

# Assessing the Impact of the Asian Financial Crisis and El Niño on Poverty in the Philippines

by  
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## I. Introduction

In 1997-1998, the Philippine economy faced not only the Asian financial crisis but also the El Niño phenomenon. *Ab initio* analysis suggests that the financial crisis did not severely affect the Philippines as much as it did other East Asian countries (see, for example, World Bank, 1999). Reyes (2000) and Kakwani (2000b) independently point out that the combined effects due to the crisis and the El Niño phenomenon have led to a rise in the poverty incidence from the official estimates before the crises to the period of the crises. Datt and Hoogeveen (2000) go further and even suggest that the El Niño phenomenon actually had a stronger impact on the Philippines than the Asian financial crisis. Other studies, however, such as de Dios (1999) and Lim (2000), imply that the crisis may have had a much greater effect than what was believed. De Dios (1999) concludes that the effect of the crisis “may be seen in rising unemployment and underemployment and in the deteriorating quality of jobs.” This would suggest that even if the financial crisis may have had a minimal impact on some macro economic indicators, it might have had a stronger effect on indicators of poverty, such as poverty incidence and poverty gap.

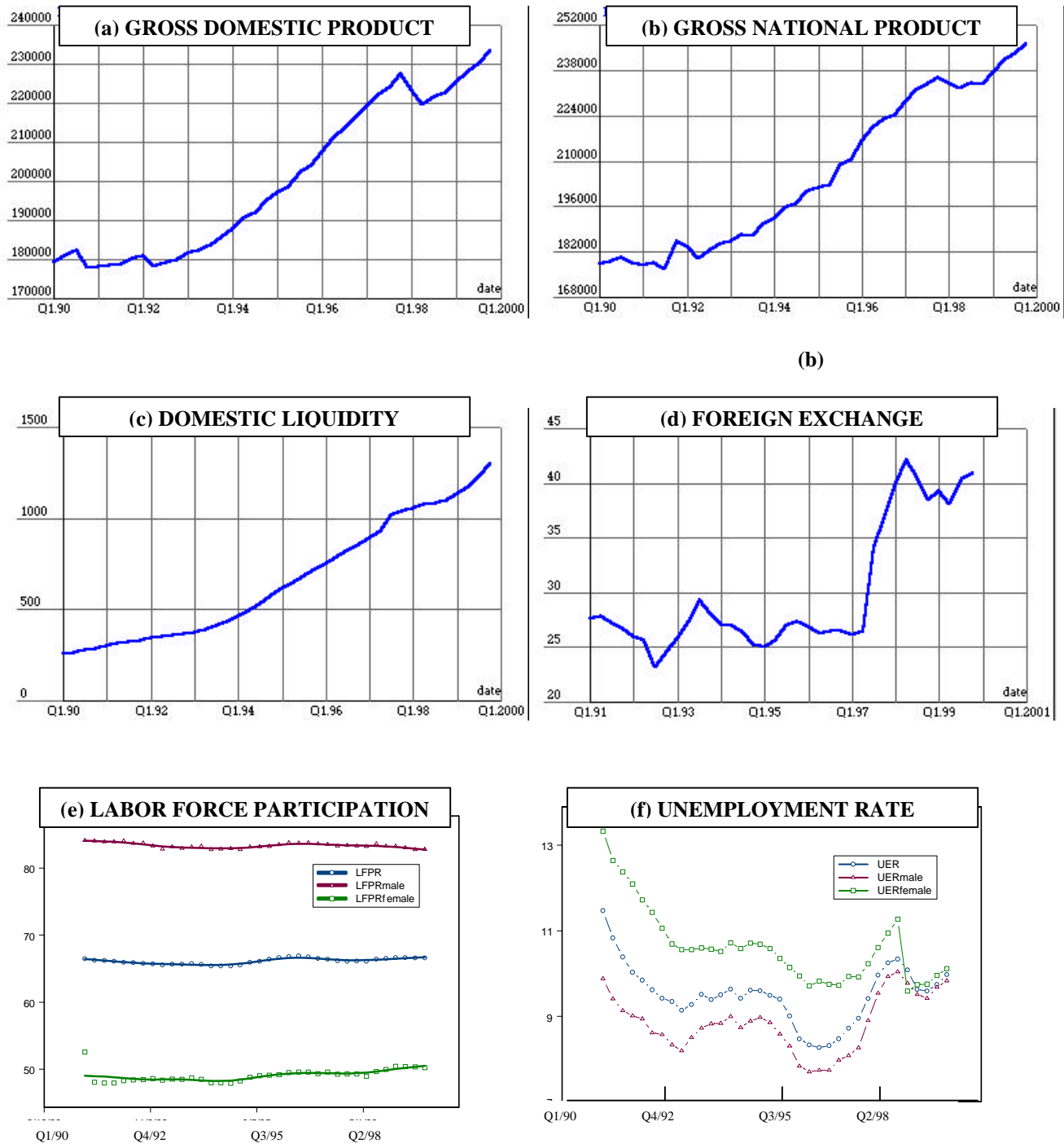
In the following section, we firstly look into some quarterly seasonally adjusted macro-economic indicators and assess the impact of the Asian financial crisis on the Philippines and El Niño based on these indicators. We then investigate the impact of the two crises by examining some panel data from the 1997 Family Income and Expenditures Survey (FIES), the October 1997 to July 1998 Labor Force Surveys (LFS) and the 1998 Annual Poverty Indicator Survey (APIS). Structural descriptions of these panel households that have moved in income quintile and poverty status are also considered in the context of classification and regression trees.

## II. Macro Economic Indicators Before and During the Crisis

In considering the effects of the two crises, we firstly considered looking into a number of quarterly macro-economic indicators pertaining to national accounts, labor and monetary indicators. Monetary indicators considered were foreign exchange, i.e. the nominal peso-dollar rate at the end of the quarter, and domestic liquidity in billion pesos comprising money supply, quasi-money and deposit substitutes. Figure 1 provides the seasonally adjusted values of these indicators from 1991 up to 1999. Seasonal adjustment on the original time series (generated by the Philippine Statistical System) was implemented through EUROSTAT’s Demetra software using the TRAMO-SEATS approach to deseasonalization (see, Gomez and Maravall, 1996).

