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Simulating the Impact of Fuel Prices Rising and Direct Cash Assistance Compensation (BLT BBM) on Poverty in Indonesia

Ariful Romadhon[1, *], Ardi Adji[2]

[1]Economics and Business Faculty, University of Indonesia, Indonesia

[*] E-mail: ariful.romadhon@gmail.com

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Abstract

Crude oil prices have become volatile as geopolitical conflicts that occur in oil-exporting countries make the Indonesian government have to increase fuel prices and plan to provide cash transfers as compensation. This study analyzes the impact of fuel price rising and the direct cash assistance compensation program/Bantuan Langsung Tunai (BLT BBM) on poverty using micro data simulation. Poverty simulation is generated by modifying the poverty line (GK) and expenditure by utilizing leading indicators such as commodities inflation, household consumption expenditure growth, and population growth. The simulation results show that the presence of compensation can reduce the poverty rate compared to the absence of compensation. Without compensation, the poverty rate in September 2022 is predicted to be 10.36 percent (0.82 percent higher than in March 2022), while under the government's scheme where compensation is given to households receiving the Family Hope Program (PKH)/Non-Cash Food Assistance (BPNT), poverty is predicted to be 9.56 percent (0.02 percent higher than in March 2022). Exclusion error in the program of 55.35 percent in the lowest decile is an obstacle in poverty alleviation. Improvement and updating of the database of program recipients is needed so that the program can be more targeted to reach the poor.

Keywords: Simulation Poverty, Leading Indicators, Direct Cash Assistance Program, Poverty and Expenditure Modification
JEL Classification: E31; H31; I38

INTRODUCTION

Poverty is still a major issue for countries in the world, especially in developing countries such as Indonesia. It is undeniable that poverty alleviation is the first goal of the 17 goals contained in the Sustainable Development Goals (SDG's), which is to end poverty in all forms everywhere. In the National Medium-Term Development Plan (RPJMN) for 2020–2024, the Government of Indonesia targets the poverty rate to reach six to seven percent by 2024 (Ministry of National Development Planning/Bappenas, 2020). Poverty is a multidimensional problem where there are various aspects that cause a person to become poor, one of which is the energy crisis. There have been many studies that

show the link between the incidence of energy crisis and poverty problems (Ikhsan et al., 2005; Naranpanawa & Bandara, 2012; Yuliana, 2011).

One of the causes of the energy crisis is oil price shocks, which is a condition of disruption in the global supply of petroleum, resulting in an increase in the price of fuel oil (Hamilton, 2003). An energy crisis can be detrimental to the economy as a whole, including in developing countries where the greatest impact is felt on people who have socio-economic vulnerabilities. The energy crisis has led to an increase in the cost of living and a rise in poverty (United Nations, 2022). The energy crisis is characterized by world crude oil prices that often fluctuate, affecting a country's economy. One of the causes of the increase in world crude oil prices is the influence of the geopolitical situation of oil-exporting countries that are not conducive (Hamilton, 1983; United Nations, 2022). Various studies mention that the increase in fuel prices is the main cause of the decline in real household income and the increase in poverty (Kpodar & Liu, 2021; Naranpanawa & Bandara, 2012).

Energy issues are one of the important issues because Indonesia is classified as an oil importing country where dependence on crude oil from oil exporting countries is still very high (Sa'adah et al., 2017). The ratio of fuel imports to fuel needs in 2021 was 31.46 percent, while in 2022 it was 35.65 percent, (an increase of 4.19 percent). The increase in imports is because the demand for fuel oil began to increase during the economic recovery period due to the Covid-19 pandemic. On the other hand, the price of crude oil has been fluctuating due to geopolitical conflicts in the oil-exporting country, namely Russia. Russia is a major exporter of natural gas and the second largest oil exporter in the world (United Nations, 2022). The increase in fuel prices led to an increase in refined oil products and a number of prices for goods and services for daily needs. In addition, the increase in crude oil prices has increased the burden of state subsidies on fuel (Ministry of Energy and Mineral Resources, 2022)

In light of this, the Indonesian government has decided to raise fuel prices in September 2022. There are several reasons for the increase in fuel prices. First, the increasing size of the State Budget (APBN) subsidy burden. The government has adjusted the state budget assumption on the Indonesian Crude Price (ICP) from US$ 63/barrel to US$ 100/barrel. The exchange rate assumption is set at IDR 14,700/US$, the volume of pertalite is predicted to reach 29 million kiloliters and the volume of subsidized diesel will reach 17.44 million kiloliters. The adjustment of the ICP assumption resulted in an increase in the budget for subsidies and energy compensation. Second, the provision of fuel subsidies is considered not on target because the total fuel subsidy for pertalite reaches 93.5 trillion, of which 80.4 trillion is received by households and 13.1 trillion is received by businesses. Of the 80.4 trillion subsidy received by households, only 16.1 trillion or around 20 percent was received by poor households (Ministry of Finance, 2022). This is supported by the results of previous studies, one of which by Rentschler (2016) in developing countries, namely Nigeria, found that in urban areas, the richest 10 percent of the population group spent 28 times more on energy consumption than the poorest 10 percent of the population group. Average energy expenditure by urban households is consistently higher than rural households despite having the same level of total expenditure. Such differences in consumption can be attributed to different access, energy availability and

economic activities. Not surprisingly, fuel subsidies benefit the rich more than the poor, directly reinforcing existing patterns of inequality and poverty.

In Indonesia, energy prices are not determined by market mechanisms, but are set administratively by the government. Through Decree of the Minister of Energy and Mineral Resources, 2022 Number 218.K/MG.01/MEM.M/2022 concerning the retail price of certain types of fuel oil and special types of fuel oil for assignments, the government made a policy of increasing the price of fuel oil (BBM). The fuel price increase began on September 3rd, 2022. When compared to March 2022 conditions, the types of fuel that experienced an increase were pertalite by 30.72 percent, pertamax by 61.11 percent, and diesel by 32.04 percent in September 2022 (Table 1). Based on previous research, fuel price increases can result in a decrease in people's purchasing power in the short term and have a different burden according to household income class. For poor or low-income households, the direct burden tends to be smaller given the share of energy consumption including fuel in total expenditure. On the other hand, if there is an increase in fuel prices, then according to existing economic theory, it will have a negative impact. An increase in fuel prices will have an inflationary effect, which is an effect that can reduce the purchasing power of the community. From a psychological aspect, people also assume that an increase in fuel prices will always be followed by an increase in the prices of goods at large (inflation) (Ikhsan et al., 2005).

Table 1. Price of Fuel Oil (BBM) by Type for the Period March–September 2022 (Rupiahs/Litre)

Fuel Type	March 2022	April 2022	September 2022	Price Change March–September 2022	Percentage Change in Price March–September 2022
(1)	(2)	(3)	(4)	(5)	(6)
Pertalite	IDR7.650,00	IDR7.650,00	IDR10.000,00	IDR2.350,00	30,72%
Pertamax	IDR9.000,00	IDR12.500,00	IDR14.500,00	IDR5.500,00	61,11%
Solar	IDR5.150,00	IDR5.150,00	IDR6.800,00	IDR1.650,00	32,04%

Source: Ministry of Energy and Mineral Resources, 2022

Based on previous studies, an increase in fuel prices can affect the economic performance of a country. In measuring the performance of an economy, it can be seen from three key indicators in macroeconomics, namely gross domestic product (GDP) (economic growth), consumer price index (CPI), and unemployment rate (Mankiw, 2016). There is a significant relationship between rising oil prices and low economic performance (Hamilton, 1983; Santini, 1992; Sarmah & Bal, 2021). An energy crisis causes an increase in fuel prices and can lead to stagflation, i.e. an economic slowdown and price rise (inflation) simultaneously (Barsky & Kilian, 2001; Sarmah & Bal, 2021). Inflation fluctuations can cause economic changes that will affect overall economic performance (Sek et al., 2015).

