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The Impact of Rastra-BPNT Assistance on Household Food Expenditure Patterns and Poverty Status in Indonesia

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Abstract

This study uses Susenas March 2019 raw data in a cross-section of 34 provinces and 514 districts/cities in Indonesia with a coverage of 315,672 households, designed using a quasi-experiment on the treatment group and control group after program implementation. The treatment group was formed by beneficiary families while the control group was formed by non-beneficiary families. The sample of beneficiaries was 50,485 or 9,845,922 households if calculated with Susenas weighting (65.55% of the total 2019 realization of 15,020,323 national beneficiaries) and non-beneficiaries were 181,358 households. The data were analyzed using a probit regression model and impact estimation was conducted using the Propensity Score Matching (PSM) approach. The results suggest that education level is a bigger determinant for households to become Rastra-BPNT beneficiaries, especially for household heads who did not finish primary school and those who graduated from primary school. Rastra-BPNT food social assistance has a significant and positively correlated impact on beneficiary families with a pattern of food proportion to total expenditure > 50%. There was a shift in the food consumption budget share for Beneficiary Families in several dominant commodities such as grains; eggs and milk; processed food and beverages; and cigarettes, tobacco and betel. The distribution of Rastra-BPNT from November 2018 to February 2019 can reduce the gap between household groups, but there are still errors in the distribution of benefits.

Keywords: Food Social Assistance, Rastra-BPNT, Food Expenditure Pattern, Poverty Status, Household Expenditure Patterns.

1. Introduction

Most people in Asian countries consume rice as a staple food, about 90 percent of the world's rice consumption is produced and consumed in Asia. Empirically, more than half of the household expenditure ratio in the Asian region is spent on food or rice as a normal item [1]. Social protection is an integral aspect of the development process as well as poverty alleviation and inequality reduction in a country [2]. Government policies are often believed to be fundamentally linked to the ability of regulators to ensure food security for households in the country [3]. It is therefore not surprising that governments in most countries play a major role in maintaining stable below-market food prices and commodity supplies to create food security [4]. This policy is a series of government interventions designed to provide access to and supply of food for vulnerable and food-insecure populations [5]. The in-kind transfer program is predicted to be an income shock and encourage households to reduce the portion of their rice budget (consumption). The reduction in the proportion of food expenditure will divert households to consume non-food commodities so that welfare increases. In-kind transfers in developed countries have a greater impact, while in developing countries, cash transfer programs are better than in-kind transfers [6]. This is because in-kind transfer programs in developing countries have high costs compared to developed countries [7]. The results show that in-kind transfer programs have several advantages, such as encouraging consumption; lowering prices at the local level especially in remote areas, thus benefiting beneficiaries more; and being more politically feasible. While in-cash transfers can provide cost-effectiveness benefits; Stabilizing household income (pensions) and improving children's health and school enrollment rates [8].

The ideals of Indonesia's social protection system have been mandated by article 34 of the 1945 Constitution, that the state is obliged to develop a national social protection and security system, being a social safety net program. Social assistance programs aim to improve social welfare through poverty reduction [9]. Social assistance provided can be in the form of contributive (conditional) or non-contributive (unconditional) schemes from beneficiaries. Social assistance can be provided directly in the form of money (in-cash transfers), or goods and services (in-kind transfers). Social assistance can also be short-term due to certain socioeconomic conditions and long-term, especially for vulnerable populations [10].

The monetary crisis in 1998 has caused various social and economic problems in Indonesia. One of them was scarcity, production instability, and high food prices, which caused inflation in various regions (consumer price index). Thus, the Special Market Operation (OPK) policy emerged. The aim was to reduce the burden on poor and near-poor households in meeting their basic needs, especially rice. In 2002, the program was renamed the rice for the poor (Raskin) program in

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the form of food subsidies. Since 2016, Raskin has been socialized into the social food assistance rice for prosperous families (Rastra). Because its purpose is no longer only as a social safety net, but rather social protection (social safety net) for very poor, poor, and near-poor households [11]. The target is to reduce the burden of household expenses in meeting food needs (rice) through subsidized rice purchases with an allocation of 15 kg per Beneficiary Family (KPM) per month, with a Rastra Redemption Price (HTR) of IDR 1,600 / kg of Bulog medium rice. In 2016, Rastra was distributed to 15.6 million beneficiary households, but in 2017 the Indonesian government began implementing a limited Non-Cash Food Assistance (BPNT) program in 44 selected cities consisting of 14.3 million Rastra beneficiaries and 1.2 million BPNT beneficiaries. BPNT is a food social assistance scheme for the bottom 25% of income families in the form of in-kind transfers but distributed through electronic vouchers. BPNT beneficiaries receive a balance in a bank account of Rp110,000/KK/month with a Prosperous Family Card (KKS). The balance can be exchanged for rice and eggs at merchants (e-warong) that cooperate with the bank. BPNT is a non-cash food assistance in an effort to alleviate poverty and encourage financial inclusion [12]. The number of beneficiaries in 2019 increased to 15.6 million in 317 districts/cities compared to the previous year of 10.3 million BPNT beneficiaries and 5.3 million Rastra beneficiaries.

In Indonesia, in-kind social assistance can have an impact on beneficiary household expenditure, especially on food consumption. Previous research has shown in-kind transfers boost household spending on food. However, comparisons of aggregate expenditure shares and poverty rates can be biased if observed only in terms of per capita expenditure, without considering the demographic and socioeconomic composition of beneficiary household members. It is necessary to analyze the impact of food aid based on household characteristics such as age, gender, education, employment, family status, number of household members, and access to clean water and sanitation facilities; ownership of assets such as mobile phones, televisions, computers, jewelry, motorcycles, cars, boats, and houses or land; and residential areas such as cities and villages [13].