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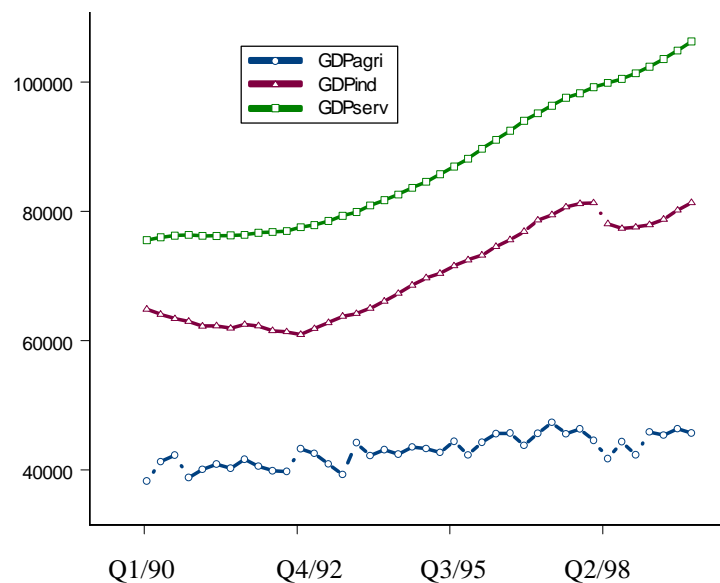


**Figure 1**

Quarterly deseasonalized values of (a) gross domestic product at constant prices (in million pesos) (b) gross national product at constant prices (in million pesos) (c) foreign exchange (nominal peso-dollar) rate at the end of the quarter (d) domestic liquidity in billion pesos, (e) labor force participation rate (middle=total, lower=female, upper=male) (f) unemployment rate (middle=total, upper=female, lower=male).

Looking through some of the time series in Figure 1, we observe a number of booms and busts in the Philippine economy. For example, upticks in the unemployment indicators during the early nineties may have been the result of the large-scale power outages experienced in the Philippines. If we were to assume that the financial crisis and El Niño were the only shocks experienced by the Philippine economy in late 1997 and 1998, we can largely attribute the volatility of the foreign exchange rate to the financial crisis while the changes in trends on gross domestic product in this period are due to a combination of these two crises. Note that the disaggregated figures for the employment indicators tend to also show that during the period of these two crises, shocks were experienced less by females who may have had better ways of coping than their male counterparts. Since gross national product was not as much affected as gross domestic product in the 1997-1998 period, dollar remittances from overseas Filipinos effectively cushioned the impact of the crises on the economy.

Looking through these indicators in comparison with the effects on similar indicators of our Asian neighbors (see, e.g., Kakwani, 2000a) may lead us to conclude that the effects of the crisis and El Niño in the Philippines were rather minimal. The impact however of the two crises may have been understated by aggregation at the national level. This suspicion is confirmed by taking into account the seasonally adjusted values of Gross Domestic Product (at constant prices) by major sectoral origin. Figure 2 shows that the industrial sector was hit rather hard during the crises period. Furthermore, looking through a small window on the agricultural sector, we see a downward shock in this sector during this period although looking at a wider time series suggests that this impact may not be that strong.



**Figure 2**

**Seasonal adjusted values of Gross Domestic Product at constant prices (in million pesos) for the agricultural sector (lower curve), industrial sector (middle curve), and services sector (upper curve).**

To assess the strength of the ill effects on the agricultural and industrial sectors, we consider the methodology of Kakwani (2000a), which involves the construction of a crisis index  $100(x - x^*)/x^*$  based on the observed value  $x$  and the predicted value  $x^*$  for a particular indicator from past trends before the period of the crisis. Datt and Hoogeveen (2000) point out that this methodology is rather problematic not only because the choice of the period prior to the crisis is arbitrary, but also because the difference  $x - x^*$  is totally attributed to the financial crisis.

For our purposes, we will consider the index as a crises (rather than a crisis) index as two major crises affected the Philippine economy in 1998. In effect, the combined effect of the financial crisis and El Niño is being measured by this methodology. There does not seem to be an easy way to handle decomposition of these effects of these shocks on the basis of this methodology. The effect may even be confounded by other realities, e.g. political governance. The crises index alone is descriptive. The strength of the index has to be assessed, say, by calculating a Wald T statistic formed from the ratio of this index to its estimated standard error. We utilized such a methodology on the logarithms of the seasonal adjusted values of gross domestic product to obtain the values of the crises index for the four quarters of 1998 (assuming the crisis effects were not immediately felt on these macro indicators). Estimates for each time point in this period were obtained through a simple linear time trend model starting from the first quarter of 1992. Table 1 (a) lists the calculated annual average of the quarterly crises indices. The required estimated standard errors were calculated through the use of the bootstrap (see, e.g., Efron and Tibshirani, 1993) in order to handle complications that arise from obtaining the variance of the ratio  $x/x^*$ . From the observed T statistics, we are led to conclude that the Asian crisis and El Niño significantly hit the industrial sectors, but was not felt as much in the agricultural and services sectors. Further calculations, this time on the combined 1998 and 1999 data (see Table 1b), suggest that the impact of the financial crisis even lingered beyond 1998. Thus, while the effects of the Asian financial crisis and the El Niño phenomenon may have been initially thought off to be negligible, our results show that the effects were felt strongly by some sectors.

**Table 1**

**Crisis Index for Gross Domestic Product (a) based solely on 1998 data; (b) based on both 1998 and 1999 data. Index per quarter was based on use of Kakwani (2000) method on logarithms of deseasonalized data.**

	Gross Domestic Product per Sector			Gross Domestic Product (National)
	Agriculture	Industry	Services	
Average Crises Index	-0.0079	-0.0066	-0.0012	-0.0042
Bootstrapped Standard Error	0.0077	0.00092	0.0013	0.0011
T – Statistic	-1.02	-7.21	-0.88	-3.63

(a)

	Gross Domestic Product per Sector			Gross Domestic Product (National)
	Agriculture	Industry	Service	
Average Crises Index	-0.0063	-0.0086	-0.0017	-0.0049
Bootstrapped Standard Error	0.0078	0.0011	0.0017	0.0011
T – Statistic	-0.81	-8.06	-1.02	-4.37

(b)

Table 2, which lists the crises indices for labor force statistics on major sectors, likewise suggests a prolonging of the impact of the crisis. For the industrial sector, the impact of the crises on the labor force was not immediately felt. The T statistics were insignificant for the calculations using data for the period up to 1998. Using the longer time span (up to 1999) provided a close to significant T statistic. These results suggest a lagged effect of the crises on the labor force. It would be interesting to look into calculations on other macro economic indicators. Furthermore, these results lead us to wonder how income distribution and poverty has been affected by the two crises, which is the subject of investigation in the next sections.

