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DISAGGREGATED WELFARE EFFECTS OF AGRICULTURAL PRICE POLICIES IN URBAN INDONESIA

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Abstract

This paper presents a theoretically consistent methodology that could be used to measure changes in different income groups' welfare level caused by alternative price policies. The paper details the basic stages of the methodology: classification of households in income groups, estimation of demand systems for each income group, and measurement of welfare changes using compensating variation measures. The methodology was applied to data related to expenditure and socioeconomic characteristics of Indonesian Urban households. A simulation analysis measuring the welfare changes under different pricing scenarios showed that the welfare of the low-income households was affected most by increases in the prices of rice and fish.

Key Words
Methodology, Income Groups, Welfare, Pricing Policies.

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1. INTRODUCTION

Historically, the Government of Indonesia (GOI) has intervened both directly and indirectly to control and stabilize prices in food markets. It has intervened in rice markets directly by setting floor and ceiling prices and indirectly by subsidizing input prices. For example, the objective of Indonesian price policies in the 1960s and in the early 1970s was to maintain reasonable rice prices for urban consumers through ceiling prices below the level of world market prices. In the 1970s, this policy was gradually superseded by the government's promotion of rice production. The government intervened to increase domestic prices steadily relative to world prices. For corn, which is the main input used by the country's growing, modern poultry industry, the GOI intervened by investing resources in research (for nonrice staples and secondary crops), by maintaining floor prices for corn, and by subsidizing prices paid by feed mills (Timmer 1990). In addition, the GOI intervenes directly in wheat, soybean, soybean meal, and sugar markets, and by controlling import and export licensing influences peanut and mungbean markets (Tabor, et al. 1987).

These policies clearly reflect a development strategy based on capital-intensive urban rather than on employment-intensive rural development. One result of such policies is the extraction of economic surplus from agriculture for use in promoting growth in the urban sector (Pinstrup-Andersen 1985).

In recent years, the GOI, as have many other developing country governments, has cutback public expenditures to reduce the increasing fiscal deficit caused by its intervention policies. The partial or total elimination of input and food subsidies and increases in foodstuff prices included in the

reforms were price adjustments likely to have variable effects on consumers because behavioral parameters with respect to consumption are different across socio-economic classes. For example, changes in the prices of basic food commodities would especially affect low-income households because food, particularly basic commodities, represents a large budget share at low-income levels. Recent studies of the food situation in developing countries have demonstrated convincingly that income distribution, as well as relative prices, play a crucial role in determining food consumption, as well as related levels of hunger and malnutrition (Pinstrup-Andersen 1988; Pinstrup-Andersen, Londono, and Hoover 1976; Pinstrup-Andersen and Caicedo 1978; Pinstrup-Andersen and Alderman 1988; Alderman and Timmer 1980; Kennes 1983).

The price effects of changes in food and agricultural policies have brought the need for consistent methodologies not only to monitor the disaggregated welfare effects of such adjustments but also to cope with the possible need for compensation schemes that are sound in fiscal terms and considerate of (effective in their impact on) the poor. Unfortunately, such methodologies are not generally used.

Traditional welfare analysis of price policy changes usually considers all consumers as a group and uses the notion of consumer surplus (an exact measure of consumer welfare only in restrictive instances). This approach provides a quite general measure of the change in welfare because it does not show how the welfare levels of specific groups of consumers are affected. Focusing on all consumers as a group is neither effective nor useful if policy makers are concerned with the effects of these adjustments on the well-being of specific target groups. Any generalization to these target groups that uses demand parameters estimated in aggregate could be erroneous and misleading.