2. Research Method

This study uses cross-sectional raw data from the March 2019 National Socio-Economic Survey (SUSENAS) results spread across 34 provinces and 514 districts/cities in Indonesia totaling 315,672 households. However, cross-section data does not allow for non-randomized assigment to control for all relevant predictors [14]. Therefore, a quasi experimental design approach was used but it was a non-equivalent control group by conducting experiments on the treated and comparison groups (control) with the assumption that after the realization of the program [15]. The treatment group is formed by beneficiary families while the control group is formed by non-beneficiary families using the difference means approach [16]. Furthermore, the impact estimation was conducted using the Propensity Score Matching method [17]. This approach is assumed to reduce selection bias, as two groups or characteristics have different opportunities to receive the intervention. To obtain the best estimated method, the sample households (unit of analysis) are the aggregate households with the lowest 40% expenditure as the target group and the highest 60% expenditure as the non-target group. The selected sample is the beneficiary families of the Rastra-BPNT food social assistance program distributed in the period November 2018 to February 2019. Recipient households and non-recipients of food social assistance by expenditure group, Susenas March 2019, the Rastra-BPNT sample is 50,485 households or 9,845,922 weighted families (65.55 percent of the total 2019 realization of 15,020,323 National families) and non-recipients are 181,358 households.

Operational Definition of Variables. A cross-sectional research design was chosen to estimate the impact of the social food assistance program on household expenditure patterns and poverty status [18]. The design is also able to estimate differences between the treated and control groups on outcome variables [19]. The definitions of the variables to be estimated in this study are: Outcome variable: a reflection of changes in outcomes that are actually targeted in both the short and long term as a result of program implementation, including Food consumption patterns explained by food expenditure per capita/month; food budget share; and budget share by commodity consumed; total household expenditure per capita/month and Household poverty status explained by expenditure group and poverty status [20]. Treatment variables are independent variables or other observable characteristics that can influence outcome variables by providing treatment instruments, consists of beneficiaries and non-beneficiaries of Rastra-BPNT from November 2018 to February 2019, Susenas March 2019. Explanatory variables are other observable characteristics that can determine the probability of the treatment variable to explain the causal relationship in the outcome variable as a result of program implementation.

Each parameter was analyzed using a means approach with the two-sample t-test method (two independent samples with unequal standard error of mean assumptions) because it is considered to represent the difference in the sample mean estimate from the total population estimated using Stata-MP17. To determine households receiving Rastra-BPNT food social assistance, the Probit Regression method is used, so that the explanatory variables that are the best unbiased estimators can be determined and used in further model estimation. The probit regression model can be solved with the cumulative distribution function of the normal distribution. To interpret the results of the binary probit estimation, the marginal effects approach produced by

the probit model is used. Marginal effects show how much influence each significant predictor has on the variability of each category on the response variable. In binary probit, marginal effects can measure the variability of discrete variables on the probability of the predicted response variable changing from 0 (zero) to 1 (one). As for continuous predictors, the marginal effect measures the instantaneous variability level of the response variable due to changes in the predictor. Then this study uses the average change in odds produced by the probit model or Average Marginal Effect (AME) by multiplying it by each predictor variable and averaging the results across all observations to reduce unobserved heterogeneity. To get a more representative marginal effect of each predictor, the delta method standard error approach is used.

Steps for estimating the probit model that will be used in testing the research hypothesis are Estimation of probit model with maximum likelihood and robustness check; Overall model fit with log-pseduolikelihood (G-test); Partial model fit with Wald-test; Goodness of fit model with Deviance-test; Coefficient of determination with pseudo-R2; and Apparent Error Rate. The PSM method is used to compare the average outcome of beneficiaries with a more balanced non-beneficiary of Rastra-BPNT where matching estimates are selected based on the similarity of observed characteristics. Propensity score is the value of the i-th observation (i = 1,2,...,n) as the conditional probability of being assigned to treatment (Di = 1) and control (Di = 0) groups according to the observed covariate vector xi adalah $E(x_i) = P(D_i = 1|X_i = x_i)$. $Y_i = D_i Y_{1,i} + (1 + D_i)Y_{0,i}$.

Where: Di ε(0,1) is the treatment variable indicator, namely Rastra-BPNT, if Di = 1: treatment groups are Rastra-BPNT recipients and if Di = 0: control groups are non-recipients of Rastra-BPNT; yi is the potential outcome of the i-th observed household, namely expenditure pattern (d_expend) and poverty status (d_stmiskin), if yi = 1 is the potential outcome of Rastra-BPNT recipients and if yi = 0 is the potential outcome of non-recipients of Rastra-BPNT. To reduce selection bias in the PSM probit model, the nearest neighbor matching method is used. The main parameter for testing the post-matching estimation results of the PSM method in this study was analyzed by the Average Treatment on the Treated (ATT) to the difference between the average potential results of the treatment group and the control group, or can be formulated as follows $ATT = E[y(1) - y(0)|rastra\_bpnt = 1]. = E[y(1)|rastra\_bpnt = 1] - E[y(0)|rastra\_bpnt = 1]$.

Estimation of mean treatment effects with PSM in this study using Stata-MP 17 (Psmatch2) and k-match or multi-algorithm approaches before and after matching (nearest-neighbor and kernel matching). The PSM model that is formed must fulfill the assumptions of a goodness of fit treatment mean effect estimate, including Conditional independent assumption (the resulting group is not influenced by other predictors, except for the treatment that has been determined) and Common support (overlapping or intersecting in the k-density propensity score between the treated group and the control group that has similar characteristics). The stages of testing the feasibility of the treatment effect model Perform estimation of the binary probit model; Estimating the propensity score; Selecting the matching algorithm, namely nearest neighbor with replacement one to one matching and kernel matching; Conducting a balancing test, selection bias of predictors that determine households receiving Rastra-BPNT (selection bias), and combining significant predictors before and after matching; Checking and testing the common support by conducting a quality test of the matching results; Estimating the standard error, final distribution and common support post-matching; and Estimating the average treatment effect on the treated (ATT) of k-match or multi-algorithm approach before and after matching (nearest neighbor and kernel matching).