**Table 2**

**Crises Index for labor force statistics (a) based solely on 1998 data; (b) based on data from 1998 up to 1999. Index per quarter uses Kakwani (2000) method on the logarithms of deseasonalized data.**

	Labor Force per Sector		
	Agriculture	Industry	Service
Average Crises Index	-0.0044	-0.0094	-0.00068
Bootstrapped Standard Error	0.0062	0.0058	0.0034
T – Statistic	-0.69	-1.59	-0.20

(a)

	Labor Force per Sector		
	Agriculture	Industry	Service
Average Crises Index	-0.0015	-0.013	-0.0020
Bootstrapped Standard Error	0.0071	0.0065	0.0032
T – Statistic	-0.20	-1.92	-0.63

(b)

### III. Poverty Statistics in 1997 and 1998

The earlier section indicates that while the impact of the crisis on macro economic indicators at the national level appears to be rather negligible, disaggregated figures suggest that the impact may have been different for different people across different sectors. Some people may have had effective coping mechanisms during the crisis, some did not and some may even have used the crisis as an opportunity for gain. In order to assess the impact of the Asian financial crisis and the El Niño phenomenon on the Philippines more extensively, it is thus necessary to investigate its effects at the micro level, particularly on the poverty situation.

Official poverty statistics in the Philippines are based on the FIES, a survey conducted every three years by the National Statistics Office (NSO). The FIES uses urban and rural areas for its principal domains. Through an inter-agency committee of the National Statistical Coordination Board (NSCB), a regional poverty line or threshold is determined based on calculating minimal food and non-food requirements of a household. Representative food menus for urban and rural areas of each region are constructed with the menus considering local consumption patterns and satisfying a minimum nutritional requirement of 2,000 calories per person per day. Based on local prices, the menus form a regional food poverty threshold. The expenditure patterns of households (gleaned from the FIES) within a ten-percentile band of the food regional threshold are then used to determine the regional poverty threshold. Each household's per capita income is then compared with the regional poverty line to determine whether or not the household is poor. Alternatives to the official methodology for poverty measurement have actually been suggested, e.g., Balisacan (1999) and Kakwani (2000b), which employ consumption rather than income data. The latter also incorporates the use of equivalence scales to account for age and gender composition of household members in poverty measurement. The official methodology is currently under review.

Since official poverty thresholds are based on the FIES, official poverty statistics are released only every three years. The official thresholds for 1997 are listed in Table 3 together with estimated 1998 poverty thresholds. The latter were obtained by inflating the 1997 figures by the corresponding regional consumer price index.

**Table 3**  
**Regional Poverty Thresholds in 1997 and 1998**

Region	Poverty Threshold	
	1997	1998
1 (Ilocos)	11975	13213
2 (Cagayan)	9880	10813
3 (Central Luzon)	11839	13029
4 (Southern Luzon)	12452	13683
5 (Bi col)	10378	11309
6 (Western Visayas)	10560	11394
7 (Central Visayas)	8718	9641
8 (Eastern Visayas)	8727	9455
9 (Western Mindanao)	9732	10648
10 (Northern Mindanao)	10440	11512
11 (Southern Mindanao)	10503	11522
12 (Central Mindanao)	11119	12151
13 (National Capital Region)	14299	15321
14 (Cordillera Administrative)	12836	13821
15 (Autonomous Region of Muslim)	11134	12293

Note: The 1997 figures are official poverty thresholds, while the 1998 figures are inflated from 1997 thresholds based on the consumer price index per region.

The simplest poverty measure, household poverty incidence, is defined as the number of poor households relative to the total number of households. That is, if  $Z$  represents the per capita poverty threshold,  $n$  represents the total number of households, and  $Y_i = 1$  or  $0$  depending on whether the per capita income  $X_i$  of household  $i$  is less than  $Z$  or not, then household poverty incidence is

$$\frac{1}{n} \sum_{i=1}^n Y_i.$$

If a household is poor, then all persons living in that household are poor. Consequently, weighting the household poverty incidence by the size  $m_i$  of the  $i$ th household yields the poverty headcount measure

$$\frac{1}{N} \sum_{i=1}^n m_i Y_i \text{ where } N = \sum_{i=1}^n m_i, \text{ the total number of individuals.}$$

The household poverty incidence and headcount measures are straightforward, readily understandable and thus the most commonly used poverty statistics. Their simplicity however fails to take into account the degree of poverty suffered by the poor, i.e. the extent to which the poor fall below the poverty threshold. Furthermore, these statistics are insensitive to changes in the income distribution of the poor and to changes in the absolute deprivation level. The poverty gap ratio, defined as the aggregate shortfall of incomes of the poor relative to the poverty threshold, i.e.

$$\frac{1}{N} \sum_{i=1}^n m_i Y_i \left( \frac{Z - X_i}{Z} \right),$$

addresses the limitations of the poverty headcount. Furthermore, in practice, the computations for the poverty statistics are further weighted by some raising factor arising from the survey design. The raising factor is a household variable that corresponds to the number of entire households that the sampled household represents.

The latest official poverty statistics released by the NSCB are based on the 1997 FIES, which covers a sample of 39,520 households. While the FIES provides a wealth of information on information and expenditure of the households, on their own, these data do not provide any clues to the Asian financial crisis and the impact of the crisis on the Philippine economy. The 1997 FIES covered merely the first few months of the financial crisis, which started on the third quarter of 1997.