The estimation of demand parameters plays a crucial role in developing consistent methodologies specific to targeted (income) groups. Estimation of demand systems for different socio-economic groups yields the appropriate parameters because it is difficult to incorporate income distributional effects into demand analysis and because unbiased and consistent structural demand parameters are needed for groups following different underlying behaviors. When behaviors differ by income levels, the effects of income distribution can be represented by subdividing consumers into income or socio-economic groups and modeling the behaviors of these groups separately (Pollak and Wales 1981; Ray 1980; Ray 1982; and Jarque 1987). Specific demand parameters of an income group that are estimated in this way can be used to evaluate accurately the effects of alternative price policies on the well-being of the different groups, to design specific target group compensation schemes (such as a food price subsidy or food assistance), and to design policies improving the nutrition of deficient groups (Pinstrup-Andersen 1988; Pinstrup-Andersenm, Londono, and Hoover 1976; Pinstrup-Andersen and Caicedo 1978; Pinstrup-Andersen and Alderman 1988; Alderman and Timmer 1980; Kennes 1983; and Timmer 1981). In sum, consistent methodologies for assessing policy effects on consumers should include classification of the population into appropriate income classes, estimation of demand parameters for each income class, and welfare analysis based on estimated behavioral parameters.

The general objective of this paper is to present a theoretically sound methodology that could be used to measure welfare-level changes experienced by and caused by the adoption of alternative food-price policies. Such a methodology could also be applied to an analysis of agricultural production changes. This paper has three specific objectives: 1) to develop a

methodology classifying households by income groups; 2) to analyze expenditure patterns for different income groups; and 3) to evaluate specific welfare effects of selected price policies on different income groups.

The paper is organized as follows. The next section discusses data issues and the methodology used to classify households by income groups. An analysis of consumption patterns for these specified income groups is presented. Section 3 reviews some of the new developments in duality theory and the extension to welfare analysis. Section 4 simulates price policies to evaluate the different welfare effects of alternative price scenarios. Section 5 discusses the policy implications of these simulations. Section 6 concludes the study.

2. THE DATA AND CLASSIFICATION OF HOUSEHOLDS IN INCOME GROUPS

Data Issues

Data from the National Social and Economic Surveys (SUSENAS) of households in Indonesia were used in this study. The government of Indonesia periodically conducts these surveys to collect data related to expenditure and socioeconomic characteristics of Indonesian households. The surveys from 1981, 1984 and 1987 provide the data basic for this study.

SUSENAS uses a proportional random sample of households within a primary sampling unit (PSU), which is a subunit of census area segments, to represent the probability of selection. The selection of PSU's for these surveys was based upon a stratified sample design established for the Indonesian Census. To make the summary data more manageable for analysis, the information on individual households was aggregated within each PSU to obtain a "representative" household. Because the SUSENAS surveys in 1984 and 1987 were

taken in spring only, subround one (Spring) from SUSENAS 1981 was used to avoid possible seasonal bias.

The resulting data set constituted the main source of information for the study. Because it was not possible to obtain individual household level information, an "average" or representative household per PSU was constructed by dividing the aggregate levels of some selected variables (demographic and total expenditures) by the number of households in that PSU. These representative "average" households per PSU were the units of observation for this study and are hereafter referred to as "households".

Only the observations belonging to the urban regions, both on and off Java, were analyzed, because we would have needed more detailed information than was available, had we wanted to repeat this exercise for the rural population (e.g., agricultural production activities). In total, there were 3705 observations for the urban population, on and off Java for the three time periods.

Classification of households by income groups

Households were classified by income groups by establishing boundaries for these groups in terms of household income. Differences in household behavior as expressed by differences in household characteristics in the acquisition of goods was the fundamental criterion behind this approach. Households showing similar consumption behaviors were classified as belonging to the same income group.

Heteroskedasticity problems are common when cross-sectional data are used in the estimation of income based parameters (e.g., Engel relations.) Particularly, for low-income households, food expenditures are almost completely explained by income. For high-income households, food expenditures

also depend upon other factors such as household demographic characteristics and geographic location, etc. For these households, the part of expenditure not explained by income is more likely to vary. In other words, the values of the disturbances are likely to be small for low-income households and large for high-income households.

The method for classifying households into income groups therefore is based on an analysis of homogeneity of variances of residuals from Engel regressions. The procedure has two basic steps: estimation of Engel relations and tests for homoskedasticity of variances.