3. Result and Discussion

Using descriptive analysis of means and standard error of mean (variation in mean differences between two groups), we found that Rastra-BPNT beneficiaries and non-beneficiaries differ in various aspects of demographic and socio-economic characteristics except for the gender of the household head. In general, the average monthly per capita income of recipient households is IDR 714,973, lower than that of non-recipients at IDR 1,115,708 or about IDR 400,735 different. The majority of recipient households are male (88.32%) with an average age of around 48 years and 90.2% belong to the productive age (15-64 years), and 98.72% are married. According to the latest level of education, the average household head graduated from primary school (40.32%) with an average length of schooling of 8 years. On average, the recipient family heads mostly work in the agricultural sector (55.81%) and only 27.46% work in the formal sector. The most striking characteristic difference between the two groups of household heads is that the average length of schooling of non-recipient households is around 10 years or 2 years different from recipient households. In other words, the level of education completed by Rastra-BPNT beneficiaries is 83.27% more at the high school level and below compared to non-beneficiaries with an average of 56.22%.

Table 1. Characteristics of Rastra-BPNT Recipient and Non-Recipient Households

Explanatory Variables	total sample (N = 231.843)		beneficiary (N_1 = 50.485)		non-beneficiary (N_2 = 181.358)		difference	
	mean	s.e	mean	s.e	mean	s.e	mean	s.e
Monthly Income per Capita (ln)	13,828	0,001	13,480	0,002	13,925	0,001	-0,445***	0,003
Head of Household Characteristics:								
gender (1 = female)	10,45%	0,001	11,68%	0,002	10,11%	0,001	1,57%***	0,002
age (year)	46,938	0,025	48,421	0,052	46,526	0,028	1,896***	0,060
working-age population (1 = 15-64 years old)	92,11%	0,001	90,20%	0,001	92,64%	0,001	-2,43%***	0,001
marital status (1 = married)	97,39%	0,000	98,72%	0,001	97,02%	0,000	1,70%***	0,001
years of schooling (year)	9,417	0,001	7,747	0,011	9,882	0,009	-2,135***	0,018
education attainment (1 = ≥ *SMA*)	37,89%	0,001	16,73%	0,002	43,78%	0,001	-27,05%***	0,002
edu1 (1 = not completed SD)	16,04%	0,001	25,42%	0,002	13,43%	0,001	12,00%***	0,002
edu2 (1 = SD graduates)	28,99%	0,001	40,32%	0,002	25,83%	0,001	14,50%***	0,002
edu3 (1 = SMP graduates)	17,08%	0,001	17,52%	0,002	16,96%	0,001	0,56%**	0,002
edu4 (1 = SMA graduates)	27,42%	0,001	15,06%	0,002	30,86%	0,001	-15,80%***	0,002
edu5 (1 = college graduates)	10,48%	0,001	1,67%	0,001	12,93%	0,001	-11,25%***	0,002
occupation (1 = agriculture sector)	38,10%	0,001	55,81%	0,002	33,16%	0,001	22,65%***	0,002
employment status (1 = formal)	41,86%	0,001	27,46%	0,002	45,87%	0,001	-18,40%***	0,002
emp1 (1 = self-owned business)	30,79%	0,001	33,31%	0,002	30,09%	0,001	3,22%***	0,002
emp2 (1 = sob with non-permanent worker)	18,61%	0,001	26,25%	0,002	16,48%	0,001	9,77%***	0,002
emp3 (1 = sob with permanent worker)	4,76%	0,000	2,68%	0,001	5,34%	0,001	2,66%***	0,001
emp4 (1 = worker/employee/staff)	37,10%	0,001	24,78%	0,002	40,53%	0,001	-15,74%***	0,002
emp5 (1 = freelancer)	7,76%	0,001	11,88%	0,001	6,61%	0,001	5,27%***	0,001
emp6 (1 = non-paid worker)	0,98%	0,000	1,10%	0,000	0,95%	0,000	0,15%**	0,001
Household Characteristics:								
household sizes (person)	3,915	0,003	4,283	0,008	3,812	0,004	0,471***	0,008
domicile (1 = rural)	56,11%	0,001	74,83%	0,002	50,90%	0,001	23,92%***	0,002
house ownership (1 = self-owned)	81,25%	0,001	89,15%	0,001	79,05%	0,001	1,10%***	0,002
floor area per capita (1 = ≥ 8 m^2)	90,49%	0,001	85,62%	0,002	91,85%	0,001	-6,23%***	0,001
source of lightning (1 = PLN electricity)	94,04%	0,000	89,45%	0,001	95,32%	0,000	-5,87%***	0,001
energy for cooking (1= gas/LPG)	73,91%	0,001	60,45%	0,002	77,66%	0,001	-17,21%***	0,002
sanitation (1 = decentable)	78,22%	0,002	68,93%	0,002	80,81%	0,001	-11,88%***	0,002
source of drinking water (1 = decentable)	90,30%	0,001	84,49%	0,002	91,92%	0,001	-7,43%***	0,001
most roof material (1 = decentable)	98,90%	0,000	97,63%	0,001	99,24%	0,000	-1,62%***	0,001
most wall material (1 = decentable)	97,74%	0,000	95,49%	0,001	98,36%	0,000	-2,88%***	0,001
most flooring material (1 = decentable)	96,92%	0,001	93,31%	0,001	97,92%	0,000	-4,61%***	0,001
Asset Ownerships:								
flat screen television (1 = yes, ≥ 30 inch)	14,86%	0,001	3,82%	0,001	17,94%	0,001	-14,12%***	0,002
cellular phone (1 = yes)	76,92%	0,001	62,44%	0,002	80,95%	0,001	-18,52%***	0,002
refrigerator (1 = yes)	61,14%	0,001	39,05%	0,002	67,29%	0,001	-28,24%***	0,002
gold/jewelry (1 = yes, ≥ 10 gram)	20,09%	0,001	7,49%	0,001	23,60%	0,001	-16,10%***	0,002
computer/laptop (1 = yes)	19,87%	0,001	5,41%	0,001	23,90%	0,001	-18,49%***	0,002
motorcycle (1 = yes)	79,80%	0,001	68,87%	0,002	82,84%	0,001	-13,97%***	0,002
boat/motorboat (1 = yes)	2,59%	0,000	3,71%	0,001	2,27%	0,000	1,44%***	0,001
car (1 = yes)	12,97%	0,001	2,24%	0,001	15,96%	0,001	-13,72%***	0,002
land (1 = yes)	75,15%	0,001	77,92%	0,002	74,38%	0,001	3,55%***	0,002
Financial Literacy (1 = have a bank account)	67,80%	0,001	62,27%	0,002	69,34%	0,001	-7,07%***	0,002
Household Island Residence:								
sumatera (1 = sumatera)	29,23%	0,001	30,09%	0,002	28,98%	0,001	1,11%***	0,002
jawa (1 = jawa)	31,52%	0,001	25,89%	0,002	33,09%	0,001	-7,20%***	0,002
bali and southeast nusa (1 = balinusa)	7,70%	0,001	11,35%	0,001	6,68%	0,001	4,67%***	0,001
kalimantan (1 = kalimantan)	10,40%	0,001	6,40%	0,001	11,51%	0,001	-5,10%***	0,002
sulawesi (1 = sulawesi)	13,39%	0,001	15,57%	0,002	12,75%	0,001	2,82%***	0,001
maluku (1 = maluku)	3,01%	0,000	3,34%	0,001	2,92%	0,000	0,42%***	0,001
papua (1 = papua)	4,78%	0,000	7,35%	0,001	4,06%	0,000	3,29%***	0,001