In response for the need to have more frequent and reliable information especially on non-income based poverty correlates during years when the FIES is not conducted, the NSO conducted the first APIS in 1998 on a sample of 38,709 households. The 1998 APIS is unique in that it includes two questions pertaining to the Asian financial crisis. The first question pertains to whether or not the household was affected by price increases, loss of domestic jobs, loss of overseas jobs, lessening of wages, and the El Nino. Among those affected by the financial crisis, a second question was asked regarding the household response to the crisis.

Some of the households interviewed for the 1997 FIES were also included as respondents in the 1998 APIS, thus forming a panel data. Of the 38709 households included

in the 1998 APIS survey and the 39520 households included in the 1997 FIES, we considered particularly some 11723 households common to both surveys (which also form a panel with the October 1997 to July 1998 rounds of the LFS, also conducted by the NSO). These panel data provide useful information on how lifestyles of households changed from one year to another, especially in relation to income and poverty status.

Tables 4 lists the annual per capita income of the panel data disaggregated by major island, urban-rural divide and sex of household head in 1997 and 1998. Disparities in income distribution can already be gleaned from here. Furthermore, since per capita income appears to have only slightly decreased, this may initially suggest that the impact of these shocks was indeed not quite severe in the Philippines. However, disaggregation shows a different story. Urban incomes appear to have been much more affected by the crises than rural areas. Households headed by women again also appear not to have been affected as much as their male counterparts by the crises.

**Table 4**  
**(Nominal) Per Capita Income Estimates for 1997 and 1998 Using Panel Data**

		1997	1998
<b>(National)</b>		24511	24111
<b>Major Island</b>	<i>Luzon</i>	29831	28993
	<i>Vi sayas</i>	17973	18124
	<i>Mi ndanao</i>	19264	19289
<b>Urban-Rural Divide</b>	<i>Urban</i>	34391	33350
	<i>Rural</i>	16263	16400
<b>Sex of Household Head</b>	<i>Mal e</i>	23420	22876
	<i>Femal e</i>	31235	31730

Before further analyzing these panel data in more detail, let us note that, strictly speaking, the FIES and the APIS are not really comparable both in their income and consumption data. The 1997 FIES income data has a full 1997 calendar year reference period (January to December 1997) while the 1998 APIS income data is limited to the second and third quarters of 1998. Consequently, estimated annual income from the APIS may be seriously underestimated due to the shorter reference period. As far as the consumption data in the two surveys, the consumption module of the FIES is much more robust and detailed (going up to more than 20 pages of more than 400 expenditure lines) than the APIS (2 page) module (which consisted of 27 expenditure lines). Note that with more questions about consumption patterns, one expects to record higher spending, as more questions will jog the memory of the respondent. Consequently, expenditure data for the APIS is likely to be severely underestimated in comparison with a scenario of having used the lengthier FIES module in 1998. Despite these technical limitations on the 1997 FIES and 1998 APIS, we nonetheless consider obtaining income-based estimates of poverty incidence and poverty gap from the panel data of these two surveys in order to get a sense of the variations in the welfare of the panel households during the crisis period.

Tables 5 and 6 list our estimates of the Gini index of inequality for total household incomes, household poverty incidence, the poverty headcount and poverty gap for the years



1997 and 1998 at national and sub-national levels using the panel data and the design weights from the 1998 APIS, together with the poverty thresholds in Table 4. Note that we purposely neglected to take into consideration a new geo-political region called Caraga, which was not accounted for in the officially released regional poverty lines. Furthermore, to make the income data for the two surveys comparable, the APIS (half year) household income data was firstly adjusted into an estimate of the total 1998 household income taking into account quarterly seasonal fluctuations in gross value added for the agricultural, services and industrial sectors in 1998.

An immediate inspection of the generated poverty statistics and Gini inequality index (based on household income) in Table 5 shows that our 1997 estimates agree with the official income-based statistics, suggesting that estimates from panel data may be adequately used. Furthermore, the financial and El Nino crises appear to have worsened the poverty situation with a rise in household poverty incidence, headcount ratio, poverty gap and the Gini inequality index for the panel. Note, however, that to ensure that these apparent rises in poverty statistics for the panel data are not merely due to noise, standard errors for the differences were calculated and the corresponding Wald T statistic also computed (cf. Table 7).

**Table 5**  
**Income-based National Poverty Statistics for 1997 and 1998**

<b>National Level Poverty Statistics</b>	<b>Official Statistics</b>	<b>Panel Data Estimates</b>	
	1997	1997	1998
<b>Household Poverty Incidence</b>	31.8	33.3	39.1
<b>Poverty Headcount</b>	36.8	38.0	43.9
<b>Poverty Gap</b>	10.0	12.7	16.4
<b>Gini Index</b>	0.487	0.470	0.494

The disaggregated statistics in Table 6 indicate that for each year, poverty is more of a rural phenomenon. In fact, roughly three out of every four poor panel households were situated in rural areas. The increase in rural per capita income (shown in Table 4) was not enough to improve the poverty situation in rural areas. Poverty even worsened in the rural areas from 1997 to 1998. The ill effects of the crises on the poverty situation was not only limited to rural areas. The effects of the crises cut across major spatial locations. Luzon bore the brunt of the effects among all the major islands. While all regions appear to have worsened in poverty incidence and gap, some regions such as Ilocos, Central Luzon, Southern Tagalog, Western Visayas, and the major urban center Metro Manila appear to have suffered much more than other regions. In addition, we can observe that households headed by men appear to have been struck more by the crises.

Table 6 also indicates that male headship is a positive correlate of poverty in the Philippines, as was pointed out in Datt and Hoogeveen (2000) and in Kakwani (2000b). Most analysts may consider this surprising since female headship of households imply widows,

unwed mothers and the like. It has been observed in Africa that households headed by females are poorer than male-headed households. For developing countries, such as the Philippines, Thailand and Vietnam, however, male-headed households appear to be poorer. It may be possible that, female household heads are able to empower themselves and consequently, outperform their male counterparts. Alternatively, since the operational definition of household headship is unclear and left to the respondents, field personnel may often record males as heading the households unless very manifestly seen otherwise, thus explaining why the reported number of female headed households is few and why we consequently get such results.

