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# **Has Inflation Hurt the Poor? Regional Analysis in the Philippines**

Hyun H. Son

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Asian Development Bank





ERD Working Paper No. 112

# HAS INFLATION HURT THE POOR? REGIONAL ANALYSIS IN THE PHILIPPINES

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MAY 2008

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## **FOREWORD**

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## **ABSTRACT**

This paper measures the impact of price changes on poverty using the Philippines as an example. The impact of price changes is captured by the price elasticity of poverty for three widely used poverty measures, namely, headcount ratio, poverty gap ratio, and severity of poverty. An empirically operational price index called the price index for the poor is developed, which indicates whether the price changes hurt the poor relatively more than the nonpoor. Furthermore, the paper develops formulae for aggregating regional price indices into the national price indices. The results show that since 2003, prices increases have led to greater suffering for the poor, particularly the ultra poor.



## I. INTRODUCTION

A recent wave of global food price inflation has pushed millions of people into poverty. Many people who were poor before these price increases may now be on the verge of hunger and malnutrition. In view of this development, the standard measures of inflation may have now become irrelevant because they do not take into account the consumption patterns of the poor.

Standard measures of inflation are calculated based on an average consumption basket. However, there is a significant variation in the consumption basket across the population, including by income level (Arrow 1958). This consumption basket consists of different commodities with different prices (i.e., the prices of different commodities change at different rates). Consequently, the impact of changes in prices on the poor will be different from that of the rich. If food prices go up at a faster rate than nonfood prices, this will hit the poor harder than the rich. This is because a higher proportion of the poor's consumption basket is devoted to necessary goods and services such as food items. It is thus highly relevant for policymakers to identify the impact of relative prices changes on different segments of the population. This paper intends to address this issue using the Philippines as a case study.

The main objective of this paper is to define a measure that will systematically capture the impact of prices on poverty. Poverty can be measured by several indices. The most common among them are the class of Foster, Greer, and Thorbecke (FGT) poverty measures (Foster, Greer, and Thorbecke 1984). Every poverty measure gives different weights to the poor depending on how far below the poverty line they are. Therefore, the impact of prices on poverty will differ depending on what poverty measure is used. This paper develops a methodology to measure the impact of prices on poverty based on three most popular measures of poverty: headcount ratio, poverty gap, and severity of poverty.

In practice, the inflation rate is officially estimated based on the Laspeyres price index, which uses the average budget shares of goods in the consumer's basket as weights. However, this index is completely insensitive to the distributional impact of price changes. Hence, to understand the impact of price changes on poverty, an alternative price index using weights that reflect the consumption patterns of the poor is needed. This paper derives a new price index for the poor (PIP) where the weights used are derived from the price elasticity of poverty. Thus, there will be a monotonic relationship between the PIP and the changes in poverty, implying that the higher the index is, the greater the increase in poverty.<sup>1</sup> The PIP will be useful in assessing whether price changes hurt the poor relatively more (or less) than the nonpoor when measured against the commonly used Laspeyres price index.

Furthermore, this paper develops formulae for aggregating regional price indices into the national price indices. The formulae help derive national price indices that are consistent with the

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<sup>1</sup> It is possible to construct weights from the budget shares of the poor but this will be an ad hoc procedure because it does not have any relation to poverty measures. The main contribution of this paper is to determine weights that have a monotonic relationship with the chosen poverty measure.

regional price indices. Thus, the national price indices presented for the Philippines are derived from the regional price indices. Such formulae are useful in identifying the regional contributions of price changes to the national inflation rate.

The remainder of the paper is structured as follows. Sections II—VII are devoted to the methodology to define and derive the impact of price changes on average standard of living as well as on poverty. The methodologies related to the new price index for the poor are also presented. Section VIII presents the analysis of the empirical results. The final section offers some concluding remarks.

## II. IMPACT OF PRICE CHANGES ON AVERAGE STANDARD OF LIVING<sup>2</sup>

Assume there are  $n$  items of consumption and  $x$  is the per capita total expenditure of a household. Further consider that if  $v_i(x)$  is the per capita expenditure on the  $i$ th commodity of a household with per capita total expenditure equal to  $x$ , then

$$x = \sum_{i=1}^n v_i(x) \quad (1)$$

The per capita expenditure  $x$  can also be written as an expenditure function  $e(u, \mathbf{p})$ :

$$x = e(u, \mathbf{p}) \quad (2)$$

where  $\mathbf{p}$  is the price vector. The expenditure function is the minimum expenditure needed to enjoy  $u$  level of utility given the price vector  $\mathbf{p}$ . Suppose  $\mathbf{p}$  increases to  $\mathbf{p}^*$ , then the consumer needs to be compensated so that he/she enjoys the same level of utility that he/she enjoyed before the price increase. This gives the change in real per capita expenditure as<sup>3</sup>

$$\Delta x = -[e(u, \mathbf{p}^*) - e(u, \mathbf{p})] \quad (3)$$

Using Taylor expansion on equation (3) gives

$$dx = -\sum_{i=1}^n \frac{\partial e}{\partial p_i} (p_i^* - p_i) \quad (4)$$

where the terms of higher order smallness have been dropped. Dropping these terms implies that we are assuming there is no substitution due to changes in relative prices. Thus, equation (4) gives the price elasticity of standard of living of an individual with income  $x$ :

$$\frac{p_i}{x} \frac{\partial x}{\partial p_i} = -\frac{v_i(x)}{x} \quad (5)$$

which shows that if the price of the  $i$ th commodity increases by 1%, the real standard of living of a household with per capita expenditure  $x$  will reduce by  $\frac{v_i(x)}{x}$  %.

<sup>2</sup> The average standard of living is referred to as per capita real expenditure throughout the paper.

<sup>3</sup> This measures the price impact based on Hicks' (1946) compensation variation.

The average per capita expenditure of the whole population is given by

$$\mu = \int_0^{\infty} xf(x)dx \quad (6)$$

where  $f(x)$  is the density function of  $x$ .

Differentiating equation (6) with respect to  $p_i$  and utilizing equation (5), the price elasticity of the average standard of living is obtained as

$$\frac{p_i}{\mu} \frac{\partial \mu}{\partial p_i} = -\frac{\mu_i}{\mu} = -\bar{w}_i \quad (7)$$

where  $\mu_i$  is the average expenditure of the  $i$ th commodity of the whole population and  $\bar{w}_i$  is the average budget share of the  $i$ th commodity. This equation tells us that if the price of the  $i$ th commodity increases by 1%, the average per capita real expenditure of the whole population will decrease by  $\bar{w}_i$  percent. In other words, any increase in price leads to a reduction in average standard of living, where the magnitude of reduction is equal to the average budget share of the commodity.

The prices of different commodities do not change at a uniform rate. The prices of some commodities may increase while that of others may decrease. The changes in prices of different commodities have different impacts on the average standard of living. To determine the impact of or how much changes in prices have affected the average standard of living, we derive the formula in equation (8) below.

Suppose  $\mu$  is the average standard of living when the base year price vector is  $\mathbf{p}$ . Suppose  $\mathbf{p}$  changes to  $\mathbf{p}^*$  and the average standard of living changes to  $\mu^*$ , then applying Taylor expansion and omitting the terms of higher order smallness, the proportional change in the real standard of living due to price changes is obtained as:

$$\frac{\mu^* - \mu}{\mu} = \sum_{i=1}^n \frac{(p_i^* - p_i)}{p_i} \frac{\partial \mu}{\partial p_i} \frac{p_i}{\mu} = -\sum_{i=1}^n (p_i^* - 1)\bar{w}_i \quad (8)$$

where all prices have been normalized with respect to base year prices set equal to 100. In the derivation of equation (8), the result in equation (7) is applied. From equation (8), one can see that if all prices increase by  $r$  percent, i.e.,  $p_i^* = (1 + r)p_i$ , the average standard of living will decrease by  $r$  percent.  $-(p_i^* - 1)\bar{w}_i$  is the contribution of the  $i$ th price change on the average standard of living.

The most widely used price index is the Laspeyres price index, where base year prices normalized to 100 can be defined as

$$L = \sum_{i=1}^n p_i^* \bar{w}_i \quad (9)$$

which from equation (8) is related to the proportional change in the average standard of living:

$$\frac{\mu^* - \mu}{\mu} = -(L - 1) \quad (10)$$

This equation shows that there is a one-to-one relationship between changes in average standard of living and the Laspeyres price index: the larger the  $L$  is, the greater is the reduction in the average standard of living. The average standard of living has decreased (increased) over time when the calculated value of  $L$  is greater (less) than 1.

### III. REGIONAL PRICE IMPACT ON AVERAGE STANDARD OF LIVING

Suppose a country is divided into  $k$  mutually exclusive regions. Since regional prices do not change by the same proportion, the impact of regional prices changes on the average standard of living will be different. This section derives the formulae that capture the impact of regional prices changes on the national average standard of living.

The average standard of living in a country is related to the average standard of living in its regions as:

$$\mu = \sum_{j=1}^k a_j \mu_j \quad (11)$$

where  $\mu_j$  is the average standard of living in the  $j$ th region and  $\alpha_j$  is the population share of the  $j$ th region. Suppose  $p_{ij}$  is the price of the  $i$ th commodity in the  $j$ th region at base period. Suppose further that this price changes to  $p_{ij}^*$ , which will impact the average standard of living in the  $j$ th region. Assume that the average standard of living in the  $j$ th region changes to  $\mu_j^*$ , then from equation (8):

$$\frac{\mu_j^* - \mu_j}{\mu_j} = \sum_{i=1}^n \frac{(p_{ij}^* - p_{ij})}{p_{ij}} \frac{\partial \mu_j}{\partial p_{ij}} \frac{p_{ij}}{\mu_j} = - \sum_{i=1}^n (p_{ij}^* - 1) \bar{w}_{ij} \quad (12)$$

where all regional prices have been normalized with respect to base year prices set equal to 100 and  $\bar{w}_{ij}$  is the  $i$ th budget share in the  $j$ th region. Substituting equation (12) into (11) gives the proportional change in the national standard of living due to changes in regional prices:

$$\frac{\mu^* - \mu}{\mu} = \frac{1}{\mu} \sum_{j=1}^k a_j \mu_j \left[ \frac{\mu_j^* - \mu_j}{\mu_j} \right] = - \frac{1}{\mu} \sum_{i=1}^n \sum_{j=1}^k a_j \mu_j (p_{ij}^* - 1) \bar{w}_{ij} \quad (13)$$

Given the average budget shares for each region, the national budget share can be calculated as

$$\bar{w}_i = \frac{1}{\mu} \sum_{j=1}^k a_j \mu_j \bar{w}_{ij} \quad (14)$$

The national budget share is the weighted average of the regional budget shares with weights proportional to the regional shares of the total expenditure. Similarly, national prices of different commodities is defined as

$$\bar{p}_i^* = \frac{\sum_{j=1}^k a_j \mu_j \bar{w}_{ij} p_{ij}^*}{\sum_{j=1}^k a_j \mu_j \bar{w}_{ij}} \quad (15)$$

which shows that the national prices of different commodities are the weighted average of the regional prices.

Using equations (14) and (15) into (13) gives the proportional change in the average standard of living as

$$\frac{\mu^* - \mu}{\mu} = - \sum_{i=1}^n (\bar{p}_i^* - 1) \bar{w}_i \quad (16)$$

where  $-(\bar{p}_i^* - 1) \bar{w}_i$  is the contribution of the  $i$ th commodity to the proportional change in the national standard of living. It can be seen that if the  $i$ th commodity national price increases by 1%, the national average standard of living will decline by  $\bar{w}_i$  %.

Using equation (10), the Laspeyres index for the  $j$ th region can be rewritten as

$$L_j = 1 - \frac{\mu_j^* - \mu_j}{\mu_j} \quad (17)$$

and the national Laspeyres index as

$$\tilde{L} = 1 - \frac{\mu^* - \mu}{\mu} \quad (18)$$

Combining equations (17) and (18) with (13),

$$\tilde{L} = \frac{1}{\mu} \sum_{j=1}^k a_j \mu_j L_j \quad (19)$$

which shows that the national Laspeyres index is the weighted average of the regional Laspeyres indices with weights proportional to the regions' shares in total expenditure.  $\frac{a_j \mu_j L_j}{\mu}$  is the contribution of the  $j$ th region to the national Laspeyres price index.