Estimation of Engel Relations. The objective of the estimation was to identify groups of residuals of sample observations having different variances. To achieve this objective, a number of substeps were followed. First, an Engel function of the form

$$E_i = \alpha_{i0}\,\text{REGION} + \alpha_{i1}\,\text{AS1} + \alpha_{i2}\,\text{AS2} + \alpha_{i3}\,\text{AS3} + \alpha_{i4}\,\text{AS4} + \alpha_{i5}\,\text{AS5} + \alpha_{i6}\,\text{AS6} + \alpha_{i7}\,\text{TOTEXP} + \mu_i \qquad (1)$$

i = foods, non foods, fish, fruits, vegetables, eggs

$\mu_i \sim \text{iid}\ (0, \nu_i^2)$

was estimated for years 1981, 1984, and 1987, independently, where E_i is expenditures in commodity group i; REGION is a dummy variable (Java = 1, Off Java = 0); AS1 is the average number of children 1-5 years of age, per household; AS2 is the average number of children 5-10 years of age, per household; AS3 is the average number of males 10-20 years of age, per household; AS4 is the average number of females 10-20 years of age, per household; AS5 is the average number of males 20 years and older, per

household; AS6 is the average number of females 20 years and older, per household; and TOTEXP is the total expenditure, per household.

Next, for each regression, these parameter estimates were used to get the corresponding residuals. Finally, the residuals were plotted against total expenditures. All groups of residuals having different variances were identified by visual inspection.

Tests for homoskedasticity of variances. The objective of the analysis of residuals from the Engel estimation was to perform successive Goldfeld-Quandt tests to classify households into groups having different variances. Classification of households into income groups was determined by setting successively aggregated corresponding income boundaries for groups of residuals.

The Goldfeld-Quandt test is based on the idea that if sample observations have been generated under the conditions of homoskedasticity, or if the null hypothesis

$$H_o : \sigma_1^2 = \sigma_2^2 = \ldots = \sigma_m^2 \qquad (m \leq n), \tag{2}$$

is true where n is the number of observations and m is the number of groups, then the variance of the disturbances of one part of the sample observations is the same as the variance of the disturbances of another part of the observations. Thus a test for homoskedasticity becomes simply a test for the equality of two variances. Moreover, because under H_o each sample variance has a chi-square distribution divided by the number of degrees of freedom, their ratio has an F distribution, provided the two sample variances are independent. The requirement that the two sample variances be independent

means that two separate regression equations must be estimated, one for each part of the sample observations. Then, the test statistic is

$$s_2^2 / s_1^2 \sim F(n_2 - 2, n_1 - 2), \quad (3)$$

where s_i^2 is the variance for sample i, and where n_i is the number of observations in sample i.

Equation (1) was estimated independently for each group of observations identified as having homogeneous variance, first evaluated by visual inspection and then by successive application of Goldfeld-Quandt tests. The tests were performed to see if the variances of the residuals of each adjacent pair of groups of observations were the same. If they were, then the observations in both groups were said to belong to the same income group. If they were not the same (i.e., statistically different at $\alpha = 0.5$), then the observations in each group were said to belong to different income groups.

Final boundaries were determined for every income group by repeating the Goldfeld-Quandt tests successively for smaller groups of observations around tentative boundary points. This process was repeated for each survey. Finally, income existed for every year. Final income groups were found by grouping the corresponding yearly income classes.

The 3705 observations for urban zones reported in the 1981, 1984, and 1987 SUSENAS surveys were distributed, following this methodology, into four income groups: low, medium-low, medium-high, and high.

Food participation rates

Participation rate, defined as percentage of sampled representative households report expenditures on food groups, assists in identifying the most

frequently accessed food groups by every income group. It is extremely important to understand the extent of the problem of zero expenditures for the subsequent econometric analysis and for effective policy formulation. Food-group participation rates for urban Indonesia all three years are presented in Table 1.