Further cross-sectional inspection of the regional estimates in Table 6 reveals high regional disparities with ARMM, Central Mindanao and Bicol having the highest household and individual poverty incidence. The contribution to total household and total individual poverty of ARMM and Central Mindanao is, however, rather small. The lowest poverty incidence for both 1997 and 1998 was in the premiere urban center Metro Manila with surrounding areas also having low incidence rates. However, despite the small poverty incidence, we also see an increase in the estimated poverty statistics for Metro Manila and surrounding areas from the period 1997 to 1998, and these increases appear to be rather substantial. On the basis of poverty gap, we may consider the Autonomous Region of Muslim Mindanao (ARMM) as being better off than Central Mindanao. This suggests that a considerable proportion of the poor in ARMM are actually at the poverty threshold. However, we also note that poverty gap appears to have widened from 1997 to 1998 in ARMM. As was pointed out in Kakwani (2000b), the disparities in determining who is worse off from the use of different criteria suggests the need to adopt different poverty reduction strategies for different regions. In regions where poverty gap is high but gap is not too high (as in ARMM), the goal must be to maximize the number of poor targeted. In regions where poverty gap is high but incidence is not too high, households and people will have to be brought closer to the poverty line. Finally, in regions where poverty is really severe (both in incidence and in gap), strategies must both be in terms of maximizing the numbers assisted and minimizing the gap.

**Table 6**  
**Poverty Statistics and Gini Estimates in 1997 and 1998 using Panel Data**  
**(a) by Major Island; (b) by Region;**  
**(c) by Urban-Rural Classification, and; (d) by Sex of Household Head.**

Island	Household Poverty Incidence		Poverty Headcount		Poverty Gap		Gini	
	1997	1998	1997	1998	1997	1998	1997	1998
Luzon	25.3	31.5	29.2	36.0	9.11	12.5	0.448	0.457
Visayas	38.8	45.0	44.3	50.2	15.1	19.2	0.473	0.501
Mindanao	45.0	49.7	50.7	54.9	17.8	22.3	0.468	0.521

(a)

Region	Household Poverty Incidence		Poverty Headcount		Poverty Gap		Gini	
	1997	1998	1997	1998	1997	1998	1997	1998
1 (Ilocos)	36.7	45.3	42.4	52.2	14.2	20.6	0.427	0.494
2 (Cagayan)	30.0	31.7	33.9	35.9	9.2	11.8	0.463	0.499
3 (Central Luzon)	19.0	27.2	21.0	30.9	5.7	9.5	0.380	0.395
4 (Southern Luzon)	23.1	30.7	26.8	34.7	8.3	11.8	0.411	0.433
5 (Bi col)	52.1	55.5	59.2	62.0	21.7	24.3	0.476	0.474
6 (Western Vi sayas)	41.3	50.3	47.5	56.5	16.7	21.5	0.463	0.500
7 (Central Vi sayas)	35.7	41.8	39.0	45.2	13.0	17.3	0.484	0.506
8 (Eastern Vi sayas)	39.5	41.3	47.4	47.7	15.9	18.3	0.465	0.492
9 (Western Mi ndanao)	38.2	47.7	42.6	49.5	14.7	21.1	0.475	0.503
10 (Northern Mi ndanao)	44.4	49.6	49.9	55.2	17.4	22.9	0.481	0.516
11 (Southern Mi ndanao)	41.4	46.1	46.9	51.9	16.3	20.2	0.445	0.456
12 (Central Mi ndanao)	55.5	58.4	62.6	65.9	25.8	27.1	0.503	0.479
13 (National Capital Region)	9.2	14.7	12.2	18.1	2.7	4.8	0.431	0.412
14 (Cordillera Administrative Region)	48.0	48.6	55.3	54.7	21.7	23.1	0.510	0.668
15 (Autonomous Region of Muslim Mi ndanao)	53.9	54.1	58.5	58.5	15.9	22.7	0.370	0.379

(b)

Urban- Rural Classification	Household Poverty Incidence		Poverty Headcount		Poverty Gap		Gini	
	1997	1998	1997	1998	1997	1998	1997	1998
Urban	17.3	24.1	21.0	28.4	5.8	9.1	0.446	0.477
Rural	46.6	51.6	52.4	57.2	18.5	22.7	0.429	0.449

(c)

Sex of Household Head	Household Poverty Incidence		Poverty Headcount		Poverty Gap		Gini	
	1997	1998	1997	1998	1997	1998	1997	1998
Male	35.0	41.3	39.6	45.9	13.3	17.3	0.470	0.493
Female	22.6	25.5	25.7	28.3	7.9	9.4	0.468	0.493

(d)

To craft economic policies for addressing future challenges posed by such crises, we must be convinced that apparent increases in the poverty statistics during the crises period

shown in Tables 5-6 are scientifically attributable to the crises. The increases may actually be due to sampling error. Standard errors for the 2-year differences in poverty statistics ought therefore to be estimated. These can be readily done through the bootstrap (Efron and Tibshirani, 1993). The ratio of these differences to their respective estimated bootstrapped standard errors form Wald T statistics; these are provided for in Table 7. These statistics help us to decide whether these differences are real or not. A rough rule is to decide that these differences are real when the t-statistics are larger than 2 in magnitude.

**Table 7**  
**T Statistics for 2 Year Differences in Poverty Statistics Estimates**  
**(a) by Major Island; (b) by Region;**  
**(c) by Urban-Rural Classification, and; (d) by Sex of Household Head.**

<b>Major Island</b>	<b>T-Statistics for Differences in</b>		
	<b>Household Poverty Incidence</b>	<b>Poverty Headcount</b>	<b>Poverty Gap</b>
<b>(National)</b>	<b>(10.15)</b>	<b>(10.88)</b>	<b>(17.52)</b>
Luzon	9.85	10.27	13.93
Visayas	5.48	4.92	8.66
Mindanao	4.92	4.20	8.93

(a)

