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The Household Consumption Decision of Staple Food Purchase in the Midst the Covid-19 Pandemic

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Keywords:	Abstract
	Covid-19 has brought surprising changes in the household behavior pattern and decision-making process in consuming food. Therefore, this study aimed to (1) identify household consumption pattern and purchase behavior due to the dynamics of supply shock during the Covid-19 pandemic and (2) analyze factors that influence household consumption decisions on food purchase during the Covid-19 pandemic. One hundred participants from Kaliwates and Sumbersari District, Jember Regency, had recruited by the cluster sampling technique. These districts were purposively selected as the study locations. Data were analyzed using logit analysis. Findings reported that variable of price, income, age, and residence dummy had significantly influenced the household consumption decision on food purchase during the pandemic at the level of=20%. Secure staple food stock is required, recalling the evidence that no significant change in the food consumption patterns documented in this study.

How to Cite (APA 6th Style):

Zainuddin, A., Wibowo, R., Suciati, L. P., Setyawati, I. K., Magfiroh, I. S., Ibanah, I., … Hani, E. S. (2022). The Household Consumption Decision of Staple Food Purchase in the Midst the Covid-19 Pandemic. *SOCA: Jurnal Sosial Ekonomi Pertanian, 16*(1), 63–73. https://doi.org/https://doi.org/10.24843/SOCA.2022.v16.i01.p06

INTRODUCTION

Rice is the prime source of calories favored in the Indonesian local community. Non-rice calories energy popularly comes from cassava (Yudaningrum, 2011). The majority of people in Jember Regency also meet their calories intake by consuming rice. The level of rice consumption between the rural and urban areas somehow slightly different. The National Socioeconomic Survey in 2018 reported higher rice consumption in rural areas than in urban areas. The same situation also occurred in Jember Regency. Data revealed that rice consumption in rural areas was higher than in urban areas (Central Bureau Statistics, 2019). The pattern and growth of food consumption show the level of household income or the family purchasing power. Higher-income will stimulate a family to improve the quality of their food consumption at a higher price. A higher budget produces a more diverse food consumption pattern with richer nutritional content (Yudaningrum, 2011).

The level of public food consumption before the outbreak of Covid-19 was relatively low. The expense allocated for food purchases is also quite low. However, the level of fast food consumption before the Covid-19 pandemic tended to be high ((Ariani & Purwantini, 2006; Ilham & Sinaga, 2007; Relawati et al., 2021). Before the outbreak, daily food needs are commonly obtained in markets, shops, or supermarkets. Food hoarding behavior was rarely documented during those periods (Srigustini & Aisyah, 2021). Covid-19 outbreak at the beginning of 2020 has been causing a remarkable shift in people's consumption patterns and behavior. Primary food consumption increases, followed by the need for a higher budget to purchase staple food. Moreover, online food purchase and food hoarding behavior is also increased (Chenarides et al., 2021; Eftimov et al., 2020; Hirvonen et al., 2021; Relawati et al., 2021; Srigustini & Aisyah, 2021; Yılmaz et al., 2020).

The Covid-19 pandemic has deeply affected community or household food consumption patterns. Layoffs are quite common during this era. The unemployed population rapidly increased and altered the public spending on food consumption. Generally, the COVID-19 pandemic delivered impacts on food demand, price, consumption, and expenditure. This outbreak also modifies community consumption patterns ((Chenarides et al., 2021; Eftimov et al., 2020; Hirvonen et al., 2021). The consumption patterns and decisions during the pandemic are essential to be well elaborated.

Studies related to food consumption patterns during the COVID-19 pandemic had been widely conducted. Studies by ((Dewi Wulandani & Anggraini, 2020; Hestina et al., 2020; Hirawan & Verselita, 2020; Jusriadi et al., 2020; Kamim, 2020; Ulya, 2020) discovered that the Covid-19 pandemic had afflicted food security in Java and Indonesia. Further, studies by (Chenarides et al., 2021; Eftimov et al., 2020; Hanifah & Rahadi, 2020; Hirvonen et al., 2021; Rahmawati, 2020; Relawati et al., 2021; Sinaga, 2020) reported a transition from the conventional food purchase to online purchase behavior during the pandemic. The novelty of this study lies in the factors that influence the food purchasing decisions, especially in Jember Regency during the Covid-19 pandemic. The factors studied were age, educational background, income, dummy variables with the price increase, dummy variables with shopping area change, dummy variables with stock change, and residence. This study aims to identify household consumption pattern and purchase behavior due to the dynamics

of supply shock during the Covid-19 pandemic and (2) analyze factors that influence household consumption decisions on food purchase during the Covid-19 pandemic.