Table 1 shows that low-income households had low-participation rates in meats, dairy products and some palawija products, groups and that high-income groups showed high-participation rates for almost all commodity groups. Almost all income groups showed some expenditure on fruits, vegetables, fish, and palawija crops. Rice was consumed by nearly all households, regardless of income level.

3. ANALYTICAL FRAMEWORK

Some duality results

When consumer behavior is specified, the cost function is the solution to the dual problem

$$c(p,u^*) = \min \; p'q \qquad (4)$$
$$\text{s. t.} \quad u(q) = u^* ,$$

where $c(p,u^*)$ is the cost function. In this sense, the cost function gives the minimum cost of attaining u^* at prices $p_1,\ldots,p_n$.

The partial derivatives of the cost function with respect to prices are the Hicksian demand functions, i.e.,

$$\frac{\partial c\,(p,u^*)}{\partial p_i} = x_i\,(p_1,\ldots,p_n,u^*). \qquad (5)$$

This property is commonly known as **Shephard's lemma**.

Using Shephard's lemma, Marshallian demand functions can be obtained from the cost function by simple substitution:

$$q_i = x_i\,(p,u^*) = x_i\,[p,v(p,m)]$$
$$= q_i\,(p_1,\ldots,p_n,m). \tag{6}$$

Furthermore, the outlay in the primal problem must be the cost minimum in the dual problem:

$$c\,(p_1,\ldots,p_n,u^*) = m. \tag{7}$$

When (7) is inverted, u can be expressed as a function of price and income. Then, the following identity is true:

$$v\,[p,c(p_1,\ldots,p_n,u^*)] = u^*. \tag{8}$$

In this paper, we will use the cost function belonging to the PIGLOG family associated to the Almost Ideal Demand System (AIDS). Deaton and Muellbauer (1980a) approximate the cost function of the PIGLOG class with the following cost function, which is defined as of the flexible functional form

$$\ln c = \alpha_0 + \sum_{j=1}^{8} \alpha_j \ln P_j + \tfrac{1}{2} \sum_{j=1} \sum_{k=1} \hat{\gamma}_{jk} \ln P_j \ln P_k + U\beta_0 \prod P_j^{\beta_j}. \tag{9}$$

Detailed derivations of the model (a) are available in Deaton and Muellbauer (1980a and 1980b).

Welfare measures

The true index of cost of living, compensating variation, and equivalent variation measure welfare changes exactly. The exact measures can be described in terms of the cost function: index numbers are based on ratios of the cost function under different price regimes, and compensating and equivalent variation are based on differences in the values of the cost function evaluated at different sets of prices and fixed utility levels. Marshallian consumer surplus is exact only under special conditions.

To measure welfare changes associated with price changes, we use the compensating variation measure. Compensating variation is the amount of money that needs to be provided (or the amount that must be taken away) to leave the individual as well-off in the new situation as he/she was in the old. Formally,

$$CV_i = c(u_i^0, p_i^1) - c(u_i^0, p_i^0) \qquad i=1,\ldots,4, \tag{10}$$

where

CV_i = compensating variation of a price change for the ith income group,

u_{i0} = original utility level for the ith income group,

p_i^0 = original mean price vector for the ith income group, and

p_i^1 = new mean price vector for the ith income group.

Because the Hicksian demand functions are the derivatives of the cost function, integration also gives the difference in costs of reaching the same level of well-being at two different price situations. Then,

$$CV = -\int_{p^1}^{p^0} \sum_i x_i\,(p,u^0)\,dp_i + \Delta m \quad . \tag{11}$$

Both vectors of prices are data (the original vector of prices is known, and the new vector of prices is set exogenously), but utility levels are not. Thus, to estimate the CV_s by income group, we estimate, first, the original utility levels for each income group by using the duality result (7) and the cost function (9).

Then,

$$u_0 = \ln C - (\alpha_0 + \sum_{j=1}^{8} \alpha_j \ln P_j + 1/2 \sum_{j=1}^{} \sum_{k=1}^{} \hat{\gamma}_{jk} \ln P_j \ln P_k)(\Pi P_j^{\beta_j - 1}) \quad . \tag{12}$$

Finally, the CVs for each income group are determined using equation (10).

