The Evolution of Poverty during the Crisis in Indonesia, 1996 to 1999*

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Abstract: The economic crisis has caused a clear deterioration in the welfare of the Indonesian people. While there are many dimensions to individual and family welfare, here we focus on only one: a consumption expenditures based measure of “poverty.” Even within the measurement of poverty, we address only the evolution of poverty during the crisis. Specifically, we examine the appropriate method to compare the change in poverty between the February 1996 and February 1999 Susenas surveys. Conceptually, to set a 1999 poverty line comparable to that of 1996 is a price deflation issue. The question is: how much it would cost in 1999 to purchase a bundle of goods that would produce the same level of material welfare as the money expenditures which defined the poverty line in 1996? Empirically, given the large changes in the relative price of food, the key issue is the weight given to food prices in the price index.

While use of different deflators produces a range of plausible estimates we produce two “base cases” – one working forward from 1996 and one backward from 1999. If one were to accept the official BPS figure of 11.34 percent for February 1996, then poverty increased from the immediate pre-crisis levels of around 7-8 percent in the second half of 1997 to post-crisis levels of 18-20 percent by September of 1998 and was 18.9 percent in February 1999. Alternatively, if one begins from out best estimate of the level of poverty in February 1999 of 27.1 percent then poverty rose by 9.6 percentage point from 17.5 percent in February 1996.

Since February 1999 poverty appears to have reduced considerably. However, two years after the crisis started, poverty is still substantially higher than its pre-crisis level.
Introduction

There are many broad issues in defining “poverty,” which is intrinsically a complex social construct. Even within a narrow definition of poverty based on a deficit of consumption expenditures, there are numerous thorny technical issues in setting an appropriate “poverty line” (Pradhan et al, 2000; Ravallion, 1994). This note avoids both of those and is limited to examining how poverty, defined on a consistent, welfare comparable basis, changed in Indonesia over the course of the series of crises it has experienced since August 1997. We use a variety of data sets and studies to place together a consistent series of the evolution of poverty, which spans the period from February 1996 to August 1999.

As the issues surrounding poverty measurements are complex, let us begin with two basic issues. First, the deflation of nominal to “real” expenditures to maintain comparability in welfare levels and, second, the responsiveness of poverty rates to changes in real expenditures. With these basics in hand, we can estimate changes in headcount poverty rates over time using a range of price deflators. Based on our preferred method we create a consistent set of estimates of poverty over the course of the crisis based on all of the various data sets and studies available. Finally, we discuss how the depth of poverty and inequality changed during the crisis.

I) Defining “real” expenditures

The deflation of nominal to “real” expenditures is central to a “welfare comparable” basis for comparisons of poverty over time. For any given distribution of expenditures across households, the determinant of the poverty rate is the “poverty line.” The poverty
line is expressed in rupiah: it is simply the amount of expenditures above which households are “not poor” and below which households are in (varying degrees of) poverty.

A fruitful way of thinking about the deflation of poverty line in nominal rupiahs, so that it represents “the same” amount of “real” rupiahs in another period, is using standard microeconomic theory of consumer choice with individual welfare maximization. The consumer choice problem is to choose a consumption basket for given expenditures and prices so as to maximize their utility.\(^1\) For any given preference mapping, the solution to that problem is the “indirect utility function,” which gives the maximum level of utility achievable for given prices and expenditures. The “dual” of this maximization problem for the consumer is to choose a consumption basket minimizing the expenditures necessary to achieve any given level of utility. The outcome of this problem is the “expenditure function,” i.e. the minimum level of expenditures necessary to achieve any fixed standard of living (level of utility):

\[
e(p, U^0) = \min_{x} p' x \text{, subject to } U(x) = U^0
\]

Where \(p\) and \(x\) are N by 1 vectors of prices and quantities of commodities.

One way to conceptualize the poverty line is to choose a level of welfare below which a household is “poor,” \(U^{poverty}\), and then define the poverty line as the money expenditures necessary to attain that level of welfare:

\[
\text{Poverty Line } = PL = e(p, U^{poverty})
\]

\(^1\) This of course assumes away the decision between savings and consumption.
Using expenditure functions allows us to draw on a large body of consumer welfare economics in thinking about comparing poverty lines over time. So, suppose that prices change from the \((N \times 1)\) vector of prices in 1996, \(\mathbf{p}^{96}\), to the \((N \times 1)\) vector of prices in 1999, \(\mathbf{p}^{99}\). This shift in prices could involve changes in the level and changes in relative prices. The “exact” index of inflation in the poverty line is the amount of expenditures necessary at the new price level \((\mathbf{p}^{99})\) to achieve the level of welfare which defined poverty at the old prices \((\mathbf{p}^{96})\):

\[
PL^{99} = e(\mathbf{p}^{99}, U^{\text{poverty}}) = (1 + \Pi_{PL}^{96,99}) * e(\mathbf{p}^{96}, U^{\text{poverty}}) = (1 + \Pi_{PL}^{96,99}) * PL^{96}
\]

This “exact” inflation index is difficult to implement in practice as the appropriate weights on the \(N\) individual prices in such an index would depend on the underlying preferences or empirically on the entire matrix of own and cross price elasticities.

Nevertheless, this approach provides a solid conceptual basis for intertemporal comparisons: what is the money expenditures at the new prices necessary to achieve the same utility level as at the old prices?

The deflation of nominal expenditures is highly problematic in Indonesia over the crisis period because of the huge change in relative prices. If all prices had changed uniformly then deflation would not be a serious problem as the price of any commodity (or any bundle of commodities) could be used. But in Indonesia over this period, the relative price of food rose tremendously. Inflation in the price of food from February 1996 to February 1999 was 160 percent, while the increase in the non-food components of the
CPI was much lower 81 percent. This means when we deflate nominal expenditures into “real” expenditures, we have to be very careful in defining how exactly “real” is calculated.²

Table 1 illustrates the problem. Median nominal consumption expenditures increased by 110 percent from February 1996 to February 1999. How much did median “real” expenditures rise? If one made the mistake of defining “real” expenditures as purchasing power over non-food items only, then median “real” expenditures have actually risen by 16.2 percent. If, in contrast, a price deflator was defined only as purchasing power over rice, then “real” expenditures have fallen by 26 percent. But this “rice only” deflator is just as unrealistic as a “non-food only” as all households actually consume a mix of goods.