In Indonesia, the increase in fuel prices was followed by an increase in the prices of a number of goods and services as can be seen through the official reports of economic indicators published by Statistics Indonesia/Badan Pusat Statistik. In September 2022 there was inflation of 1.17 percent on a monthly

basis (month-to-month/mtm) and on a calendar year basis (year-on-year/yoy) of 5.95 percent. The inflation of 1.17 percent was the highest inflation since December 2014. The main commodities contributing to September 2022 inflation were fuel prices, rice, and city transportation. The impact of the fuel price increase caused inflation in most expenditure groups. The three highest inflations were in the expenditure groups for transportation at 8.88 percent, food and beverages/restaurants at 0.57 percent, and health at 0.57 percent (Statistics Indonesia, 2022a). Villas-boas et al., (2007) found that an increase in fuel prices has an income effect. People reallocate expenditure and save money by buying regular (cheaper) foodstuffs where their real income is reduced as a result of the fuel price increase. The increase in food prices caused by the increase in fuel prices causes people who are already poor to become poorer.

Table 2. Comparison of the Consumer Price Index and Inflation Rate by Expenditure Group for the Period March–September 2021 and March–September 2022

No	Expenditure Groups	March 2021 CPI	September 2021 CPI	March–September 2021 Inflation	CPI March 2022	CPI September 2022	March–September 2022 Inflation
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Food, Beverages, and Tobacco	109,39	108,55	-0,77%	113,32	117,14	3,37%
2	Clothing and Footwear	105,57	106,49	0,87%	107,72	108,15	0,40%
3	Housing, Water, Electricity, and Household Fuel	102,95	106,49	3,44%	104,84	106,6	1,68%
4	Household Supplies, Equipment, and Routine Maintenance	106,46	107,84	1,30%	110,52	113,27	2,49%
5	Health	106,46	109,34	2,71%	110,53	112,12	1,44%
6	Transportation	102,75	103,13	0,37%	105,17	119,64	13,76%
7	Information, Communication, and Financial Services	100,05	100,06	0,01%	99,83	99,75	-0,08%
8	Recreation, Sports, and Culture	104,06	104,74	0,65%	106,04	107,6	1,47%
9	Education	107,75	109,40	1,53%	109,6	112,25	2,42%
10	Food and Beverage Supply/Restaurants	108,44	109,85	1,30%	111,83	114,83	2,68%
11	Personal Care and Other Services	111,74	113,26	1,36%	116,69	119,12	2,08%
General (Headline)		106,15	106,53	0,36%	108,95	112,87	3,60%

Source: Socio-Economic Data Monthly Report April 2022 and October 2022 (Statistics Indonesia, 2022b, 2022a)

The impact of the fuel price increase on inflation can be more clearly seen if inflation is examined based on the time before and after the fuel price increase. The inflation rate from March to September 2021 was only 0.36 percent while the inflation rate from March to September 2022 reached 3.6 percent. There is an increase of 3.24 percentage points in inflation in September 2022 (Table 2). It cannot be denied that the period March 2021–September 2021 is still classified as

an economic recovery period due to the Covid-19 pandemic, but the considerable difference in inflation rates gives a little idea that there is a contribution of fuel price increases to the increase in inflation rates. In the period March–September 2022, the expenditure group for transportation experienced the highest inflation of 13.76 percent, followed by food, beverages, and tobacco at 3.37 percent, and provision of food and beverages/restaurants at 2.68 percent. The sector most affected by oil price shocks is the transportation sector. The transportation sector has the highest increase in the consumer price index (CPI) compared to other sectors because it is directly related to fuel oil energy consumption (Gao et al., 2014).

The impact of fuel price increases on poverty can be seen directly through historical poverty in Indonesia. In general, the trend of Indonesia's poverty rate in the period September 2011–March 2022 has decreased. However, in 2006, September 2013, March 2015, March 2020, and March 2021 there was an increase in the poverty rate. In 2006, September 2013 and March 2015, the increase in the poverty rate was triggered by an increase in the price of fuel oil (BBM) which caused the price of basic goods to rise. Based on historical data, Indonesia's poverty rate always rises when there is an increase in fuel prices. Meanwhile, the increase in the poverty rate in the period March 2020–March 2021 was triggered by the Covid-19 pandemic that began to spread in Indonesia and the implementation of policies to limit social mobility on a large-scale (Figure 1).

The trend of the poverty rate in Indonesia in March 2022, which has just been in the recovery phase due to the Covid-19 pandemic, must be faced with an increase in fuel prices in early September 2022. Based on historical data, Indonesia's poverty always rises when there is an increase in fuel prices. Poverty, which had touched a single digit, must be faced with an energy crisis. On the other hand, the government also provides compensation in the form of direct cash assistance (BLT BBM) to people who are classified as poor.

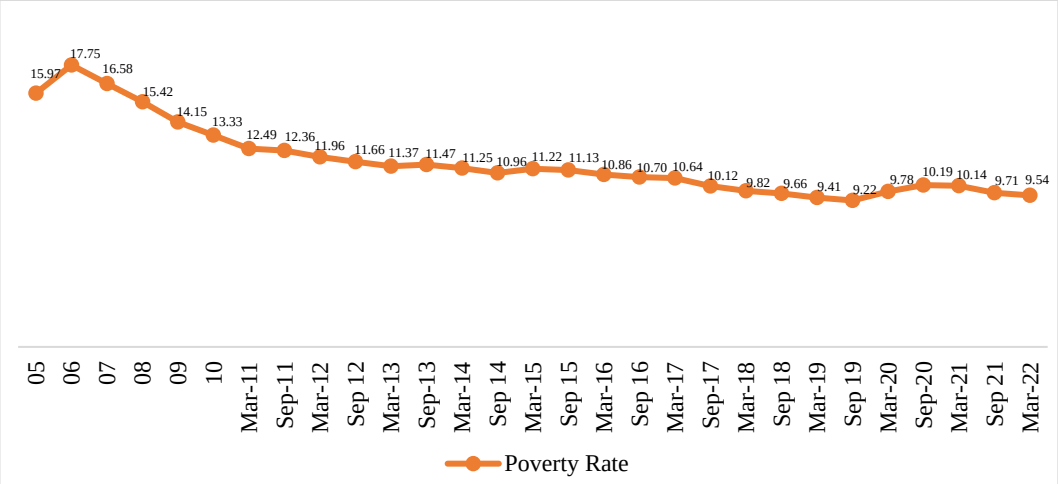

Figure 1. Poverty Rate Trends in Indonesia, 2005–2022
Source: Statistics Indonesia, 2022

As explained earlier, an increase in fuel prices has heterogeneous impacts, one of which is a decrease in people's real consumption. When a fuel price

increase occurs, consumers are very likely to experience a decrease in real consumption expenditure, which even includes goods and services that are not energy-related, if the demand for energy-related goods and services is inelastic (Edelstein & Kilian, 2009). This is because an increase in fuel prices can shift demand for other goods and services (Gao et al., 2014).

In response to the increase in fuel and other commodity prices, the government is providing Direct Cash Assistance Compensation (BLT BBM) to protect the purchasing power of the poor and vulnerable. The compensation will be given to 20.65 million beneficiary families/Keluarga Penerima Manfaat (KPM), namely families who are still registered in the Family Hope Program/Program Keluarga Harapan (PKH) and Non-Cash Assistance Program/Bantuan Pangan Non-Tunai (BPNT). The compensation provided is Rp150,000 per month, given for four months (September 2022–December 2022) and distributed twice (Rp300,000.00 per distribution) (Ministry of Social Affairs of the Republic of Indonesia, 2022).

BLT BBM compensation is one of the government's policy products in an effort to reduce poverty due to the increase in fuel prices. In relation to policy planning, indicators such as inflation, economic growth, and population growth can be used to estimate the poverty rate in a certain period. Estimates of the poverty rate can be used so that the policies implemented can achieve the targets as planned. One way to estimate the poverty rate is by using simulation. Poverty simulation allows us to get an idea of what will happen in the future using various schemes. When there is an economic shock, poverty simulation becomes very important because policies must be taken quickly and precisely.