4. Results and Discussion

The compensating variation is especially important for policy analysis because it gives the actual amount of money required to leave the consumer at least as well-off as before the change in the pricing policy. In empirical practice, it is estimated by retrieving the underlying cost function using the estimated parameters of a complete system of demand equations. Demand parameters of an AIDS system estimated using the SUSENAS data were used to characterize the structure of the underlying cost functions for each income group. Table 2 provides the demand elasticities for the high-, medium-high-, medium-low-, and low-income groups. The results from a static simulation exercise to measure welfare losses for each income group under different pricing policies show the application of the procedures. These pricing strategies include changes in prices of commodity groups for which the GOI intervenes directly or indirectly in fixing consumer prices (rice, meats, and

dairy products) and changes in prices of commodity groups consumed mainly by low income households (rice and fish). These pricing examples include single and multiple changes in prices of rice, dairy products, fish, meats, rice-dairy products, rice-fish, and rice-meats.

Welfare losses under alternative single price increases

The analysis of single commodity price increases involved independent increases of 10% in the prices of rice, dairy products, fish, and meats. The results from this exercise are shown in Table 3. Clearly, households in different income groups were affected differently by commodity price increases. Increases in any commodity price caused differential welfare effects through all income classes.

The resulting consumer welfare losses for every income group depended upon the commodity price changed. An increase of 10% in the price of rice caused the greatest welfare loss for any income group, and an increase of 10% in the price of dairy products caused the smallest. An increase of 10% in the price of meats caused the second greatest welfare loss for the high-income groups and the second smallest for the low-income groups. An increase of 10 percent in the price of fish caused the second largest welfare loss for the lowest income groups and the third smallest for the high-income groups.

The low-income groups were the most affected and the high-income groups the least affected by an increase in the price of rice. On average, the welfare loss for the medium-low income households was about 1.9 times the loss for the high income households. If we consider not only what these losses represent in terms of mean total expenditures but also that rice expenditures were the largest food expenditures in the budgets of the medium-low and the

low-income households, then we can conclude that low-income households were the households most affected by price increases for rice.

An increase in the price of dairy products affected high-income households the most and low-income households the least. On average, the loss for high-income households was about 7.0 times the loss for low income households. Nevertheless, for all income groups, welfare losses represented a small proportion of the mean total expenditures. Effects of changes in meat prices were similar.

Although on average an increase in the price of fish affected high-income households the most and low-income households the least, the loss for high-income households was only about twice that for low-income households.

Welfare losses under alternative multiple price increases

Several pricing scenarios involving joint increases of 10% in the prices of rice and dairy products, rice and fish, and rice and meats illustrate the effect of multiple price increase. The results from this exercise are shown in Table 4. As for single price increases, it clear that the welfare of households in different income groups was affected differently by these multiple price increases.

Any multiple price increase caused, in absolute terms, great welfare losses for any income group. Nevertheless, when considering not only what these losses represent in terms of the mean total expenditures but also the relative increase in welfare losses from single to multiple price changes, then it can be seen that low-income households were generally much more affected than were high-income households by these multiple price increases. In other words, the additional welfare losses for the low-income households were much larger than the additional welfare losses for the high-income households.

The examples of multiple price changes illustrate the differential effects on welfare among the income groups. For example, the joint increase in the prices of rice-meats and rice-dairy products affected high-income households the most and low-income households the least. On average, the welfare losses for the high-income households were about 1.4 and 2.2 times the loss for the low-income households. These numbers confirm that the additional welfare losses caused by the multiple price increases were greater for low-income households than for high-income households (on average, the welfare losses for high-income households were about seven times those for the low-income households, when single price increases occurred).

The joint increase in the prices of rice-fish affected the low-income households most and the high-income households least. On average, the welfare losses for the low-income households were about 1.5 times those for the high-income households. This means that the low-income households were generally much more affected by an increase in rice-fish prices than by an increase in either rice-dairy products or rice-meat prices. In contrast, the high-income households were less affected by increases in the prices of rice-fish than by any other multiple price increase.

