ISBN : 978-602-14917-9-9

IMPACTS OF RISING STRATEGIC FOOD PRICES ON POVERTY IN INDONESIA

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Abstract. Poverty has existed for many years, and will always exist in a large number of countries, so poverty alleviation targets are a challenge for most countries. The main objective of this research is to analyze the impact of strategic food price increases on poverty with a systematic measure. The study uses SUSENAS (Indonesian National Socioeconomic Survey) raw data. The total data used is 287,830 households. consisting of 166,019 rural households and 121,811 urban households. The impact of price changes on poverty can be seen by using The HeadCount Ratio, The Poverty Gap Ratio, The Sen Index, and The Foster-Greer and Thorbecke Index. The analysis showed rice is a strategic food whose price increase has the biggest impact on increasing poverty, so it needs government efforts to reduce the rate of increase in rice prices if it wants to reduce poverty.

Key Word: Head Cont Ratio, Poverty Gap Ratio, Sen Index

1. Introduction

Food which includes rice, corn, soybean, beef, shallot, chili, and sugar is a basic requirement for human life [1]. According to [2] and [3], these seven strategic commodities will determine the success in realizing the main objectives of agricultural development, namely dynamizing the rural economy, strengthening food security, and alleviating poverty and improving household economic prosperity. Poverty is a real picture of the failure of the country's economic development. Poverty has existed for many years, and will always exist in a large number of countries, so poverty alleviation targets are a challenge for most countries [4].

Poverty can be distinguished by its definition, namely absolute poverty and relative poverty [5]. There are three measures to calculate poverty, namely the Head-count ratio, the poverty gap ratio and the severity of poverty [6]. The emergence of poverty often begins with a continuous increase in food

ISBN : 978-602-14917-9-9

prices. The next increase in food prices causes a decrease in the amount of food consumption. The decrease in the amount of food consumption due to decreased purchasing power of households according to [7] is an indication of an increase in poverty. An increase in the price of each strategic commodity will have two impacts. First, rising prices reduce people's real income, which in turn increases poverty. Second, the price increase changes in income distribution as a result of different price increases across individuals depending on their income. As changes in distribution can increase or decrease poverty, it is the second impact that determines whether price changes are pro-poor or anti-poor [6].

Several studies on the impact of rising prices on poverty have been conducted by several researchers, including [8; 9; 10; 11]. However, research that specifically examines the impact of rising strategic food prices on poverty in Indonesia has never existed. The main objective of this study is to determine a systematic measure of the impact of rising strategic food prices on poverty.

Material and Methods

2.1 Data

Indonesian data on household incomes and expenditures were obtained from SUSENAS (Indonesian National Socioeconomic Survey). This data is cross-sectional and it is published by The Central Statistic Agency of Indonesia. The data is collected from each household for one week by performing a direct interview. The total data used is 287,830 households. consisting of 166,019 rural households and 121,811 urban households.

2. 2 Model Selection

BPS (Central Bureau of Statistics) uses the concept of ability to meet basic needs (basic needs approach) to measure poverty. With this approach, poverty is seen as an inability on the economic side to meet basic food and non-food needs as measured by expenditure. So poor households are households that have an average monthly per capita expenditure below the poverty line. The impact of price changes on poverty is seen by using The HeadCount Ratio in estimating poverty levels, using The Poverty Gap Ratio in estimating poverty depth, using The Sen Index in estimating poverty severity and using The Foster-Greer and Thorbecke Index in estimating severity intensity.

The first step is taken before determining poverty levels, poverty depth, poverty severity, and poverty intensity in determining the poverty line. The poverty line is determined based on the 2016 BPS reference semester one. This determination is based on the use of research data in March 2016.