Theoretically, compensating variation is a numerical measure of the effect of price changes on consumer welfare. Compensating variation allows consumers to keep their initial level of utility (satisfaction) the same as before the change in the price of the good/service (Hicks, 1946). Chitiga et al., (2012) in their research on the macro-micro approach to the impact of rising international oil prices on poverty in South Africa using Computable General Equilibrium (CGE). In the scenario without price subsidies from the government, poverty indicators will increase. The scenario with government price subsidies also leads to an increase in poverty. The subsidy does provide some compensation for the increase in fuel prices, but at the same time there is a decrease in household income. Estrades & Terra (2012) found that the provision of cash transfer programs focused on the poorest households has a significant and positive effect on the consumption and welfare of these households.

Simulating Poverty Rates as an Application of the Short-Term Outlook for Poverty Alleviation Policies

Starting from the government's decision to raise fuel prices on September 3rd, 2022 due to the world oil price shock and the government's plan to provide BLT BBM compensation to protect the purchasing power of the poor and vulnerable poor from declining, researchers are interested in analyzing this against poverty that will occur in September 2022. Since the September 2022 National Socioeconomic Survey (Susenas raw) data has not yet been released and the poverty rate is generally only officially released three to four months after the

survey period, researchers used the previous period's raw data, namely the March 2022 Susenas raw data.

Estimates of poverty rates can be obtained by conducting simulations using leading indicators. Development indicators are dynamic along with government programs and policy responses. Based on the available indicators, these leading indicators are more dynamic than the poverty rate, so they need to be monitored early to estimate the poverty rate in a certain period. The use of Susenas raw data for the previous period can be used as preliminary information and planning material related to poverty alleviation programs by using additional information in the form of predecessor indicators such as inflation, economic growth, and population growth in calculations and simulations. The poverty baseline indicators are used to estimate Indonesia's poverty rate as an application of the short-term outlook. Inflation is a precursor indicator that runs more dynamically than the poverty rate, which can be used to estimate the poverty rate in a certain period. One of the methods that can be used to estimate the poverty rate is the modified per capita expenditure method and the modified poverty line method (Nugroho et al., 2020).

In analyzing the impact of a policy, ideally it should be done using the latest data that corresponds to the time the policy was implemented. However, in practice, such data cannot be obtained quickly. In general, poverty figures and indicators are published every first week after 3 months of survey implementation. Even with limited data, by using simulations, the decomposition of the poverty rate can be done by considering the inflation rate per type of commodity needs. Nugroho et al., (2020) in their study on poverty simulation explained that inflation is a leading indicator that can be used as a calculation instrument. An understanding of inflation can provide an opportunity for policy makers to determine the direction of policy in reducing the poverty rate for at least the next six months. In addition, the calculation of the poverty rate in the future needs to be done periodically. This step can improve the understanding of policy makers to implement adequate interventions in accordance with the price movements of basic needs, especially those related to the commodity components of the poverty line and achieve the targeted poverty rate. Son & Kakwani (2009) and Son (2008) in their research on the prediction of poverty levels using a modified method. The modification is done by analyzing the magnitude of the impact of price increases on per capita expenditure and its impact on the poverty line so that the poverty rate after a price increase can be obtained.

Therefore, based on the explanation above, researchers are interested in examining the impact of fuel price increases and direct cash transfer compensation assistance on poverty in Indonesia using simulations using leading indicators.

In contrast to previous studies that used general inflation, national economic growth, and annual population growth, this study tries to use more specific leading indicators such as commodities and commodity group inflation, the growth of the GDP component of household expenditure, and interim population growth as leading indicators in simulating the poverty indicators.

METHOD

The method of analysis in this study is quantitative using descriptive analysis using the modified method on per capita expenditure and the modified method on the poverty line.

Data

This study uses secondary data obtained from the results of the Kor National Socio-Economic Survey (Susenas) and the March 2022 Expenditure Consumption Module. Susenas is a survey that includes data on health, education, fertility, family planning, housing, and other socioeconomic conditions. The March 2022 Susenas data can be presented at the household and individual level.
In addition, this research also uses several publication data as supporting data sourced from the Statistics Indonesia/Badan Pusat Statistik). The following are some of the supporting data used in this study, namely:

a. National headline inflation by province and area of residence (urban and rural) for the period of March and September 2022
b. Inflation of food and non-food commodities and some Indonesian commodity prices for the period March and September 2022
c. Growth of Gross Domestic Product at Constant Prices in the expenditure component of the household economy for the first quarter of 2022 and the third quarter of 2022
d. Interim population projections by province for the period March–September 2022

Unit of analysis

The unit of analysis in this study is the household. The scope of this study covers all districts/cities in 34 provinces in Indonesia. The unit of analysis in this study is households in Indonesia in the March 2022 and September 2022 periods. The households were obtained from processing the March 2022 Susenas raw data and the modified March Susenas raw data. The entire sample of Indonesian households for the March 2022 period amounted to 339,584 households. From the household sample, there are 1,237,946 sample residents.

Poverty Simulation Flow Based on the Poverty Line Modification and Expenditure Modification Methods

The initial stage of forming the unit of analysis was to use the households from the March 2022 Susenas, which amounted to 339,584 sample households. From these sample households, there are 287,052 households that fall into the non-poor category and 29,532 that fall into the poor category. Because they use the same raw data, all of these samples will also be reused in the poverty simulation. In the September 2022 poverty simulation, the March 2022 Susenas raw data was modified in the expenditure breakdown. In addition, researchers also modified the household weights and individual weights using the results of interim population projections by province for the March–September 2022 period. This was done to accommodate population growth so that the resulting poverty simulation is closer to the actual conditions. Furthermore, households in the September 2022 period can be categorized into two, households that received BLT BBM compensation and households that did not receive BLT BBM.

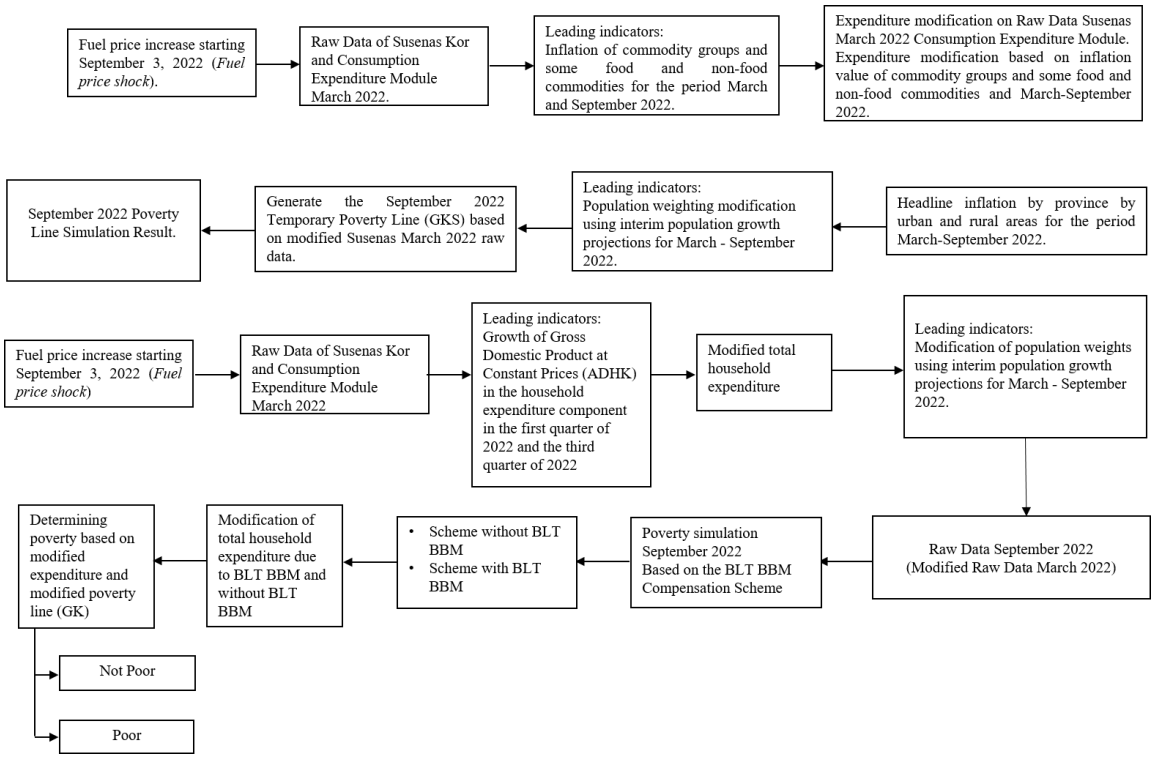

Figure 2. Poverty Simulation Flow based on the Poverty Line Modification and Expenditure Modification Methods
Source: Following the Simulation Flow of the National Team for the Acceleration of Poverty Reduction (2020) by Making Various Adjustments by the Researcher

Researchers used the raw Susenas March 2022 in conducting poverty simulations. Before conducting the simulation, researchers modified the raw data of the Susenas March 2022 Consumption Expenditure Module using several supporting data that were previously published by BPS or can be called the leading indicators of the poverty rate that have been explained previously, namely inflation, economic growth, and population growth.