5. Policy Implications

These results have quite important implications for food policies in Indonesia. First, if the policymaker's objective is to protect the welfare of low-income households, then any increase in the price of rice, without an adequate compensation scheme, would be the worst policy choice. Probably the most appropriate action, given this objective and the need of reducing the fiscal deficit, would be to make direct transfers to the poor (through either ration schemes or direct food assistance programs) instead of a general

subsidy should it be possible to distinguish rice quality, one option may be to restrict price increases on rice consumed by low-income households. Proportionally greater increases in the price of the rice consumed by the high-income groups and proportionally lower increases, or none at all, in the prices of the rice consumed by the low-income groups would ease the welfare losses of low-income households (if the elasticity of substitution among different types of rice is small for high-income households). In any event, an increase in the price of the rice consumed by low-income households would cause severe welfare losses.

Second, price changes for meat or dairy may arise from changes in the prices of inputs (feed grains). Wheat and soybean markets are inputs for the livestock industry, and corn input for the poultry industry. In the instance of increased input prices, and hence meat prices, we showed that low-income households would be minimally affected by an increase in the price of dairy products. High-income households would be most affected and, alternatively, benefit most from any price subsidies to input foodstuffs.

Third, note that an increase in the price of fish would affect low-income households more than would any similar increase in the price of either dairy products or meats. This is particularly relevant in the Indonesian case, considering both changes in trade regulations and development of domestic shopping. Any subsidy in the price of fish would benefit low-income households more than would any subsidy in either dairy products or meats, and subsidies in the price of fish could be used to ease low-income households' welfare losses caused by increases in the price of rice.

Finally, the multiple price increase simulation showed that the additional welfare losses from multiple price changes were greater for low-income

households, in part because food represents a greater share of the household budget than do other goods. High-income households were affected most by increases in rice-dairy product prices, and least by increases in rice-fish prices.

6. Summary and Conclusions

The main purpose of the present study was to develop a theoretically consistent methodology that could be used by policymakers to measure changes in different income groups' welfare level that were caused by the adoption of alternative food pricing policies. The proposed methodology involved three basic stages: 1) classification of households in income groups; 2) estimation of demand systems for each of these income groups; and 3) measurement of welfare changes by estimating compensating variation measures from the underlying cost functions.

The present study classified households based on expenditure behavior. Households showing similar consumption behaviors were classified in the same income group. Technically speaking, the methodology by which to classify households was based on an analysis of homoskedasticity of variances of residuals from regressions of Engel relations. Analysis of consumption patterns for each income group was made to identify the most accessed foods as well as the most important food items in the budgets. This analysis confirmed that different income groups have different consumption patterns, evidenced both by the types of foods consumed (participation rates) and by estimated demand parameters and elasticities. The final stage of the methodology involved thorough characterization of the underlying cost functions of the AIDS systems, using estimated demand parameters for each income group. A simulation analysis measuring the welfare changes under

different single- and multiple-pricing scenarios showed that the welfare of the low-income households was affected most by increases in the prices of rice and fish.

These results have quite important policy-and-welfare analysis implications. If the objectives of the government were both to reduce the burden of agricultural subsidies on the fiscal deficit and to preserve the welfare levels of the low-income groups, then a number of policy options can be suggested: 1) direct transfers to low income households only; 2) smaller increases in the price of the type of rice that low-income households consume the most (if there exist different qualities of rice and if high-income households have a low elasticity of substitution among different types of rice); 3) reduction or elimination of direct and indirect price subsidies for meats and dairy products; 4) no increases (but perhaps subsidies) in the price of fish.