#### IV. IMPACT OF PRICE CHANGES ON POVERTY

To measure the impact of prices changes on poverty, the specific measure of poverty must be chosen. There exist several poverty measures in the literature. Different poverty measures imply different value judgment. The choice of a measure depends on policymakers' value judgment. Instead of making the judgment ourselves in choosing a poverty measure, the three most widely used poverty measures are used in this study, namely, headcount ratio ( $H$ ), poverty gap ratio ( $g$ ), and severity of poverty ( $s$ ), which are respectively defined as:

$$H = \int_0^z f(x) dx = F(z) \quad (20)$$

$$g = \int_0^z \left[ \frac{z-x}{z} \right] f(x) dx \quad (21)$$



$$s = \int_0^z \left[ \frac{z-x}{z} \right]^2 f(x) dx \quad (22)$$

where  $f(x)$  is the density function of income  $x$  and  $F(z)$  is the probability distribution function at the income level equal to the poverty line  $z$ .

The impact of price changes on poverty is captured by the price elasticity of poverty. Son and Kakwani (2008) have derived the price elasticity of poverty for an entire class of additive separable poverty measures, of which headcount ratio, poverty gap ratio, and severity of poverty are included. Using their general results, the poverty elasticity of these three measures were derived with respect to the price of the  $i$ th commodity as

$$\eta_{hi} = \frac{\partial H}{\partial p_i} \frac{p_i}{H} = \frac{zf(z)w_i(z)}{H} \quad (23)$$

$$\eta_{gi} = \frac{\partial g}{\partial p_i} \frac{p_i}{g} = \frac{1}{g} \int_0^z \left[ \frac{x}{z} \right] w_i(x) f(x) dx \quad (24)$$

$$\eta_{si} = \frac{\partial s}{\partial p_i} \frac{p_i}{s} = \frac{2}{s} \int_0^z \left[ \frac{x}{z} \right] \left[ \frac{z-x}{z} \right] w_i(x) f(x) dx \quad (25)$$

As shown in Section II, an increase in the price of a commodity decreases the standard of living of everyone in society, which increases poverty. The magnitude of the increase in poverty depends on the price elasticity. For convenience, let us denote  $\theta$  as any of the three poverty measures, with its elasticity with respect to  $p_i$  given by  $\eta_{\theta i}$ . If the price of the  $i$ th commodity increases by 1%, then poverty measured by  $\theta$  will increase by  $\eta_{\theta i}$  percent. If all prices increase by 1%, then  $\theta$  will increase by  $\eta_{\theta}$  percent, where  $\eta_{\theta}$  is given by

$$\eta_{\theta} = \sum_{i=1}^n \eta_{\theta i} \quad (26)$$

Equation (26) is the total poverty elasticity, where  $n$  is the total number of commodities.

Suppose  $\theta$  is the poverty measure when the price vector is  $\mathbf{p}$ . Suppose further that  $\mathbf{p}$  changes to  $\mathbf{p}^*$  and the poverty measure  $\theta$  changes to  $\theta^*$ . Applying the Taylor expansion and omitting the terms of higher order smallness, the proportional change in poverty due to price changes is:

$$\frac{\theta^* - \theta}{\theta} = \sum_{i=1}^n \frac{(p_i^* - p_i)}{p_i} \frac{\partial \theta}{\partial p_i} \frac{p_i}{\theta} = \sum_{i=1}^n (p_i^* - 1) \eta_{\theta i} \quad (27)$$

As before, all prices have been normalized with respect to base year prices, which is equal to 100. From (27), one can see that if all prices increase by  $r$  percent, i.e.,  $p_i^* = (1+r)$ , the poverty measure  $\theta$  will increase by  $r\eta_{\theta}$  percent, where  $\eta_{\theta}$  is the total poverty elasticity defined in (26).  $(p_i^* - 1)\eta_{\theta i}$  is the contribution of the  $i$ th price change on the proportional change in poverty measured by  $\theta$ .

## V. REGIONAL IMPACT OF PRICE CHANGES ON POVERTY

Again, suppose a country is divided into  $k$  mutually exclusive regions. Since regional prices do not change by the same proportion, the impact of regional prices changes on poverty will also be different. This section derives the formulae that capture the impact of regional price changes on different poverty measures.

The three poverty measures used are additive and decomposable. With such property, the national poverty measure  $\theta$  can be rewritten as the weighted average of regional poverty measures denoted as:

$$\theta = \sum_{j=1}^k a_j \theta_j \quad (28)$$

where  $\theta_j$  is the poverty measure in the  $j$ th region and  $a_j$  is the population share of the  $j$ th region. Suppose  $p_{ij}$  is the price of the  $i$ th commodity in the  $j$ th region in the base period and suppose this price changes to  $p_{ij}^*$ , which will have an impact on the poverty measure in the  $j$ th region. Consider that the poverty measure  $\theta_j$  in the  $j$ th region changes to  $\theta_j^*$ , then from equation (27):

$$\frac{\theta_j^* - \theta_j}{\theta_j} = \sum_{i=1}^n \frac{(p_{ij}^* - p_{ij})}{p_{ij}} \frac{\partial \theta_j}{\partial p_{ij}} \frac{p_{ij}}{\theta_j} = \sum_{i=1}^n (p_{ij}^* - 1) \eta_{\theta ij} \quad (29)$$

where all regional prices have been normalized with respect to base year prices set to 100 and  $\eta_{\theta ij}$  is the  $i$ th price elasticity of poverty in the  $j$ th region. Substituting equation (29) into (28) gives the proportional change in the national poverty due to changes in regional prices:

$$\frac{\theta^* - \theta}{\theta} = \frac{1}{\theta} \sum_{j=1}^k a_j \theta_j \left[ \frac{\theta_j^* - \theta_j}{\theta_j} \right] = \frac{1}{\theta} \sum_{i=1}^n \sum_{j=1}^k a_j \theta_j (p_{ij}^* - 1) \eta_{\theta ij} \quad (30)$$

Given the poverty elasticity of each region and using equation (28), national poverty elasticity can be calculated as

$$\tilde{\eta}_{\theta i} = \frac{1}{\theta} \sum_{j=1}^k a_j \theta_j \eta_{\theta ij} \quad (31)$$

The national poverty elasticity is the weighted average of the regional poverty elasticities with weights proportional to the regional shares of poverty. Similarly, national prices of different commodities can be defined as

$$\tilde{p}_i^* = \frac{\sum_{j=1}^k a_j \theta_j \eta_{\theta ij} p_{ij}^*}{\sum_{j=1}^k a_j \theta_j \eta_{\theta ij}} \quad (32)$$

which shows that the national prices of different commodities are the weighted averages of regional prices of different commodities. Note that these national prices for various commodities will be different for each of the poverty measures.

Substituting equations (31) and (32) into (30) gives the proportional change in national poverty as

$$\frac{\theta^* - \theta}{\theta} = \sum_{i=1}^n (\tilde{p}_i^* - 1) \tilde{\eta}_{\theta i} \quad (33)$$

where  $(\tilde{p}_i^* - 1) \tilde{\eta}_{\theta i}$  is the contribution of the  $i$ th commodity to the proportional change in the national poverty. It can be seen that if the  $i$ th commodity national price increases by 1%, the national poverty will increase by  $\tilde{\eta}_{\theta i}$  %.

## VI. PRICE INDEX FOR THE POOR

Section II has demonstrated that the Laspeyres price index has a one-to-one relationship with the change in the average standard of living. This index is completely insensitive to how the changes in prices affect the poor. Son and Kakwani (2008) have derived a price index for the poor that has a one-to-one relationship with a poverty measure. The PIP can be derived for any poverty measure.

Assume a counterfactual situation where all prices change by the same proportion i.e.,  $p_i^* = \lambda p_i$ . Then  $\lambda$  may be called as the price index for the poor if it gives the same change in the poverty measure  $\theta$ , given that the price vector changes from  $p$  to  $p^*$ . If all prices have been normalized with respect to base year prices set to 100, then  $p_i^* = \lambda$  for all  $i$ , which by substituting in equation (27) gives

$$\lambda = \frac{1}{\eta_{\theta}} \sum_{i=1}^n p_i^* \eta_{\theta i} \quad (34)$$

where  $\eta_{\theta}$  is the total poverty elasticity defined in (26).  $\lambda$  is the PIP. It is a weighted average of price indices of each commodity. Weights implied by this index are the poverty weights implicit in poverty measures. Different poverty measures imply different PIPs.

The relationship between the PIP and the proportional poverty reduction can be obtained from equations (27) and (34) as

$$\frac{\theta^* - \theta}{\theta} = (\lambda - 1) \eta_{\theta} \quad (35)$$

which in view of the fact that  $\eta_{\theta} > 0$ , shows that there is a one-to-one relationship between the proportional change in poverty and the PIP. To further explain, the larger the  $\lambda$  is, the greater is the increase in poverty. Poverty increased (decreased) over time when  $\lambda$  is greater (less) than 1.

A price increase in any commodity has two effects. One is that it reduces people's real income, which leads to an increase in poverty. The other effect is related to changes in the distribution of income. As price changes affect individuals differently depending on their income, the changes in prices can either increase or decrease income inequality. The Laspeyres price index is responsive to changes in average standard of living but completely insensitive to changes in inequality. Conversely, the PIP is sensitive to changes in income distribution. Son and Kakwani (2008) have shown that the two indices are related as

$$\lambda = L + \frac{1}{\eta_{\theta}} \sum_{i=1}^n p_i^* (\eta_{\theta i} - \bar{w}_i \eta_{\theta}) \quad (36)$$

The second term in the right hand side of this equation reveals whether the changes in prices increase or decrease income inequality. If the second term is positive (negative), then it implies that changes in prices increase (decrease) income inequality, i.e., changes in prices are inequality increasing (decreasing) if  $\lambda$  is less (greater) than  $L$ .

## VII. WITHIN AND BETWEEN REGIONAL INEQUALITY

Using equation (34), the PIP for the  $j$ th region can be written as

$$\lambda_j = \frac{1}{\eta_{\theta j}} \sum_{i=1}^n p_{ij}^* \eta_{\theta ij} \quad (37)$$

where

$$\eta_{\theta j} = \sum_{i=1}^n \eta_{\theta ij} \text{ is the total poverty elasticity of the } j\text{th region.}$$

Similarly, the national price index of the poor can be given by

$$\tilde{\lambda} = \frac{1}{\tilde{\eta}_{\theta}} \sum_{i=1}^n \tilde{p}_i^* \tilde{\eta}_{\theta i} \quad (38)$$

where

$$\tilde{\eta}_{\theta} = \sum_{i=1}^n \tilde{\eta}_{\theta i} \text{ is the national total poverty elasticity.}$$

Substituting equations (31) and (32) into equation (38) and utilizing equation (37) gives

$$\tilde{\lambda} = \frac{\sum_{j=1}^k a_j \theta_j \eta_{\theta j} \lambda_j}{\sum_{j=1}^k a_j \theta_j \eta_{\theta j}} \quad (39)$$

which shows that the national PIP is the weighted average of the regional PIPs and  $\frac{a_j \theta_j \eta_{\theta j} \lambda_j}{\sum_{j=1}^k a_j \theta_j \eta_{\theta j}}$  is the contribution of the  $j$ th region to the national PIP.

Combining equations (19) and (39) gives

$$\tilde{\lambda} - \tilde{L} = \frac{\sum_{j=1}^k a_j \theta_j \eta_{\theta j} (\lambda_j - L_j)}{\sum_{j=1}^k a_j \theta_j \eta_{\theta j}} + \frac{\sum_{j=1}^k a_j \theta_j \eta_{\theta j} (L_j - \tilde{L})}{\sum_{j=1}^k a_j \theta_j \eta_{\theta j}} \quad (40)$$

The left hand side of this equation reveals how much changes in prices have affected the national income inequality. This impact is the sum of two components given in the right hand of this equation. The first component is the impact of price changes on the inequality within the region while the second component is the impact of price changes on the inequality between regions.

The impact of price changes in the  $j$ th region is captured by  $(\lambda_j - L_j)$  and the first term in the right hand side of equation (40) is the weighted average of inequality impacts within each regions. Similarly,  $(L_j - \bar{L})$  captures the deprivation of the  $j$ th region relative to the national deprivation caused by price changes in different regions. The second term in the right hand side of equation (40) is the weighted average of the relative deprivations suffered by different regions.

## VIII. EMPIRICAL ILLUSTRATION

### A. Data Source

The empirical illustration is largely based on the 2003 and 2006 Family Income and Expenditure Surveys (FIES) covering almost 40,000 households throughout the Philippines. The survey provides detailed household incomes and consumption expenditures. Unit record data were used to calculate the poverty weights. The poverty lines used for the study are developed by Balisacan (1999).

Monthly price data were obtained from the Philippine National Statistical Office (NSO). These data were collected for 17 regions over the period from January 2000 to March 2008. These regions are the National Capital Region (NCR), Cordillera Administrative Region (CAR), Ilocos, Cagayan Valley, Central Luzon, Calabarzon, Mimaropa, Bicol, Western Visayas, Central Visayas, Eastern Visayas, Zamboanga Peninsula, Northern Mindanao, Davao, Soccsksargen, Caraga, and Autonomous Region in Muslim Mindanao (ARMM).

