		233		233		263
R - square		0.5890		0.5869		0.5904		0.5902		0.5890		0.5869		0.5904
F test								F(14,3917) = 0.65						
Ptob > F								0.83						

Note: The t-statistics allow for design effects due to the stratification and clustering of the APIS sample. The sample has 168 strata and 3378 primary sampling units. Each of the regressions also allow for strata fixed effects and 32 provincial dummy variables to control for missing *barangay* data. The estimated income models exclude 125 observations with negative reported incomes.
Source: Calculated from 1998 APIS data.

Table 4: Impact of the crisis on *consumption* poverty and inequality

Poverty/inequality measure	Actual	Counterfactual (all shocks zero)	Impact (%)	Counterfactual (without L-shock)	Counterfactual (without E-shock)	Counterfactual (without LE-shock)
Mean consumption (per capita per year)	26482 *450*	27859 *468*	-4.9	26837 *454* [25.8]	27004 *460* [37.9]	26982 *454* [36.3]
Headcount index (%)	31.7 *0.47*	29.1 *0.46*	8.7	31.2 *0.47* [17.0]	30.5 *0.46* [46.5]	30.7 *0.47* [36.5]
Poverty gap index (%)	9.43 *0.20*	8.47 *0.19*	11.3	9.32 *0.20* [11.5]	8.91 *0.19* [54.1]	9.10 *0.20* [34.4]
Squared poverty gap index (%)	3.93 *0.11*	3.48 *0.10*	13.0	3.89 *0.11* [9.5]	3.67 *0.11* [57.0]	3.78 *0.11* [33.5]
Theil's T-index	0.513 *0.057*	0.512 *0.056*	0.1	0.513 *0.057*	0.513 *0.058*	0.511 *0.056*
Variance of logs	0.628 *0.011*	0.633 *0.011*	-0.9	0.635 *0.011*	0.624 *0.011*	0.631 *0.011*
Generalized entropy measure (e=2)	2.02 *0.68*	1.97 *0.67*	2.4	1.99 *0.67*	2.05 *0.71*	1.98 *0.66*
Generalized entropy measure (e=3)	75.0 *48.4*	69.7 *44.4*	7.5	72.1 *46.5*	76.4 *48.7*	71.0 *45.8*

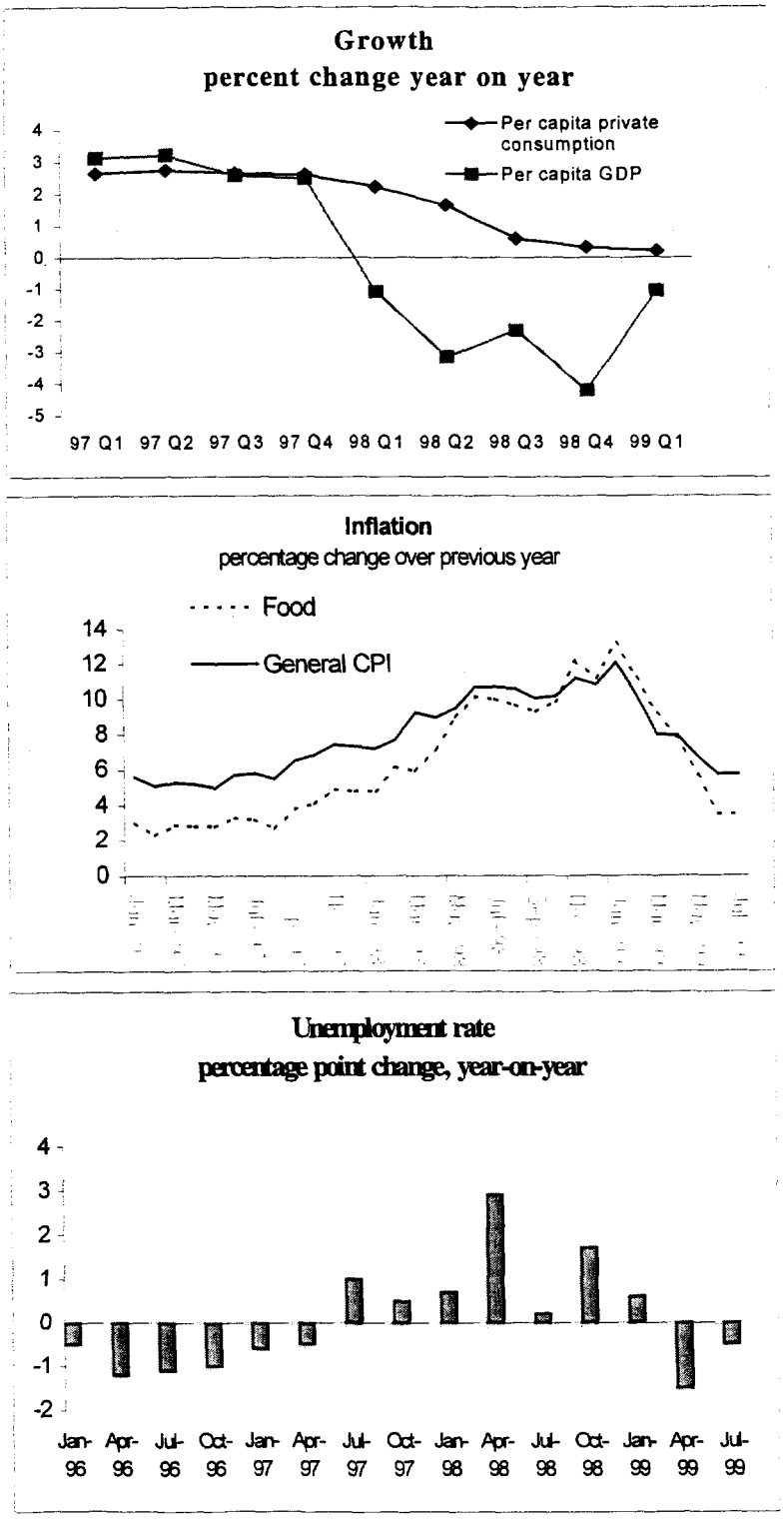
Note: Figures in *italics* are the standard errors corrected for sample design effect. The figures in square brackets give the relative contribution of the three shocks to the total impact (not calculated for the inequality measures for which these contributions are not additive.
Source: Calculated from 1998 APIS data.