If one uses the standard approach and deflates nominal expenditures by the consumer price index (CPI), this implies that “real” expenditures were only 1.3 percent lower in February 1999 than in February 1996. But the share of food in the CPI basket (which is around 40 percent) is much lower than in actual consumption expenditures as recorded in the Susenas, and certainly understates the importance of food for the poor.³ If one constructs a price index using the CPI price series but with weights for prices based on the actual consumption basket of the poorest 30 percent of households then inflation in that consumption basket was 136 percent and median “real” expenditures fell 10.9 percent. This sensitivity of the measurement of “real” expenditure changes to deflation in the presence of large changes in relative prices especially complicates the calculation of the

² See Suryahadi and Sumarto (1999).
poverty index, because the poor have a higher share of food in the consumption than do the non-poor (a relationship known as Engel’s Law).

Table 1: Sensitivity of “Real” Expenditures Change between February 1996 and February 1999 to Deflator Used to Deflate Nominal Expenditures

| Deflator                                   | Food Share | Percentage increase in prices by this deflator | Percentage change in median “real” expenditures by this deflator |
|--------------------------------------------|------------|-----------------------------------------------|---------------------------------------------------------------|
| All non-food                               | 0          | 81                                            | 16.2                                                          |
| CPI                                        | 0.40       | 113                                           | -1.3                                                          |
| Mean food share of Susenas                 | 0.55       | 124                                           | -6.1                                                          |
| Household specific deflator based on Engel’s Law | 0.63     | 131                                           | -9.0                                                          |
| Food share based on actual consumption of the bottom 30 percent of the population | 0.70   | 136                                           | -10.9                                                         |
| Fixed weights using poverty basket in 1996 | 0.80       | 144                                           | -13.8                                                         |
| All Food                                   | 1          | 160                                           | -19.1                                                         |
| Rice Price only                            | --         | 184                                           | -26.0                                                         |

Notes:
This table uses median expenditures, whose nominal value rose by 110 percent (from Rp. 52,123 to Rp. 109,587). Mean nominal expenditures rose by less, only 96 percent (from Rp. 69,972 to Rp. 137,284).

The percentage change in real expenditures (RE) does not fall one for one with a rise inflation (%ΔP=Π) for a given percentage change in nominal expenditures (E). Since %ΔRE=(%ΔE−Π)/(Π+1) then:

\[
\frac{\partial (%\Delta RE)}{\partial \Pi} = \frac{(1 - %\Delta E)}{(\Pi + 1)^2}
\]

In table 2 we show the mean and median of nominal and “real” expenditures for each expenditures quintile in 1996 and 1999 using a deflator that reflects the actual share of food in the total expenditures of the bottom 30 percent of households. This deflator should

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3 Susenas is the “National Socio-Economic Survey” conducted by Statistics Indonesia (BPS). The “Core” of this survey, which contains summary characteristics of households and individuals, is conducted annually. The detailed “Consumption Module” of the survey, which forms the basis for the official poverty statistics, is conducted every three years. For more details about Susenas, see Imawan and Ahnaf (1997).
capture the expenditure changes of the poorest, but overstate the real expenditures declines of richer households (as the food share in their consumption is lower). The nominal expenditures actually rose more for the poorer quintiles, with the median rising 120 percent for the poorest quintile, versus only 90 percent for the richest quintile, a difference of 30 percentage points. However, since as pointed out above, deflation narrows the gaps in real expenditures changes so that real expenditures of the poorest quintile fell by 7 percent and of the richest quintile by 20 percent, a difference of only 13 percentage points.\(^4\)

\(^4\) This also means that one has to be very careful in discussing distributional changes and the changes in “real” expenditures of various expenditure classes or inequality. For instance, even if the nominal expenditures of the bottom and top quintile changed by a similar amount, the poorer quintile will be much worse off, since they have a much larger proportion of food in their consumption and the relative price of food increased. Comparing the inequality of nominal expenditures across the two periods does not capture the changes in the inequality of standards of living.
Table 2: Changes in Nominal and Real Expenditures by Quintiles

| Quintile | Nominal Expenditures | Real Expenditures |
|----------|----------------------|-------------------|
|          | Mean | Median | % Change | Mean | Median | % Change |
| 1st      | 27,848 | 61,470 | 120.73 | 28,663 | 63,195 | 120.48 |
| 2nd      | 39,969 | 86,107 | 115.44 | 39,935 | 86,160 | 115.75 |
| 3rd      | 52,400 | 109,981 | 109.89 | 52,123 | 109,595 | 110.26 |
| 4th      | 72,459 | 146,376 | 102.01 | 71,234 | 144,932 | 103.46 |
| 5th      | 157,192 | 282,517 | 79.73 | 123,682 | 234,616 | 89.69 |
| Total    | 69,972 | 137,284 | 96.20 | 52,123 | 109,587 | 110.25 |

II) Sensitivity of poverty rate to the poverty line

The second basic issue is how much poverty rates are “expected” to change from a given distributionally neutral change in real expenditures. Starting from a general class of decomposable poverty measures proposed by Foster, Greer, and Thorbecke (1984), the formula for a poverty measure with poverty line $z$, expenditures $y$, and poverty aversion parameter $\alpha$ is:

$$\text{Poverty}(\alpha, Z) = \int_0^z \left(\frac{z - y}{z}\right)^\alpha f(y) dy$$

The estimate of the headcount poverty rate $P(0)$, when $\alpha = 0$, is simply the count of the number of households whose expenditures are below the poverty line divided by the total population.
In terms of continuous distribution this is simply the integral of the probability density function (pdf) up to the poverty line. But this integral is the cumulative density function (cdf, denoted \( F(.) \)) of expenditures:

\[
\text{Poverty}(\alpha = 0, Z) = \int_{0}^{z} f(y) dy = F(z)
\]

This means that the sensitivity of the headcount poverty rate to changes in the poverty line at any given point is simply the value of the cumulative density function. This has two implications. First, this sensitivity is at a maximum at the mode of the probability density function. Second, generally the poverty rate will be more sensitive to changes in the poverty line around the mode the lower is inequality (as this implies more of the pdf is concentrated around that point and hence the steeper the slope of \( F(z) \) at that point).\(^5\) In the case of Indonesia, inequality is relatively low and the poverty line is relatively near the mode, so the sensitivity of the headcount poverty rate to the poverty line is quite high.

For a given percentage rise in the poverty line, how many percentage points does poverty change? Table 3 gives the answer. For both the 1996 and 1999 data, a poverty line is chosen that produces a 9.75 percent poverty rate\(^6\). We then increase these poverty lines by 5, 10, 15, 20, and 25 percent and calculate the respective poverty rates. Based on this we estimate the (semi-)elasticity of the poverty rate as the percentage point changes in the poverty rate with respect to percentage changes in the poverty line. The

\(^5\) Just imagine the special case in which everyone has exactly the same expenditures, then either everyone is in poverty or no one is, and the cdf is discontinuous (has essentially infinite slope) at that point.