For each of the 17 regions, the price data provided by the NSO contain detailed monthly prices for 29 commodity groups of household consumption including nine food and 20 nonfood commodity groups that represent wide ranges of goods and services consumed by the population. The next step was to match the price data with the household survey for the 29 commodity groups. As a result, 27 commodity groups were matched, of which nine groups represent food and 18 groups are nonfood.

The study used monthly price data available from January 2000 to March 2008. The impact of prices on the average standard of living, poverty, and inequality were analyzed over this period. As mentioned, the analysis started at the regional level to derive the national estimates for the Philippines. Since detailed information on disaggregated commodities is available for only one period from the household survey, substitution bias could not be considered, as this will require detailed household surveys for at least two periods. Nevertheless, the objective of this study to measure the impact of price changes on poverty would not be undermined since the magnitude of substitution bias will be small for the poor. The poor do not enjoy the luxury of substituting one commodity for another. They spend a large proportion of their incomes on necessities. Moreover, almost all countries in the world base their price indices using a fixed basket corresponding to the base period suggesting that in practice, the substitution bias is not factored in. Furthermore, the main purpose of the current study is to demonstrate that statistical offices can easily construct price indices for the poor using the household survey for the base period.

## B. Inflation Rates Faced by the Poor

In practice, the official inflation rate is estimated based on the Laspeyres price index. As pointed out, the Laspeyres price index is constructed using the average budget shares of commodities as weights. The Laspeyres price index, however, uses weights that commonly reflect the consumption patterns of the average population. For the poverty impact analysis, it would be more appropriate to use an alternative price index that takes into account the consumption patterns of the poor. In this context, this paper has proposed a new PIP that is constructed based on weights relevant to any poverty measure. In the Laspeyres price index for the Philippines, the greatest weight is rendered to rentals, which is the major expenditure item for the average population. In contrast, rice is the item that is given the highest weight in constructing the PIP. The weights for the PIP are determined by the price elasticity of poverty measures. Thus, each poverty measure (headcount ratio, poverty gap ratio, and severity of poverty) will have a different PIP.

Inflation rates based on the Laspeyres price index and the PIP for the three poverty measures are in Table 1. Note that while the inflation rate derived from the Laspeyres price index is the official inflation rate, the inflation rate resulting from the PIP can be referred to as the inflation rate faced by the poor.<sup>4</sup> The results suggest that the inflation rate faced by the poor—particularly the ultra poor—has been higher than the official inflation rate since 2005 by 0.2% point in 2005–06, 0.6% point in 2006–07, and 5.6% point in 2007–08. In earlier periods, the official inflation rate had been higher than the inflation rate faced by the poor. The same pattern is also seen across regions (Appendix Table A.1).

**TABLE 1**  
**ANNUAL INFLATION RATES FOR THE PHILIPPINES**

PERIOD	INFLATION RATE (BASED ON LASPEYRES INDEX)	INFLATION RATE FACED BY THE POOR		
		PIP (HEADCOUNT)	PIP (POVERTY GAP)	PIP (SEVERITY)
2000–01	7.8	6.5	6.3	6.2
2001–02	2.7	2.6	2.7	2.7
2002–03	3.3	3.0	2.9	2.9
2003–04	5.6	5.6	5.7	5.8
2004–05	7.2	7.1	7.1	7.1
2005–06	5.9	5.9	6.1	6.2
2006–07	2.6	3.0	3.2	3.3
2007–08	15.6	20.0	20.7	21.1

PIP = price index for the poor.

Note: To calculate the inflation rate based on the Laspeyres price index, the 2003 FIES is used to get weights

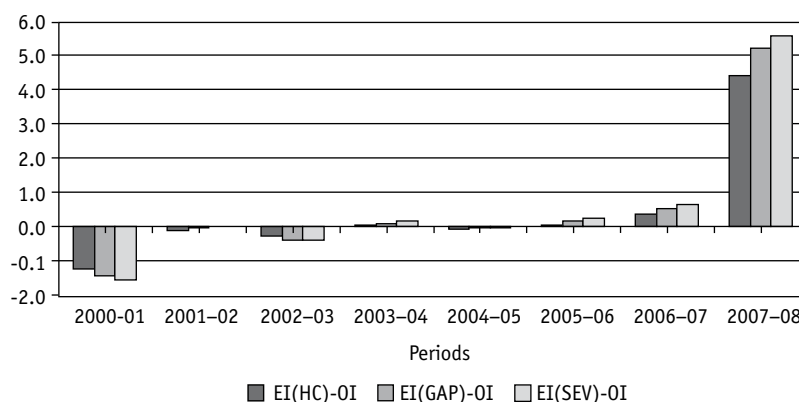
Source: Author's calculations.

<sup>4</sup> Households are defined as poor if their per capita household expenditures are less than the per capita poverty line that is comparable over time and across regions. Otherwise, households are nonpoor. See Balisacan (1999) for detailed discussions on the poverty line.

As proven in equations (16) and (35), the inflation rate implied by the Laspeyres price index has a one-to-one relationship with changes in the average standard of living, whereas the inflation rate implied by the PIP has a direct relation with changes in poverty. Having said that, the results in Table 1 suggest that because of price increases, the average standard of living has fallen and poverty has increased in all periods. Looking at the magnitude of the inflation rate, it can be concluded that the rate of decline in the average standard of living (and increase in poverty) has been the highest in the recent period, 2007–08.

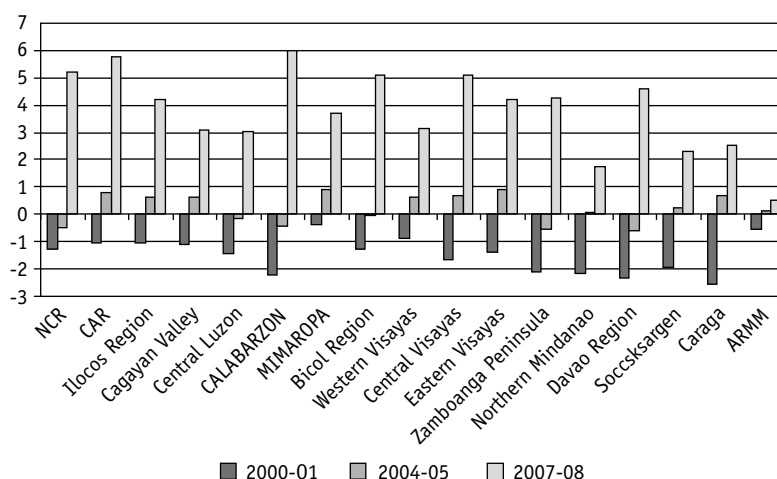
Comparing the inflation rate measured by the Laspeyres index with that by the PIP captures the distribution impact of inflation. If the inflation rate measured by the Laspeyres index is higher than that measured by the PIP, the prices of luxury commodities consumed mainly by the nonpoor have risen at a rate faster than those of necessities consumed mainly by the poor. In this case, the changes in relative prices of commodities have decreased inequality, i.e., the rich have been hurt relatively more than the poor due to the price changes. This has happened in the Philippines in the period 2000–2005 (Figure 1). From 2005 onwards, the inflation rate measured by the PIP is higher than that measured by the Laspeyres index, with the difference rising sharply in 2007–08. This suggests that the prices of necessities such as food have increased at a rate faster than those of the nonfood commodities. Such changes in relative prices have hurt the poor much more than the nonpoor because the purchasing power of the former has been eroded. Accordingly, the changes in relative prices have increased inequality in recent years, particularly 2007–08, across regions and thus, for the whole Philippines (see also Figure 2).

**FIGURE 1**  
**IMPACT OF PRICE CHANGES ON INEQUALITY FOR THE PHILIPPINES**



Note: EI(HC) is the inflation rate based on the PIP for the headcount ratio, EI(GAP) is the inflation rate based on the PIP for the poverty gap ratio, EI(SEV) is the inflation rate based on the PIP for the severity of poverty, and OI is the official inflation rate based on the Laspeyres price index. This graph depicts the difference in the inflation rates between PIP and the Laspeyres index.

**FIGURE 2**  
**IMPACT OF PRICE CHANGES ON INEQUALITY BY REGIONS**



NCR = National Capital Region; CAR = Cordillera Autonomous Region; ARMM = Autonomous Region of Muslim Mindanao.

Note: The bar represents the difference between the effective inflation rate from the PIP of the severity of poverty and the official inflation rate from the Laspeyres price index at a particular period.

Source: Author's calculations based on Appendix Table A.1.

Analysis using the PIP, weighted according to the consumption patterns of the poor in the Philippines, suggests that the food inflation rate faced by the poor has been higher than the official rate since 2004-05 (Table 2). Particularly in 2007-08, the food inflation rate implied by the severity of poverty is 2.1% points higher than that suggested by the Laspeyres index. A similar pattern can be observed across the 17 regions (Appendix Table A.2).

**TABLE 2**  
**ANNUAL FOOD INFLATION RATES FOR THE PHILIPPINES**

PERIOD	INFLATION RATE (BASED ON LASPEYRES INDEX)	INFLATION RATE FACED BY THE POOR		
		PIP (HEADCOUNT)	PIP (POVERTY GAP)	PIP (SEVERITY)
2000-01	4.7	4.3	4.1	4.0
2001-02	2.2	2.6	2.7	2.8
2002-03	2.3	2.2	2.2	2.2
2003-04	6.5	6.2	6.3	6.3
2004-05	6.6	7.1	7.3	7.3
2005-06	5.6	5.7	5.9	6.0
2006-07	3.3	3.5	3.7	3.8
2007-08	22.8	24.3	24.7	24.9

PIP = price index for the poor.

Note: To calculate the food inflation rate based on the Laspeyres price index, the 2003 FIES is used to get weights.

Source: Author's calculations.



Table 3 shows the percentage contribution of food to the total inflation rate. In 2000–01, the increase in food prices contributed to the total inflation rate by 25.3%. In later periods, the contribution of food to total inflation has been increasing rapidly. In 2007–08, the food prices increase has accounted for almost 62% of the total inflation rate. The contribution of food to the total inflation rate has always been higher for the poor. In 2007–08, the contribution of food to the PIP using the severity of poverty measure accounts for almost 75% of total inflation. From these observations, it may be concluded that the increase in food prices has been the major factor fuelling inflation in the Philippines in recent periods. Nonfood items have played a relatively minor role. This suggests that government policies should be directed toward stabilizing food prices. It also implies that monetary policy may not be an effective tool to combat rising inflation in current periods. Such policies may push the economy into recession, which will hurt the poor even more.

**TABLE 3**  
**PERCENTAGE CONTRIBUTION OF FOOD TO TOTAL INFLATION RATE**  
**FOR THE PHILIPPINES**

PERIOD	LASPEYRES INDEX	PRICE INDEX FOR THE POOR		
		HEADCOUNT	POVERTY GAP	SEVERITY
2000–01	25.3	37.6	38.9	39.4
2001–02	33.3	55.6	59.7	61.4
2002–03	28.7	42.0	45.2	47.0
2003–04	48.1	63.2	66.2	67.7
2004–05	38.9	58.6	62.5	64.1
2005–06	40.9	56.9	60.3	61.9
2006–07	51.9	67.0	70.6	72.1
2007–08	61.9	71.4	73.6	74.5

Note: Percentage contribution of food to total inflation rate by region is also presented in Appendix Table A.4.  
Source: Author's calculations.

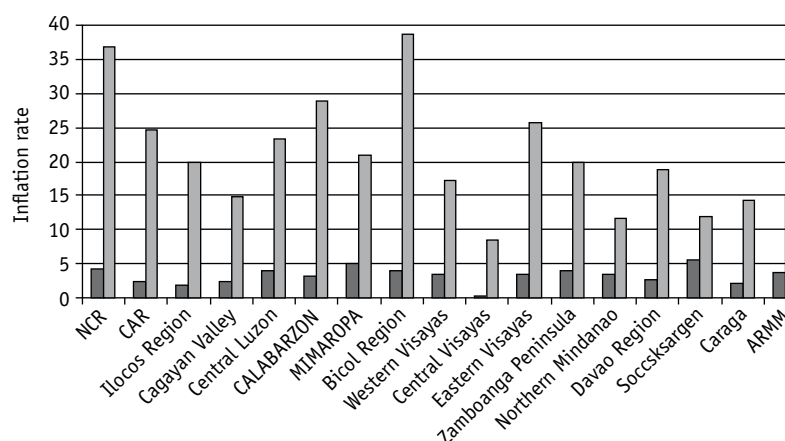
Rice is basic to the diet of most people in Asia. The Philippines is not an exception. In this regard, the rice price increase experienced particularly in the last few months of 2008 has an important implication for Filipinos. While the percentage change in rice price has been low and stable in the early 2000s, it has begun to increase at an annual rate of more than 2% since 2003–04. The rice inflation rate escalated to 22.9% just between 2007 and March 2008. Such increase has never been observed in recent decades in the Philippines. The hike in the price of rice has outpaced that of the other basic commodities except fuel (Table 4). In addition, it can be observed from Figure 3 that the price increase in rice has been particularly sharper for some regions in the latest period. For the first three months of 2008 for instance, the Bicol region and the National Capital Region have experienced an average increase in the price of rice by 38.6% and 36.8%, respectively.