<b>Region</b>	<b>T-Statistics for Differences in</b>		
	<b>Household Poverty Incidence</b>	<b>Poverty Headcount</b>	<b>Poverty Gap</b>
1 (Ilocos)	3.57	3.90	6.51
2 (Cagayan)	1.07	1.04	4.42
3 (Central Luzon)	6.18	6.89	6.06
4 (Southern Luzon)	5.68	5.88	7.30
5 (Bicol)	1.92	1.65	3.23
6 (Western Visayas)	4.93	4.87	6.81
7 (Central Visayas)	4.10	4.32	6.26
8 (Eastern Visayas)	0.76	0.14	2.10
9 (Western Mindanao)	3.64	3.09	4.87
10 (Northern Mindanao)	3.10	2.92	5.74
11 (Southern Mindanao)	2.31	2.22	3.94
12 (Central Mindanao)	1.09	1.28	0.34
13 (National Capital Region)	5.06	4.25	4.61
14 (Cordillera Administrative Region)	0.27	-0.27	1.73
15 (Autonomous Region of Muslim Mindanao)	0.27	0.35	6.34

(b)

Urban-Rural Classification	T-Statistics for Differences in		
	Household Poverty Incidence	Poverty Headcount	Poverty Gap
Urban	10.98	9.70	15.05
Rural	5.94	5.28	12.34

(c)

Sex of Household Head	T-Statistics for Differences in		
	Household Poverty Incidence	Poverty Headcount	Poverty Gap
Male	11.09	12.25	18.01
Female	2.83	3.16	2.85

(d)

From Table 7, we see that the changes in the poverty situation brought about by the crises in the national and major island levels are significant. Also, there is actually no evidence from the panel data to claim that poverty incidence and poverty headcount in some regions, namely, Cagayan, Bicol, Eastern Visayas, Central Mindanao and ARMM, worsened in the period of the crisis. The Cordillera Administrative Region (CAR) even appears to have improved its poverty headcount from 1997 to 1998, but this apparent improvement is actually due to noise. At best, we can say that in these regions there was no evidence from the panel data of any change in the poverty incidence and headcount.

While ARMM, Cagayan, Bicol and Eastern Visayas did not worsen in their respective poverty incidences in the period from 1997 to 1998, the poverty gap in these regions, however, substantially widened. These results confirm the suspicion that the crises actually deeply affected the poverty situation in the country, not just in terms of poverty incidence but also in terms of poverty gap. This may pose further challenges to current poverty alleviation programs.

#### IV. Poverty Status and Income Movements in 1997 and 1998

In the previous section, we noted the worsening of the poverty situation during the crises period. This can be further investigated with the aid of the panel data by carefully inspecting movements in the income distribution from 1997 to 1998. Following Haughton, *et al.* (2000), we explored a disaggregation of the panel households according to their national per capita income quintile status in 1997 and in 1998 (cf. Table 8) in order to analyze income movements within this period. This disaggregation of households was further broken down into three categories representing “shooting stars”, households that moved up from their income quintile group by two or more ranks; “sinking stones”, those that moved down from their income quintile group by two or more ranks; and the rest of the households (who did not have any dramatic changes in their quintile ranks).

**Table 8**  
**Panel Household cross classified by**  
**National Per Capita Income Quintiles in 1997 and 1998.\***

1997 National PCI Quintiles	1998 National PCI Quintiles					Total
	Poorest	Mid-poor	Middle	Mid-upper	Upper	
Poorest	1313 (61.71) <b>(61.69)</b>	570 (26.53) <b>(25.73)</b>	218 (9.72) <b>(9.49)</b>	42 (1.62) <b>(1.62)</b>	12 (0.42) <b>(0.50)</b>	2155
Mid-poor	611 (27.02) <b>(27.62)</b>	934 (39.20) <b>(38.87)</b>	616 (24.86) <b>(24.81)</b>	180 (7.53) <b>(7.65)</b>	30 (1.39) <b>(1.69)</b>	2371
Middle	208 (7.88) <b>(8.00)</b>	608 (25.57) <b>(25.18)</b>	941 (38.01) <b>(37.66)</b>	606 (24.32) <b>(24.56)</b>	98 (4.21) <b>(5.06)</b>	2461
Mid-upper	55 (2.14) <b>(2.14)</b>	209 (8.89) <b>(8.62)</b>	561 (23.12) <b>(22.55)</b>	1149 (45.78) <b>(45.51)</b>	514 (20.06) <b>(23.76)</b>	2488
Upper	11 (0.62) <b>(0.54)</b>	42 (1.89) <b>(1.59)</b>	140 (6.47) <b>(5.48)</b>	534 (23.93) <b>(20.66)</b>	1520 (67.09) <b>(68.99)</b>	2248
Total	2199	2363	2476	2511	2174	11723

\*cells represent number of households; weighted percentages to row total listed in parentheses; weighted percentages to column totals in bold and parentheses;

In Table 9, we list the responses of the shooting stars, sinking stones and the rest of the households to a crisis-related APIS question on whether or not the household was affected by price increases, loss of (domestic and overseas) jobs, reduced wages and the El Niño. These self-reported measures of shock indicate that practically everyone (across categories) felt price shocks and that relatively few, about one in twenty, households experienced loss of migrant or overseas employment. The sinking stones appear to have experienced the greatest impact of the migrant and domestic labor market shock while the shooting stars felt the least impact for labor market shocks as well as the least impact for the shock due to a lessening of wages. The shooting stars, surprisingly, report the greatest shock from El Niño although sinking stones outnumber them by a ratio of two to one.

**Table 9**  
**Impact of Crises on Panel Households**

Group	Proportion of Households to Total Panel Households	Proportion (in Percent) of Households Affected by				
		Price Increases	Loss of Domestic Jobs	Loss of Overseas Jobs	Less Wages	El Niño
<b>Sinking Stones</b>	5.47	91.63	25.85	5.62	15.93	60.20
<b>Shooting Stars</b>	5.13	89.76	15.40	4.30	13.13	65.81
<b>Others</b>	89.40	90.01	18.97	4.41	16.16	59.72
<b>Overall</b>	100	90.09	19.16	4.47	15.99	60.06

Given this classification of movements in income quintile status, it would be informative to see some structural descriptions of the household movement by constructing a classification and regression tree (Breiman *et al.*, 1984), which provides a rudimentary way of

representing the importance of a number of inputs to a particular output being investigated, and thus to determine the “correlates” that yield the output. The tree in Figure 3, for instance, identifies which of household characteristics in 1997 and 1998 and other determinants of consumption and income, are important structural descriptions for the stratification formed by the shooting stars, sinking stones and those who moved by at most one quintile.