Another characteristic that is different is that only 33.16% of non-recipients work in agriculture and the formal sector (45.87%) as more work as laborers/employees (40.53%). The average household size of Rastra-BPNT recipients is 4 people. There is a significant difference between the two groups, with more beneficiaries living in rural areas (74.83%). Based on house ownership, recipient households generally already own a house, but non-recipients have an average floor area per capita ≥ 8 m2 (91.85%). The majority of Rastra-BPNT recipient households reside in Sumatra (30.09%) and Java (25.89%), while the rest (44.02%) reside outside of Sumatra and Java.

Food Expenditure Patterns of Rastra-BPNT Recipients and Non-recipients. The proportion of food expenditure of Rastra-BPNT beneficiaries and non-beneficiaries has differences in the adequacy of energy and protein consumption as well as food and non-food consumption. The energy adequacy of beneficiaries is lower and significantly different from non-beneficiaries. The average calorie consumption per capita of beneficiaries is 2,138.83 kcal/day, which is still below the energy adequacy recommended in the Minister of Health Decree No. 75 of 2013 of 2,150 kcal/capita/day. However, the average protein consumption per capita of beneficiaries of 59.38 grams/day has met the recommended protein adequacy of 57 grams per capita/day. There are also differences in the consumption of fat and carbohydrates that support or supply energy (calories), the average

beneficiary consumes more carbohydrates than non-beneficiaries, while the average non-beneficiary consumes more fat than Rastra-BPNT recipients.

Table 2. Expenditure Patterns of Rastra-BPNT Recipient and Non-Rastra Recipient Households

Outcome Variables	total sample (N = 231.843)		beneficiary (N_1 = 50.485)		non-beneficiary (N_2 = 181.358)		difference	
	mean	s.e	mean	s.e	mean	s.e	mean	s.e
Calorie consumption (kcal/capita/day)	2.217	1,351	2.139	2,756	2.238	1,544	-99,60***	3,267
Protein consumption (gram/capita/day)	64,95	0,052	59,38	0,094	66,50	0,058	-7,12***	0,121
Fat consumption (gram/capita/day)	56,21	0,050	49,52	0,097	58,07	0,057	-8,55***	0,120
Carbohydrate consumption (gram/capita/day)	326,29	0,206	331,55	0,439	324,82	0,233	6,73***	0,498
Food consumption (IDR/capita/month)	619.071	743	482.855	1.158	656.990	872,4	-174.135***	1.763
Total budget share of food (%)	55,12	0,000	60,99	0,000	53,49	0,000	7,51***	0,001
Budget shared by food commodities (%):	mean	%	mean	%	mean	%	mean	%
Cereals	72.610	14,37	75.379	18,10	71.839	13,34	3.540***	4,76
Tubers	7.543	1,25	9.356	1,72	7.039	1,12	2.317***	0,60
Fish/shrimp/squid/shell	58.184	9,48	47.107	9,54	61.268	9,46	-14.161***	0,08
Meat	26.104	3,83	16.568	3,02	28.759	4,05	-12.191***	-1,04
Eggs and milk	32.633	5,16	20.080	4,17	36.127	5,44	-16.047***	-1,27
Vegetables	44.776	7,90	40.430	8,62	45.986	7,70	-5.555***	0,92
Legumes	11.052	2,00	9.215	2,02	11.564	1,99	-2.349***	0,03
Fruits	32.438	4,81	21.107	4,05	35.592	5,02	-14.486***	-0,97
Oils and fats	15.310	2,80	13.986	3,10	15.679	2,72	-1.692***	0,38
Beverage stuff	19.402	3,48	18.185	4,00	19.740	3,33	-1.556***	0,66
Spices	12.349	2,15	10.570	2,24	12.845	2,13	-2.274***	0,12
Miscellaneous food item	10.733	1,81	8.807	1,83	11.269	1,80	-2.462***	0,03
Prepared food and beverages	198.099	29,38	124.382	24,97	218.620	30,60	-94.237***	-5,63
Cigarettes, tobacco and betel	77.838	11,58	67.683	12,62	80.665	11,29	-12.982***	1,33
Non-food consumption (IDR/capita/month)	651.013	2.015	340.339	1.462	737.497	2.507	-397.157***	4.813
Total budget share of non-food (%)	44,88	0,000	39,01	0,000	46,51	0,000	-7,61***	0,001
Budget shared by non-food commodities (%):	mean	%	mean	%	mean	%	mean	%
Housing and household facility	334.608	56,24	182.728	54,94	376.887	56,61	-194.159***	-1,67
Goods and services	145.795	22,53	76.235	23,35	165.158	22,31	-88.923***	1,04
Clothing, footwear, and headgear	39.442	6,95	22.839	7,22	44.064	6,88	-21.225***	0,34
Durable goods	69.291	5,77	26.809	4,95	81.117	5,99	-54.308***	-1,04
Taxes and insurances	38.376	6,54	21.110	7,77	43.182	6,19	-22.072***	1,58
Parties and ceremonies	23.502	1,96	10.618	1,77	27.089	2,02	-16.471***	-0,25
Total expenditures (IDR/capita/month)	1.270.085	2.463	823.194	2.294	1.394.487	3.018	-571.293***	5.848