\(^6\) This 9.75 percent is produced by an iterative procedure for defining the poverty rate outlined in Pradhan et al (2000) using Susenas 1996 data set.
results suggest that for every one percent fall in real expenditures the poverty rate rises by one half of a percentage point, if the poverty rate is around 15 percent. However, the sensitivity to poverty increases with the poverty line, so that at 25 percent above the poverty line a one percent change in expenditures produces around 0.6 – 0.7 percentage point change in poverty, as one moves into a range with a higher values of the pdf (steeper cdf).

The combination of the changes in real expenditures in table 2 and the responsiveness of poverty to expenditures in table 3 indicate some rough orders of magnitude of how much we should expect poverty to increase. For instance, from table 2 the median “real” expenditures of the second quintile (which is the change in expenditures at the 30th percentile) fell by 8.58 percent. This means that, absent changes in distribution, we should expect a change in poverty rates between 0.62*8.58 = 5.32 and 0.68*8.58 = 5.83 percentage points if one uses a deflator reflecting the food share of the bottom 30 percent of the population to define real expenditure changes.
| Percentage increase in poverty line over lowest level | Using 1996 Susenas Data | Using 1999 Susenas Data |
|------------------------------------------------------|-------------------------|-------------------------|
| If poverty line is (Rp/person/month)                  | Then headcount poverty is (percent) | Elasticity (percent point change in poverty/percentage change in expenditures) |
| 0                                                    | 28,516                  | 9.75                    | - |
| 5                                                    | 29,942                  | 12.01                   | 0.45 |
| 10                                                   | 31,368                  | 14.39                   | 0.50 |
| 15                                                   | 32,793                  | 16.93                   | 0.56 |
| 20                                                   | 34,219                  | 19.50                   | 0.59 |
| 25                                                   | 35,645                  | 22.06                   | 0.62 |
| If poverty line is (Rp/person/month)                  | Then headcount poverty is (percent) | Elasticity (percent point change in poverty/percentage change in expenditures) |
| 62,877                                               | 9.75                    | -                        |
| 66,021                                               | 12.10                   | 0.47 |
| 69,165                                               | 14.55                   | 0.51 |
| 72,309                                               | 17.40                   | 0.63 |
| 75,452                                               | 20.18                   | 0.64 |
| 78,596                                               | 23.03                   | 0.68 |

The combination of (a) the sensitivity of measured price inflation to the changes food share, (b) the change in real expenditures to changed inflation estimates, and (c) the sensitivity of poverty rates to expenditure changes can give us some rough rules of thumb as to what to expect from various food shares ($\omega$) in price deflation embedded in the poverty calculations. The formula is:

$$\Delta Poverty(w) - \Delta Poverty(w') = (\omega - \omega') \times (\Pi_{food} - \Pi_{non-food}) \times \left(\frac{\partial RE}{\partial \Pi}\right) \times \left(\frac{\partial Poverty}{\partial RE}\right)_{dist.}$$

In words, the difference in the estimate of poverty between two periods from using two different weights given to food in a price deflator is (a) the difference in the food share times (b) the difference in food and non-food inflation (which determines the change in measured inflation) times (c) how much real expenditures change due to a change in inflation times (d) how much the poverty rate changes for a distributionally neutral change in real expenditures. So, if we did nothing else besides use an estimate of inflation based on a
food share of 70 percent versus using the CPI (with a food share of less than 40 percent) this would change estimates of the change in poverty between the two periods by approximately:

\[ \Delta \text{Poverty} \equiv 0.3 \times (160 - 81) \times 0.4 \times 0.5 = 4.7 \text{ percentage points.} \]

This is obviously an enormous change. Similarly, if only food price inflation was used versus an inflation rate calculated based on the food/non-food share of the bottom 30 percent in actual consumption (around 0.7) this would increase poverty rates by a similarly large amount.  

III) Estimates of the change in headcount poverty

Even though we are just estimating changes in poverty, to understand the deflation of the poverty line we do need to explain, and hence how one arrives at, the food share of the poverty basket (how our poverty line is set).

The poverty line is set as a food poverty line plus a non-food allowance:

\[ PL = FPL + NFA \]

The food poverty line (FPL) is defined as the level of expenditures necessary to reach 2,100 calories at the consumption pattern (quantities (q’s) of the K commodities in the basket) and prices (p’s over the same K commodities) of a reference group. The reference group is defined on the basis of real expenditures (e).

\[ FPL = \sum_{k=1}^{K} p_k(e) \times q_k(e) \times \theta(e) \]
The constant $\theta$ is the ratio of 2,100 to the actual daily calories of the food basket represented by the quantities $(q_i)$ times the caloric intake per unit $(c_i)$ and serves to scale up the quantities in the consumption basket so that caloric intake is 2,100 calories per person per day:

$$\theta(e) = \frac{2,100}{\sum_{i=1}^{K} q_i(e) * c_i}$$

The FPL is the expenditures of those households who, if they spent all their expenditures on food could just afford to attain 2,100 calories at the consumption patterns of the reference group (there are much cheaper or more expensive ways to attain 2,100 calories). The non-food allowance is set as the actual non-food expenditures of those households whose total expenditures are equal to the food poverty line (even though the FPL is not the actual food expenditures, but is scaled up to reach a predetermined caloric intake). This non-food expenditures are derived from an Engel curve estimated using food share ($\omega$) with natural log of expenditures transformed so that the estimated constant of the regression is the predicted food share of those at the food poverty line$^8$:

$$\omega_i = \bar{\omega} + \beta \ln(e_i / FPL) + \epsilon_i$$

So, let’s assume we have a poverty line in 1996 and see how poverty has changed between 1996 and 1999. In each of these:

$$PL^{99} = PL^{96} * (1 + \Pi_{PL})$$

$^7$ Some have actually indirectly proposed poverty rates based on the price of rice alone, by using a poverty standard based on purchasing power over rice only.
Where $\Pi_{\text{PL}}$ is the inflation rate. As described above the ideal or exact inflation ($\Pi_{\text{PL}}$) rate should be chosen so that the money expenditures of the poverty line in 1999 ($\text{PL}^{99}$) at the level and pattern of prices in 1999 provides the same level of welfare as the poverty line in 1996. While this is impossible to implement because of the large changes in relative prices, the key issue is the weight ($w_F$) given to food:

$$\Pi_{\text{PL}} = w_F \times \Pi_F + (1 - w_F) \times \Pi_{\text{NF}}$$

We try using three different methods of choosing weights for food versus non-food prices in defining that deflator and using two alternative series on food price changes, which requires a slight digression.

We are building an overall price index out of two sub-indices, one for food and one for non-food. For food prices, there are currently two choices as a food price index can be constructed either from the underlying CPI price series or from the unit prices (values divided by quantities) reported in the Susenas database (for a given reference group). Either of these detailed food price series can be used to construct an inflation rate for food using expenditure shares for items within the food basket based on a sample of poor consumers. However for non-food prices only CPI prices exist — there is no Susenas equivalent. So, this gives a combination of six possible inflation rates in the poverty line: three methods of choosing weights to combine food and non-food inflation and two estimates of food price inflation.