Table 1 Household participation rates for food expenditures by income group, urban Indonesia, all years

Food group	Income groups				
	Low	Medium Low	Medium High	High	General
	Percent				
Meat	68.1	90.1	95.2	98.5	90.0
Dairy	48.0	77.6	89.5	94.7	80.3
Rice	99.5	99.9	100.0	100.0	99.9
Fruits	94.5	98.6	99.3	99.7	98.4
Fish	97.2	99.7	99.7	99.5	99.3
Fresh fish	87.2	96.7	98.5	98.8	96.2
Dry fish	89.8	92.5	93.0	89.6	91.7
Palawija	98.4	99.2	99.7	99.7	99.4
Cassava	73.8	75.0	76.1	74.5	75.1
Corn	38.0	35.5	36.0	37.7	36.4
Nuts	66.6	79.5	86.1	91.7	82.1
Wheat	22.7	38.2	48.0	54.4	42.2
Vegetables	99.8	99.9	100.0	99.8	99.9

Table 2 Marshallian own price and expenditure elasticities of rice, dairy products, fish and meats for different income groups in urban Indonesia

Income Group	Mean total expend. (rupiahs)	Rice		Dairy		Fish		Meats	
		Own	Exp	Own	Exp	Own	Exp	Own	Exp
High	189891.3	-.42	.26	-.74	.70	-.50	.22	-.89	.69
Med-high	82156.1	-.58	.10	-.64	.71	-.66	-.82	-.91	.25
Med-low	49132.9	-.87	.15	-.55	.23	-.63	-.34	-.81	-.85
Low 1[a]	28566.4	-.71	.34	-.29	.84	-.84	.16	-.53	.39
Low 2[b]	23930.4	-1.59	.10			-.53	.70	-.91	.65
Low 3[c]	25443.8	-1.67	.71	.33	.34	-.63	.98		
Low 4[d]	20302.6	-.98	.31			-.48	.58		

[a] Low 1 = subsample share of meats > 0, and share of dairy products > 0.

[b] Low 2 = subsample share of meats > 0, and share of dairy products = 0.

[c] Low 3 = subsample share of meats = 0, and share of dairy products > 0.

[d] Low 4 = subsample share of meats = 0, and share of dairy products = 0.

Table 3 Differential welfare changes caused by a single increase of 10% in the prices of rice, dairy products, fish and meats

Income Group	Mean total expend. (rupiahs)	Rice	Dairy	Fish	Meats
High	189891.3	-447.9	-157.2	-190.3	-246.7
Medium-high	82156.1	-498.2	-76.0	-128.1	-163.8
Medium-low	49132.9	-520.5	-55.2	-123.9	-103.3
Low 1[a]	28566.4	-375.6	-23.5	-129.0	-59.4
Low 2[b]	23930.4	-1368.1	-	-153.2	-84.0
Low 3[c]	25443.8	-599.5	-64.6	-124.1	-
Low 4[d]	20302.6	-942.2	-	-234.2	-

[a]Low 1 = subsample share of meats > 0, and share of dairy products > 0.

[b]Low 2 = subsample share of meats > 0, and share of dairy products = 0.

[c]Low 3 = subsample share of meats = 0, and share of dairy products > 0.

[d]Low 4 = subsample share of meats = 0, and share of dairy products = 0.

Table 4 Differential welfare changes caused by a multiple increase of 10% in the prices of rice-dairy products, rice-fish and rice-meats

Income Group	Mean total expend. (rupiahs)	Rice-Dairy	Rice-Fish	Rice-Meats
High	189891.3	-604.3	-639.4	-689.7
Medium-high	82156.1	-574.1	-629.7	-663.6
Medium-low	49132.9	-576.6	-647.5	-627.7
Low 1[a]	28566.4	-398.8	-507.8	-431.9
Low 2[b]	23930.4	-	-1530.5	-1456.1
Low 3[c]	25443.8	-663.9	-722.2	-
Low 4[d]	20302.6	-	-1187.9	-

[a]Low 1 = subsample share of meats > 0, and share of dairy products > 0.

[b]Low 2 = subsample share of meats > 0, and share of dairy products > 0.

[c]Low 3 = subsample share of meats = 0, and share of dairy products > 0.

[d]Low 4 = subsample share of meats = 0, and share of dairy products > 0.

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