RESEARCH METHOD

Study Duration and Location

This study was conducted in Jember Regency for three months, from October to December 2020. Jember Regency was purposively selected as a study location due to its status as a Covid-19 impacted area, famous as an "education city" with a high mobilization rate, and had the largest population in East Java. Further, four districts then selected as study locations. These areas were identified carefully through the Covid-19 distribution map by assessing its characteristic as urban and rural areas. Kaliwates and Sumbersari District selected as study locations that represented the urban areas. Balung and Ambulu District chosen as study locations that represented rural areas. These districts were also appointed purposively due to the high number of positive cases that had occurred in the area.

Data Collection

Data were collected from primary and secondary sources. Primary data were obtained through interview sessions with the participants. The secondary data from Indonesia Central Bureau of Statistics, East Java Central Bureau of Statistics, Jember Central Bureau of Statistics, related literature, scientific journals, internet sources, and other sources collected to support the study findings. An online-based structured questionnaire (google form) was applied to collect the study data. Food data collected included six types of commodities, namely rice, cooking oil, granulated sugar, egg, vegetable, and fruit. These commodities were selected because of their high consumption rate and drastic price fluctuation during the Covid-19 pandemic.

Study Population and Sampling

One hundred participant were recruited by the cluster sampling technique. Participant represented the four district area in Jember Regency, two district of urban areas and two districts of rural areas. Balung and Ambulu Districts represented the rural area, while Sumbersari and Kaliwates districts presented the urban areas. These area were chosen because its high Covid-19 cases and known as a high-populated area in Jember Regency. The aspect of occupation and characteristic of income source: fixed income or variable income (civil servants, farmers, private sector employee, small businesses owner) are also contributed in area selection. Participant recruited through the accidental sampling technique. Participant who met the inclusion criteria of occupation, >17 years old, contributed essential role in decision making of food purchase was directly asked to participate in the study. We selected only a member in a family as the study participant.

Data Analysis

The first study objective addressed by the descriptive analysis to examine information and data collected from the questionnaire. The data and information then presented in tables and grouped based on similar answers. The results obtained from the statistical analysis were presented in the percentage form, based on the number of respondents. The highest percentage established the domination of the

analyzed variables. The analysis result used to investigate the general characteristics of consumers and the purchasing decision process.

The second objective analysis was conducted by enrolling the logit analysis. This analysis provided an analysis of factors that influence household consumption decisions on staple food purchase during the COVID-19 pandemic in the Jember Regency. This logit analysis is formulated as follow:

$$E\,(y|x)= \frac{e^{\beta_0+\beta_1 X_1+\beta_2 X_2+\beta_3 X_3+\beta_4 D_1+\beta_5 D_2+\beta_6 D_3+\beta_7 D_4}}{1+e^{\beta_0+\beta_1 X_1+\beta_2 X_2+\beta_3 X_3+\beta_4 D_1+\beta_5 D_2+\beta_6 D_3+\beta_7 D_4}}$$

This equation could be substituted into the following formula:

$$Y\,(x) = \ln\left(\frac{y(x)}{1-y(x)}\right)= \beta_0+\beta_1 X_1+\beta_2 X_2+\beta_3 X_3+\beta_4 D_1+\beta_5 D_2+\beta_6 D_3+\beta_7 D_4$$

Y = Decision to change food purchases during the Covid-19 Pandemic (Dummy 1= purchase pattern change; 0=fixed purchase)
X1 = Age (years)
X2 = Educational Background (years)
X3 = Income (IDR/Month)
D1 = Price Increase (Dummy 1= price increase; 0 = no price increase)
D2 = Change of Shopping Area (Dummy 1 = shopping area change, 0 = no change)
D3 = Change of Stock/Hoarding Pattern (Dummy 1 = change of stock/hoarding; 0 = no change)
D4 = Residence (Dummy 1= urban area, 0 = rural area)

RESULTS AND DISCUSSION
Identification of Household Consumption and Purchase Pattern in Jember Regency due to the Dynamics of Supply Shock during the Covid-19 Pandemic

The Covid-19 pandemic had presented huge impacts on the consumption pattern in Jember Regency. This study would examine the consumption pattern of staple food purchases, especially for the commodity of rice, cooking oil, granulated sugar, vegetable, and fruit. We also investigated the change of purchase method and the frequency of purchase, before and during the pandemic. The demographic characteristics of the participants reveal in Table 1.