Interestingly, Figure 3 shows that the most important factor among the household characteristics is whether or not the household owned a refrigerator in 1997 (and this appears to serve as a proxy variable for household income). The household’s ownership of a refrigerator interacts with a number of 1997 household variables, namely, the family size and occupation of the household head together with some 1998 household variables, viz., ownership of a washing machine, the family size, the primary class of worker of the household head in 1998.

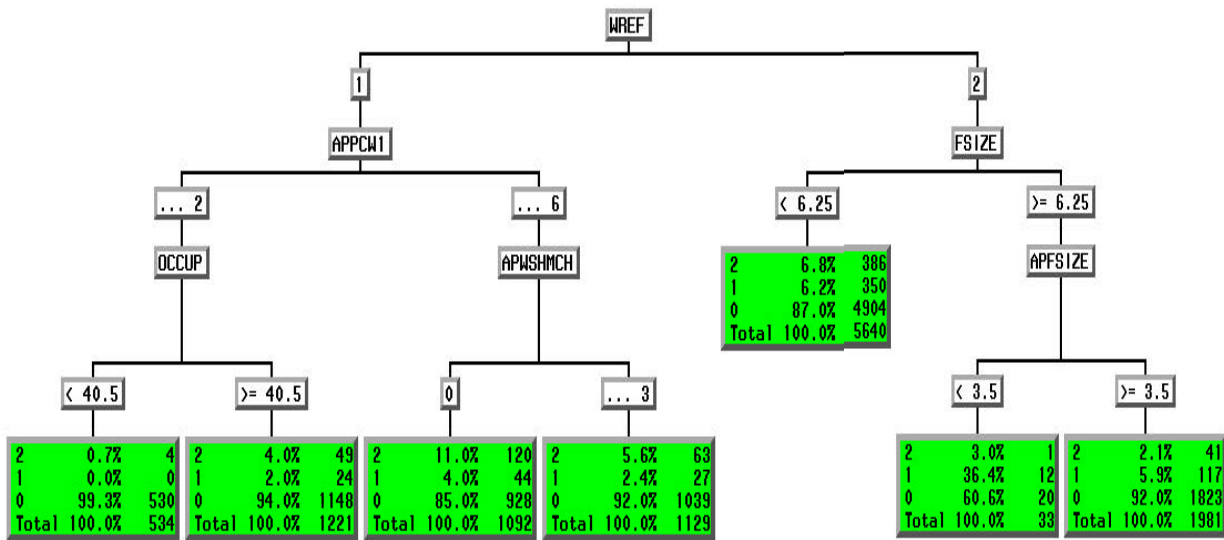


Figure 3

Classification and regression tree for sinking stones, shooting stars and other households. The value on each “leaf” represents the number of households (and the percentage to the total households in the leaf).

In place of the three-group classification from the movements in income quintile status, we also considered another cross-classification of our panel data, this time according to the household poverty status in the years 1997 and 1998 (cf. Table 10). We readily notice the shifting of a considerable number of panel households (1504), which were non-poor in 1997, into poverty. This figure is rather astonishing and serves to show the impact of the crises on poverty. In fact, this figure is nearly double the figure of the number of poor households in 1997 that moved out of poverty. Notice also that although there was an increase in poverty incidence from 1997 to 1998 in the panel, the (weighted) proportion of (1997) non-poor households who moved into poverty is roughly the same as the (weighted) proportion of (1997) poor households who moved out of poverty.

**Table 10**  
**Panel Households according to Poverty Status\* in 1997 and 1998**

1997 Poverty Status	1998 Poverty Status		Total
	NON- POOR	POOR	
NON- POOR	6567 (80. 21) <b>(87. 87)</b>	1504 (19. 79) <b>(33. 76)</b>	8071 <b>(66. 72)</b>
POOR	834 (22. 19) <b>(12. 13)</b>	2818 (77. 81) <b>(66. 24)</b>	3652 <b>(33. 28)</b>
Total	7401 (60. 90)	4322 (39. 10)	11723

\*cells represent number of households; weighted percentages to row total listed in parentheses; weighted percentages to column totals in bold and parentheses.

Table 11 lists the responses of the panel households to an APIS question regarding the household responses to the crises. It can be readily noticed that most households changed their eating habits, with the households that moved into poverty displaying the highest response to this item. Another clear response to the crises among panel households affected by the crises is increased working hours with again the highest response from households that moved into poverty. Clearly, the proportion of households that received assistance from other households was higher than those that received assistance from government.

**Table 11**  
**Self-Reported Responses of Panel Households Affected by Crisis**

Group	Proportion (in Percent) of Panel Households Affected by Crisis That					
	Changed Eating Patterns	Took Children Out of School	Migrated to city or other countries	Received assistance from other households	Received assistance from government	Increased working hours
<i>Risers</i>	47. 90	8. 59	8. 42	16. 91	10. 62	36. 06
<i>Flats</i>	46. 38	7. 15	5. 56	16. 55	7. 07	28. 14
<i>Fallers</i>	53. 53	7. 04	4. 52	15. 03	9. 31	28. 34
Overall	47. 45	7. 25	5. 64	16. 37	7. 64	28. 76

It may be of particular interest to also determine the household characteristics that correlate with jumps into and out of poverty within the one-year period using classification and regression trees. Classification and regression trees not only show us the important inputs for arriving at an output but also provide us a useful way for “deciding” how to classify households according to the suggested inputs. Note that the combined number of risers (poor who became nonpoor) and fallers (nonpoor who became poor) is far fewer than the flats (who experienced no change in their poverty status). A standard classification and regression tree on all the panel data would be unable to provide us decision rules that are directly useful for describing and distinguishing the risers from the fallers and from the other households. Another classification and regression tree diagram is shown in Figure 4 for such ends, this time based on an equal sized sampling on the three groups of households, viz., those that moved into poverty, those that did not change their status, and those that moved out of



poverty. To classify a particular household's movement in poverty status, the attributes of the household can be routed down the tree according to the values of the attributes of the household tested in successive nodes. When a leaf (or final node) is reached from the root, the household is then classified according to the class assigned the leaf.