Table 5: Impact of the crisis on *income* poverty and inequality

Poverty/inequality measure	Actual	Counterfactual (all shocks zero)	Impact (%)	Counterfactual (without L-shock)	Counterfactual (without E-shock)	Counterfactual (without LE-shock)
Mean consumption (per capita per year)	26547 *527*	28437 *556*	-6.6	27010 *531* [24.5]	27254 *548* [37.4]	27268 *531* [38.1]
Headcount index (%)	31.7 *0.45*	28.3 *0.43*	12.0	31.2 *0.45* [14.6]	29.9 *0.44* [53.5]	30.6 *0.44* [31.9]
Poverty gap index (%)	11.1 *0.22*	9.5 *0.20*	16.0	10.9 *0.22* [10.4]	10.2 *0.21* [57.0]	10.6 *0.21* [32.6]
Squared poverty gap index (%)	5.48 *0.142*	4.67 *0.132*	17.5	5.41 *0.142* [8.5]	5.00 *0.136* [59.6]	5.22 *0.140* [31.9]
Theil's T-index	0.636 *0.069*	0.627 *0.068*	1.5	0.635 *0.068*	0.634 *0.071*	0.631 *0.068*
Variance of logs	0.785 *0.015*	0.779 *0.014*	0.8	0.795 *0.015*	0.770 *0.014*	0.789 *0.015*
Generalized entropy measure (e=2)	2.87 *0.605*	2.76 *0.585*	4.2	2.81 *0.585*	2.92 *0.636*	2.77 *0.574*
Generalized entropy measure (e=3)	68.8 *22.9*	63.8 *21.5*	7.8	65.5 *21.8*	71.8 *24.4*	63.9 *21.2*

Note: Figures in *italics* are the standard errors corrected for sample design effect. The figures in square brackets give the relative contribution of the three shocks to the total impact (not calculated for the inequality measures for which these contributions are not additive.
Source: Calculated from 1998 APIS data.

Figure 1: Some key macro indicators in recent years, by quarter



Source: Compiled from data published by the National Statistics Office and the National Statistical Coordination Board.