The first step is to form a Temporary Poverty Line/Garis Kemiskinan Sementara (GKS). The Temporary Poverty Line is obtained from the March 2022 Poverty Line/Garis Kemiskinan (GK) by province and area of residence (urban and rural) multiplied by general inflation by province and area of residence for the period March 2022–September 2022. After the Temporary Poverty Line was established by province and region of residence, researchers modified the raw data of the Susenas March 2022 Consumption Expenditure Module using commodity group inflation and price changes in several food and non-food commodities for the March 2022 and September 2022 periods officially released by BPS. In other words, the nominal household expenditure by type of commodity group and commodity will change by the inflation that occurred between the two months, but without changing the commodity unit. The modified household expenditure was used in the simulation to obtain the September 2022 Poverty Line. Furthermore, the interim population projection by province for the period March–September 2022 is used to estimate the total population in September 2022 and is used as a weight correction in the modified raw data. This stage is very important

because the observation unit used in calculating the September 2022 Poverty Line is obtained from the reference population, which is 20 percent of the population that is above the Temporary Poverty Line and uses a corrected weight in order to describe the condition of the September 2022 population. By performing these steps, the September 2022 Poverty Line simulation results have been obtained.

After obtaining the September 2022 Poverty Line simulation results, researchers modified household expenditure in the initial raw data (March Susenas Consumption Expenditure Module before being modified using inflation). Household expenditure was modified using the national Gross Domestic Product Growth at Constant Prices in the components of household expenditure in the first quarter of 2022 and the third quarter of 2022. That way, only the nominal total household expenditure will change by the growth of household expenditure that occurs between the two quarters and the commodity unit does not change.

Note that the expenditure modification using inflation is only used to calculate the Poverty Line, while the expenditure modification only uses household expenditure growth to represent September 2022 expenditure.

Poverty Simulation Assumptions

There are several assumptions that need to be considered in simulating poverty using the modified per capita expenditure method and the modified poverty line:

a. Assumptions that are fixed and not directly calculated:
   - Population growth uses the Interim 2020–2023 population projection by province to illustrate the September 2022 population condition.
   - The quantity of goods consumed by households is fixed.
b. Variable assumptions are those that are set based on leading indicators that directly affect consumption and the price level of goods and services:
   - Price growth (inflation) directly affects the price of goods and services. Expenditure on goods and services rises but with a fixed quantity. The change in expenditure will affect the formation of the poverty line.
   - Economic growth directly affects household expenditure, but does not affect the formation of the poverty line.
c. Other Assumptions:
   - This study did not use the family data approach, but instead used the household data approach due to data limitations.
   - BLT BBM compensation is given per month (for four months) starting from September 2022–December 2022 in accordance with the government's plan. However, the simulation conducted in this study assumes that the nominal assistance received is for one month, namely September 2022 (not cumulative for four months). This is because the researcher wants to see poverty at one point in time according to the corresponding month, which is September 2022. For example, if the BLT BBM that was given was IDR150,000 per month and was given for four months (September 2022, October 2022, and November 2022, December 2022), then the assistance of IDR150,000 was used in calculating poverty in September 2022, not IDR600,000. Likewise, if the distribution is given at once in 2 stages, for example, IDR300,000 in September 2022 and IDR300,000 in November

2022, then the amount of IDR150,000 for September 2022 will be considered in accordance with the planned use at the time the assistance is distributed.

Methods for Calculating Poverty

The conceptual reference for the poverty calculation method used in this study is the concept of absolute poverty using the Foster-Greer-Thorbeck (FGT) index. The use of the FGT index has the advantage of being comparable across time and regions so that it can evaluate the success of poverty reduction policies, provided that the definition of poverty has not changed. In measuring poverty, Statistics Indonesia uses the concept of the ability to fulfill basic needs (basic needs approach). Poverty is considered an economic inability to fulfill basic food and non-food needs and is measured in terms of expenditure. People are categorized as poor if they have an average expenditure per capita per month below the poverty line.

The following is the formula for calculating poverty or known as the FGT (Foster, Greer and Thorbecke) poverty index (Foster et al., 1984):

$$P_\alpha = \frac{1}{n} \times \sum_{i=1}^{q} \left[\frac{(z - y_i)}{z}\right]^\alpha \qquad i = 1, 2, 3, \dots, q, y_i < z \tag{1}$$

Description:
α : 0 (P_0/Head Count Index)
α : 1 (P_1/Poverty Gap Index)
α : 2 (P_2/Proverty Severity Index)
z : Poverty line
y_i : Average monthly per capita expenditure of people below the poverty line
q : Number of people below the poverty line
n : The total population

From the equation above, P_0/Head Count Index is the percentage of the population that falls below the poverty line. Meanwhile, P_1/Poverty Gap Index describes a measure of the average expenditure gap of each poor person against the poverty line. The higher the index value, the further the average expenditure of the population is from the poverty line. Furthermore, P_2/Proverty Severity Index describes a measure of the distribution of expenditure among the poor. The higher the index value, the higher the expenditure inequality among the poor.

$$y_{hi_t} = y_{hi_{t-1}} \times \left(1 + \frac{p_{i_t} - p_{i_{t-1}}}{p_{i_{t-1}}}\right) \qquad \begin{matrix} i = 1, 2, 3, \dots, k \\ h = 1, 2, 3, \dots, n \end{matrix} \tag{2}$$
$$= y_{hi_{t-1}} \times (1 + inf_i)$$

$$y_{h_t} = \sum_{i=1}^{k} y_{hi_{t-1}} \times \left(1 + \frac{p_{i_t} - p_{i_{t-1}}}{p_{i_{t-1}}}\right) \quad \begin{matrix} i = 1, 2, 3, \dots, k \\ h = 1, 2, 3, \dots, n \end{matrix} \tag{3}$$
$$= \sum_{i=1}^{k} y_{hi_{t-1}} \times (1 + inf_i)$$

$$\bar{y}_{h_t} = \frac{1}{m_{h_t}} \times \sum_{h=1}^{n} y_{h_t} \qquad h = 1, 2, 3, \dots, n \qquad (4)$$

Descriptions:

y_{hi_t} : Expenditure on household h on commodity group or commodity i in period t (September 2022)

$y_{hi_{t-1}}$: Expenditure on household h on commodity group or commodity i in period $t-1$ (March 2022)

y_{h_t} : Total expenditure of household h in period t (September 2022)

$\bar{y}_{h_t}$: Average per capita expenditure of household h in period t (September 2022)

p_{i_t} : General CPI consumer price index in commodity group i or average general price of commodity i in period t (September 2022)

$p_{i_{t-1}}$: General CPI consumer price index in commodity group i or average general price of commodity i in period $t-1$ (March 2022)

inf_i : Inflation on commodity group i or price increase on commodity i

m_{h_t} : The number of household members in the hth household in period t (September 2022)

The March 2022 Susenas household expenditure was modified using the inflation indicator for the March 2022–September 2022 commodity or commodity group, the figures for which have been previously released. The modified per capita expenditure was used as a reference for calculating the Poverty Line or what can be called the Simulated Poverty Line by province and area of residence (urban and rural). The Simulated Poverty Line is obtained by using 20 percent of the population (reference population) who are above the Temporary Poverty Line. Meanwhile, the Temporary Poverty Line calculation is obtained from the March 2022 Poverty Line multiplied by general inflation by province and region of residence (urban and rural). It should be noted that the per capita expenditure is the per capita expenditure in a month. It is only used in calculating the poverty line. The September 2022 per capita expenditure that will be compared with the simulated poverty line is the March 2022 per capita expenditure modified using the Gross Domestic Product (GDP) component indicator at constant prices, namely the growth of household consumption expenditure from March 2022 to September 2022.