The classification and regression tree from equal sized stratified sampling in Figure 4 illustrates once again the importance of refrigerators as an indicator of movement to and away from poverty. Among households with a refrigerator (in 1997) and with a rather large family size, those with four or more members in the households below the age of fifteen are likely to have moved into poverty. Among households without refrigerators in 1997, those whose heads engage in agriculture, fisheries, forestry, mining and quarrying are likely to have moved into or out of poverty with more of these households moving out of (rather than into) poverty. Among households without refrigerators in 1997, and whose heads engage in businesses outside of agriculture, fisheries, forestry, mining and quarrying, nearly half of them who had no members below 25 moved into poverty.

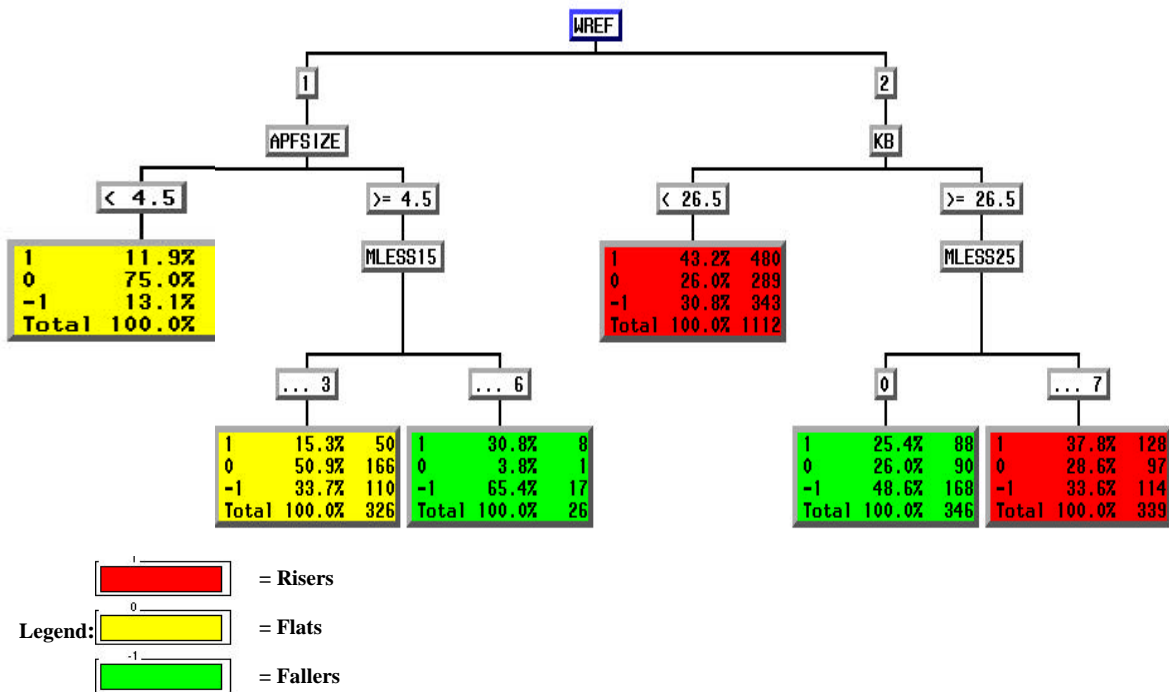


Figure 4

Classification and regression tree for households moving into poverty, moving out of poverty, and remaining in the same status using a 10 percent stratified sample

V. Concluding Remarks

A number of lessons can be gleaned from the results in this paper from a policy perspective. Government development plans have espoused a policy thrust on sustaining economic growth with equity, i.e. programs and projects have been outlined so that various sectors complement each other towards raising economic growth, which in turn is expected to generate stable employment opportunities and to reduce poverty. Poverty in the

Philippines is largely a rural phenomenon. Consequently, government efforts must continue to concentrate poverty alleviation policies toward rural areas through infrastructure development, agricultural modernization in conjunction with structural reforms.

The financial crisis and El Niño have further aggravated household poverty, which at their 1997 levels was already rather high. Evidence from the panel suggests that government did not significantly assist the panel households in coping with the crises. This paper suggests that the impact of the crisis has been uneven with some households suffering more than others, even among poor households. Government ought to learn how to target effectively victims of crises and help those who need help the most.

The impact of the financial crisis and El Niño on household poverty appears to be largely related to family size and occupation of the household heads, and this impact appears to have lingered. While some households with large family sizes may have had coping mechanisms, e.g., increased working hours and income transfers, or pulling their children out of school and putting them to work, it appears however that households with large family sizes were generally the ones most vulnerable to shocks. This suggests that government ought to display resolve in empowering households to have the family sizes they desire. The latest official statistics indicate that, at the national level, actual and desired fertility rates differ by one child. This gap ought to be bridged as a form of safety net against the effects of future crises. Attempts to alleviate poverty may only be continuously hampered by a population size whose growth exceeds the growth of the country's resources.

In addition, government together with the private sector ought to take a more active stance in assisting the public into getting gainful occupations. In handling similar crises in the future, government ought to consider funding a number of short-term training programs for those displaced by the effects of the crises. Being able to shift occupations is largely dependent on the quality of one's education and training. While there may have been some gains in providing universal access to education over the past several decades, there are questions on whether low income families are being given improved access to quality education, especially in higher education (Albert, 2000). Hitherto, the programs offered in basic and higher education do not actually reflect labor market needs with the effect of having an oversupply of college graduates for some occupations resulting in underemployment and meager national productivity levels. Long term investments will thus have to be made in both formal and non-formal education so that the labor force, especially the poor, may be assisted in choosing well their occupations, empowering them to cope with future shocks to the economy and improving their productivity, competitiveness and general state of well being.

Development policies and programs are beyond doubt dependent on fiscal constraints, which may not improve considerably within the short term. However, it is important that fiscal constraints do not hamper the development and implementation of long-term solutions to the country's problems. Furthermore it is important to recognize that a central issue in policy formulation is being able to collect information that will provide us reliable indications of whether goals being set out in these programs are truly being met. This paper would have wanted to touch on a number of other matters, e.g. whether current income-based poverty measurement and data may be exaggerating actual levels of poverty statistics, and if so, by

how much, as well as possible measurement errors in current data collection schemes. These research problems ought to be studied carefully in the future, as they will no doubt have effects on concrete policy directions that need to be taken.

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