**TABLE 4**  
**ANNUAL INFLATION RATES OF BASIC COMMODITIES IN THE PHILIPPINES**

PERIOD	RICE	FUEL	LIGHT	WATER	EDUCATION	MEDICAL	TRANSPORT
2000-01	1.3	10.1	14.8	12.0	11.0	9.2	12.4
2001-02	1.8	-0.1	2.3	12.3	8.8	6.7	1.0
2002-03	1.9	10.1	3.1	8.7	8.1	7.4	3.5
2003-04	2.5	13.5	4.8	1.7	8.6	4.8	12.6
2004-05	6.8	17.7	16.4	21.4	6.7	6.1	17.9
2005-06	3.8	17.5	11.3	7.0	5.4	6.7	12.1
2006-07	3.4	3.3	2.7	5.1	6.7	4.6	0.6
2007-08	22.9	52.6	-9.7	10.0	13.5	16.0	13.0

Source: Author's calculations.

**FIGURE 3**  
**ANNUAL RICE INFLATION RATE BY REGION, 2006-08**  
**(PERCENT)**



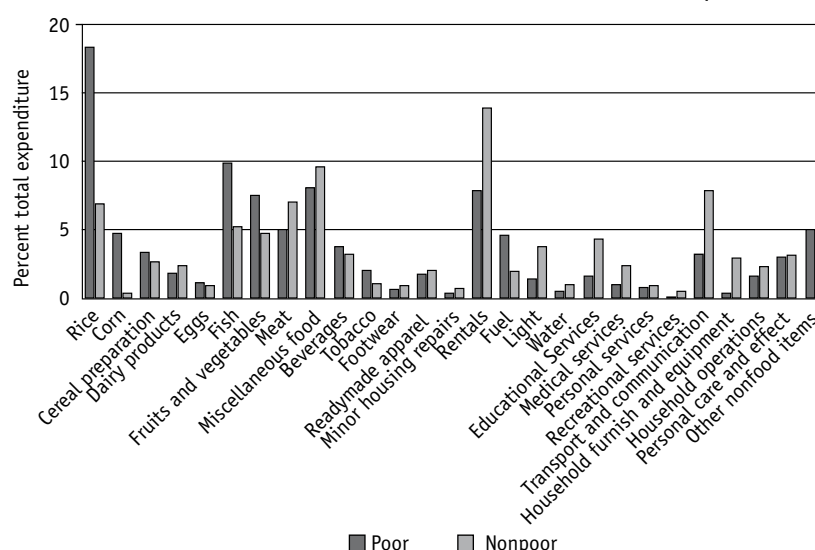
NCR = National Capital Region; CAR = Cordillera Autonomous Region; ARMM = Autonomous Region of Muslim Mindanao.

Source: Appendix Table A.3.

### C. Impact of Price Changes on Average Standard of Living and Poverty

Before carrying out an impact analysis of price changes on average standard of living and poverty, it is useful to understand the consumption patterns of the people and of the poor in the country. According to Figure 4, the poor allocate almost 60% of their expenditure on food while the same proportion of total expenditure is spent on nonfood among the nonpoor. While the poor allocate more than 18% of their total expenditure solely on purchasing rice, almost 14% of the total expenditure of the nonpoor is spent on rentals. This reflects different consumption patterns between the poor and the nonpoor. In general, poorer households spend a greater proportion of their expenditure on food commodities than the nonpoor. Such consumption patterns indicate that rising food prices will have much greater adverse impact on the standard of living of the poor.

**FIGURE 4**  
**SHARE IN TOTAL EXPENDITURE BY THE POOR AND NONPOOR, 2003**



Source: Author's calculations based on the 2003 FIES

The increases in various commodity prices exert different impacts on the average standard of living and on poverty. This impact may be quantified by calculating the price elasticity of the average standard of living and of poverty with respect to the prices of different commodities. The empirical results are presented in Table 5.

**TABLE 5**  
**PRICE ELASTICITY OF POVERTY BY COMMODITY IN THE PHILIPPINES**

EXPENDITURE ITEMS	PRICE ELASTICITY WITH RESPECT TO				ADDITIONAL NUMBER OF POOR DUE TO 10% INCREASE IN PRICE (IN MILLIONS)
	AVERAGE STANDARD OF LIVING	HEADCOUNT	POVERTY GAP RATIO	SEVERITY OF POVERTY	
Rice	-0.08	0.32	0.51	0.62	0.66
Corn	-0.01	0.05	0.15	0.24	0.11
Cereal preparation	-0.03	0.07	0.09	0.10	0.14
Dairy products	-0.02	0.04	0.05	0.05	0.08
Eggs	-0.01	0.02	0.03	0.04	0.05
Fish	-0.06	0.18	0.27	0.34	0.38
Fruits and vegetables	-0.05	0.14	0.21	0.26	0.28
Meat	-0.07	0.12	0.14	0.14	0.25
Miscellaneous	-0.09	0.17	0.21	0.24	0.35
Beverages	-0.03	0.08	0.10	0.12	0.16

*continued next page.*

TABLE 5. *CONTINUED.*

Tobacco	-0.01	0.04	0.05	0.06	0.08
Footwear	-0.01	0.01	0.02	0.02	0.03
Readymade apparel	-0.02	0.04	0.05	0.06	0.08
Minor housing repairs	-0.01	0.01	0.01	0.01	0.02
Rentals	-0.13	0.16	0.21	0.24	0.34
Fuel	-0.02	0.08	0.13	0.16	0.16
Light	-0.04	0.04	0.04	0.04	0.07
Water	-0.01	0.01	0.01	0.01	0.02
Educational services	-0.04	0.03	0.05	0.05	0.07
Medical services	-0.02	0.03	0.03	0.03	0.05
Personal services	-0.01	0.02	0.02	0.02	0.03
Recreational services	-0.00	0.00	0.00	0.00	0.01
Transport and communication	-0.08	0.07	0.09	0.10	0.15
Household furnishings and equipment	-0.03	0.01	0.01	0.01	0.03
Household operations	-0.02	0.03	0.05	0.06	0.06
Personal care and effects	-0.03	0.06	0.08	0.09	0.13
Other miscellaneous items	-0.07	0.09	0.14	0.17	0.20
Per capita total expenditure	-1.00	1.92	2.74	3.29	4.00
Food	-0.42	1.10	1.66	2.04	2.30
Nonfood	-0.58	0.82	1.08	1.25	1.70

Source: Author's calculations.

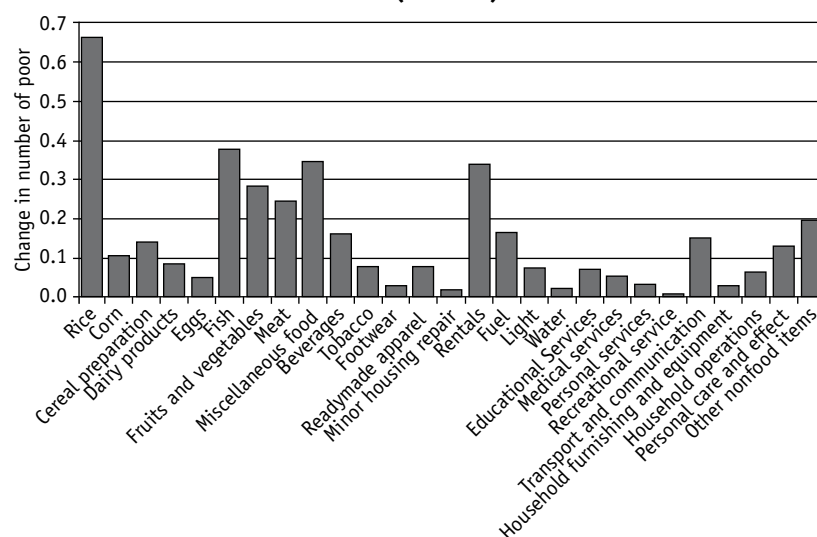
The price elasticity of the average standard of living suggests that a 10% increase in food prices will result in a decrease in average standard of living by 4.2%. On the other hand, a 10% increase in nonfood prices will lead to a 5.8% decline in the average standard of living in the Philippines. The impact of an increase in food prices on poverty is much larger. A 10% increase in food prices contributes to more than 11% increase in the headcount ratio. The impact on the severity of poverty is over 20%. Since the severity of poverty gives more weight to the poor who live far below the poverty line, the impact of increase in food prices on the ultra poor can be severe.

In the recent period from 2007 to March 2008, rice prices have increased at an annual rate of 22.9%. The price elasticity of rice for the average standard of living is only -0.08, which means that an increase in rice prices by 22.9% would result in a decline in average standard of living by only 1.8%. However, the impact of the rice price hike on poverty is much greater. The price elasticity of the severity of poverty is 0.62, suggesting that a 22.9% increase in rice price will result in an increase of the severity of poverty by 14.2%. This finding indicates that rising rice prices hit the ultra poor the hardest.

The price elasticity for the headcount ratio can be used to predict the additional number of people who would be forced into poverty because of a 10% price increase in various types of food and nonfood items for the Philippines. The empirical results are presented in the last column of Table 5. As shown also in Figure 5, the results suggest that a 10% increase in food prices and nonfood prices will lead to an additional 2.3 million and 1.7 million poor people, respectively.

Applying the same analysis on rice and fuel, a 10% increase in the prices of these goods will result in an additional 0.66 million and 0.16 million poor people in the Philippines, respectively.

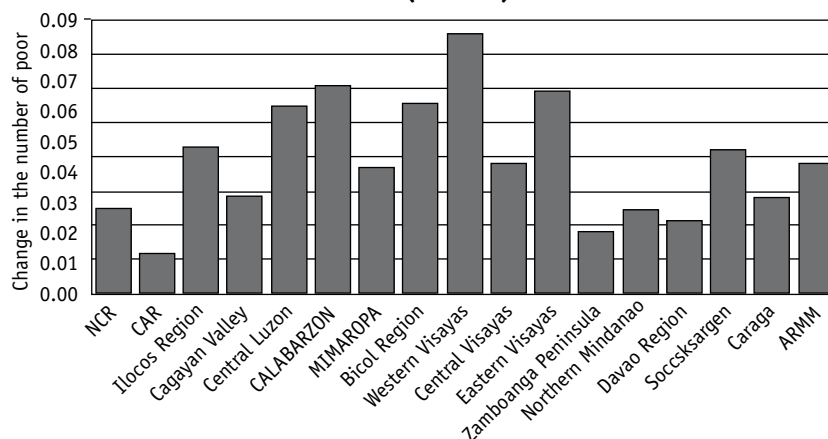
**FIGURE 5**  
**CHANGE IN NUMBER OF POOR WITH A 10% INCREASE IN COMMODITY PRICES**  
**(MILLIONS)**



Source: Table 5.

Figure 6 looks at the impact of a 10% increase in rice price on the additional number of poor across the country's 17 regions. This can be helpful in identifying certain regions that could have been affected by the surge in rice price in recent months. The results suggest that the increase in the number of poor people will be highest in the Visayas and the Luzon and Bicol regions, which account for 0.38 million of the 0.66 million, respectively, of the population that would be forced into poverty from a 10% price increase in rice. The National Food Authority is selling subsidized rice

**FIGURE 6**  
**CHANGE IN NUMBER OF POOR WITH A 10% INCREASE IN RICE PRICE**  
**(MILLIONS)**



Source: Appendix Table A.5.

to vulnerable groups in the Philippines at a much lower price than the market price. If the subsidies are removed, then rice will be sold at the market price. The adverse impact of this scenario would be far greater for the three regions of Visayas, Luzon, and Bicol. In particular, the change in rice price is likely to increase the number of poor the most in Western Visayas.

Next the impact of higher food prices, particularly rice, on the average standard of living and on poverty is quantified, taking into account the direct effects from changes in commodity prices (Table 6), i.e., assuming that households' nominal incomes remain constant. The estimates presented in Table 6 are based on the impacts under the actual price changes.