Figure 2: Change in the cumulative distribution function due to the crisis

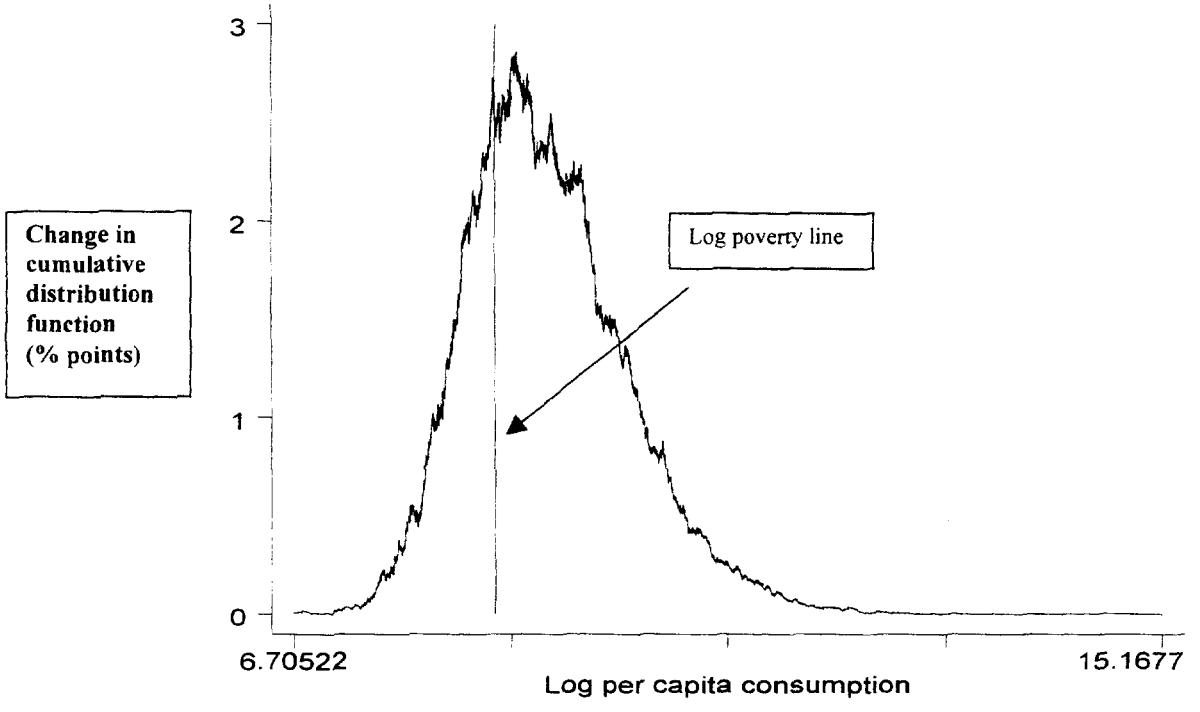


Figure 3: Percentage change in the cumulative distribution function due to the crisis