Notes: *) p < 0,1; **) p < 0,05; ***) p < 0,01. Source: Raw Data SUSENAS, March 2019 (Processed).

The importance of adequate household energy and protein consumption can be used as an indicator to obtain the nutritional condition of the population, as well as an indicator of the government's success in food, agriculture, health and socio-economic development in an integrated manner. The adequacy of energy and protein is highly dependent on the purchasing power of the household itself. The higher the household's purchasing power, the greater the opportunity for the household to choose foodstuffs that are good in terms of quantity and type.

Probit Model Determinants of Rastra-BPNT Recipient Households. The AME value of each predictor that determines whether a household is a Rastra or BPNT beneficiary is shown in Table 3 below. There is a significant and negatively correlated effect between the level of education completed and the likelihood of a household being a Rastra-BPNT beneficiary (poor or vulnerable household). The first reason is that poverty level can be a major obstacle in achieving completed education or a factor that can prevent households from gaining access to proper education. Secondly, investment in education can improve skills and productivity which in turn can improve wage levels and household welfare. Investments in education and human capital are necessary to increase welfare and improve the poverty status of households.

Table 3. Determinants of Households Receiving Rastra-BPNT

Treatment Variable (rastra_bpnt)	coefficient	std. err	AME (dy/dx*)	Δ std. err	mfx
Monthly Income per Capita (ln)	-0,303***	0,008	-0,072***	0,002	13,8282
Head of Household Characteristics:					
gender (1 = female)	0,094***	0,011	0,022***	0,003	0,1045
age (year)	0,003***	0,000	0,001***	0,000	46,9384
working-age population (1 = 15-64 years old)	0,131***	0,014	0,031***	0,003	0,9211
marital status (1 = married)	0,084***	0,025	0,020***	0,006	0,9739
years of schooling (year)	-0,008*	0,005	-0,002*	0,001	9,4167
education attainment (1 = ≥ SMA)	-0,544***	0,040	-0,130***	0,010	0,3789
edu1 (1 = not completed SD)	0,171***	0,019	0,041***	0,004	0,1604
edu2 (1 = SD graduates)	0,106***	0,017	0,025***	0,004	0,2899
edu4 (1 = SMA graduates)	0,316***	0,029	0,075***	0,007	0,2742
occupation (1 = agriculture sector)	0,016**	0,008	0,004**	0,002	0,3810
employment status (1 = formal)	0,007	0,032	0,002	0,008	0,4186
emp1 (1 = self-owned business)	0,015	0,032	0,004	0,008	0,3080
emp2 (1 = sob with non-permanent worker)	-0,006	0,032	-0,001	0,008	0,1861
emp3 (1 = sob with permanent worker)	-0,131***	0,019	-0,031***	0,005	0,0476
emp5 (1 = freelancer)	0,197***	0,033	0,047***	0,008	0,0776
Household Characteristics:					
household sizes (person)	0,067***	0,002	0,016***	0,001	3,9147
domicile (1 = rural)	0,265***	0,008	0,063***	0,002	0,5611
house ownership (1 = self-owned)	0,263***	0,011	0,063***	0,003	0,8125
floor area per capita (1 = ≥ 8 m2)	-0,066***	0,011	-0,016***	0,003	0,9049
source of lightning (1 = PLN electricity)	0,019	0,014	0,005	0,003	0,9404
energy for cooking (1= gas/LPG)	-0,055***	0,009	-0,013***	0,002	0,7391
sanitation (1 = decentable)	-0,086***	0,008	-0,021***	0,002	0,7822
source of drinking water (1 = decentable)	-0,039***	0,010	-0,009***	0,002	0,9030
most roof material (1 = decentable)	-0,093***	0,028	-0,022***	0,007	0,9889
most wall material (1 = decentable)	-0,042**	0,021	-0,010**	0,005	0,9774
most flooring material (1 = decentable)	-0,221***	0,017	-0,053***	0,004	0,9692
Asset Ownerships:					
flat screen television (1 = yes, ≥ 30 inch)	-0,240***	0,014	-0,057***	0,003	0,1486
cellular phone (1 = yes)	-0,108***	0,008	-0,026***	0,002	0,7692
refrigerator (1 = yes)	-0,253***	0,008	-0,060***	0,002	0,6114
gold/jewelry (1 = yes, ≥ 10 gram)	-0,216***	0,011	-0,052***	0,003	0,2009
computer/laptop (1 = yes)	-0,288***	0,012	-0,069***	0,003	0,1987
motorcycle (1 = yes)	-0,121***	0,009	-0,029***	0,002	0,7980
boat/motorboat (1 = yes)	0,144***	0,020	0,034***	0,005	0,0259
car (1 = yes)	-0,442***	0,016	-0,105***	0,004	0,1297
land (1 = yes)	-0,033***	0,009	-0,008***	0,002	0,7515
Financial Literacy (1 = have a bank account)	0,271***	0,007	0,065***	0,002	0,6780
Household Island Residence:					
sumatera (1 = sumatera)	-0,178***	0,018	-0,043***	0,004	0,2923
jawa (1 = jawa)	-0,390***	0,018	-0,093***	0,004	0,3152
bali and southeast nusa (1 = balinusa)	-0,179***	0,019	-0,043***	0,005	0,0770
kalimantan (1 = kalimantan)	-0,526***	0,020	-0,126***	0,005	0,1040
sulawesi (1 = sulawesi)	-0,212***	0,018	-0,051***	0,004	0,1337
maluku (1 = maluku)	-0,345***	0,024	-0,082***	0,006	0,0312
Constanta	3,522	0,130			
Wald Chi-Square (43) = 33.338,72	Prob. > Chi-Square = 0,000				
Pseudo R^2 = 0,1859	Log-Pseudolikelihood = -98.910,832				
Deviance-test = 225.477,01	Prob. > Chi-Square = 1,000				