$$y_{h_t} = y_{h_{t-1}} \times \left(1 + \frac{c_t - c_{t-1}}{c_{t-1}}\right) \qquad h = 1, 2, 3, \dots, n \qquad (5)$$

$$= y_{h_{t-1}} \times (1 + c) \qquad h = 1, 2, 3, \dots, n$$

$$\bar{y}_{h_t} = \frac{1}{m_{h_t}} \times \sum_{h=1}^{n} y_{h_t} \qquad h = 1, 2, 3, \dots, n \qquad (6)$$

Descriptions:

y_{h_t} : Total expenditure of household h in period t (September 2022)

$y_{h_{t-1}}$: Total expenditure of household h in period $t-1$ (March 2022)

$\bar{y}_{h_t}$: Average per capita expenditure of household h in period t (September 2022)
c_t : GDP at constant prices by expenditure component of household consumption in period t (Quarter III-2022)
c_{t-1} : GDP at constant prices by expenditure component of household consumption in period $t-1$ (Quarter I-2022)
c : Growth of national household consumption expenditure component in period t (Q3-2022) and $t-1$ (Q1-2022)
m_{h_t} : Number of household members in household h in period t (September 2022)

Modified Poverty Line Method

The modified poverty line method uses inflation rates and population estimates for a certain period to estimate future poverty (Nugroho et al., 2020). The establishment of the September 2022 Poverty Line begins with the establishment of the Temporary Poverty Line. The calculation of the September 2022 GKS is obtained through the March 2022 Poverty Line, which is differentiated by province and region (urban and rural), multiplied by general inflation (a combination of 90 regencies/municipalities), which is also differentiated by province and region (urban and rural). What is meant by the modification of the Poverty Line in this study is that the Poverty Line is calculated using raw data on household expenditure and per capita expenditure of Susenas March 2022 that has been modified using inflation indicators for commodity groups or commodities for the period March 2022–September 2022. The per capita expenditure that has been modified with the inflation rate is used as the basis for calculating the September 2022 Poverty Line. The poverty line can also be regarded as the Simulated Poverty Line, which can be differentiated by province and region of residence (urban and rural).

Furthermore, the Poverty Line is obtained by using 20 percent of the population (reference population) who are above the Temporary Poverty Line. The reference population in question is a population whose expenditure has been modified using inflation. A person is said to be poor if the per capita expenditure that has been modified by household expenditure growth is below the Simulated Poverty Line.

Per capita expenditure modified using inflation aims to calculate the poverty line (used as the reference population). Meanwhile, per capita expenditure modified using household consumption expenditure growth from March 2022 to September 2022 is used to represent September 2022 per capita expenditure.

Use of Population Projections in Poverty Simulation

Population projections are used in the poverty calculation. This is because the population in September 2022 has increased compared to March 2022. Population projections are used as a correction to the individual weights and household weights in the poverty simulation calculation.

Table 3. Simulation Scheme for Poverty Calculation in September 2022 with and without BLT BBM Compensation Program

Poverty Rate in September 2022 (Simulation)	Fuel Cash Transfer Recipient Scheme	BLT BBM Compensation in September 2022
(1)	(2)	(3)
First Scheme	Without BLT BBM Compensation Program	-
Second scheme	PKH Recipient Households Get BLT BBM Compensation Program	IDR150.000,00
Third scheme	PKH/BPNT Recipient Households Get BLT BBM Compensation Program	IDR150.000,00

RESULTS

Exclusion Error dan Inclusion Error

Before conducting a poverty simulation, it is necessary to identify the exclusion error and inclusion error (Table 4). Exclusion error is the error of not including poor households that should have been included in the database. Conversely, inclusion error is the error of including non-poor households in the database (National Team for the Acceleration of Poverty Reduction, 2022). Reflecting on the distribution of the previous direct cash transfer, which was in 2008, the accuracy of the provision of assistance to target households is still a chore that must be improved. There were still targeting errors and BLT recipients who were not included because verification did not run properly (Rosfadhila et al., 2011).

Table 4. Identification of Exclusion Error and Inclusion Error

Household Poverty Status	Did Not Get the Program	Getting the program
(1)	(2)	(3)
Not Poor	✓	*Inclusion error*
Poor	*Exclusion error*	✓

Source: National Team for the Acceleration of Poverty Reduction, 2022

As initial information, it is necessary to identify the target families of cash transfer recipients. Based on information from the Ministry of Social Affairs, there were approximately 20.65 million beneficiary families/Keluarga Penerima Manfaat (KPM) who received BLT BBM. For information, the government provides BLT BBM compensation based on an integrated database. BLT BBM is distributed to families who are still actively registered as PKH/BPNT recipients. This means that families who do not have PKH/BPNT are not targeted to receive BLT BBM.

Although the government's measure of assistance policy is the family, researchers approached it using the household approach due to data limitations. The identification of exclusion and inclusion errors is very important because it will directly affect the results of the poverty rate simulation. This is because the BLT BBM program is based on the ownership of an active social assistance program. In this study, the researcher assumes that BLT BBM recipient households are households that are still actively registered in certain social assistance programs in March 2022. These social assistance programs include

PKH/BPNT. Poverty simulations were conducted with various possible schemes based on social assistance ownership. For example, in the scheme of providing assistance to PKH/BPNT recipient households, in the poverty simulation, if the household is classified as poor and does not yet have PKH/BPNT, it will not receive BLT BBM compensation.

Figure 3 shows the distribution of beneficiaries of the Family Hope Program (PKH) by decile group of household per capita expenditure based on the March 2022 Susenas results. To facilitate analysis, for example, decile groups 1 to decile 4 represent groups of households classified as poor and vulnerable to poverty. Decile 1 represents a group of households that have the lowest expenditure (poorest). It can be seen that if the Direct Cash Compensation is given only to PKH recipient households, the exclusion error in decile 1 will reach 73.05 percent or can be said to be still very high. This means that there are 73.05 percent of households that do not receive the benefits of the BLT BBM compensation program, even though this group of households deserves assistance because they have the lowest per capita expenditure (in decile 1) or are classified as the poorest. It can also be interpreted that only 26.95 per cent of the poorest households received the compensation program. Ideally, the distribution of assistance should be right on target. However, in reality, there are still households that are classified as well-off households (decile 5 and above) that actually receive compensation or the so-called inclusion error.

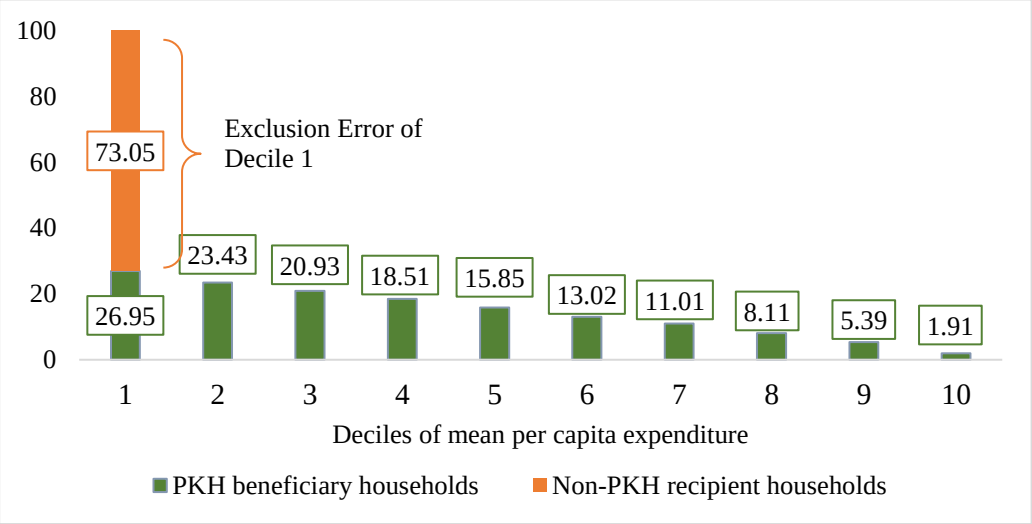

Figure 3. Distribution of PKH Beneficiaries by Decile Group of mean per capita expenditure in Indonesia, March 2022 (Weighted)
Source: Susenas March 2022

In Figure 4, information is presented on the distribution of beneficiaries of the Non-Cash Food Assistance Program (BPNT) by decile group of household per capita expenditure based on the March 2022 Susenas results. If the Cash Transfer Compensation is provided only to BPNT recipient households, the exclusion error in decile 1 will reach 64.18 percent (8.87 percent lower compared to the scheme of providing compensation only to PKH households). The coverage of targeted households in the BPNT scheme is better than the PKH scheme but the error rate is still very high. Meanwhile, the number of well-off households (decile 5 and

above) receiving compensation has also increased compared to the PKH scheme. Exclusion error and inclusion error are problems that must be overcome in order to maximize poverty alleviation.

