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Discussion Paper 141

The Sensitivity of Calorie-Income Demand Elasticity to Price Changes: Evidence from Indonesia

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Since the onset of the country's financial crisis in 1997, Indonesian households experienced large increases in the prices of rice and other food and nonfood products. Such price increases lead to a decrease in household purchasing power and a relative price effect that induces households to seek substitutes for more expensive foods. Concern about the impact of the crisis on the quantity and quality of food available in poor households gave rise to a number of social safety net programs aimed at protecting caloric availability by means of cash or in-kind transfers of staple foods and the creation of temporary employment.

Programs such as these, along with other related cash transfer programs, spring from the assumption that there is a positive relationship between income and caloric availability. Much research in development economics and food policy has focused attention on the size of this calorie-income elasticity but less on the sensitivity of this parameter to the price environment.

During the financial crisis, the value of Indonesia's currency depreciated dramatically. In addition, subsidies were removed on a number of items, including rice, oil, and fuel. The question is whether estimates of the income elasticity of calories obtained from a sample of households observed before the crisis can provide guidance on how caloric availability may respond to additional income during a period with a different set of relative prices.

From a policy perspective, the sensitivity of calorie-income elasticity to the relative prices in the economy implies that policies aimed at increasing household income, such as employment and cash transfer programs, may be more—or less—effective at different periods, depending on the economic conditions prevailing at the time of their implementation.

The Data: The Relationship Between Income and Calories

The analysis makes use of the detailed consumption module of the National Socio-Economic Survey (SUSENAS) collected every three years by the Government of Indonesia. The consumption module, which surveys over 60,000 households, is nationally representative of urban and rural areas. Using non-

parametric as well as regression methods, the study examines the relationships between income and total calories and between income and calories from cereals and other foods (excluding cereals and root crops).

The data confirm that the relative prices faced by households changed considerably between 1996 and 1999. The price of calories from tubers or root crops decreased substantially, especially for households at the bottom end of the distribution of per capita expenditure. In contrast, the changes in the relative prices of fish, meat, eggs and milk, and vegetables varied more by income and geographic location.

The data also reveal a remarkable stability in the average share of calories obtained from cereals between 1996 and 1999. In addition, in 1999 a higher share of calories is obtained from root crops, which provide a rich source of calories and whose price relative to cereals decreased significantly. Among poorer households in rural areas, the shares of calories obtained from fish, meat, eggs and milk products, and fruits and vegetables decreased in 1999. The share of calories from meat, in particular, decreased by 50 percent in 1999 from the already low level of 1996. In contrast, the share of calories from cereals and root crops such as cassava and sweet potatoes increased. Considering that fish, meat, eggs and milk products, and fruits and vegetables are important sources of micronutrients, it appears that poorer households in 1999 experienced a significant reduction in their dietary as well as caloric intake.

It is thus clear that the changes in the relative prices of cereals and noncereals or other foods do not appear to be

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associated with any major change in the way poorer households acquire calories. Put differently, holding income constant, the changes in relative calories between 1996 and 1999 do not appear to induce a poor household to substitute away from cereals or change significantly the way in

which it acquires calories. To the extent that the preceding insights are valid, the income elasticity of total calories is less likely to be affected by relative price changes, no matter how large they are.

Empirical Analysis and Results

In an effort to uncover the main reasons behind these findings, income elasticity estimates were obtained for calories from cereals and from other food crops (excluding cereals and root crops). The income elasticity of the demand for calories is a weighted aggregate of the income elasticity of the demand for individual food items, each one of which may be sensitive to changes in the relative price environment faced by the consumer. The change in the income elasticity of calories for cereals may be countered by opposing changes in the income elasticity of other foods, thus leading to the absence of any significant effect of the change in prices on the income elasticity of total calories. A closer look at the changes in the income elasticity of the demand for calories from cereals and other food items in 1999 relative to 1996 reveals that the calorie-income elasticity for cereals as a group increases while the calorie-income elasticity for other food items as a group decreases.

The opposing changes in the income elasticity for cereals and other foods are not only consistent with economic theory, but also plausible with the presence of a binding subsistence constraint. As higher prices decrease the purchasing power of income and push households below the minimum level of calories required for subsistence, households tend to allocate a higher proportion of a marginal increase in their income to cereals. Irrespective of whether the relative price of cereals is higher, on an absolute level, cereals continue to provide more calories per dollar than any other food group.

Conclusions

This paper examined the robustness of the income elasticity of the demand for calories to changes in the relative prices and economic environment price faced by households. Using household consumption and calorie data, the analysis revealed that the calorie-income

elasticity is remarkably insensitive to changes in relative prices. The income elasticity of the demand for total calories in Indonesia appears to be slightly higher in 1999 than in 1996. This increase is very small, which implies that the income elasticity of calories may be considered as invariant to the level of relative prices. It also suggests the effectiveness of either cash transfer programs or other programs aimed at protecting *caloric availability* within households at a time of crisis do not run any risk of becoming less effective due to changes in the price environment faced by households. At a broader level, this finding suggests that structural parameters estimated using cross-sectional data from a normal economic environment continue to be very useful in describing economic behavior, even at times of crisis and high inflation.

The finding from the empirical analysis—that from 1996 to 1999 the calorie-income elasticity for cereals as a group increases while the calorie-income elasticity for other food items as a group decreases—highlights a serious limitation of an income transfer program aimed at protecting the consumption of nutrients of poorer households. Cash transfers may be effective at maintaining the total calories available at the household level, but most of these calories are likely to be derived from cereals rather than foods that provide essential micronutrients. Any effort to maintain the consumption of micronutrients of poorer households during a lengthy economic crisis must involve something different than or complementary to an income transfer.

Keywords: food security, poverty, nutrition, prices, cash transfers, Indonesia

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