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8 This uses the fact that $\ln(1)=0$ so that when actual expenditures are equal to the poverty line the predicted value of the food share is just the constant since the $\hat{\beta} \ln(.)$ term of the prediction disappears when $e=FPL$. 

14
Since it is well known from consumer theory that a fixed weights (Laspeyres) price index overestimates the change in welfare from a given change in prices (since the fixed weights do not allow for substitution effects due to relative price changes) we begin by using two Laspeyres indices, with the only issue being the weight on food and non-food inflation (both from the CPI).

The first deflator, we call method I, uses the actual expenditures of poor households. This would be the natural deflator in defining household’s real expenditure, as it uses their actual consumption shares. In order to do this we estimated an Engel curve:

$$\omega_i = \text{e}_i + \beta \ln(e_i) + \epsilon_i$$

Based on the predicted values of the food share from this regression we created a deflator for each household:

$$\Pi_i = \hat{\omega}_i \ast \Pi_F + (1 - \hat{\omega}_i) \ast \Pi_{NF}$$

Deflating all nominal expenditures to real terms and using the same poverty line produce the same result as inflating the poverty line and comparing it with nominal expenditures. This procedure can therefore be thought of as equivalent to using the deflator which uses the food share of those at the poverty line (\(\omega(e=PL)\)) in constructing a price index for the poverty line.

Using this inflation rate for the poverty line, table 4 shows that the poverty rate increased by 5.53 percentage points using CPI for food and non-food inflation rates (in the range of the distributionally neutral “expected” values from the rules of thumb elaborated

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9 The expenditure shares were taken from the consumers in the 100 Village Survey, whose food share was near that of the bottom 30 percent of consumers from the Susenas.
above of between 5.32 and 5.83 percentage points) and around 7.12 percentage points when using Susenas unit prices for the food inflation and CPI for non-food inflation.\textsuperscript{10}

Obviously this arises because of the differences in food price inflation in the CPI versus Susenas unit prices. Table 5 shows that in aggregate the Susenas food price inflation is 8 percentage points higher than CPI food inflation, resulting in 5 percentage points higher in total inflation in method I.\textsuperscript{11}

| Share of food in inflation                                                                 | Base Case* | Using CPI   | Using Susenas Unit Prices for Food |
|-------------------------------------------------------------------------------------------|------------|------------|-----------------------------------|
| Method I: Actual share of food in consumption expenditures, at poverty line                | 9.75       | 15.28      | 16.87                             |
| Method II: Using the share of food in the poverty basket                                   | 9.75       | 16.27      | 17.89                             |
| Method III: Using new food poverty line and recomputing non-food share\textsuperscript{#} | 9.75       | 20.33      | 22.35                             |

Notes:
* The base case of poverty rate 9.75 percent in 1996 is obtained using an iterative method. The algorithm of this iterative method is to obtain a poverty line which coincides with the central point of the reference population expenditures. The steps in this iterative method are outlined in the appendix and discussed in details in Pradhan et al (2000).
# This procedure is methodologically consistent, but not welfare consistent. Methodologically consistent means that poverty basket is calculated using the same procedure each year. While, welfare consistent means that individual is at the same level of utility (the same material standard of living) in the two periods. Methodologically consistent is not necessarily welfare consistent and vice versa.

\textsuperscript{10}The food and non-food price inflation of CPI used are the provincial level. Meanwhile, the food price inflation of Susenas unit prices are not only varied across provinces, but also across urban-rural areas within province.
| Table 5: Differences in Inflation Rates between CPI and Susenas Unit Prices (%) |
|--------------------------------|
| **Food share** | **Using CPI** | **Using Susenas Unit Prices for Food** |
| Food           | 160           | 168 |
| Non-food       | 81            | 81  |
| **Total:**     |               |     |
| - Method I     | Actual        | 137 | 142 |
| - Method II    | 0.8           | 144 | 151 |
| - Method III   | 1.0           | 160 | 168 |

Notes: The weights of each of the 52 commodities in the Susenas unit prices are based on their shares in the 1996 poverty line.

The second method (method II) uses the share of food in the poverty basket in 1996 as the weight for food in the estimate of inflation. Given the methodology used, the poverty line is the food poverty line (FPL) plus a non-food allowance, where the non-food allowance is the non-food expenditures of those at the food poverty line. However, the resulting share of food expenditures in the poverty line (FPL/PL) is not the food share of those at the FPL but is

\[ \frac{1}{2 - \omega(e=FPL)} \].

This again (unfortunately) requires explanation. One might have thought the share of food in the poverty basket (FPL/PL) would be the *actual* share of food of those at the poverty line (PL), or perhaps the actual food share of those at the *food* poverty line (FPL), but the share of food in the poverty basket is substantially higher than both of those. Figure 1 illustrates the reason, which is simply that the Engel curve is non-linear. This non-linearity implies that when an NFA is added to the FPL to reach the PL, the *marginal* propensity

\[ \frac{1}{2 - \omega(e=FPL)} \].

11 The aggregate inflation rates are obtained as weighted averages of inflation rates faced by
to spend on food is lower than the *average* propensity to spend. This implies that in moving from the FPL to PL, total expenditures increase by NFA but food expenditures increase by less than that. The “food share” of the poverty line (FPL/PL) is in fact higher than the *actual* food share of those households at either the FPL or PL.

Since rays from the origin in figure 1 represent constant food shares, one can see that there is an expenditure level ($e^*$) such that at that expenditure level the food share chosen equals the food share in the poverty basket. Since $\omega(e^*) > \omega(e=FPL) > \omega(e=PL)$ this implies $e^* < FPL < PL$. In 1996 we can calculate that the expenditures of those whose food share was that of the poverty basket ($e^*$) was Rp. 17,395. This is a level well below the poverty line of Rp. 28,516 and also well below the mean expenditures of those below the households in the sample.
poverty line of Rp. 23,920. This implies that the price index using the food share of the poverty basket represents the welfare change of a very, very poor group. This price index will *overstate* the real expenditure loss of those above that level and hence will moderately overstate the increase in poverty rate.

So the second, not entirely intuitive but not completely unnatural, fixed weights price deflator to use is:

$$\Pi_{PL}^{96(PB)} = \left(\frac{1}{2 - \omega_{PB}^{96}}\right) * \Pi_F + \left(\frac{1 - \omega_{PB}^{96}}{2 - \omega_{PB}^{96}}\right) * \Pi_{NP}$$

Using this deflator, table 4 shows that the poverty rate increases by around 6.52 percentage points (from 9.75 to 16.27 percent) using the CPI series, or around 8.14 percentage points (from 9.75 to 17.89 percent) using the Susenas unit prices. The reason for this difference, as shown in table 5, is that the Susenas unit prices total inflation rate is 7 percentage points higher than the CPI inflation rate.