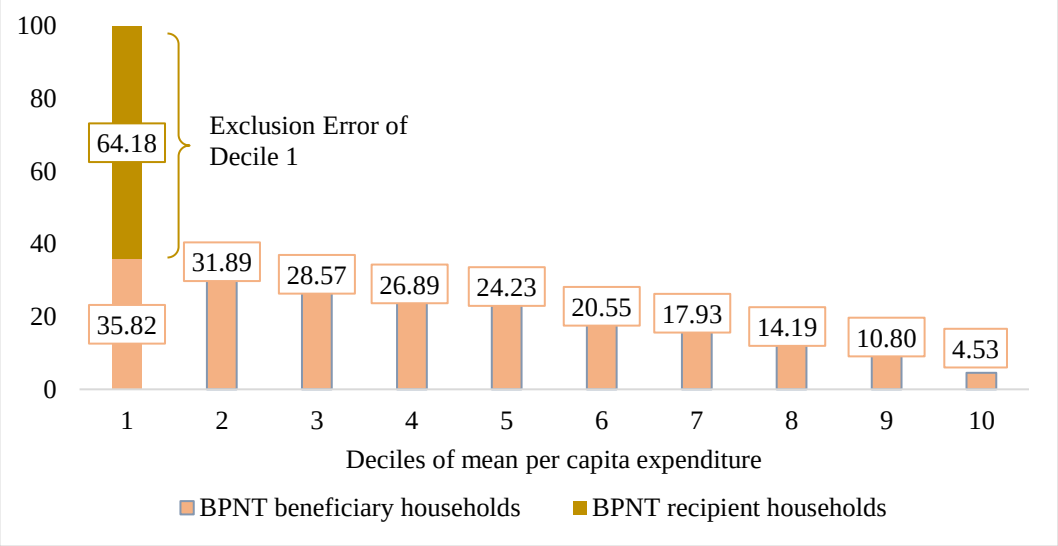

Figure 4. Distribution of BPNT Beneficiaries by Decile Group of Mean per Capita Expenditure in Indonesia, March 2022 (Weighted)
Source: Susenas March 2022

In Figure 5, it can be seen that if the Cash Transfer Compensation follows the government's scheme, which is given to PKH/BPNT recipient households, the exclusion error in decile 1 will be 55.35 percent. Although this figure is lower than the PKH-only and BPNT-only schemes, more than half of the households in decile 1 still do not receive the program, even though they deserve compensation. Only 44.65 per cent of households in decile 1 received program benefits. In the government scheme, it was also found that well-off households with non-poor status still received the PKH/BPNT program. This indicates that the provision of the PKH/BPNT program is still not well targeted. This problem must be taken seriously by the government because the PKH and BPNT recipient base is the gateway in integrating other assistance, such as during the fuel price increase shock. A poorly targeted database resulted in households that were targeted for BLT BBM compensation also being poorly targeted.

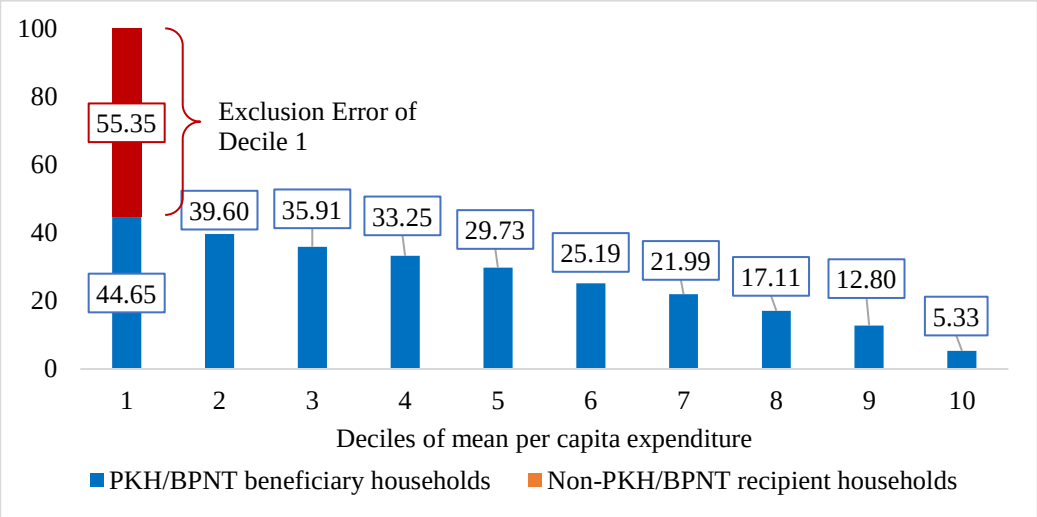

Figure 5. Distribution of PKH/BPNT Beneficiaries by Decile Group of mean per Capita Expenditure in Indonesia, March 2022 (Weighted)
Source: Susenas March 2022

Poverty Rate Simulation Results

Based on the simulation results, the poverty line in September 2022 increased compared to March 2022. The national poverty line in March 2022 amounted to IDR 505,469.00/capita/month and increased to IDR 528,975.00/capita/month (an increase of 4.65 percent) in September 2022 (Table 5).

According to table 5, poverty rate in March 2022 was 9.54 percent. This figure is the actual figure officially released by the Statistics Indonesia (Statistics Indonesia, 2022d). In Figure 4.7, it can be seen that there are three poverty rate schemes from the simulations that have been conducted. The first scheme is a scheme in which the fuel price increase is not responded to with a special policy or in other words, the fuel price increase is responded to without providing BLT BBM compensation to targeted households. Thus, poverty rate in September 2022 is estimated to have increased to 10.36 percent. In other words, poverty rate will increase by 0.82 percent or an additional 2.3 million people will become poor compared to March 2022. This unassisted scheme is certainly a scheme that is not expected to occur because it is contrary to the government's expectations in overcoming poverty problems.

In general, a fuel increase that is responded to by providing BLT BBM compensation (second scheme and third scheme) can reduce the poverty rate of the population compared to without BLT BBM compensation. However, poverty that will occur in September 2022 is predicted to be higher than in March 2022. The provision of compensation can restore the purchasing power of households that fell due to inflation in the prices of food and non-food goods caused by the increase in fuel prices. BLT BBM is considered to be able to help although it is limited to meet the needs of life in the short term (Rosfadhila et al., 2011). The decline in household purchasing power can be seen from the results of the poverty simulation without compensation (scheme 1) where the poverty rate is 10.36 percent, the monthly per capita expenditure will also be lower. In contrast,

poverty will be much lower if households receive compensation and per capita expenditure per month in households will increase if compensation is given.