Table 1. Change in the Number of Food Consumed during the Covid-19 Pandemic

Characteristics	Answer of "Yes"	Answer of "No"
Change in rice consumption during the pandemic	8 participants (8%)	92 participants (92%)
Reduction the cooking oil used during the pandemic	24 participants (24%)	76 participants (76%)
Change in sugar consumption during the pandemic	31 participants (31%)	69 participants (69%)
Changes in consumption of egg during the pandemic	22 participants (22%)	78 participants (78%)
Changes in vegetable consumption during the pandemic	7 participants (7%)	93 participants (93%)
Changes in fruit consumption during the pandemic	29 participants (29%)	71 participants (71%)

Source: primary Data (processed)

Analysis revealed a change in food consumption during the pandemic. Ninety-two percent of participants claimed no change in rice purchasing occurred during the pandemic. Rice is a typical Indonesian staple food. The income level does not significantly influence rice purchasing behavior during the pandemic. We only identified 8% of participants who changed their rice purchase. They stated that they had substituted rice with sweet potatoes, corn, and other local commodities. The substitution of rice probably done by individuals with a higher level of income due to their concern for health during the pandemic. This finding was consistent with studies by (Andriani, 2021; Sandi Wachyuni & Wiweka, 2020 that had highlighted the tendency to eat healthier food and process their daily food at home during the pandemic.

Contrary, we found a change in the utilization of cooking oil in Jember Regency. The recent study identified that 24% of the participants had reduced their cooking oil purchase. They elaborated that the increase in cooking oil prices during the pandemic pushed them to reduce the use of cooking oil. Further, some participants stated that they changed their cooking oil consumption for health reasons. A significant change in sugar consumption was reported in this study. Thirty-one percent of the participant declared that they had reduced their sugar intake. We identified that this behavior change mostly occurred in the low to moderate economic class. Granulated sugar was not a primary need to serve everyday food consumption. Due to the lower-income level during the pandemic, people managed to reduce their sugar consumption and allocate the budget for other necessities.

We also documented the change in egg consumption behavior. Results revealed that 22% of the participant had reduced the consumption of eggs during the pandemic. Instead, they picked other protein sources, such as *tempeh* (fermented soybean cake) and tofu. However, the rest of the participants have still consumed chicken eggs as their best protein sources. They stated that egg is a common source of animal protein.

No change in vegetable consumption reported in this study. Table 1 reveals that most respondents (93%) did not modify their purchase or consumption of vegetables during the pandemic. Vegetables are typical commodities consumed by diverse layers of communities in all circumstances. However, fruit consumption was decreased during the pandemic. Twenty-nine percent of participants reduced their consumption of fruits. Participants had declared that fruits were not part of their daily food consumption. Hence, they preferred to reduce their fruit consumption. The lower level of income during the pandemic may contribute to the change of food consumption patterns.

To provide a more comprehensive analysis of food consumption change, we conducted an analysis on the selection of shopping areas before and during the pandemic. The change of shopping area presents in Table 2.

Table 2. Change of Shopping Area Selection Before and During the Covid-19 Pandemic

Shopping Area	Before the Pandemic	During the Pandemic
Market	40.3 percent	20.8 percent
Grocery Store	29.2 percent	34.7 percent
Peddlers or *Melijo*	27.8 percent	38.9 percent
Online purchase	2.8 percent	5.6 percent

Source: primary Data (processed)

The majority of participants stated that they had purchased their grocery needs in the market before the pandemic. According to the statistical analysis, 40.3%, 29.2%, 27.8%, and 2.8% of the participants had purchased their daily needs at the market, grocery stores, mobile traders, and online, respectively. The affordable price, broad type of brands, quality, and price offered by the market were the reasons for its popularity as a shopping area among the participants before the pandemic. Unfortunately, its popularity was significantly decreased because of the social distancing measures during the pandemic. The shopping area selection was shifted to the nearest grocery store (34.7%) and mobile traders or melijo (38.9 percent). Around twenty percent of participants remained to purchase their daily needs in the market. They insisted to shop in the market due to its cheaper price. In addition, to reduce the spread of the Covid-19 disease, 5.6% of participants decided to do online shopping. They mentioned that online shopping had provided chances to arrange contactless shopping.