Furthermore, the poverty line is used to measure (1) the percentage of poverty with a headcount ratio; (2) depth of poverty with poverty gap; (3) the severity of poverty with severity poverty; and (4) poverty intensity with foster-Greer and thorbecke index. each equation is described as follows [12;13; 14; 15; 16] :

1. Headcount ratio elasticity

$$H \equiv \int_{\theta}^{z} f(x)dx \equiv F(z) \quad \text{..... (1)}$$

Refers to Shepard's Lemma

$$\frac{p_i}{z}\frac{\partial z}{\partial p_i} = \frac{p_i q_i(z)}{z} = w_i(z) \quad \text{..... (2)}$$

$$\eta H_i = \frac{\partial H}{\partial p_i}\frac{p_i}{H} = \frac{z f(z) w_i(z)}{H} \quad \text{..... (3)}$$

2. Poverty gap elasticity

$$\eta\theta i = \frac{\partial \theta}{\partial p_i}\frac{p_i}{\theta} = -\frac{1}{\theta}\int_0^z \frac{\partial p}{\partial x}\, x\, w_i(x) f(x)dx \quad \text{..... (4)}$$

3. Sen index elasticity

$$\eta\theta i = \sum_{i=1}^{m} \eta\theta i \frac{\partial \theta}{\partial p_i}\frac{p_i}{\theta} = -\frac{1}{\theta}\int_0^z \frac{\partial p}{\partial x}\, x\, w_i(x) f(x)dx \quad \text{..... (5)}$$

4. FGT elasticity

$$\eta_{\alpha i} = \frac{\partial \theta_\alpha}{\partial p_i}\frac{p_i}{\theta_\alpha} = \frac{\alpha}{\theta_\alpha}\left[\int_0^z \left(\frac{z-x}{z}\right)^{\alpha-1} w_i(x) f(x)dx - \int_0^z \left(\frac{z-x}{z}\right)^{\alpha} w_i(x) f(x)dx\right] \quad \text{..... (6)}$$

ISBN : 978-602-14917-9-9

While the effect of price changes on poverty from several elasticities can be written as follows:

$$\sum_{i=1}^{n}\left(\frac{p_i^*-p_i}{p_i}\right)\eta\theta i = \sum_{i=1}^{n}\left(\frac{p_i^*-p_i}{p_i}\right)w_i\,\eta\theta + \sum_{i=1}^{n}\left(\frac{p_i^*-p_i}{p_i}\right)(\eta\theta i - w_i\eta\theta) \quad \text{..... (7)}$$

Then there are several main indices that have been developed by Son & Kakwani, (2009) which will be used to measure the impact of rising prices on poverty. These are the Price Elasticity of Poverty, the Price Index for the Poor (PIP) and the Pro-poor Price Index (PPI).

Indeks Harga Keberpihakan Masyarakat Miskin (Pro-poor Price Index)

$$\varphi_i = \frac{\eta\theta i}{\bar{w}_i\eta_\theta} \quad \text{..... (8)}$$

Price Index for the Poor

$$\lambda = \sum_{i=1}^{m}\frac{p_i^*}{p_i}\left(\frac{\eta\theta i}{\eta_\theta}\right) \quad \text{..... (9)}$$

3. Result and Discussion

3.1 Price Elasticity of Poverty

The calculation of price elasticity of poverty (PEP) in urban households is presented in table 1. The PEP of rice for head count ratio is 1.531, indicating that an increase in rice prices by 1% will increase the headcount ratio by 1.531 percent. Similarly, if a shallot increase of 1% will increase the headcount ratio by 0.122%. if the entire price rises by 1% it will increase the headcount ratio by 4.479%.

Table 1. Price Elasticity of Poverty in Urban Households

Commodity	HeadCount (%)	Poverty Gap (%)	Poverty Severity (%)
FGT Index	**7.79**	**1.19**	**0.27**
Rice	**1.531**	0.799	**1.044**
Corn	0.000	0.008	0.010
Beef	0.000	0.001	0.001
Shallot	0.122	0.056	0.071
Chili	0.164	0.076	0.096
Sugar	0.122	0.070	0.088
Other Food	**2.204**	**2.344**	**2.810**
Other Non Food	**1.743**	**2.175**	**2.642**
Total	**4.479**	**5.530**	**6.762**

Source : Author's Calculated

The analysis shows that an increase in the price of rice by 1% will increase the depth of poverty by 0.799% and increase the severity of poverty by 1,044%. The results of this analysis indicate that rice is a very strategic commodity because the impact of rising rice prices is very large on increasing the severity of poverty in urban households (table 1). This supports the findings [17] which states that increasing the price of staple foods will increase poverty.