**TABLE 6**  
**PERCENTAGE CHANGE IN AVERAGE STANDARD OF LIVING AND POVERTY**  
**DUE TO PRICE CHANGES IN THE PHILIPPINES**

PERIOD	DUE TO CHANGES IN FOOD PRICES				DUE TO CHANGES IN RICE PRICE			
	AVERAGE STANDARD	HEADCOUNT	POVERTY GAP	SEVERITY	AVERAGE STANDARD	HEADCOUNT	POVERTY GAP	SEVERITY
2000-01	-1.97	4.72	6.75	8.08	-0.10	0.52	0.92	1.15
2001-02	-0.92	2.83	4.42	5.58	-0.14	0.63	0.98	1.18
2002-03	-0.93	2.39	3.56	4.39	-0.15	0.56	0.82	0.96
2003-04	-2.69	6.83	10.33	12.84	-0.20	0.95	1.65	2.14
2004-05	-2.72	7.87	12.06	14.87	-0.54	2.46	4.06	5.01
2005-06	-2.32	6.29	9.73	12.18	-0.30	1.30	2.19	2.76
2006-07	-1.35	3.84	6.09	7.72	-0.27	1.07	1.74	2.15
2007-08	-9.45	26.58	40.52	50.20	-1.80	6.71	10.82	13.41

Note: Regional estimates are presented in Appendix Tables A.6–A.9.

In the period 2007–08, the increase in food prices contributed to a reduction in the average standard of living by 9.45%. The impact on poverty was much greater with the severity of poverty increasing by more than 50% during the same period. The contribution of the increase in rice price on the severity of poverty in 2007–08 was estimated to be 13.41%. These estimates suggest that increases in food prices have enormous impacts on poverty.

Rising prices reduce the average standard of living and increase poverty. The increase in nominal income has the opposite impact, increasing the average standard of living and reducing poverty. The actual impact on the standard of living and poverty will therefore be determined by the net impact of the two factors. If the price (income) effect dominates over the income (price) effect, then the real standard of living declines (increases) and poverty increases (decreases). The net effect therefore has to be examined. The income effect can be quantified only if household survey data for at least two periods are available. Given the available FIES surveys for the Philippines, the income effect between 2003 and 2006 could be quantified.

The income impact was calculated under the counterfactual that the prices of all commodities did not change between 2003 and 2006. The price impact was calculated under the counterfactual that nominal incomes of all households did not change between 2003 and 2006. The percentage changes in the average standard of living and in poverty were calculated using these scenarios (Table 7).

In the Philippines as a whole, the changes in prices lowered the average standard of living by 19.7% and raised the severity of poverty by 68.6% between 2003 and 2006 (Figures 7 and 8). The increases in households' incomes (i.e., income impact) resulted in an increase in the average standard of living by 18.9% and a decline in the severity of poverty by 51.8%. The net effect of price and income increases during 2003–2006 was, thus, a 16.8% increase in the severity of poverty, implying that poverty in the Philippines increased over the period. The net impact on the average standard of living is a decline by only 0.8%. However, the poor, particularly the ultra poor, have suffered a large decline in their real incomes, resulting in a higher incidence of poverty.

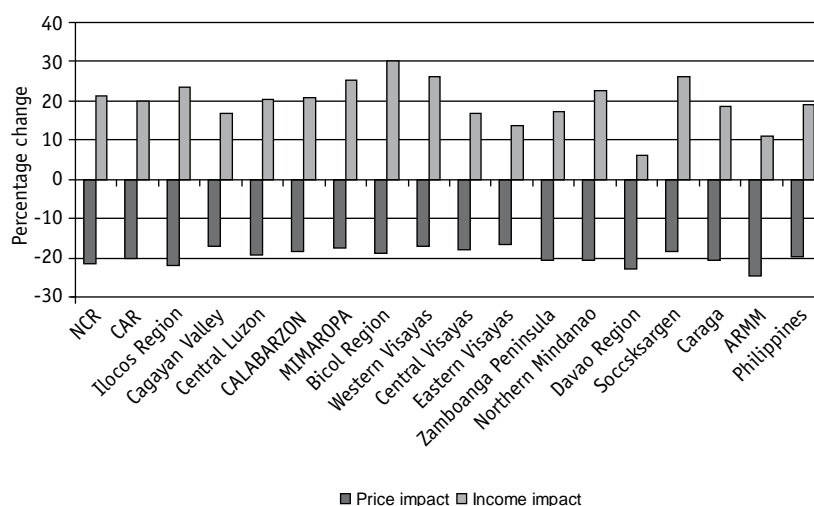
Of all commodity prices, food price increases account largely for the impact of price on the average standard of living and on poverty during 2003–2006, and, to a lesser extent, during 2000–2003 (Appendix Tables A.6 and A.9). During the first quarter of 2008, the 9.45% decline in the average standard of living was solely due to the food price increases. Likewise, the 50.2% increase in the severity of poverty in the same period was attributable to the increase in food prices. Overall, the price increases led to a lower standard of living and higher poverty in the Philippines in 2003–2006 (Table 7).

**TABLE 7**  
**PERCENTAGE CHANGE IN AVERAGE STANDARD OF LIVING AND POVERTY**  
**BETWEEN 2003–06**

REGIONS	AVERAGE STANDARD OF LIVING		HEADCOUNT RATIO		POVERTY GAP		SEVERITY OF POVERTY	
	PRICE IMPACT	INCOME IMPACT	PRICE IMPACT	INCOME IMPACT	PRICE IMPACT	INCOME IMPACT	PRICE IMPACT	INCOME IMPACT
NCR	-21.4	21.4	89.7	-40.0	95.4	-17.2	102.1	-67.7
CAR	-20.2	19.8	53.5	-31.3	84.5	-35.3	96.6	-55.9
Ilocos Region	-22.1	23.7	65.7	-33.7	94.0	-27.8	111.1	-46.2
Cagayan Valley	-16.9	16.7	40.4	-24.3	62.6	-33.6	77.4	-53.8
Central Luzon	-19.5	20.3	59.0	-42.9	78.0	-49.1	89.5	-62.1
CALABARZON	-18.5	20.7	46.1	-16.6	59.9	-35.0	68.7	-49.8
MIMAROPA	-17.3	25.1	29.4	-25.3	50.8	-32.1	62.7	-39.2
Bicol Region	-18.7	30.1	27.1	-29.5	43.3	-40.6	55.4	-53.5
Western Visayas	-16.9	26.3	36.3	-33.0	55.0	-41.1	67.2	-53.6
Central Visayas	-17.8	16.9	30.0	-41.5	45.5	-54.5	56.6	-71.6
Eastern Visayas	-16.7	13.6	28.9	-33.8	49.0	-37.0	64.4	-62.1
Zamboanga Peninsula	-20.5	17.3	23.6	-24.3	37.2	-6.7	47.7	-35.9
Northern Mindanao	-20.5	22.4	36.5	-59.1	60.8	-57.7	75.4	-84.8
Davao Region	-23.0	6.3	43.7	-2.8	69.8	-23.9	83.2	-39.3
Soccsksargen	-18.6	26.4	42.5	-42.5	60.3	-48.1	73.0	-61.0
Caraga	-20.7	18.6	39.1	-31.6	66.5	-24.8	86.1	-63.9
ARMM	-24.7	10.8	29.5	-16.3	50.5	-19.5	68.0	-33.9
Philippines	-19.7	18.9	42.5	-27.7	57.7	-33.8	68.6	-51.8

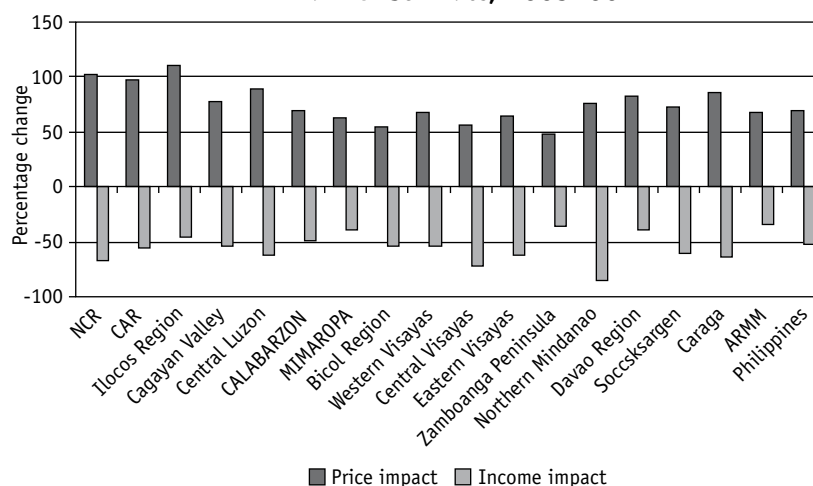
NCR = National Capital Region; CAR = Cordillera Autonomous Region; ARMM = Autonomous Region of Muslim Mindanao.  
Source: Author's calculations.

**FIGURE 7**  
**PERCENTAGE CHANGE IN AVERAGE STANDARD OF LIVING UNDER**  
**ALTERNATIVE SCENARIOS, 2003–06**



Source: Table 7.

**FIGURE 8**  
**PERCENTAGE CHANGE IN THE SEVERITY OF POVERTY UNDER**  
**ALTERNATIVE SCENARIOS, 2003–06**



Source: Table 7.



## **IX. CONCLUSIONS**

The effects of rising food prices will differ across households (ADB 2008). On one hand, there will be some households that may benefit from higher prices. On the other hand, other households may be adversely affected. Rising food prices may lead to income gains for net producers. However, many urban and rural poor who are food consumers and not necessarily producers will suffer the most from rising food prices. In this context, it would be interesting to examine the number of poor individuals who stand to lose from such price increases. For policymakers in developing countries, it is imperative to investigate what would be the net impact of food price increase on poverty. In addition, concerns over rising food prices are mounting because such increase can undermine the gains from poverty reduction and human development that developing countries have experienced over the last decade or so.

Using household surveys and detailed price data, the study analyzed the impacts of higher food prices on the average standard of living and on poverty for the Philippines. The study showed the dominating effect of rising food prices on poverty over the period 2003–2006. In particular, the severity of poverty rose by 16.8% while the standard of living declined by about 1% over the period. The study also suggested that the decline in the standard of living due to food price increases was particularly greater for the poorest of the poor. At worse, these households struggling to meet the minimum standards of living might have no choice but to cut down their expenditures on health and children's education.

Hence, safety measures will be required particularly for the poorest of the poor to be able to cushion the negative impact of higher food prices.

The study proposed an alternative price index for the poor called price index for the poor, which takes into account the consumption patterns of the poor. The most widely used Laspeyres price index is derived based on higher weights to commodities that are largely consumed by the rich. In this respect, the study argued that the PIP could be the more appropriate price index compared to the Laspeyres price index in assessing the effect of price changes on poverty. Based on PIP, the inflation rate faced by the poor was higher than the official rate that is based on the Laspeyres price index, by 0.2, 0.6, and 5.6 percentage points during the periods 2005–06, 2006–07, and 2007–2008, respectively. The PIP suggests that the inflation rate faced by the poor has been lower than the official inflation rate in the earlier period.

The study also found that compared to nonpoor consumers, inflation hits poor consumers harder. Specifically, the poor are highly sensitive to price changes in food, particularly staple food items such as rice. Estimates on the price elasticity of poverty by commodity suggest that a 10% increase in food prices will create an additional 2.3 million poor people, while a 10% increase in nonfood prices will drive an additional 1.7 million people into poverty. A 10% increase in the price of rice will force an additional 0.66 million people into poverty, while a 10% increase in fuel prices will cause an additional 0.16 million poor people.

Finally, the study found that the increase in food prices has been the major factor causing high inflation in the Philippines in recent periods. The nonfood items of consumption have played a relatively minor role. It is wiser thus to direct government policies toward stabilizing food prices. Moreover, given these current trends, monetary policy may not be an effective tool to combat rising inflation. Such policies may push the economy into recession, which will hurt the poor even more.