The third possible procedure (method III) is to inflate the food poverty line (FPL) from 1996 to 1999 by a food price index and then compute the non-food allowance again in 1999 using the same Engel curve methodology as for 1996. This is a procedure which is *methodologically* consistent, but which is not *welfare* consistent as it produces, implicitly, a weight on the share of food in the inflation rate that is extremely high, i.e. almost 1. The impact of this procedure, when considered as an inflation in the poverty line is:

$$PL^{99} = PL^{96} * (1 + \Pi_F) * \left(\frac{2 - \omega_{e=FPL}^{99}}{2 - \omega_{e=FPL}^{96}}\right)$$

Since in this method the PL in both periods is a proportion of the FPL, if the food share is unchanged between 1996 and 1999, then the final term is equal to 1, and the inflation in the
poverty line is the same as food price inflation, implying the weight of food is 100 percent \((\omega=1)\).

Since the non-food allowance is proportional to the food poverty line, equal food shares would imply the non-food allowance increases by as much as the food poverty line, which is the food inflation rate. In fact, when the FPL was inflated to a FPL in 1999 and the food share at the FPL was recomputed in 1999 the food share was in fact very nearly the same (79.42 percent versus 80.21 percent).\(^{12}\) Therefore, this method produces a much higher inflation rate than any reasonable price deflator as the poverty line is raised by essentially the full amount of food price inflation. Hence, table 4 shows that using this deflator the poverty rate climbs by around 10.58 percentage points using CPI inflation and around 12.6 percentage points using Susenas unit prices inflation.\(^{13}\)

This is an important point as the methodologically consistent procedure for fixing the non-food basket does not produce a welfare consistent ranking. That is, we know from basic consumer theory that method I, using a Laspeyres index of food and non-food inflation rates based on actual consumption shares of the poor, should overstate the welfare impact of those at the poverty line because it does not allow for consumers response to changing relative prices by changing their consumption patterns. As is well known, the Laspeyres index will exceed the “exact” inflation rate from an expenditures function since the increase in the amount of money expenditures needed to reach the same

\(^{12}\)Hence, in method II and hereafter, the food share at the poverty line is fixed at 0.8.

\(^{13}\)Here is where the rules of thumbs derived above come in handy in gaining intuition and understanding the difference between the two procedures. Since the “poverty line” weights uses a food share of 0.8 and the recomputation essentially uses a weight on food of 1, the expected difference
level of utility is lower when one allows for substitution across commodities (e.g. buying relatively less of items whose prices increased).

Method II (using the poverty basket food share) also overstates poverty increases, not only (as in Method I) because it does not allow substitution but also because it does not use the actual consumption bundle of households at the poverty line. But method II is perhaps defensible as the food weight in the price index represents the actual consumption pattern of some group in poverty (although a group considerably below the poverty line).

However, poverty line inflation rates, such as that of method III, that expand the 1996 inflation line to 1999 by more than the amount of method II are creating a poverty line at which the welfare of those at the poverty line in 1999 is higher, perhaps substantially higher, than those at the poverty line in 1996. The repetition of the same method on different data sets does not guarantee a result such that the material standard of living represented by the resulting poverty lines is equivalent. Why this is so is something of a puzzle. Apparently the Engel curve relationship shifted over time.

Therefore, for consistent welfare measures we propose to use method II for comparisons over time, in which case the headcount poverty rate increased by between 6.52 and 8.14 percentage points, depending on whether the food prices are taken from either CPI or Susenas unit prices. This is keeping in mind that method II is something of a “worst case” scenario when food prices are increasing.

\[
\text{in the percentage points of poverty between the two methods is: } 0.2 \times 0.79 \times 0.4 \times 0.63 = 0.398, \text{ which is quite close to the actual difference between the two methods in table 4 of 20.33-16.27=4.06.}
\]
The same procedures mentioned above as in table 4 can also be applied by working backward. That is, we use an iterative method to set the poverty line and poverty rate in 1999, then we deflate that poverty line back to 1996 rupiah using methods I and II for the deflators. The results of using this methodologically consistent procedure in 1999 are very much higher levels of poverty as the “base case” is in 1999.

The results as presented in table 6 show that, using this procedures with CPI inflation, the poverty rate would have risen from 19.95 percent in 1996 to 27.13 percent in 1999 using actual share of food in consumption expenditures at the poverty line (method I) and from 17.55 to 27.13 percent using the share of food in the poverty basket (method II). This implies poverty rate increased by 7.18 and 9.58 percentage points by each method respectively using CPI. Again, they are consistent with the previous procedures, where poverty also increased by between 5.53 and 6.52 percentage points. Using Susenas unit prices, the implied increase in poverty rate is 8.84 percentage point if method I is employed and 11.39 percentage point by method II.
| Share of food in inflation                                                                 | Base Case | Using CPI     | Using Susenas Unit Prices for Food |
|------------------------------------------------------------------------------------------|-----------|---------------|-----------------------------------|
| Method I: Actual share of food in consumption expenditures, at poverty line               | 27.13     | 19.95         | 18.29                             |
|                                                                                            | 1999      | 1996          | Change                           |
| Method II: Using the share of food in the poverty basket                                   | 27.13     | 17.55         | 15.74                             |
|                                                                                            | 1999      | 1996          | Change                           |

Notes: Working backward - start with poverty rate in February 1999 resulted from the iterative method.

Since the iterative method in 1999 produces a much higher level of poverty, these absolute changes are smaller percentage changes. Take for example the method II with CPI prices. Using the 1996 base case, poverty rate increased from 9.75 percent to 16.27 percent, which is 6.52 percentage points or 66.9 percent. Meanwhile, using the 1999 base case, poverty rate rose from 17.55 percent to 27.13 percent, which is 9.58 percentage points but only 54.6 percent.

IV) A consistent set of estimates of poverty over the course of the crisis

Over the course of the crisis there have been a number of estimates of poverty rates, using different large scale (but not necessarily nationally representative) household surveys. Unfortunately, each of those used a different and non-comparable base for the “pre-crisis” poverty rate and a different method of deflation for the changes in the poverty line, so that these estimates of the headcount poverty rate are not comparable in either levels or changes. In this section we create, as best as possible, a consistent series of poverty rates.
using our own estimates from the various data sets which we have access to and by adjusting the estimates from different sources where we do not have the raw data.