Susenas data on March 2016 shows the average urban household consumption of beef is 0.11 0ns / capita/ day, smaller than the US Department of Agriculture's recommendation of 5.5 ounces for

ISBN : 978-602-14917-9-9

women and 5 ounces for men. The low consumption of beef in urban households causes the effect of price increases to be less visible on the poverty level of urban households.

Table 2. Price Elasticity of Poverty in Rural Household

Commodity	HeadCount (%)	Poverty Gap (%)	Poverty Severity (%)
FGT Index	**14.11**	**2.74**	**0.79**
Rice	0.754	0.766	0.948
Corn	0.018	0.029	0.040
Beef	0.009	0.001	0.001
Shallot	0.037	0.051	0.061
Chili	0.069	0.065	0.075
Sugar	0.069	0.071	0.087
Other Food	**1.044**	**1.657**	**1.935**
Other Non Food	**0.592**	**1.510**	**1.766**
Total	**2.956**	**4.149**	**4.913**

Source: Author's Calculated

Table 2 shows the impact of rising rice prices on the percentage of poverty, poverty depth, and poverty severity for rural households is lower than urban households. As with urban households, the biggest impact of rising prices on poverty is on the commodity of rice.

The impact of changes in strategic commodity prices for households nationally is almost the same as urban and rural households (table 3). The increase in rice prices had the greatest impact on increasing the percentage of poverty, poverty depth, and poverty severity.

Tabel 3. Price Elasticity of Poverty in Indonesia

Commodity	HeadCount (%)	Poverty Gap (%)	Poverty Severity (%)
FGT Index	**10.95**	**1.97**	**0.53**
Rice	**1.143**	0.782	0.996
Corn	0.009	0.019	0.025
Beef	0.004	0.001	0.001
Shallot	0.08	0.053	0.066
Chili	0.117	0.07	0.086
Sugar	0.096	0.07	0.087
Other Food	**1.624**	**2.001**	**2.373**
Other Non Food	**1.168**	**1.842**	**2.204**
Total	**3.718**	**4.84**	**5.838**

Source: Author's Calculated

Tables 1, 2, and 3 show the headcount ratio. Poverty gap, Poverty severity, and FGT. Poverty gap value is 4.84% for Indonesian households, 4.149% for rural households, and 5,530% for urban households. This ratio shows that the average household food expenditure is 4.84% lower than the corresponding poverty line compared to household food expenditure in Indonesia as a whole, also, they show a small portion of food expenditure needed to eradicate poverty. Besides, the resources needed to move households to or outside the poverty line are higher in rural areas compared to urban areas.

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Poverty severity, which illustrates the severity of poverty and inequality of expenditure or income among households in Indonesia, varies from 4,913 for rural households, 5,838 for Indonesian households to 6,762 for urban households. This shows that the highest inequality is in urban households.

The three types of poverty index in the form of headcount index, poverty gap index and poverty severity index are family indexes known as the F-G-T index so that they can be written in the same formulation. The F-G-T index has a strictly decreasing nature of the poor standard of living, ie the lower the standard of living owned, the lower the value of this index or the poorer the population. Another advantage of this measure is that for the three poverty indices, this measure has the nature of axiomatic monotonicity subgroups [18]. The analysis shows that there is a high intensity of poverty for Indonesian households, urban households, and rural households. the relative lack of expenditure of each poor household from the poverty line issued; the FGT index gives greater weight to households far below the poverty line. the intensity of poverty is more serious among poor households living in rural areas, and among the FGT index, the FGT index is higher than the cent index in urban areas for very poor households, however, the penny index is higher in rural areas. According to these figures, the severity of poverty is a very serious problem in rural areas; on the other hand, income distribution is uneven among very poor households. but in urban areas, the average income shortfall from the poverty line for very poor people is very high [5].