Table 5. Poverty Indicators in March 2022 (Actual) and Simulated Poverty in September 2022 in Indonesia Based on the BLT BBM Compensation Scheme (Weighted)

Indicators	March 2022 (Actual)	Poverty Simulation in September 2022		
		Without BLT BBM Compensation	BLT BBM compensation of Rp150,000 for PKH recipient households	BLT BBM compensation of Rp150,000 for PKH/BPNT recipient households
		1st scheme	2nd scheme	3rd scheme
(1)	(2)	(3)	(4)	(5)
Total Population	274.204.096	276.536.099	276.536.099	276.536.099
Number of Poor People	26.161.161	28.651.119	27.319.026	26.449.602
Poverty Rate/P_0 (Percent)	9,54	10,36	9,88	9,56
Poverty Line (GK)/capita/month (IDR)	505.469	528.975	528.975	528.975
- Food Poverty Line/capita/month	374.455	389.817	389.817	389.817
- Non-Food Poverty Line/capita/ month	131.014	139.157	139.157	139.157
Poverty Gap Index/P_1	1,586	1,816	1,664	1,570
Poverty Severity Index/P_2	0,395	0,467	0,419	0,391
Gini Ratio	0,384	0,384	0,381	0,379
Mean Expenditure per Capita per Month (IDR)	1.327.782	1.351.671	1.357.084	1.361.673
Average number of household members in poor households	4,74	4,72	4,74	4,80
Number of Households	72.857.566	73.465.960	73.465.960	73.465.960
Number of Poor Households	5.523.998	6.069.381	5.760.072	5.507.125
Household Poverty Rate (Percent)	7,58	8,26	7,84	7,50

Source: Susenas March 2022 and Modified Susenas March 2022 (data processed)

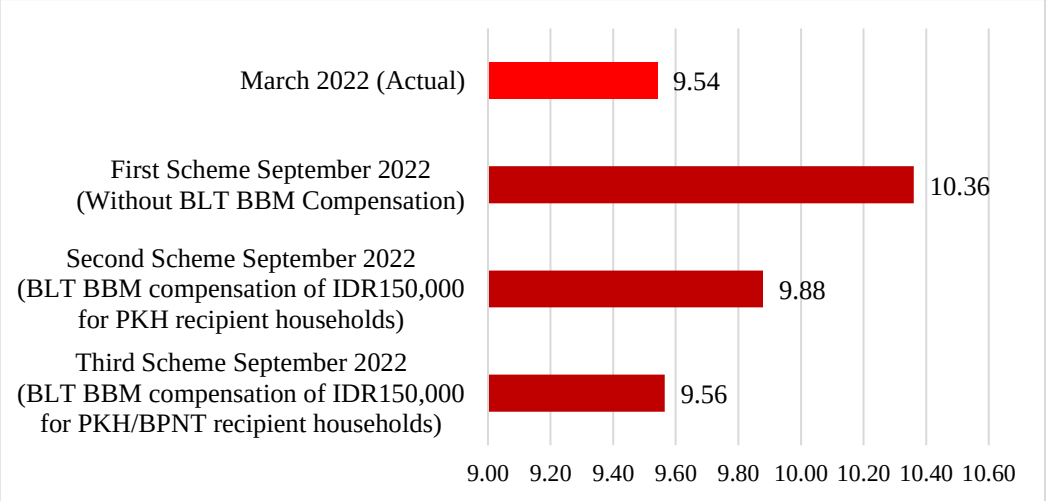

Figure 6. Poverty Rate Simulation in Indonesia, September 2022 (Weighted)
Source: Susenas March 2022 and Modified Susenas March 2022 (data processed)

In the second scheme, if the fuel increase is followed by BLT BBM compensation for households receiving the Family Hope Program (PKH) of IDR150,000, population poverty in September 2022 is predicted to increase to 9.88 percent (an increase of 0.34 percent compared to March 2022). However, this figure is 0.48 percentage points lower than in scheme 1 (without assistance).

The third scheme has a wider program scope than the second scheme because it adds households that have Non-Cash Food Assistance (BPNT) as beneficiaries of BLT BBM with the same amount of IDR150,000. This scheme follows the government's scheme, where the target beneficiaries are those who have PKH/BPNT. Based on the simulation results through the 3rd scheme, population poverty in September 2022 is estimated at 9.56 percent (an increase of 0.02 percent compared to March 2022).

An increase in fuel prices that is not accompanied by government policy instruments will result in an increase in the poverty rate. Although the existence of price subsidies is able to reduce the poverty rate, the poverty rate may still rise due to a decrease in household income. The decline in household income is influenced by macroeconomic conditions, namely low savings, investment, and employment opportunities (Chitiga et al., 2012).

Poverty Gap Index Simulation Results

The problem of poverty is not just the number and percentage of poor people. Another aspect that needs to be considered is the poverty depth index. The poverty depth index is a measure of the average expenditure gap of each poor person against the poverty line (Statistics Indonesia, 2022d).

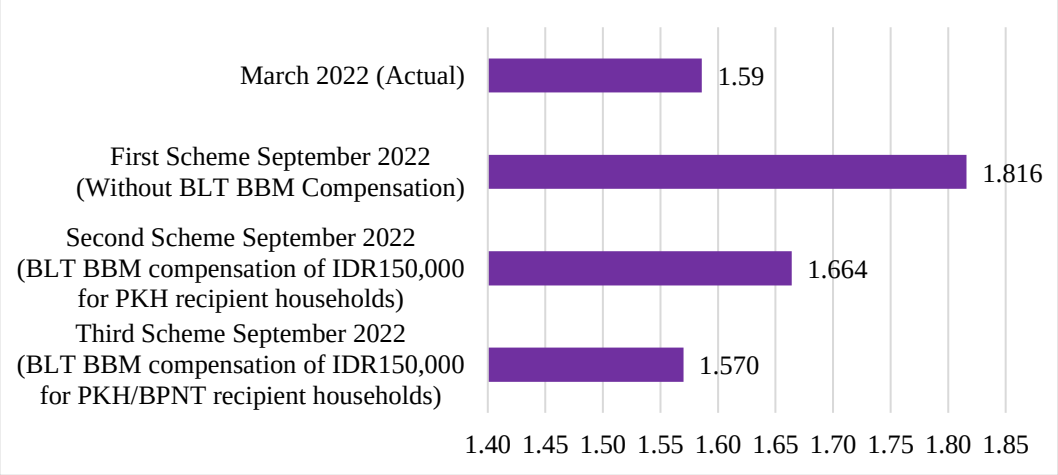

Figure 7. Poverty Gap Index Simulation in Indonesia, September 2022 (Weighted)
Source: Susenas March 2022 and Modified Susenas March 2022 (data processed)

If the fuel price increase is addressed without the BLT BBM compensation program, the poverty depth index (P1) is predicted to be 1.816 (an increase of 0.23 points) compared to March 2022 which was only 1.586. On the other hand, the poverty depth index with the BLT BBM compensation scheme (scheme 2 and scheme 3) has a much lower poverty depth index than without the program. In the 2nd scheme, providing compensation to PKH recipients would result in a poverty depth index of 1.664 (0.078 points higher than in March 2022, but 0.152 points

lower than the no compensation scheme). In the third scheme with PKH/BPNT recipients as compensation recipients (in accordance with the government scheme), the poverty depth index is estimated at 1.570 (0.016 points lower) compared to March 2022. In the scheme run by the government, providing compensation to PKH/BPNT recipients is able to reduce the depth of poverty.

Poverty Severity Index Simulation Results

The next aspect that can be seen in relation to poverty indicators is the poverty severity index (P2). The poverty severity index describes the distribution of expenditure among the poor Statistics Indonesia, 2022d). Just like the poverty depth index, the poverty severity index will also be higher in the absence of compensation than in the presence of compensation. The poverty severity index in March 2022 is 0.395. If the fuel price has increased, but there is no compensation program (first scheme), then the poverty severity index in September 2022 is estimated to be 0.467 (an increase of 0.072 points) compared to March 2022.

If the fuel price increase is followed by the BLT BBM compensation policy (second scheme and third scheme), then the poverty severity index will be much lower than without the program. In the second scheme, the poverty severity index is 0.419 (0.024 points higher) compared to March 2022. This is because the coverage of BLT BBM beneficiaries only reaches PKH recipient households. In the third scheme, the severity index is lower at 0.391 because this scheme includes PKH/BPNT households. This figure is 0.004 points lower than in March 2022.