All of the estimates must start from a consistent base. This needs to take into account that the economy was growing from February 1996 at least through the middle of 1997.\textsuperscript{14} This additional income would have likely reduced poverty, so that the poverty rate just before the crisis is not simply the \textit{level} of poverty in February 1996, but the level reached accounting for poverty reduction from February 1996 to the beginning of the crisis.

Second, the estimates must use common method of computing changes over time, in particular how the poverty line is inflated. We attempt to adjust all the estimates so that the poverty line deflator used is consistent with that using a food share of 0.8 (as in method II above).

The databases from which we calculate our own estimates from household survey data, chronologically, are:

- Susenas February 1996 (consumption module with sample of 65,000 HH),
- 100 Village Survey May 1997 (12,000 HH),
- 100 Village Survey August 1998 (12,000 HH),
- Mini Susenas December 1998 (10,000 HH),
- 100 Village Survey December 1998 (12,000 HH),
- Susenas February 1999 (consumption module of 65,000 HH),
- 100 Village Survey May 1999 (12,000 HH), and Mini Susenas August 1999 (10,000 HH).
All these databases are collected by BPS.

We start by using the poverty rates for February 1996 and February 1999 from Susenas as estimated in Table 4. We choose method II with CPI prices for inflating poverty line during the period. Hence, we have a poverty rate of 9.75 percent for February 1996 and 16.27 percent for February 1999. We apply the same method to other databases, but the inflation rates used are based on the national level only. Table A1 in the appendix describes the steps in estimations for these data sets, with the results presented in table 7. In the first step, we calculate the poverty line which produces a poverty rate of 9.75 percent in the Susenas February 1996. In step II we update this poverty line for Mini Susenas December 1998 and August 1999 using the appropriate price indices and then estimate the respective poverty rates.

The 100 Village Survey data needed to be treated differently for two reasons. First, it was not a nationally representative sample. Second, its consumption expenditures questions were not identical to Susenas consumption module. So, in this case we calibrated the 100 Village Survey poverty rate to match the other surveys at one point in time. Therefore, in step III we calibrate the poverty line in the 100 Village Survey December 1998 so that it produces the same poverty rate as the Mini Susenas December 1998 (12.33 percent). In the final step, we then update the resulted poverty line backward to May 1997 and August 1998 and forward to May 1999 and then estimate the respective poverty rates.

14 February 1996 is the last Susenas consumption module available before the crisis.
In addition to these data, there are three sources which estimate poverty rates for at least two points in time:

- BPS, which estimates poverty in February 1996 and February 1999 using Susenas and December 1998 and August 1999 using Mini Susenas. Their estimates which are presented in table 7 are those which consistently use the February 1996 poverty bundle.  

- Gardiner (1999), who has used the core (not consumption module) expenditures of the Susenas to create poverty estimates for February 1996, February 1997, and February 1998.

- The Indonesia Family Life Survey (IFLS), carried out jointly by Lembaga Demografi – Universitas Indonesia (LDUI) and RAND, produced estimates for August-October 1997 and September-December 1998 (the extended periods for each round are due to the tracking of individuals in the panel survey).

The reconciliation of all the above estimates is presented in table 7, with column A starts from our estimate of 9.75 percent headcount poverty in February 1996, while column B uses the official BPS figure of 11.34 percent as the initial point. To see the pattern of the poverty evolution from these series more easily, figure 2 shows the column A series after transformed into a poverty index, where the lowest point is set to equal 100. The December 1998 point is not connected because the temporary drop in poverty during this period is difficult to explain. After this point we present two series, where the one with

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15 See BPS/UNDP (1999).
16 See Frankenberg et al (1999).
continuous line is connecting SMERU estimates while the discontinuous line is for BPS estimates, both are based on column A. Both series indicate a significant reduction in poverty rates after February 1999 with the end points of both series in August 1999 are very close to each other.

Four points emerge from table 7 and figure 2:

- First, poverty appears to have fallen from February 1996 to around the third quarter of 1997, so that this adjustment is important as assuming the poverty rate immediately before the crisis was still 11 percent would not give a true picture of the crisis impact on poverty.

- Second, the magnitude of poverty rate increase from the lowest point to the highest point by the two series are quite close, i.e. 10.8 percentage points using the iterative initial point and 12.5 percentage points using the BPS initial point. In relative terms, both imply an increase of 164 percent from the lowest to the highest point. This can be regarded as the maximum impact of the crisis on poverty.

- Third, the poverty rate appears to have peaked some time around the middle of the second half of 1998, which followed the large surge in the price of rice and was before the beginning of the stabilization of general inflation.
Table 7: Estimates of Poverty Rates over Time, Pre-Crisis to Post-Crisis

| Date            | Author, Data Base | Method, price series for inflation of poverty line | Actual estimate | “Best guess” consistent series of poverty rates | A Iterative initial point | B BPS initial point |
|-----------------|-------------------|---------------------------------------------------|----------------|-----------------------------------------------|--------------------------|---------------------|
| February ‘96    | SMERU, Susenas    | Base case                                         | 9.75           | 9.75              | 11.34                                  |                       |
|                 | BPS, Susenas      | Base case                                         | 11.34          | 9.75              | 11.34                                  |                       |
|                 | Gardiner, Susenas Core | Base case                                     | 11.47          | 9.75              | 11.34                                  |                       |
| February ‘97    | Gardiner, Susenas Core | Food share of bottom 30%                       | 9.36           | 7.64              | 8.89                                   |                       |
| May ‘97         | SMERU, 100 villages | Method II, CPI                                   | 7.53           | 7.53              | 8.78                                   |                       |
| August-October ‘97 | Rand &LD, IFLS 2+ | Normalization                                    | 11.0           | 6.57              | 7.64                                   |                       |
| February ‘98    | Gardiner, Susenas Core | Food share of bottom 30%                       | 14.82          | 13.10              | 15.24                                  |                       |
| August ‘98      | SMERU, 100 villages | Method II, CPI                                   | 16.07          | 16.07              | 18.69                                  |                       |
| September-December ‘98 | Rand &LD, IFLS 2+ | Own estimate inflation rate (15 points over CPI) | 19.9           | 17.35              | 20.18                                  |                       |
| December ‘98    | SMERU, Mini Susenas | Method II, CPI                                   | 12.33          | 12.33              | 14.34                                  |                       |
|                 | SMERU, 100 villages | Calibration to Mini Susenas                      | 12.33          | 12.33              | 14.34                                  |                       |
|                 | BPS, Mini Susenas | February ’96 bundle                              | 17.86          | 15.36              | 17.86                                  |                       |
| February ‘99    | SMERU, Susenas    | Method II, CPI                                   | 16.27          | 16.27              | 18.92                                  |                       |
|                 | BPS, Susenas      | February ’96 bundle                              | 16.64          | 14.31              | 16.64                                  |                       |
| May ‘99         | SMERU, 100 villages | Method II, CPI                                   | 11.29          | 11.29              | 13.13                                  |                       |
| August ‘99      | SMERU, Mini Susenas | Method II, CPI                                   | 9.79           | 9.79              | 11.39                                  |                       |
|                 | BPS, Mini Susenas | February ’96 bundle                              | 11.72          | 10.08              | 11.72                                  |                       |