When viewed from the aspect of inherent characteristics of the household, all predictors are significant in influence or can be used as a determining factor for a household to obtain Rastra-BPNT benefits except the main source of lighting that comes from PLN electricity, because it is not significantly different between beneficiaries and non-beneficiaries. The most determining household characteristics are living in rural areas 0.063 times more likely than in urban areas and home ownership status is owned 0.063 times more likely than rented, rented, official, rent-free, and other houses. Meanwhile, the housing eligibility of the widest house wall other than made of wall, plastering, woven bamboo, and wood/plastering is the smallest determinant of households receiving Rastra-BPNT.

Another factor that is negatively correlated with the household's probability of receiving Rastra-BPNT but has a significant effect is asset ownership except for boat (motorized) ownership. Households that own assets such as television ≥ 30 inches, cellular phone, refrigerator, jewelry ≥ 10 grams, computer/laptop, motorcycle, car, and land/land will reduce their probability of becoming Rastra-BPNT recipients. Car ownership is the biggest determinant, 0.105 times less likely for a household to be a recipient than not owning a car. In contrast, if you own a boat (motorized), you are more likely to be a Rastra-BPNT recipient, because boats (motorized) are generally used by households who work as fishermen as work equipment. This means that the more households that own the above assets, the less likely they are to be Rastra-BPNT beneficiaries, because assets are assets (wealth) that can be used as income when resold to fulfill life needs.

Meanwhile, household financial literacy (ownership of an account for ART aged 5 years and above) is significantly 0.065 times more likely for households that have it to obtain Rastra-BPNT, because each beneficiary will get assistance through an electronic card (e-voucher), the Prosperous Family Card (KKS) to obtain the food needed. However, according to the islands of residence, households residing outside Kalimantan Island have a 0.126 times greater chance and the smallest outside Sumatra, Bali and Nusa Tenggara Island is 0.043 times compared to other islands. This is quite relevant to the condition of the poverty rate by islands in Indonesia in SUSENAS March 2019 that Kalimantan Island has a percentage of poor households of 5.93%, so the priority of poverty alleviation shifts to eastern Indonesia such as Papua Island which has a percentage of poor households of 24.85%.

Model Propensity Score Matching: Goodness of Fit. There are 29 predictors that can be categorized as appropriate (unbiased) and can be used to estimate the effect of treatment in the next model because it will

result in a smaller selection bias and a smaller tendency to unbalance recipients and non-recipients. On the other hand, there are 14 predictors that are categorized as inappropriate (biased) so that they cannot be used (eliminated) to estimate the effect of treatment in the next model because they are expected to tend to make the percentage of selection bias even greater and unbalanced.

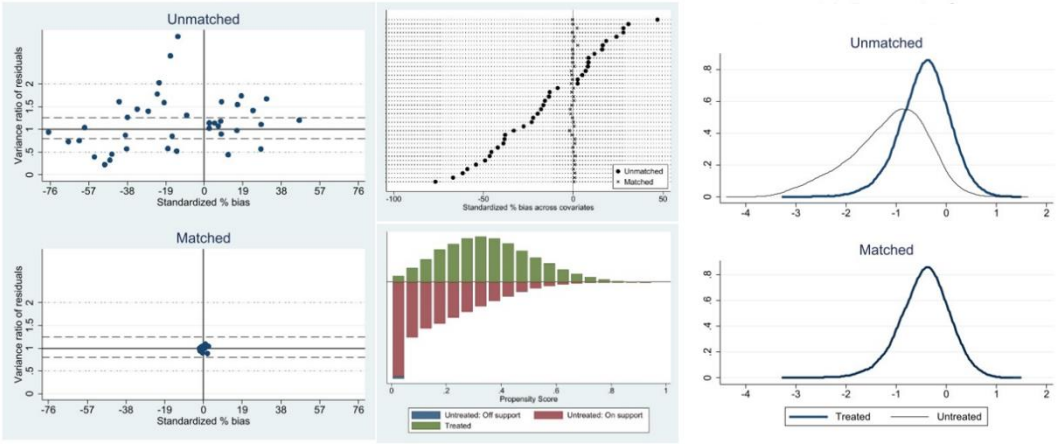

Figure 1. Distribution of Selection Bias Reduction, Common Support and Kdensity - Propensity Score Before and After Matching