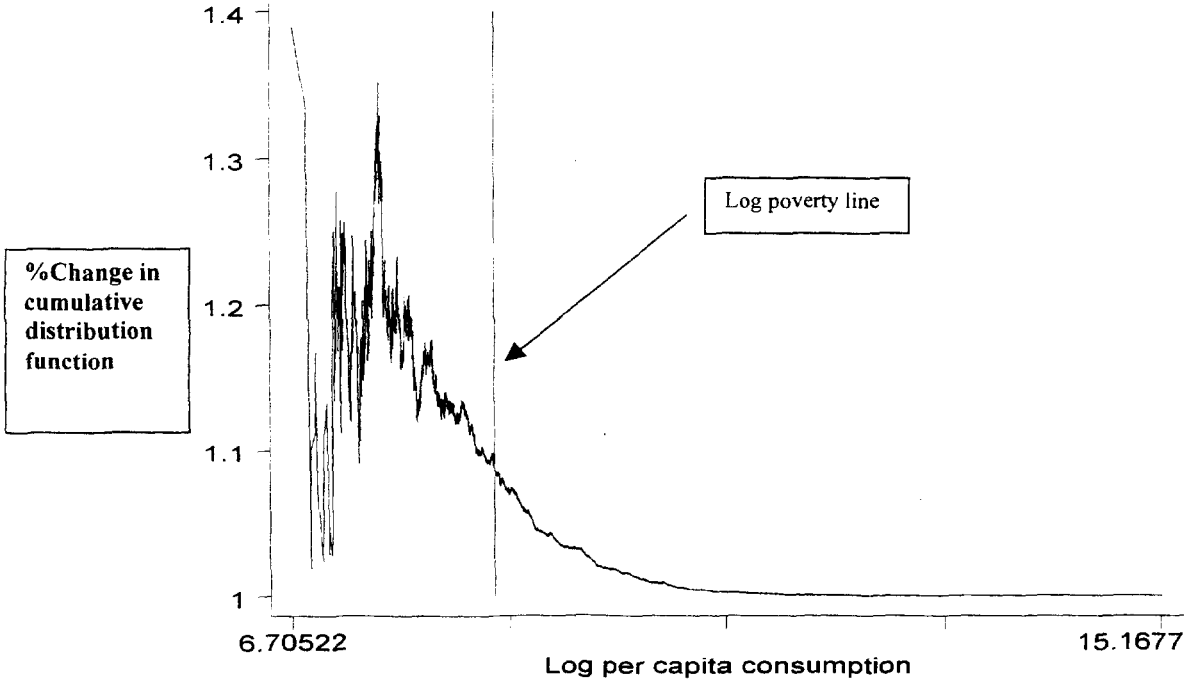


Figure 4: The relative magnitudes of income and consumption shocks

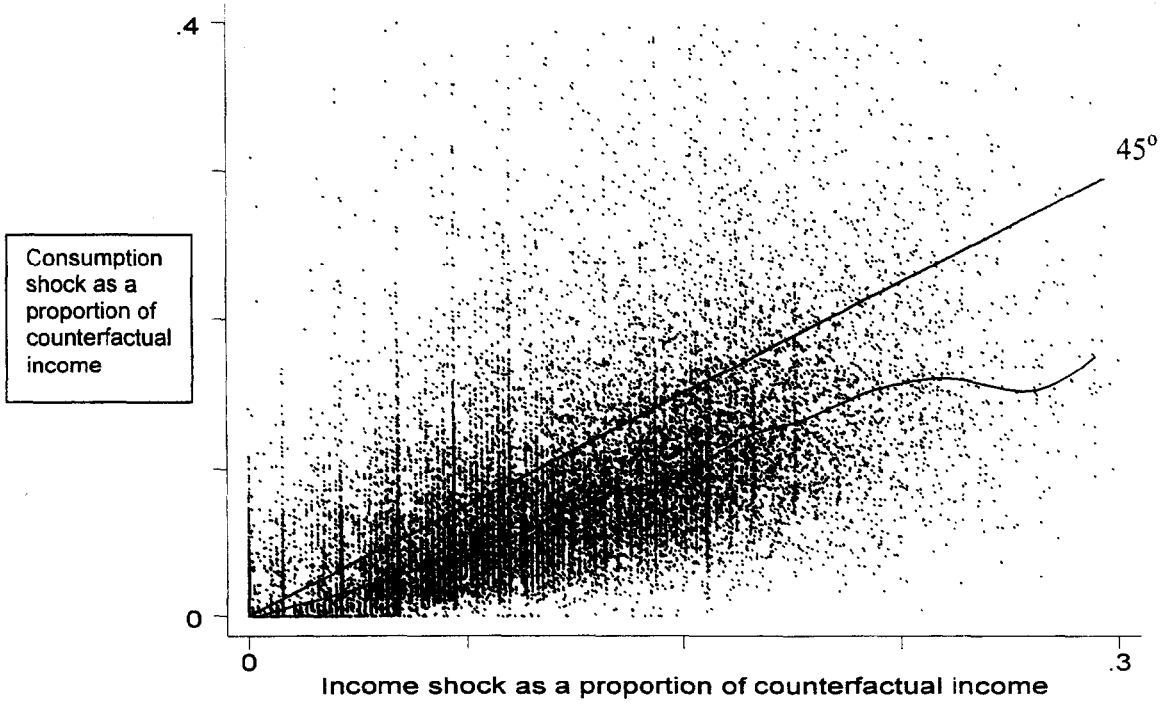


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Table A1: Descriptive statistics of model variables (1998 APIS)

Model Variables	Mean	Std. Dev.	Min.	Max.
At least one adult household member				
- in agriculture, fishery or forestry	0.441	0.497	0	1
- in mining or quarrying	0.007	0.084	0	1
- in manufacturing	0.152	0.359	0	1
- in electricity, gas or water	0.010	0.098	0	1
- in construction	0.107	0.309	0	1
- in wholesale or retail	0.243	0.429	0	1
- in transport, storage, communication	0.130	0.337	0	1
- in finance, real estate, business services	0.043	0.202	0	1
- in communal, social, personal services	0.303	0.460	0	1
Produces food for own consumption	0.455	0.498	0	1
Urban household	0.593	0.491	0	1
Member of a cooperative or NGO	0.147	0.281	0	1
Beneficiary of government assistance (extension service/scholarship/housing/land reform)	0.028	0.086	0	1
Owns land	0.178	0.383	0	1
Family size	5.058	2.260	1	24
Family size squared	30.690	27.898	1	576
Head of household is female	0.162	0.369	0	1
Age of head of household	47.246	14.220	6	99
Age of head of household squared*00	2434.4	1460.4	36	9801
Avg. years of education of adult household members	8.063	3.172	0	17
Avg. years of education of adult household members squared	75.064	50.014	0	289
No of children between 1-6 years	0.762	0.973	0	7
No of children between 7-14 years	1.051	1.197	0	7
No of male adults (at least 15 years)	1.571	1.027	0	10
No of female adults (at least 15 years)	1.572	0.935	0	10
Head of household is single	0.038	0.192	0	1
Head of household is widow(er)	0.128	0.335	0	1
Head of household is divorced	0.015	0.123	0	1
Household has electricity	0.743	0.437	0	1
Social capital index	0.474	0.229	0	1
Infrastructure capital index	0.458	0.285	0	1
Commercial capital index	0.435	0.281	0	1
Diversity of employment	1.476	0.669	1	6
Shock variables:				
Labor market shock: S(L)	0.081	0.273	0	1
El Nino shock: S(E)	0.391	0.488	0	1
Joint lab. Market-El Nino shock: S(LE)	0.176	0.381	0	1

Note: Number of observations = 38,710.
Source: Calculated from 1998 APIS data.

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