Another behavior change of the consumption pattern documented in this study was the purchase frequency. Before the Covid-19 pandemic, the participants mentioned that they did frequent shopping to meet their staple food needs, in the range of 5 to 10 times in a month. The frequency of purchase was significantly changed during the COVID-19 pandemic. Table 3 shows the change in the purchase frequency.

Table 3. Frequency of Staple Food Purchase Before and During the Covid-19 Pandemic

Purchase Frequency	Before the Pandemic	During the Pandemic
Less than 5 times in a month	70 percent	83.1 percent
5 to 10 times in a month	21.4 percent	14.1 percent
More than 10 times in a month	8.6 percent	2.8 percent

Source: primary data (processed)

The majority of participants purchased their staple food with a frequency of < 5 times in a month (83.1 percent) during the pandemic. An increase of 13.1 percent noted in comparison to purchase behavior before the pandemic. This situation might occur to a tendency to hoard staple food stock during the pandemic. Hoarding behavior produced a lower frequency of staple food purchases during the pandemic. This finding was in line with a study by (Durmaz & Dağ, 2021) that mentioned food-purchasing behavior during this pandemic has changed due to fewer purchase-making and increasing food hoarding behavior. The hoarding behavior done by the participant is revealed in Figure 1.
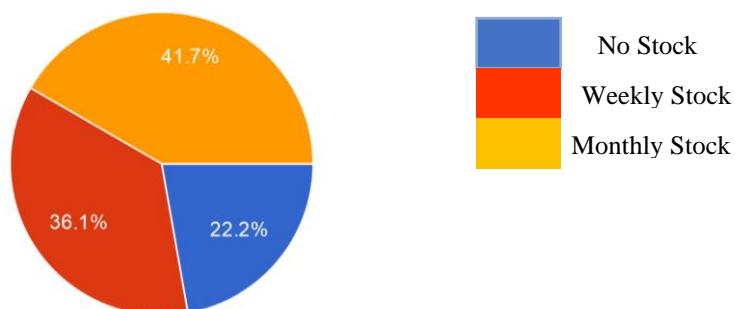
Figure 1. Period of Staple Food Hoarding during the Covid-19 Pandemic in Jember Regency

Figure 1 shows that the majority of participants hoarded the staple food during the pandemic. Findings revealed that 36.1% and 41.7% of participants conducted weekly and monthly hoard, respectively. Participants confirmed that the staple food hoarding aimed to reduce the purchase frequency and minimize interaction during the purchasing process. Interestingly, 22.2% of the participant did not show hoarding behavior. They stated that their daily-earned income did not support hoarding behavior during the pandemic. Meanwhile, the majority of participants from the urban area who had a fixed income tend to hoard the need for staple food in monthly period. This finding was in line with studies by (Durmaz & Dağ, 2021; Hirvonen et al., 2021) that explained urban populations in Turkey and Addis Ababa, tended to hoard their daily food needs, especially during this pandemic.

Factors that Influenced the Household Consumption Decision of Food Purchase during the Covid 19 Pandemic in Jember Regency

Household consumption decisions on food purchase during the COVID-19 pandemic were assumed to be influenced by factors of age, educational background, income, price increase dummy, change of shopping area dummy, stock change dummy, and residence dummy. The results of the logit regression analysis on the household consumption decision model in Jember Regency reveals in Table 4.

Table 4. Results of the Logit Model Estimation of the Factors Influencing Household Consumption Decisions on Food Due to the Covid 19 Pandemic in Jember Regency

Variable	Coefficient	Std. Error	Z value	Prob.
Constanta	2.62164	2.211741	1.185329	0.2359
Price Increase Dummy	1.43265***	0.58396	2.453335	0.0142
Income	-8.33E-07***	2.53E-07	-3.29792	0.0010
Educational Background	0.026867	0.08905	0.301713	0.7629
Stock Change Dummy	-0.75124	0.62848	-1.19533	0.2320
Shopping Area Dummy	0.38315	0.548171	0.698962	0.4846
Age	-0.04466**	0.029247	-1.52685	0.1268
Residence Dummy	-0.73786*	0.570598	-1.29313	0.1960
McFadden R-squared	0.554812			
LR statistic	34.08106			
Prob (*LR statistic*)	0.000017			

Description: * sig α=20%; ** sig α=15%; ***sig α=5%.