3.2 Pro-Poor Price Index

The pro-poor price index helps researchers to understand how changes in prices of each consumption item will affect income distribution [6]. The pro-poor price index for rice, shallots, chili, sugar, and other foods is greater than one for all poverty measures. This shows that in urban areas, the increase in prices of these commodities has a greater impact on the poor than the non-poor. The pro-poor price index for corn, beef and non-food is smaller than one. This shows that the increase in the prices of these commodities will relatively reduce income inequality [6]. state that the pro-poor price index helps us understand how changes in prices of each consumption item will affect the distribution of income. The pro-poor price index for food from the three poverty measures is greater than one, indicating an increase in food prices has a greater influence on poor households than non-poor households.

Tabel 4. Pro-Poor Price Index in Urban Households

Commodity	HeadCount	Poverty Gap	Poverty Severity
Rice	**6.594**	**2.787**	**2.977**
Corn	0.000	0.218	0.219
Beef	0.000	0.009	0.007
Shallot	**4.140**	**1.538**	**1.589**
Chili	**3.488**	**1.310**	**1.355**
Sugar	**3.732**	**1.727**	**1.787**
Other Food	**1.342**	**1.157**	**1.134**
Other Non Food	0.696	0.703	0.698
Total	**1.000**	**1.000**	**1.000**

Sources: Autor's Calculated

`The results of an analysis of the pro-poor price index for rural households show that rice, shallots, and sugar are anti-poor commodities because their value is greater than one. This condition shows that the increase in the price of rice, shallots, and sugar has a greater impact on poor households compared to non-poor households. While corn and beef are pro-poor commodities (PIP value is smaller than one).

Tabel 5. Pro-Poor Price Indeks in Rural Households

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Commodity	HeadCount	Poverty Gap	Poverty Severity
Rice	**2.603**	**1.884**	**1.970**
Corn	0.313	0.360	0.415
Beef	0.060	0.006	0.005
Shallot	**1.251**	**1.215**	**1.230**
Chili	**1.481**	0.985	0.966
Sugar	**1.662**	**1.213**	**1.248**
Other Food	0.852	0.963	0.950
Other Non Food	0.445	0.809	0.799
Total	**1.000**	**1.000**	**1.000**

Sources: Author's Calculated

In urban households, chili is an anti-poor commodity because it will have a worse impact on poor households, where the increase in chili prices will make poor households worse (increasing the percentage of poverty). However, when viewed from the depth of poverty and the severity of poverty, chili is a pro-poor commodity because its poverty gap and poverty severity are less than 1 (table 5).

Tabel 6. Pro-Poor Price Index in Indonesia

Commodity	HeadCount	Poverty Gap	Poverty Severity
Rice	**4.598**	**2.335**	**2.474**
Corn	0.156	0.289	0.317
Beef	0.030	0.007	0.006
Shallot	**2.695**	**1.377**	**1.409**
Chili	**2.485**	**1.148**	**1.161**
Sugar	**2.697**	**1.470**	**1.518**
Other Food	**1.097**	**1.060**	**1.042**
Other Non Food	0.571	0.756	0.749
Total	**1.000**	**1.000**	**1.000**

Sources: Author's Calculated

Table 6 shows that rice, onion, chili, and sugar are anti-poor commodities and corn and beef are pro-poor commodities. The increase in the price of rice, shallots, chili, sugar and other foods will have a greater impact on poor households than non-poor households.

Conclusion and Implication

An increase in strategic food prices will increase the percentage of poverty, the depth of poverty, the severity of poverty and the intensity of poverty both in rural, urban and in Indonesia in the aggregate. Of the six strategic foods (rice, corn, beef, onion, chili, and sugar), rice has the biggest impact. So the policy implication is that if the government wants to reduce poverty then the government must be able to reduce the rate of increase in the price of rice as a staple food.

Rice, shallots, and sugar are anti-poor commodities both in terms of headcount, poverty gap, and poverty severity. This means that the increase in the price of rice, onions and sugar will have a worse impact on increasing poverty for poor households than non-poor households. This finding enables a direct cash transfer policy for poor households to reduce poverty growth.

Acknowledgment

Acknowledgements are submitted to The Central Statistic Agency of Indonesia which have served the process of the data purchasing. Acknowledgments are also conveyed to all teams who have helped data analysis in this study.

ISBN : 978-602-14917-9-9

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