## APPENDIX TABLES

**APPENDIX TABLE A.1**  
**ANNUAL INFLATION RATES**

REGION	INFLATION RATE BASED ON THE LASPEYRES PRICE INDEX							
	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
NCR	7.4	2.9	3.6	5.3	8.4	6.8	2.6	11.6
CAR	6.9	1.6	7.4	7.2	6.6	5.3	1.7	12.8
Ilocos Region	8.4	2.5	2.4	6.0	8.6	6.1	2.4	13.0
Cagayan Valley	8.4	1.9	2.3	4.0	6.3	5.8	2.3	16.0
Central Luzon	7.0	1.8	3.0	6.4	6.6	5.7	2.5	22.4
CALABARZON	9.4	2.7	2.7	5.3	6.5	5.8	2.4	13.2
MIMAROPA	8.9	2.2	2.1	4.0	6.9	5.5	3.0	16.3
Bicol Region	7.1	2.9	3.1	6.2	6.2	5.3	3.1	16.2
Western Visayas	6.8	2.7	4.1	4.8	7.0	4.3	2.7	16.8
Central Visayas	8.9	4.3	5.6	5.2	6.1	5.5	2.2	15.6
Eastern Visayas	7.6	2.8	2.6	4.7	5.6	5.5	2.7	18.4
Zamboanga Peninsula	6.0	2.6	1.7	6.0	7.4	6.0	3.1	24.4
Northern Mindanao	7.9	2.9	3.4	6.3	7.0	6.0	3.5	17.6
Davao Region	7.1	3.5	2.5	7.7	8.1	5.6	2.7	15.8
Soccsksargen	6.1	2.8	3.0	6.2	6.2	5.0	3.2	17.9
Caraga	7.6	2.4	3.0	6.0	7.6	5.6	2.2	22.6
ARMM	8.5	3.5	2.9	5.7	8.7	8.5	4.8	17.7
Philippines	7.8	2.7	3.3	5.6	7.2	5.9	2.6	15.6

NCR = National Capital Region; CAR = Cordillera Autonomous Region; ARMM = Autonomous Region of Muslim Mindanao.  
 Source: Author's calculations.

APPENDIX TABLE A.1. *CONTINUED.*

REGION	INFLATION RATE FACED BY THE POOR BASED ON THE PRICE INDEX FOR THE POOR (HEADCOUNT RATIO)							
	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
NCR	6.4	2.5	3.7	5.2	8.1	6.6	2.9	16.0
CAR	5.9	0.6	5.8	6.4	7.2	5.4	1.7	17.1
Ilocos Region	7.6	2.5	2.0	5.6	8.9	5.9	2.4	16.1
Cagayan Valley	7.3	2.0	2.6	4.0	6.8	6.3	2.3	18.8
Central Luzon	5.9	1.5	2.6	6.2	6.5	5.9	2.6	24.4
CALABARZON	7.6	2.3	2.6	4.9	6.1	5.8	2.6	18.2
MIMAROPA	8.1	2.0	1.8	3.5	7.4	6.0	3.3	18.5
Bicol Region	6.0	2.7	2.9	6.2	6.3	5.5	3.5	20.1
Western Visayas	6.0	2.4	3.0	4.2	7.6	4.6	3.0	19.4
Central Visayas	7.4	4.6	5.4	5.7	6.5	6.2	2.3	18.7
Eastern Visayas	6.7	2.7	2.5	4.9	6.3	6.2	3.0	22.4
Zamboanga Peninsula	4.8	3.1	1.5	5.9	7.2	5.9	3.3	27.7
Northern Mindanao	6.1	2.7	3.6	7.3	7.0	6.3	3.8	20.4
Davao Region	5.4	3.4	2.7	8.4	7.8	5.8	3.2	19.2
Soccsksargen	4.7	2.8	3.0	6.7	6.5	5.1	3.7	19.8
Caraga	5.9	2.6	2.9	6.8	8.2	5.8	2.1	25.1
ARMM	8.2	3.5	2.9	6.0	9.0	8.5	4.8	17.9
Philippines	6.5	2.6	3.0	5.6	7.1	5.9	3.0	20.0

NCR = National Capital Region; CAR = Cordillera Autonomous Region; ARMM = Autonomous Region of Muslim Mindanao.  
Source: Author's calculations.

APPENDIX TABLE A.1. *CONTINUED.*

REGION	INFLATION RATE FACED BY THE POOR BASED ON THE PRICE INDEX FOR THE POOR (POVERTY GAP RATIO)							
	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
NCR	6.4	2.4	3.7	5.2	8.0	6.4	2.9	16.4
CAR	5.9	0.3	5.9	6.2	7.4	5.7	1.7	18.2
Ilocos Region	7.5	2.4	2.0	5.5	9.1	5.9	2.4	16.8
Cagayan Valley	7.4	2.0	2.7	3.8	6.8	6.4	2.2	18.9
Central Luzon	5.7	1.6	2.7	6.0	6.5	5.8	2.7	25.1
CALABARZON	7.4	2.3	2.6	4.7	6.0	5.8	2.7	18.7
MIMAROPA	8.4	1.8	1.7	3.3	7.7	6.2	3.5	19.4
Bicol Region	5.9	2.4	2.8	6.0	6.2	5.6	3.5	20.9
Western Visayas	6.0	2.2	2.7	3.9	7.6	4.6	3.1	19.8
Central Visayas	7.4	4.5	5.2	6.1	6.7	6.3	2.5	20.1
Eastern Visayas	6.4	2.7	2.4	4.9	6.5	6.3	3.0	22.6
Zamboanga Peninsula	4.1	3.4	1.2	5.8	7.1	5.9	3.5	28.8
Northern Mindanao	5.9	2.5	3.5	7.8	7.1	6.6	3.9	19.6
Davao Region	4.9	3.3	2.8	8.7	7.6	5.9	3.3	20.1
Soccsksargen	4.4	2.8	2.9	6.8	6.5	5.1	3.9	20.0
Caraga	5.4	2.5	2.9	7.2	8.3	5.9	2.2	25.3
ARMM	8.0	3.5	2.8	6.0	8.9	8.6	4.8	18.1
Philippines	6.3	2.7	2.9	5.7	7.1	6.1	3.2	20.7

NCR = National Capital Region; CAR = Cordillera Autonomous Region; ARMM = Autonomous Region of Muslim Mindanao.

Source: Author's calculations.

**APPENDIX TABLE A.1.** *CONTINUED.*

REGION	INFLATION RATE FACED BY THE POOR BASED ON THE PRICE INDEX FOR THE POOR (SEVERITY OF POVERTY)							
	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
NCR	6.2	2.4	3.6	5.2	7.9	6.3	2.9	16.8
CAR	5.8	0.3	5.8	6.1	7.4	5.7	1.7	18.6
Ilocos Region	7.4	2.4	1.9	5.4	9.2	5.9	2.4	17.2
Cagayan Valley	7.3	2.0	2.8	3.8	6.9	6.5	2.2	19.1
Central Luzon	5.6	1.6	2.8	5.9	6.4	5.8	2.7	25.5
CALABARZON	7.2	2.3	2.7	4.6	6.0	5.8	2.7	19.2
MIMAROPA	8.5	1.7	1.6	3.2	7.8	6.3	3.6	20.0
Bicol Region	5.8	2.3	2.8	6.0	6.2	5.5	3.6	21.3
Western Visayas	6.0	2.2	2.5	3.9	7.6	4.5	3.1	19.9
Central Visayas	7.3	4.4	5.1	6.4	6.8	6.4	2.5	20.7
Eastern Visayas	6.3	2.7	2.3	4.9	6.6	6.3	3.0	22.6
Zamboanga Peninsula	3.9	3.5	1.1	5.7	6.9	5.9	3.5	28.7
Northern Mindanao	5.8	2.4	3.5	8.1	7.1	6.7	4.0	19.4
Davao Region	4.7	3.2	2.8	8.9	7.5	6.1	3.3	20.4
Soccsksargen	4.1	2.8	2.9	6.9	6.5	5.1	4.0	20.2
Caraga	5.1	2.4	2.9	7.3	8.3	6.0	2.2	25.1
ARMM	8.0	3.5	2.8	6.0	8.9	8.6	4.8	18.2
Philippines	6.2	2.7	2.9	5.8	7.1	6.2	3.3	21.1

NCR = National Capital Region; CAR = Cordillera Autonomous Region; ARMM = Autonomous Region of Muslim Mindanao.  
Source: Author's calculations.

**APPENDIX TABLE A.2**  
**ANNUAL FOOD INFLATION RATES**

REGION	FOOD INFLATION RATE BASED ON THE LASPEYRES PRICE INDEX							
	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
NCR	5.0	0.9	2.7	6.1	4.8	5.8	3.3	20.3
CAR	4.1	0.2	2.8	7.0	7.5	4.5	1.5	21.4
Ilocos Region	6.6	3.7	0.4	7.0	9.1	4.3	2.5	17.9
Cagayan Valley	6.5	2.2	2.4	5.0	7.1	5.3	1.7	21.2
Central Luzon	5.0	1.6	1.4	7.3	6.6	5.4	2.8	22.1
CALABARZON	4.6	1.9	1.5	5.6	5.2	4.7	3.1	22.9
MIMAROPA	7.1	1.7	0.5	3.6	8.3	7.1	4.3	23.3
Bicol Region	4.5	2.7	1.7	6.4	6.2	5.3	4.2	27.2
Western Visayas	4.2	2.2	1.3	4.4	8.1	5.0	3.6	23.0
Central Visayas	5.0	5.1	6.9	6.6	7.5	6.7	2.2	20.8
Eastern Visayas	5.0	2.9	1.4	5.5	7.3	6.6	3.7	27.1
Zamboanga Peninsula	2.3	3.8	1.6	7.3	7.7	5.9	4.4	36.5
Northern Mindanao	4.0	2.8	2.6	8.0	7.3	6.6	4.5	26.1
Davao Region	2.8	3.7	2.5	10.5	8.1	4.7	3.9	24.9
Soccsksargen	2.3	3.0	2.8	8.4	7.1	5.2	4.4	22.7
Caraga	3.6	2.5	2.5	8.8	8.5	5.9	2.0	33.4
ARMM	5.6	3.4	2.5	7.4	9.7	9.4	5.6	21.3
Philippines	4.7	2.2	2.3	6.5	6.6	5.6	3.3	22.8

NCR = National Capital Region; CAR = Cordillera Autonomous Region; ARMM = Autonomous Region of Muslim Mindanao.

Source: Author's calculations.

APPENDIX TABLE A.2. *CONTINUED.*

REGION	FOOD INFLATION RATE FACED BY THE POOR BASED ON THE PRICE INDEX FOR THE POOR (HEADCOUNT RATIO)							
	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
NCR	4.5	0.9	2.7	5.5	4.6	5.6	3.4	22.0
CAR	3.8	-0.4	3.2	5.9	7.7	4.5	1.5	21.5
Ilocos Region	6.0	3.2	0.5	6.0	9.4	4.3	2.4	18.8
Cagayan Valley	5.9	2.2	2.5	4.3	7.2	5.6	1.7	21.3
Central Luzon	4.6	1.5	1.4	6.7	6.3	5.1	2.8	22.5
CALABARZON	4.3	1.7	1.6	4.8	4.9	4.7	3.1	24.1
MIMAROPA	7.4	1.4	0.4	3.0	8.6	7.1	4.4	23.2
Bicol Region	4.1	2.5	1.7	6.1	6.1	5.3	4.3	28.2
Western Visayas	3.9	2.0	1.1	3.6	8.5	4.9	3.7	23.2
Central Visayas	5.0	5.0	6.4	6.7	7.4	6.6	2.3	22.3
Eastern Visayas	4.9	2.9	1.3	5.2	7.5	6.5	3.7	28.1
Zamboanga Peninsula	1.9	4.1	1.1	6.9	7.2	5.7	4.4	35.9
Northern Mindanao	3.6	2.6	2.8	8.4	7.1	6.7	4.6	25.0
Davao Region	2.1	3.7	2.7	10.6	7.4	5.3	4.1	25.3
Soccsksargen	1.8	3.0	2.8	8.3	7.0	5.1	4.7	22.2
Caraga	2.8	2.8	2.4	8.9	8.6	5.6	2.1	31.7
ARMM	5.5	3.3	2.5	7.5	9.7	9.3	5.6	21.1
Philippines	4.3	2.6	2.2	6.2	7.1	5.7	3.5	24.3

NCR = National Capital Region; CAR = Cordillera Autonomous Region; ARMM = Autonomous Region of Muslim Mindanao.  
Source: Author's calculations.

APPENDIX TABLE A.2. *CONTINUED.*

REGION	FOOD INFLATION RATE FACED BY THE POOR BASED ON THE PRICE INDEX FOR THE POOR (POVERTY GAP RATIO)							
	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
NCR	4.3	0.8	2.7	5.6	4.7	5.3	3.4	23.2
CAR	3.8	-0.5	3.3	5.5	7.8	4.6	1.4	21.7
Ilocos Region	5.8	3.0	0.5	5.6	9.6	4.3	2.4	18.8
Cagayan Valley	5.9	2.2	2.5	3.9	7.3	5.8	1.7	21.1
Central Luzon	4.4	1.5	1.4	6.4	6.2	5.0	2.9	22.8
CALABARZON	4.0	1.8	1.6	4.4	4.8	4.7	3.1	24.3
MIMAROPA	7.6	1.3	0.3	2.7	8.8	7.1	4.5	23.4
Bicol Region	4.0	2.3	1.7	5.8	6.0	5.3	4.3	28.6
Western Visayas	4.0	2.0	1.0	3.4	8.4	4.7	3.8	22.7
Central Visayas	5.0	4.9	6.0	7.3	7.5	6.5	2.5	23.5
Eastern Visayas	4.7	2.8	1.2	5.0	7.6	6.5	3.7	27.2
Zamboanga Peninsula	1.5	4.2	0.7	6.5	6.8	5.5	4.4	34.3
Northern Mindanao	3.2	2.4	2.7	9.0	7.0	7.0	4.7	23.0
Davao Region	1.8	3.6	2.7	10.7	7.1	5.5	4.1	25.5
Soccsksargen	1.4	3.0	2.7	8.3	6.9	5.1	4.9	22.0
Caraga	2.1	2.6	2.4	9.2	8.6	5.7	2.2	31.0
ARMM	5.3	3.2	2.3	7.5	9.7	9.3	5.5	21.0
Philippines	4.1	2.7	2.2	6.3	7.3	5.9	3.7	24.7

NCR = National Capital Region; CAR = Cordillera Autonomous Region; ARMM = Autonomous Region of Muslim Mindanao.