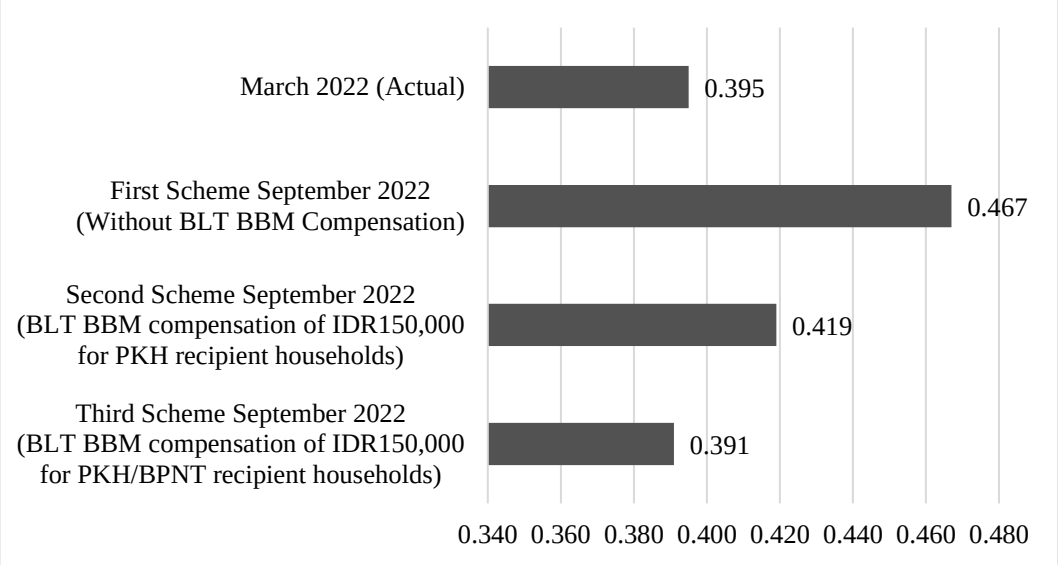

Figure 8. Poverty Severity Index Simulation in Indonesia, September 2022 (Weighted)
Source: Susenas March 2022 and Modified Susenas March 2022 (data processed)

In Figure 9, it can be observed that the scheme without BLT BBM compensation has the same Gini Ratio as the March 2022 condition, which is 0.384. Different results are shown when compensation is given where the Gini Ratio value becomes lower. This indicates that compensation can reduce expenditure inequality among the population. Although the difference is quite small because the compensation assistance is only sufficient for the basic needs of the poor and vulnerable poor.

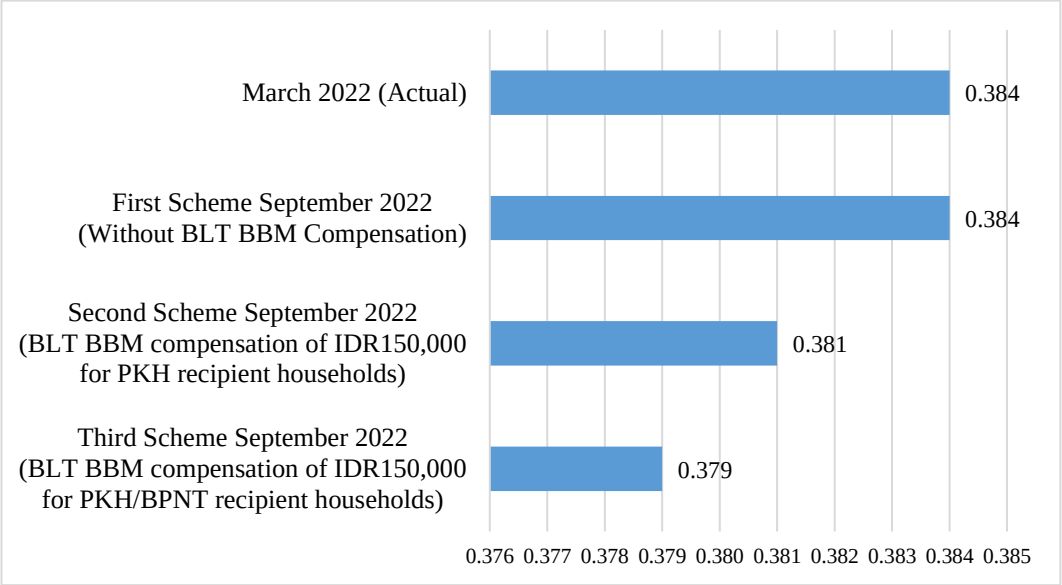

Figure 9. Gini Ratio Simulation in Indonesia, September 2022 (Weighted)
Source: Susenas March 2022 and Modified Susenas March 2022 (data processed)

CONCLUSION

The increase in fuel prices in September 2022 triggered an (inflation) in most food and non-food commodity groups, causing a decrease in people's purchasing power and an increase in the poverty line. Inflation is an important component in generating the poverty line and social assistance is an important component in restoring the purchasing power of the poor and vulnerable to poverty.

Without the BLT BBM Compensation, poverty is estimated to reach 10.36 percent (an increase of 0.82 percent) compared to March 2022 of 9.54 percent. With the BLT BBM Compensation, the poverty rate in September 2022 will be much lower. In the government scheme where BLT BBM compensation is given to PKH/BPNT recipient households, the poverty rate is estimated at 9.56 percent (an increase of 0.02 percent compared to March 2022). The fuel price increase in September 2022 triggered price increases (inflation) in most food and non-food commodity groups, causing a decrease in people's purchasing power and an increase in the poverty line.

BLT BBM has been proven to reduce poverty. BLT BBM plays a role in restoring the purchasing power of the poor and vulnerable poor. BLT BBM can be a short-term solution in poverty alleviation when there is an economic shock. However, there is still a high exclusion error in decile 1 in the government scheme where the percentage of households with the lowest 10 percent of per capita expenditure that should receive the program but do not receive it (non-PKH/BPNT) is 55.35 percent of households, thus becoming an obstacle in poverty alleviation.

DISCUSSION AND POLICY IMPLICATIONS

BLT BBM compensation plays a role in restoring the purchasing power of the poor and vulnerable poor. BLT BBM can be a short-term solution in poverty alleviation when there is an economic shock. When compared to the scheme

without compensation, the scheme with compensation assistance not only results in a lower poverty rate, but also results in a lower poverty depth index and poverty severity index.

However, it was found that there is still a high number of programs that are not well-targeted especially in decile 1. There must be improvements and updates to the accurate database of beneficiaries of assistance programs. This plays an important role in program planning and the success of poverty alleviation. Improving the quality of the integrated database will have an impact on the determination of more targeted targets. The government already has a very valuable asset in the form of Integrated Social Welfare Data/Data Terpadu Kesejahteraan Sosial (DTKS) on beneficiaries that contains information on poor families, the vulnerable poor, people who need social welfare services, and so on. The way to improve data quality is to minimize exclusion errors by identifying the socioeconomic characteristics of the poor that can be seen from various aspects of demographics, health, education, employment, asset ownership, and housing (National Team for the Acceleration of Poverty Reduction, 2022)

Improvement and updating of data on program target recipients can be integrated with other data such as the results of the BKKBN 2021 Family Data Collection/Pendataan Keluarga (PK), the results of the Socio-Economic Registration (Regsosek) data collection can be used to complement DTKS because it has more indicators and details so that ranking can be done. By doing so, it is expected that the right number of target recipients and the right amount of compensation can be formulated. On the other hand, Susenas data can be used as evaluation data for macro poverty alleviation programs that have been implemented, which can also be monitored periodically. Last but not least, it is important to maintain price stability in food and non-food commodities so that they are not too high after the fuel price increase so that people's purchasing power does not decline further.

LIMITATIONS OF THE STUDY

This study has limitations, namely using the household approach from the Susenas survey. In reality, government social assistance programs are generally based on the family concept. Household and family have different concepts. A further limitation is that the BLT BBM compensation is assumed to be entirely used up by households so that the assistance directly affects total household expenditure. The simulation used in this study could not detail the use of BLT BBM by households for specific purposes, whether all of it was used for household needs in the commodity basket or for other purposes that were not in the commodity basket.

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