The common support areas of 29 post-macthing covariates are divided into 2 groups, namely on-support (overlapping and intersecting) of 231,651 households and off-support group (not overlapping and not intersecting) of 192 households out of 231,843 observed households. Within on-support, there are 50,484 recipients (treated) and 181,167 non-recipients (control). In off-support, there are 191 non-recipients (control) and 1 recipient (treated). This off-support group of 192 households was eliminated because it was suspected to cause symptoms of bias in the estimation of the average treatment effect in the future. *Impact of Rastra-BPNT Social Assistance on Food Expenditure Patterns.*

The Rastra-BPNT food social assistance provided to households has a significant and negatively correlated impact on food expenditure/capita/month of Rp. 39,384 lower than non-recipients. With Rastra assistance of 10 kg/month (rice) or BPNT of Rp. 110,000/month (rice and eggs) can reduce the burden of spending on food needs for beneficiaries by around Rp. 39,384 (8.15%) from Rp. 482,851/capita/month. Rastra-BPNT social food assistance also has a significant but positively correlated effect on the proportion of food expenditure budget of 1.74% higher for beneficiaries than non-beneficiaries at the significance level (α = 1%). The reduced burden of food expenditure has been utilized by recipients to fulfill their food needs so that the share of food expenditure (60.60%) becomes larger. In other words, there is a tendency for recipient households to spend some or all of their additional income to consume (marginal propensity to consume) on food commodities that are greater than those of non-recipient households.

Among them are several dominant commodities such as grains; eggs and milk; meat; processed food and beverages; as well as cigarettes, tobacco and betel. This means that the shift in the bundle and the dominance of the ranking of commodity types consumed by recipient households may indicate that the Rastra-BPNT food social assistance has been well-targeted to increase consumption of basic needs (especially rice). On the other hand, this fact implies that beneficiaries are still dependent on food commodities with the highest carbohydrate and calorie sources such as rice. Overall, the impact of Rastra-BPNT is significant in changing the portion of the food expenditure budget of recipient households based on the commodity groups consumed. Except for the commodity types of fish, shrimp, squid and shellfish (0.03%), vegetables (0.01%), nuts (0.01%), and other foods (0.00%) or not much different than non-recipients.

Table 4. Estimated Impact of Rastra-BPNT on Food Expenditure Pattern Based on Average Treatment Effect on the Treated (ATT)

Outcomes Variables	Nearest-Neigbor Macthing nn (1); with replacement				Kernel Matching epan; bwidth (0,000248)			
	coefficient	s.e	Y_0	Y_1	coefficient	s.e	Y_0	Y_1
Food consumption (IDR/capita/month)	-35.435***	2.021	518.286	482.851	-39.384***	1.618	529.094	489.710
Total budget share of food (%)	0,0167***	0,001	0,6100	0,5933	0,0174***	0,001	0,6060	0,5886
Budget shared by food commodities (%):								
Cereals	0,0103***	0,001	0,1707	0,1810	0,0102***	0,001	0,1670	0,1772
Tubers	0,0004	0,000	0,0168	0,0172	0,0006**	0,000	0,0156	0,0162
Fish/shrimp/squid/shell	0,0007	0,001	0,0946	0,0954	0,0003	0,000	0,0953	0,0956
Meat	0,0048***	0,000	0,0302	0,0349	0,0050***	0,000	0,0299	0,0348
Eggs and milk	0,0042***	0,000	0,0417	0,0460	0,0045***	0,000	0,0423	0,0467
Vegetables	-0,0001	0,000	0,0864	0,0863	0,0001	0,000	0,0859	0,0860
Legumes	-0,0003	0,000	0,0205	0,0202	-0,0001	0,000	0,0207	0,0206
Fruits	-0,0015***	0,000	0,0420	0,0405	-0,0016***	0,000	0,0426	0,0410
Oils and fats	0,0005***	0,000	0,0305	0,0310	0,0004***	0,000	0,0306	0,0310
Beverage stuff	0,0011***	0,000	0,0389	0,0400	0,0010***	0,000	0,0387	0,0397
Spices	0,0003***	0,000	0,0221	0,0224	0,0004***	0,000	0,0223	0,0227
Miscellaneous food item	0,0001	0,000	0,0182	0,0183	0,0000	0,000	0,0184	0,0184
Prepared food and beverages	0,0036**	0,001	0,2497	0,2533	0,0038***	0,001	0,2529	0,2567
Cigarettes, tobacco and betel	0,0012	0,001	0,1250	0,1262	0,0019***	0,001	0,1245	0,1264
Food Consumption Pattern (1 = Proportion > 50%)	0,0433***	0,003	0,8015	0,8448	0,0496***	0,002	0,7896	0,8392

This finding contradicts Engel's Law, which states that the share of expenditure allocated to food needs (food share) tends to decrease if income increases or vice versa. In other words, the Rastra-BPNT social food assistance is only able to increase the share of food expenditure, but has not been able to contribute to the improvement of household welfare according to the consumption pattern. This finding also contradicts Working's Law, which states that the share of food expenditure is negatively correlated with total expenditure, or decreases logarithmically with household income. However, there is another economic law related to food consumption patterns, Bennet's Law, that as income increases, not only does the quantity of food increase less than proportionally, but the composition of the food bundle also changes. Thus, this finding is more relevant to Bennet's Law, that consumption of staple foods decreases as income increases. The richer a household is, the more its consumption pattern will change from being dominated by simple starchy plants to being more varied, consuming vegetables, fruit, eggs and milk.

The Impact of Rastra-BPNT Social Assistance on Poverty Status. Overall, the results of Rastra-BPNT food social assistance have a significant impact on the poverty status of beneficiaries by 0.0258 times greater (with kernel matching) than non-beneficiaries at the level of significance (α = 1%). After utilizing Rastra-BPNT from November 2018 to February 2019, the average number of beneficiaries with poor household status was 13.35% and non-beneficiaries was 10.77%, a difference of 2.58%. This means that if the government is not careful in distributing Rastra-BPNT food social assistance, there will be a tendency for the population or number of households with poor status to increase. This of course has an impact on the number of beneficiaries who are poor households, making it difficult to move out of the poverty line.