Percentage point change from the lowest point (August-October ‘97) to the peak (September-December ‘98)

|                                | A (164%)       | B (164%)       |
|--------------------------------|----------------|----------------|
|                                | 10.78          | 12.54          |

Notes on adjustments:

a) To adjust the three estimates from Gardiner, the amount necessary to make 11.47 equal 9.75 (1.72) was subtracted for all three periods. The adjustment of food share is not crucial as his food share (0.7) is quite close (0.8) and the largest relative food price shift occurred after Feb 1998.

b) For the IFLS 2+ the Aug-Oct 1997 figure was adjusted to reflect “expected” poverty in that period if poverty in Feb. 1996 was 9.75 by subtracting an adjustment for economic growth between Feb 1996 and Aug 1997 using the real per capita consumption expenditures time a semi-elasticity of poverty. Their 1998 estimate of 19.9 was adjusted by first subtracting an equivalent amount for renormalization (11-6.37) and then adding an amount for the fact that their prices were only 15 percentage points above CPI, when using CPI prices but a food share of 0.8 suggests prices 31 percentage points higher than CPI inflation (using formula above).

c) All figures are adjusted from column A to B (or vice versa) using the ratio of 11.34 to 9.75.
Fourth, after the peak point, the poverty rate has started to decline again. Nevertheless, by August 1999, two years after the crisis started, the poverty rate was still substantially higher, i.e. around 50 percent, than its pre-crisis level.

If we allow a line to not pass through the anomalous point in December 1998, this series of poverty estimates paints a very reasonable picture, around which the data show a striking consensus, as it neatly tracks known events (e.g. inflation stabilization, rice prices). This still leaves a puzzle as to the timing of the decline from the post crisis peak.
V) Beyond the headcount measure – Poverty Severity and Inequality

Poverty severity. To complement the headcount index, we also examine two of the general class of poverty measures proposed by Foster-Greer-Thorbecke (FGT) as defined above. P(1), the poverty gap index measures take into account variations in how far the expenditures of the poor fall below the poverty line. P(2), the poverty severity index, takes into account both variations in the distance of the expenditures of the poor from the poverty line and expenditures distribution among the poor.

The three different measures of poverty by urban and rural for February 1996 and February 1999 are presented in table 8. The table shows that the poverty gap index, P(1), in Indonesia during the crisis has deteriorated, with the urban index showing a more rapid increase than the rural index. In urban areas, the poverty gap index increased by 183 percent between 1996 and 1999 compared to 70.5 percent in rural areas during the same period. This suggests that the average gaps between the standards of living of poor households and the poverty line has increased dramatically during the crisis, indicating the widening depth of poverty incidence in Indonesia, especially in urban areas. The mean expenditures of those poor in urban areas has fallen from 86 percent to 84.3 percent of the poverty line, and similarly in rural areas it has fallen from 83.8 percent to 82.4 percent of the poverty line.
Table 8: Indices of Poverty Head-Count, Gap, Severity in Indonesia, 1996-1999

|                         | 1996     | 1999     | Percentage Change |
|-------------------------|----------|----------|------------------|
|                         | Urban    | Rural    | Total            | Urban    | Rural    | Total    | Urban    | Rural    | Total    |
| Head-Count Index (P0):  | 3.82%    | 13.10%   | 9.75%           | 9.63%    | 16.27%   | 20.56%   | 152.3%   | 56.9%    | 66.8%    |
| Percent population in   |          |          |                  |          |          |          |          |          |          |
| poverty                 |          |          |                  |          |          |          |          |          |          |
| Poverty Gap Index (P1): | 0.53%    | 2.12%    | 1.55%           | 1.51%    | 2.79%    | 3.61%    | 183.0%   | 70.5%    | 80.2%    |
| Total expenditure gap   |          |          |                  |          |          |          |          |          |          |
| of those below poverty   |          |          |                  |          |          |          |          |          |          |
| line as percent of total|          |          |                  |          |          |          |          |          |          |
| expenditures            |          |          |                  |          |          |          |          |          |          |
| Mean expenditures of    | 86.01%   | 83.84%   | 84.15%          | 84.30%   | 82.44%   | 82.87%   | -        | -        | -        |
| the poor as a percentage |          |          |                  |          |          |          |          |          |          |
| of the poverty line      |          |          |                  |          |          |          |          |          |          |
| (1 - P1/P0)             |          |          |                  |          |          |          |          |          |          |
| Poverty Severity Index   | 0.12%    | 0.54%    | 0.39%           | 0.37%    | 0.75%    | 0.99%    | 201.6%   | 83.6%    | 91.9%    |
| (P2): Squared poverty    |          |          |                  |          |          |          |          |          |          |
| gap                     |          |          |                  |          |          |          |          |          |          |

This deterioration was also in line with a significant increased in the severity index of poverty (P(2)) both in urban and rural Indonesia. The worsening severity of poverty were also more apparent in urban than in rural areas (201.6 percent compared to 83.6 percent). This significant increase indicates that those at the lower tail of the expenditures distribution have become worse off.

**Inequality.** We complement the discussions on poverty with a brief overview on what happens to inequality during the period. In table 9 we present the estimated changes in the Gini and Generalized Entropy (GE(α)) indices of inequality in the distribution of real per capita expenditures (PCE). We use two deflators to define real expenditures. In the first panel, we use the deflator which has a food share based on the actual consumption of the bottom 30 percent of population. In the second panel, meanwhile, we use the household specific deflator based on Engel’s law. This second deflator is included because
the first deflator is likely to underestimate the differences in the impact of price changes across households by imposing the same basket for all households.