Source: Author's calculations.



**APPENDIX TABLE A.2.** *CONTINUED.*

REGION	FOOD INFLATION RATE FACED BY THE POOR BASED ON THE PRICE INDEX FOR THE POOR (SEVERITY OF POVERTY)							
	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
NCR	4.1	0.7	2.6	5.6	4.6	5.2	3.3	23.7
CAR	3.7	-0.6	3.3	5.4	7.9	4.6	1.4	21.8
Ilocos Region	5.6	2.9	0.4	5.4	9.7	4.3	2.3	18.8
Cagayan Valley	5.9	2.3	2.6	3.8	7.3	5.8	1.7	21.1
Central Luzon	4.3	1.5	1.3	6.2	6.1	5.0	2.9	22.9
CALABARZON	3.9	1.7	1.7	4.1	4.6	4.7	3.2	24.5
MIMAROPA	7.6	1.2	0.2	2.5	8.9	7.1	4.5	23.7
Bicol Region	4.1	2.1	1.7	5.8	6.0	5.3	4.4	28.6
Western Visayas	4.1	1.9	1.0	3.3	8.2	4.6	3.8	22.5
Central Visayas	5.0	4.7	5.9	7.7	7.6	6.4	2.6	24.0
Eastern Visayas	4.5	2.7	1.2	4.9	7.6	6.5	3.7	26.9
Zamboanga Peninsula	1.3	4.3	0.5	6.2	6.6	5.3	4.3	33.4
Northern Mindanao	3.0	2.3	2.7	9.3	7.0	7.1	4.8	22.1
Davao Region	1.6	3.6	2.8	10.9	6.8	5.7	4.1	25.4
Soccsksargen	1.3	3.0	2.7	8.4	6.9	5.1	5.0	22.0
Caraga	1.7	2.5	2.5	9.3	8.6	5.8	2.3	30.4
ARMM	5.3	3.2	2.3	7.4	9.7	9.3	5.5	20.9
Philippines	4.0	2.8	2.2	6.3	7.3	6.0	3.8	24.9

NCR = National Capital Region; CAR = Cordillera Autonomous Region; ARMM = Autonomous Region of Muslim Mindanao.  
Source: Author's calculations.

**APPENDIX TABLE A.3**  
**ANNUAL RICE INFLATION RATES**

REGION	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
NCR	0.1	1.2	2.0	0.3	4.0	1.8	4.3	36.8
CAR	2.3	-1.9	4.4	1.0	9.0	4.8	2.3	24.7
Ilocos Region	2.8	0.3	1.6	1.7	12.2	4.1	1.9	19.8
Cagayan Valley	2.6	3.4	3.4	-0.5	8.4	6.8	2.3	14.8
Central Luzon	0.7	1.1	1.5	1.8	4.0	3.4	4.1	23.4
CALABARZON	0.9	1.3	2.0	0.5	2.5	3.9	3.1	28.9
MIMAROPA	9.4	-0.6	0.1	-0.6	11.4	5.7	5.0	21.0
Bicol Region	1.8	0.4	1.6	2.0	6.2	5.7	4.0	38.6
Western Visayas	1.6	1.2	0.6	0.0	11.5	2.6	3.5	17.2
Central Visayas	0.4	4.4	6.4	3.8	5.2	4.6	0.3	8.3
Eastern Visayas	3.0	3.1	0.6	3.6	9.0	5.9	3.6	25.7
Zamboanga Peninsula	0.2	2.0	0.2	6.9	7.5	3.8	3.9	19.9
Northern Mindanao	-0.5	3.3	3.8	7.2	6.6	2.1	3.4	11.5
Davao Region	0.9	4.1	1.2	7.1	9.0	2.7	2.8	18.7
Soccsksargen	0.1	4.1	2.1	6.2	6.8	2.4	5.6	12.0
Caraga	-1.9	7.3	1.8	8.1	9.4	2.6	2.1	14.4
ARMM	1.0	1.1	0.4	9.7	9.7	5.4	3.6	15.1
Philippines	1.3	1.8	1.9	2.5	6.8	3.8	3.4	22.9

NCR = National Capital Region; CAR = Cordillera Autonomous Region; ARMM = Autonomous Region of Muslim Mindanao.

Source: Author's calculations.

**APPENDIX TABLE A.4**  
**PERCENTAGE CONTRIBUTION OF FOOD TO TOTAL INFLATION RATE**

REGION	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
NCR	24.9	11.0	28.8	42.0	21.7	33.8	48.2	64.9
CAR	24.8	4.8	15.8	40.6	46.9	36.6	38.4	67.5
Ilocos Region	36.1	68.5	6.4	53.1	49.1	33.5	46.3	66.1
Cagayan Valley	34.4	49.1	44.8	56.8	51.7	42.6	32.8	62.6
Central Luzon	31.1	36.7	20.8	50.2	45.2	43.3	47.6	42.6
CALABARZON	19.7	27.2	23.0	42.1	32.4	34.1	51.9	69.6
MIMAROPA	34.3	32.7	11.0	39.4	52.5	56.6	61.9	63.3
Bicol Region	28.3	41.9	25.0	45.9	44.5	45.1	59.5	74.9
Western Visayas	25.9	33.2	13.0	39.3	49.6	49.7	55.3	57.9
Central Visayas	24.5	50.9	54.4	55.5	54.3	54.0	44.3	60.0
Eastern Visayas	29.7	46.5	24.9	52.6	59.6	55.1	61.8	68.8
Zamboanga Peninsula	17.6	64.0	42.0	55.2	47.7	46.3	64.9	68.3
Northern Mindanao	21.6	39.8	32.0	53.3	44.3	48.6	55.0	62.5
Davao Region	17.2	44.6	42.1	58.6	43.8	38.6	62.7	69.3
Soccsksargen	17.5	48.3	43.1	61.5	53.3	50.4	63.9	58.9
Caraga	21.8	47.5	38.3	65.6	51.4	49.3	42.5	67.8
ARMM	33.4	47.9	43.5	65.5	57.0	56.5	58.5	61.6
Philippines	25.3	33.3	28.7	48.1	38.9	40.9	51.9	61.9

NCR = National Capital Region; CAR = Cordillera Autonomous Region; ARMM = Autonomous Region of Muslim Mindanao.

Source: Author's calculations.

**APPENDIX TABLE A.5**  
**PRICE ELASTICITY OF POVERTY FOR RICE**

REGION	PRICE ELASTICITY WITH RESPECT TO				ADDITIONAL NUMBER OF POOR DUE TO 10% INCREASE IN PRICE (IN MILLIONS)
	AVERAGE STANDARD OF LIVING	HEADCOUNT	POVERTY GAP RATIO	SEVERITY OF POVERTY	
NCR	-0.04	0.46	0.58	0.68	0.02
CAR	-0.09	0.55	1.02	1.25	0.01
Ilocos Region	-0.11	0.60	1.01	1.30	0.04
Cagayan Valley	-0.10	0.40	0.70	0.92	0.03
Central Luzon	-0.07	0.44	0.70	0.89	0.06
CALABARZON	-0.06	0.38	0.62	0.80	0.06
MIMAROPA	-0.13	0.35	0.71	0.92	0.04
Bicol Region	-0.11	0.25	0.48	0.65	0.06
Western Visayas	-0.12	0.47	0.82	1.06	0.08
Central Visayas	-0.07	0.18	0.23	0.25	0.04
Eastern Visayas	-0.14	0.35	0.67	0.92	0.06
Zamboanga Peninsula	-0.09	0.13	0.20	0.23	0.02
Northern Mindanao	-0.08	0.21	0.25	0.26	0.02
Davao Region	-0.08	0.21	0.34	0.39	0.02
Soccsksargen	-0.12	0.41	0.66	0.81	0.04
Caraga	-0.12	0.36	0.58	0.71	0.03
ARMM	-0.17	0.23	0.46	0.63	0.04
Philippines	-0.08	0.32	0.51	0.62	0.66

NCR = National Capital Region; CAR = Cordillera Autonomous Region; ARMM = Autonomous Region of Muslim Mindanao.

Source: Author's calculations.

**APPENDIX TABLE A.6**  
**PERCENTAGE CHANGE IN AVERAGE STANDARD OF LIVING DUE TO PRICE CHANGES**

DUE TO ALL PRICE CHANGES								
REGION	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
NCR	-7.41	-2.89	-3.44	-5.36	-7.91	-6.38	-2.51	-11.69
CAR	-6.90	-1.55	-7.40	-7.06	-6.63	-5.05	-1.65	-12.76
Ilocos Region	-8.43	-2.48	-2.50	-6.00	-8.52	-5.84	-2.36	-12.56
Cagayan Valley	-8.42	-1.95	-2.34	-4.02	-6.16	-5.61	-2.30	-15.28
Central Luzon	-7.02	-1.88	-2.99	-6.28	-6.30	-5.38	-2.51	-22.44
CALABARZON	-9.38	-2.72	-2.67	-5.26	-6.24	-5.58	-2.38	-13.20
MIMAROPA	-8.91	-2.25	-2.07	-3.93	-6.85	-5.40	-3.01	-15.85
Bicol Region	-7.08	-2.86	-3.05	-6.14	-6.09	-5.19	-3.15	-16.28
Western Visayas	-6.84	-2.74	-4.07	-4.69	-6.96	-4.21	-2.72	-16.45
Central Visayas	-8.94	-4.35	-5.58	-5.22	-5.98	-5.38	-2.14	-14.73
Eastern Visayas	-7.62	-2.79	-2.57	-4.67	-5.52	-5.40	-2.67	-17.63
Zamboanga Peninsula	-5.97	-2.71	-1.72	-5.93	-7.21	-5.69	-3.04	-23.48
Northern Mindanao	-7.90	-2.94	-3.46	-6.32	-6.90	-5.74	-3.39	-17.03
Davao Region	-7.08	-3.53	-2.54	-7.79	-8.00	-5.28	-2.69	-15.30
Soccsksargen	-6.10	-2.86	-2.99	-6.31	-6.16	-4.78	-3.20	-17.43
Caraga	-7.61	-2.46	-2.98	-6.13	-7.56	-5.44	-2.19	-22.18
ARMM	-8.54	-3.52	-2.88	-5.84	-8.61	-8.35	-4.74	-17.10
Philippines	-7.80	-2.76	-3.24	-5.60	-6.98	-5.67	-2.61	-15.26
DUE TO FOOD PRICE CHANGES								
REGION	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
NCR	-1.85	-0.32	-0.99	-2.25	-1.71	-2.16	-1.21	-7.58
CAR	-1.71	-0.07	-1.17	-2.86	-3.11	-1.85	-0.63	-8.62
Ilocos Region	-3.04	-1.70	-0.16	-3.18	-4.18	-1.96	-1.09	-8.30
Cagayan Valley	-2.89	-0.96	-1.05	-2.28	-3.19	-2.39	-0.75	-9.57
Central Luzon	-2.18	-0.69	-0.62	-3.15	-2.85	-2.33	-1.19	-9.56
CALABARZON	-1.84	-0.74	-0.61	-2.21	-2.02	-1.90	-1.23	-9.18
MIMAROPA	-3.06	-0.73	-0.23	-1.55	-3.60	-3.06	-1.86	-10.03
Bicol Region	-2.00	-1.20	-0.76	-2.82	-2.71	-2.34	-1.87	-12.19
Western Visayas	-1.78	-0.91	-0.53	-1.84	-3.45	-2.09	-1.51	-9.53
Central Visayas	-2.19	-2.21	-3.03	-2.90	-3.25	-2.91	-0.95	-8.84
Eastern Visayas	-2.27	-1.29	-0.64	-2.46	-3.29	-2.97	-1.65	-12.12
Zamboanga Peninsula	-1.05	-1.73	-0.72	-3.27	-3.44	-2.63	-1.97	-16.04
Northern Mindanao	-1.70	-1.17	-1.11	-3.37	-3.06	-2.79	-1.86	-10.65
Davao Region	-1.21	-1.58	-1.07	-4.56	-3.50	-2.04	-1.69	-10.60
Soccsksargen	-1.07	-1.38	-1.29	-3.88	-3.29	-2.41	-2.04	-10.26
Caraga	-1.66	-1.17	-1.14	-4.02	-3.88	-2.68	-0.93	-15.04
ARMM	-2.85	-1.68	-1.25	-3.83	-4.91	-4.72	-2.77	-10.54
Philippines	-1.97	-0.92	-0.93	-2.69	-2.72	-2.32	-1.35	-9.45

NCR = National Capital Region; CAR = Cordillera Autonomous Region; ARMM = Autonomous Region of Muslim Mindanao.  
Source: Author's calculations.