Table 5. Estimated Impact of Rastra-BPNT on Poverty Status Based on Average Treatment Effect on the Treated (ATT)

Outcomes Variables	Nearest-Neigbor Macthing nn (1); with replacement				Kernel Matching epan; bwidth (0,000248)			
	coefficient	s.e	Y_0	Y_1	coefficient	s.e	Y_0	Y_1
Expenditure group (40% lowest)	0,0724***	0,004	0,4379	0,5103	0,0768***	0,003	0,4174	0,4942
Poverty status (poor household)	0,0250***	0,003	0,1224	0,1474	0,0258***	0,002	0,1077	0,1335
Classification Imbalance:								
40% lowest and poor household	0,0250***	0,003	0,1224	0,1474	0,0258***	0,002	0,1077	0,1335
40% lowest and not poor household	0,0474***	0,004	0,3156	0,3630	0,0511***	0,003	0,3096	0,3607
60% highest and not poor household	-0,0724***	0,004	0,5621	0,4897	-0,0768***	0,003	0,5826	0,5058

Based on the monthly per capita expenditure group, the ATT estimation results show that Rastra-BPNT food social assistance has a significant and positively correlated impact on the number of households with the lowest 40% expenditure in beneficiaries by 0.0768 times greater than non-beneficiaries at the level of significance (α = 1%). This also indicates that the provision of Rastra-BPNT social food assistance will tend to have an impact on the increasing population or number of households with the lowest 40% expenditure (program target households).

If the impact estimation of Rastra-BPNT is more detailed based on the classification of imbalances in expenditure groups and poverty status, the average difference in potential outcomes of Rastra-BPNT has more impact on beneficiaries with the lowest 40% expenditure but non-poor households by 0.0511 times compared to non-beneficiaries. This means that the provision of Rastra-BPNT food social assistance will tend to increase the population or number of households in the lowest 40% expenditure group but not poor. This means that Rastra-BPNT can reduce the gap between household groups to become less disparate (the gap is decreasing). This means that there will be beneficiaries with poor household status who can move out of the poverty line, but conversely, there will also be beneficiaries with the highest 60% expenditure who will be relegated to the lowest 40% expenditure households as a result of the provision of Rastra-BPNT food social assistance for the period November 2018 to February 2019.

Although it can reduce the gap between household groups, it can be said that the Rastra-BPNT food social assistance distributed from November 2018 to February 2019 is still not on target. This may be due to the fact that BPNT is still in the process of transforming from Rastra, which was distributed to 1.2 million beneficiaries in 2017, to 15.6 million beneficiaries in 2019.

Table 6. Distribution of Rastra-BPNT

Household Group	Targeting Group	Non-Targeting Group	Total Sample
Beneficiary Group	Targeting Success (S_1 = 25.764) (11,12%)	Inclusion Errors (E_2 = 24.721) (10,66%)	M_1 = 50.485 (21,78%)
Non-Beneficiary Group	Exclusion Errors (E_1 = 45.022) (19,41%)	Targeting Success (S_2 = 136.336) (58,81%)	M_2 = 181.358 (78,22%)
Unit Analysis	N_1 = 70.786 (30,53%)	N_2 = 161.057 (69,47%)	N = 231.843 (100%)

Another factor is the error of distributed program, Rastra-BPNT social food assistance for the period November 2018 to February 2019 cannot be said to be right on target, because there are still errors caused by not including target households as beneficiaries (exclusion error) as many as 45,022 households (19.41%), but instead including non-target households as beneficiaries (inclusion error) as many as 24,721 households (10.66%). With the exclusion error, there were households that were under-covered by 63.60%. With the inclusion error, there is leakage of 48.97%. In this case, the coverage rate is 21.78%. Overall targeting accuracy in the distribution of Rastra-BPNT food social assistance benefits amounted to 162,100 households or 69.92% of the total population consisting of 25,764 (11.12%) beneficiaries and 136,336 (58.81%) non-beneficiaries.

4. Conclusion

Based on the estimation results previously described, several research conclusions can be obtained. There is a significant influence of average monthly per capita income, household head characteristics, household characteristics, asset ownership, financial literacy, and island of residence in determining households receiving Rastra-BPNT food assistance. With education level being a greater determinant for a household to become a Rastra-BPNT recipient, especially for households that did not complete primary school and completed primary school. The next finding is that Rastra-BPNT social food assistance has a greater impact on beneficiaries' food expenditure patterns (proportion > 50%) and can reduce the burden of spending on food needs for beneficiaries by around Rp. 39,384 (8.15%) from Rp. 482,851/capita/month. The reduced burden of food expenditure has been utilized by beneficiaries to meet food needs so that the share of food expenditure is greater. This finding contradicts Engel's Law and Working's Law, in other words, the existence of Rastra-BPNT food social assistance is only able to have an impact on increasing the share of food expenditure, but has not been able to contribute to improving the degree of household welfare according to the pattern of food expenditure. Furthermore, there is a shift in the food budget share for beneficiaries towards grains; eggs and milk; meat; processed food and beverages; and cigarettes, tobacco and betel, which is more relevant to the Bennet Law. Further estimation results found that the Rastra-BPNT food social assistance can reduce the gap between household groups to become less and less disparate, but there is still an error of distributed program because there are still errors caused by not including target households as beneficiaries (exclusion error) or vice versa, including non-target households as beneficiaries (inclusion error). If the government is not careful in distributing Rastra-BPNT food social assistance, there will be a tendency for the number of poor households to increase. Therefore, it is necessary to select beneficiary households based on changes in the behavior of household head characteristics (education level and field of work), household characteristics (number of household members and domiciled in rural areas), asset ownership (assessing aspects of property ownership (wealth) that can become income when sold /exchanged), and financial literacy (infrastructure development and internet networks in the financial industry, especially in rural areas).

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