| Inequality Measure     | Feb-96 Urban | Feb-96 Rural | Feb-96 Total | Feb-99 Urban | Feb-99 Rural | Feb-99 Total | Percentage Changes Urban | Percentage Changes Rural | Percentage Changes Total |
|------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------------------|--------------------------|--------------------------|
| Deflator based on consumption of bottom 30% | 0.37 | 0.28 | 0.36 | 0.33 | 0.25 | 0.32 | -10.91 | -10.44 | -12.62 |
| Gini                   | 0.24 | 0.13 | 0.22 | 0.19 | 0.11 | 0.17 | -22.87 | -19.26 | -24.82 |
| GE(-1)                 | 0.22 | 0.13 | 0.21 | 0.18 | 0.10 | 0.16 | -21.28 | -20.04 | -23.93 |
| GE(0)                  | 0.26 | 0.15 | 0.26 | 0.20 | 0.12 | 0.19 | -23.16 | -23.38 | -26.60 |
| GE(1)                  | 0.45 | 0.25 | 0.48 | 0.32 | 0.17 | 0.31 | -29.08 | -29.80 | -34.19 |
| GE(2)                  | 0.37 | 0.28 | 0.36 | 0.35 | 0.27 | 0.33 | -6.37  | -6.03  | -8.07  |
| Household specific deflator | 0.24 | 0.13 | 0.22 | 0.21 | 0.12 | 0.19 | -13.58 | -10.50 | -15.89 |
| Gini                   | 0.22 | 0.13 | 0.21 | 0.20 | 0.12 | 0.18 | -12.73 | -11.79 | -15.61 |
| GE(-1)                 | 0.26 | 0.15 | 0.26 | 0.23 | 0.13 | 0.22 | -13.89 | -14.54 | -17.55 |
| GE(0)                  | 0.45 | 0.25 | 0.48 | 0.37 | 0.21 | 0.37 | -16.16 | -16.66 | -21.47 |

The GE(α) indices offer the advantage of being more sensitive to differences in different parts of the expenditures distribution depending on the value of the sensitivity parameter α. The larger α is, the more sensitive GE(α) is to consumption differences at the top of the distribution. On the other hand, the more negative α is, the more sensitive GE(α) is to consumption differences at the bottom of the distribution.17

The Generalized Entropy index GE(α) is given by the expression:

\[ GE(\alpha) = \frac{1}{\alpha(1-\alpha)} \left[ \frac{1}{n} \sum_{i=1}^{n} \left( \frac{y_i}{\bar{y}} \right)^{\alpha} \right] - 1; \alpha \neq 0, \alpha \neq 1 \]

GE(0) equals the standard deviation of ln(PCE), GE(1) is the Theil index of inequality, and GE(2) is half the square of the coefficient of variation of ln(PCE). For more details on this and other inequality indices, see Cowell (1995).
Table 9 shows that all the inequality measures, based on both definitions of real expenditures, indicate that both urban and rural areas experienced a decrease in inequality. These results imply that inequality changes are unlikely to be the dominant factor in poverty changes. Furthermore, the GE($\alpha$) indices show that the decrease in inequality tends to be greater the larger $\alpha$ is, which indicates that the decrease in inequality is greater at the top of the distribution.

This does raise the puzzle of how poverty severity worsened even though inequality was decreasing.

**Conclusions**

Given the large change in the relative price of food over the period during the crisis, the comparison of poverty rates over time depends critically on the choice of price deflation, and within that the choice of the weight (explicitly or implicitly) put on the food price inflation rate greatly affects the resulting poverty level.

Computation of the poverty line that adopts the same method in each period, however, may not produce comparisons that produce consistent comparisons of welfare (or equivalently, poverty lines which represent the same material standard of living in the two periods).

Our recommended method would be to use method II for comparisons over time. Even within this method, there is still the question of whether to go forward or backward. Moving forward from February 1996 to February 1999, poverty increased by between 67 and 83 percent (6.5 and 8.1 percentage points), depending on whether the food prices are either from CPI or from Susenas unit prices. Moving backward from our preferred
estimate in February 1999 of 27.1 percent, poverty had risen since February 1996 by 55 or 72 percent (9.6 or 11.9 percentage points). As shown in figure 2, nearly all of the various estimates of poverty form a very consistent and plausible story on the evolution of poverty during the crisis.
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Appendix – Construction of a poverty line in an iterative method

This appendix outlines the steps involved in the iterative approach to calculating poverty lines. The actual Stata program that implements this description is available from the authors on request, or on the SMERU web site.

1. Start with a prior on the poverty line in region \( j \). Denote this by \( z_j \).
2. Calculate real per capita consumption for household \( i \) in region \( j \) by dividing nominal capital consumption by the poverty line. \( c_{ij} = c_j^n / z_j \)
3. Regress for each product \( k \) in the food basket the per capita quantity consumed on real per capita expenditure. Sampling weights should be used in this regression. \( q_{ijk} = \alpha_{0k} + \alpha_{1k} c_{ij} + \varepsilon_{ijk} \). Only use households near the poverty line for this regression. We used only households for which \( 0.8 < c_{ij} < 1.2 \) for 1996 and \( 0.7 < c_{ij} < 1.3 \) for 1999.
4. Predict the quantity consumed for each product at the poverty line (\( \hat{q}_k \)).
\[
\hat{q}_k = \alpha_{0k} + \alpha_{1k}
\]
5. Calculate the calorie content of this basket \( cal = \sum_k \hat{q}_k u_k \), where \( u_k \) is the unit calorie content of product \( k \).
6. Scale the quantities in the basket so that the basket yields 2,100 calories. \( \bar{q}_k = \hat{q}_k (2,100 / cal) \). This is the food basket for the poverty line.
7. For each region \( j \) and for each product \( k \), do a quantile regression of unit prices on real per capita consumption. Do not apply weights in this regression.
\[
p_{ijk} = \beta_{0jk} + \beta_{1jk} c_{ij} + v_{ij}
\]
where \( p_{ijk} \) is the unit price paid by household \( i \) in region \( j \) for product \( k \). Median(\( v_{ij} \))=0.
8. Calculate the predicted unit price paid for product \( k \) in region \( j \) at the poverty line.
\[
\hat{p}_{jk} = \beta_{0jk} + \beta_{1jk}.
\]
9. Price the food basket for each region. This is the food poverty line \( z_j' = \sum_j \bar{q}_k \hat{p}_{jk} \)
10. Estimate an Engel curve for the food share \( (s) \).
\[
s_j = \alpha_j + \beta_j \log( y_j / z_j') + error term_j \]
and calculate the poverty line as \( z_j = z_j' (2 - \alpha_j) \).
11. Start at step 1 using the new \( z_j \) as priors.
Table A1: Steps in Calculating a Series of Consistent Poverty Rate Estimates, Poverty Lines, and Implicit Price Index

| Step | Database                                | Poverty Line (Rp/month) | Price Index |
|------|-----------------------------------------|-------------------------|-------------|
| I    | Susenas, February 1996                  | 28,516                  | 100         |
| IVa  | 100 Village Survey, May 1997            | 23,717                  | 102         |
| IVb  | 100 Village Survey, August 1998         | 49,295                  | 212         |
| III  | 100 Village Survey, December 1998       | 53,248                  | 229         |
| IIa  | Mini Susenas, December 1998             | 65,302                  | 229         |
| IVc  | 100 Village Survey, May 1999            | 54,643                  | 235         |
| IIb  | Mini Susenas, August 1999               | 63,306                  | 222         |