Table 4. showed that several variables were significant at the level of =20%: price, income, age, and residence dummy. Meanwhile, the variable of educational background, stock change dummy, and shopping area delivered no significant effect on the change of purchase behavior. The McFadden R-squared value from the goodness of fit model was 0.554812. This value indicated that 55.48 percent of the variation or diversity of variables changes in consumption was influenced by the variation or diversity of the independent variables such as price dummy, income, age, dummy residence, educational background, stock dummy, and shopping area dummy. The value of the LR statistic was 34.08106 with a probability of 0.00017, less than 5%. This value signified that at least one independent variable would affect the decision to change the consumption pattern or the independent variables such as price dummy, income, age, residence dummy, educational background, stock change dummy, and shopping area dummy would simultaneously influence consumer purchasing decisions amid the COVID-19 pandemic.

The variable of price dummy (1: increased price and 0: no increase) significantly influenced the consumer decision of food purchase during the Covid-19 pandemic. The coefficient of the price dummy variable was 1.43265, significant at an error rate of 5%. This value signified that a higher price would produce a higher odds ratio of the consumer opportunity to make a change on the purchase decision by 1.43265 with the assumption of other variables stayed in a constant state. Consumers would respond by changing to the lower number of purchases if the price increased. Higher prices would result in lower number of food purchased. These results were in accordance with studies by (Sentoso, 2019; Utami & Saputra, 2017) that found price would affect the number of product purchased.

The income variable delivered a negative and significant effect on the purchase behavior with a coefficient value of -8.33E-07. This value indicated that the higher income resulted in lower odds ratio of the consumer opportunity to make a purchase change, *ceteris paribus assumption*. A higher income level would produce a lower probability of the number of purchase changes with a constant consumption level. During the Covid-19 pandemic, the level of income was significantly decreased. The tendency of low food consumption widely identified worldwide. This finding was in line with studies conducted by (Chenarides et al., 2021; Eftimov et al., 2020; Hanum, 2017; Shahadatus Safia et al., 2018) that also reported a decrease in income would reduce the amount of food consumption.

The age variable also provided a negative and significant effect on the consumer decision of consumption change, with the coefficient value of -0.04466. This value indicated that the older age delivered a lower odds ratio of the consumer opportunity to make a purchase change by 0.04466, ceteris paribus assumption. This finding showed that age and maturity would determine the staple food purchasing decision amid the COVID-19 pandemic. In this study, the mean age of the participants was 38 years. It could be classified into a relatively mature period to arrange a food purchase decision. Findings also revealed that participants who aged more than 38 years did not change their staple food purchase decision. This situation probably occurred because they tend to allocate lower budgets to other necessities.

The residence dummy variable (1= urban and 0= rural) delivered a significant influence on consumer decisions in making a purchase change, with the coefficient value of -0.73786. This value showed that urban consumers tended to change their

food consumption amid this Covid-19 pandemic. Most respondents from the urban areas had a fixed income during the pandemic, causing the unchanged consumption of staple foods. Contrarily with that situation, the consumer in rural areas tended to change their consumption pattern. The majority of consumers were working as temporary-contract teachers and entrepreneurs who had uncertain incomes during this pandemic. Adequate policies to help secure the food prices are undoubtedly required to maintain proper stable food consumption and purchase in rural areas. This finding was contrary to a study by (Basith & Fadhilah, 2019) that showed that living location did not implicate consumer purchasing decisions.

CONCLUSION

The consumption patterns tended to change during the pandemic, especially on the lesser number of food purchased, shopping places, lesser shopping frequency (<5 times in a month), and hoarding frequency (weekly and monthly). A bigger shopping area highly preferred to limit interactions and facilitate contactless shopping during the pandemic. Variables that had delivered a significant effect on household consumption decisions on staple food purchase during the COVID-19 pandemic at the level of = 20% were the dummy variables of price, income, age, and residence. Variables of educational background, stock dummy, and shopping place dummy did not significantly influence household consumption decisions on food purchase during the outbreak.

RECOMMENDATION

Considering that the community did not change the food consumption pattern significantly, the stock of stable food during the Covid-19 pandemic needs to be secured. Hence, the food demands, such as rice, cooking oil, granulated sugar, eggs, vegetables, and fruits, are sufficiently met. Secure staple food stock would suppress the inflation rate during the COVID-19 pandemic. In addition, this study did not provide a comparison of food consumption patterns before and during the pandemic. Further studies suggested comparing the consumption patterns before and during the COVID-19 pandemic.

ACKNOWLEDGEMENT

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