**APPENDIX TABLE A.7**  
**PERCENTAGE CHANGE IN THE HEADCOUNT RATIO DUE TO PRICE CHANGES**

DUE TO ALL PRICE CHANGES								
REGION	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
NCR	28.14	10.47	15.47	23.00	32.78	27.15	12.38	70.59
CAR	15.84	1.54	15.36	16.66	19.12	13.82	4.46	44.18
Ilocos Region	23.01	7.49	6.38	16.88	26.89	17.09	7.06	46.82
Cagayan Valley	16.36	4.43	5.97	8.92	15.15	13.74	5.07	40.40
Central Luzon	18.06	4.71	7.98	18.53	19.12	16.75	8.00	72.86
CALABARZON	20.05	6.01	6.67	12.75	15.47	14.54	6.93	47.02
MIMAROPA	13.46	3.37	3.01	5.65	12.17	9.79	5.51	29.75
Bicol Region	8.58	3.81	4.07	8.73	8.88	7.73	5.03	28.95
Western Visayas	12.57	5.01	6.31	8.60	16.10	9.46	6.33	39.66
Central Visayas	11.36	7.05	8.38	8.75	9.82	9.29	3.39	27.11
Eastern Visayas	10.51	4.31	3.85	7.64	9.77	9.51	4.65	33.84
Zamboanga Peninsula	5.64	3.67	1.68	6.91	8.24	6.62	3.88	31.19
Northern Mindanao	10.08	4.43	5.92	12.06	11.44	10.19	6.16	32.36
Davao Region	9.91	6.37	4.97	15.67	14.22	10.34	5.82	34.30
Soccsksargen	10.38	6.12	6.45	14.82	14.04	10.74	8.16	42.17
Caraga	10.34	4.71	5.05	12.11	14.18	9.82	3.72	42.99
ARMM	9.57	4.08	3.35	7.08	10.33	9.79	5.57	20.23
Philippines	12.56	5.10	5.68	10.81	13.44	11.06	5.73	37.22
DUE TO FOOD PRICE CHANGES								
REGION	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
NCR	10.75	2.06	6.45	13.33	10.84	13.35	7.99	54.02
CAR	5.89	-0.55	4.89	8.99	11.97	6.99	2.35	32.71
Ilocos Region	10.39	5.44	0.72	10.12	16.30	7.36	3.92	32.81
Cagayan Valley	7.87	2.89	3.27	5.74	9.69	7.50	2.33	28.57
Central Luzon	8.07	2.73	2.40	11.72	10.99	8.97	4.99	39.77
CALABARZON	6.28	2.52	2.33	6.97	7.01	7.06	4.56	35.78
MIMAROPA	6.68	1.34	0.33	2.73	7.84	6.42	4.03	20.98
Bicol Region	3.36	2.06	1.37	4.97	5.04	4.43	3.57	23.62
Western Visayas	4.67	2.38	1.24	4.27	10.28	5.76	4.41	27.07
Central Visayas	4.57	4.57	5.90	6.22	6.76	5.97	2.06	19.85
Eastern Visayas	4.50	2.62	1.23	4.74	6.85	5.98	3.40	25.53
Zamboanga Peninsula	1.30	2.74	0.73	4.62	4.83	3.77	2.95	23.42
Northern Mindanao	3.45	2.51	2.70	8.21	6.82	6.48	4.39	23.45
Davao Region	2.28	3.94	2.90	11.45	8.00	5.76	4.36	26.81
Soccsksargen	2.28	3.93	3.54	10.81	9.07	6.64	6.13	28.23
Caraga	2.90	3.05	2.47	9.21	8.89	5.76	2.17	32.24
ARMM	3.47	2.05	1.53	4.79	6.11	5.78	3.43	13.01
Philippines	4.72	2.83	2.39	6.83	7.87	6.29	3.84	26.58

NCR = National Capital Region; CAR = Cordillera Autonomous Region; ARMM = Autonomous Region of Muslim Mindanao.

Source: Author's calculations.

**APPENDIX TABLE A.8**  
**PERCENTAGE CHANGE IN THE POVERTY GAP RATIO DUE TO PRICE CHANGES**

DUE TO ALL PRICE CHANGES								
REGION	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
NCR	29.98	11.19	16.63	24.73	35.17	28.41	13.48	78.74
CAR	24.38	1.36	24.48	25.25	30.60	22.32	6.93	72.49
Ilocos Region	32.34	10.51	8.90	23.51	39.26	24.35	9.99	69.81
Cagayan Valley	25.71	6.86	9.53	13.34	23.63	21.61	7.74	62.97
Central Luzon	23.49	6.59	11.17	24.13	25.32	22.40	11.05	100.33
CALABARZON	25.82	8.04	9.04	16.08	20.22	19.28	9.38	64.37
MIMAROPA	23.52	5.13	4.63	9.16	21.56	17.06	9.81	52.80
Bicol Region	13.62	5.60	6.43	13.76	14.18	12.57	8.22	48.89
Western Visayas	19.28	7.19	8.49	12.52	24.85	14.48	9.97	61.97
Central Visayas	16.37	9.96	11.62	13.77	14.69	13.73	5.28	42.31
Eastern Visayas	16.78	7.15	6.15	12.69	16.89	16.13	7.95	57.15
Zamboanga Peninsula	7.75	6.53	2.19	10.88	12.94	10.60	6.49	51.71
Northern Mindanao	15.63	6.67	9.34	20.75	18.28	16.99	10.19	49.55
Davao Region	14.30	9.65	8.10	25.67	21.91	16.69	9.53	56.45
Soccsksargen	13.45	8.67	8.96	21.19	19.88	15.18	12.01	60.22
Caraga	15.43	7.50	8.40	21.07	23.63	16.61	6.37	71.29
ARMM	15.94	6.81	5.49	12.22	17.54	16.74	9.44	34.75
Philippines	17.38	7.41	7.87	15.60	19.29	16.13	8.63	55.08
DUE TO FOOD PRICE CHANGES								
REGION	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
NCR	11.18	1.97	6.85	14.68	11.86	13.77	8.68	61.81
CAR	9.30	-1.34	8.15	13.36	19.34	11.23	3.69	52.90
Ilocos Region	14.80	7.64	1.15	14.25	24.77	10.95	5.71	48.96
Cagayan Valley	12.55	4.68	5.34	8.39	15.54	12.30	3.70	45.15
Central Luzon	10.53	3.69	3.24	15.17	14.68	12.02	6.94	54.81
CALABARZON	8.08	3.52	3.28	8.62	9.26	9.49	6.25	48.91
MIMAROPA	12.50	2.17	0.44	4.40	14.63	11.72	7.47	38.55
Bicol Region	5.67	3.15	2.33	8.07	8.42	7.53	6.09	40.57
Western Visayas	7.85	3.82	2.03	6.52	16.59	9.11	7.34	43.42
Central Visayas	7.05	6.72	8.45	10.38	10.49	8.95	3.48	32.07
Eastern Visayas	7.59	4.52	2.00	8.15	12.35	10.60	6.00	44.05
Zamboanga Peninsula	1.85	5.11	0.81	7.73	8.15	6.46	5.20	39.90
Northern Mindanao	5.16	3.90	4.49	14.88	11.42	11.41	7.64	36.35
Davao Region	3.30	6.48	4.99	19.53	12.74	10.03	7.37	45.17
Soccsksargen	2.74	5.76	5.07	15.93	13.23	9.72	9.37	41.12
Caraga	3.82	4.93	4.36	16.55	15.44	10.24	4.08	54.53
ARMM	6.06	3.58	2.61	8.69	11.08	10.43	6.15	23.37
Philippines	6.75	4.42	3.56	10.33	12.06	9.73	6.09	40.52

NCR = National Capital Region; CAR = Cordillera Autonomous Region; ARMM = Autonomous Region of Muslim Mindanao.  
Source: Author's calculations.

**APPENDIX TABLE A.9**  
**PERCENTAGE CHANGE IN THE SEVERITY OF POVERTY DUE TO PRICE CHANGES**

DUE TO ALL PRICE CHANGES								
REGION	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
NCR	31.59	11.93	17.72	26.70	37.57	30.35	14.56	87.83
CAR	27.72	1.14	27.54	28.36	35.21	25.73	7.90	84.16
Ilocos Region	37.56	12.15	10.08	27.38	46.90	28.66	11.64	84.33
Cagayan Valley	31.39	8.54	11.97	16.12	29.37	26.93	9.53	78.37
Central Luzon	26.50	7.67	13.03	27.53	29.09	25.85	13.01	117.92
CALABARZON	29.00	9.16	10.62	18.09	23.24	22.37	10.94	76.19
MIMAROPA	29.15	5.97	5.50	10.84	26.79	21.27	12.21	66.61
Bicol Region	17.42	6.95	8.21	17.57	18.12	16.17	10.69	64.13
Western Visayas	23.77	8.65	9.97	15.17	30.58	17.64	12.49	76.80
Central Visayas	19.68	11.93	13.85	17.50	18.16	16.79	6.67	53.15
Eastern Visayas	21.58	9.24	7.92	16.54	22.33	21.24	10.45	74.98
Zamboanga Peninsula	9.49	8.81	2.48	13.95	16.49	13.64	8.46	67.08
Northern Mindanao	18.42	7.84	11.37	26.08	22.28	21.01	12.59	59.28
Davao Region	16.28	11.21	9.80	30.92	25.48	20.20	11.41	67.73
Soccsksargen	15.38	10.41	10.76	25.87	23.89	18.32	14.74	73.03
Caraga	18.65	9.32	10.81	27.55	30.30	21.50	8.32	90.37
ARMM	21.50	9.21	7.36	16.37	23.62	22.67	12.75	47.12
Philippines	20.51	9.09	9.34	18.96	23.20	19.68	10.70	67.37
DUE TO FOOD PRICE CHANGES								
REGION	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
NCR	11.80	1.88	7.44	16.07	12.93	14.85	9.50	69.75
CAR	10.59	-1.77	9.53	15.00	22.40	12.97	4.23	61.11
Ilocos Region	17.35	8.86	1.26	16.59	30.18	13.21	6.75	59.40
Cagayan Valley	15.64	5.96	6.81	10.09	19.64	15.64	4.66	56.59
Central Luzon	12.06	4.29	3.75	17.34	17.02	13.97	8.25	65.02
CALABARZON	9.04	4.05	3.90	9.38	10.52	11.12	7.32	57.68
MIMAROPA	15.94	2.60	0.48	5.21	18.59	14.88	9.49	49.25
Bicol Region	7.49	3.93	3.06	10.51	10.98	9.88	8.08	53.55
Western Visayas	10.10	4.73	2.49	8.04	20.69	11.14	9.36	54.30
Central Visayas	8.77	8.18	10.24	13.58	13.23	10.99	4.55	40.90
Eastern Visayas	9.84	5.88	2.53	10.70	16.52	14.12	7.96	58.09
Zamboanga Peninsula	2.15	7.00	0.74	10.02	10.51	8.43	6.90	51.93
Northern Mindanao	6.05	4.68	5.59	19.08	14.20	14.43	9.65	43.56
Davao Region	3.60	7.73	6.14	23.83	14.86	12.45	8.92	54.43
Soccsksargen	3.04	7.02	6.23	19.80	16.18	11.96	11.68	50.61
Caraga	3.97	6.12	5.69	21.81	19.88	13.35	5.50	68.98
ARMM	8.31	4.90	3.52	11.71	15.11	14.29	8.39	31.87
Philippines	8.08	5.58	4.39	12.84	14.87	12.18	7.72	50.20

NCR = National Capital Region; CAR = Cordillera Autonomous Region; ARMM = Autonomous Region of Muslim Mindanao.

Source: Author's calculations.



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## **About the Paper**

Hyun H. Son measures the impact of price changes on poverty using the Philippines as an example, and develops an empirically operational price index called the price index for the poor, which indicates whether the price changes hurt the poor relatively more than the nonpoor.

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