Impacts of Covid-19 Pandemics and Wealth on Household Consumption in Java Island

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Abstract

Household consumption, which has changed due to the COVID-19 pandemic, can survive by using their wealth to restore consumption levels. The current research analyzes the impact of the COVID-19 pandemic and the role of wealth in household consumption in Java, which has the largest share of the economy. Using panel data from 119 regencies/cities in Java Island during the 2017-2021 period due to data availability shows that there have been changes in household consumption patterns during the pandemic. The results of the panel data analysis show that the COVID-19 pandemic has a negative effect on household consumption. In contrast, wealth positively affects household consumption in almost all provinces on the island of Java. These results suggest increasing asset ownership for households to maximize wealth, positively affecting household consumption, mainly when shocks occur.

Keywords:
household consumption; impact of covid-19; panel data regression; wealth

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INTRODUCTION

Changes in household consumption patterns can impact changes in the economy. Economic, social, demographic, and other factors can influence changes in consumption. According to the theory of life cycle and permanent income, household consumption's main factor is household income (Modigliani & Brumberg, 1954; Friedman, 1957; Ando & Modigliani, 1963). Hall (1987) states that wealth has a strong influence on consumption. Meanwhile, Pigou (1941) explains that there is a positive relationship between wealth and consumption. Oliver (1990) suggests that a more comprehensive view of economic well-being can be obtained by incorporating the characteristics of wealth. It shows that household wealth has a vital role in household consumption.

Various studies on the impact of the covid-19 pandemic have been carried out in the last two years during the pandemic (Baker et al., 2020; Christelis et al., 2020; Wu, 2020; Trianto, 2021; Xiong et al., 2021; Davis, 2021; Roll et al., 2022). The results of those studies revealed that the COVID-19 pandemic caused changes in household consumption patterns and had a negative impact on consumption. The effect of the COVID-19 pandemic has also caused a recession in Indonesia. Negative growth of -2,96% in household consumption, as the largest source of GDP, caused the economy to grow -5,35% in the second quarter of 2020. Meanwhile, the contribution of the provincial group on Java Island, about 58.75% of GDP, experienced a negative growth of -2.51%.

The rapidly changing condition due to the COVID-19 pandemic has forced households to adjust their consumption. Friedman (1957) states that wealth is a reserve for the household when unforeseen circumstances occur. According to the Global Wealth Report (CSRI 2020), the total Indonesian wealth has experienced a total increase of USD 319 billion in 2021. In addition, based on the World Inequality Report, the wealthiest 10% of Indonesians will have a total wealth equal to 60% of total household wealth in 2021. This result shows that total household wealth increased, accompanied by an increased wealth gap during the pandemic.

Empirically, Alp and Seven (2019) stated that household wealth, which was approached through a combined construction and stock price index, positively affected household consumption. Hanspal et al. (2020) stated that changes in income and wealth significantly affected US households when the COVID-19 pandemic occurred. The role of wealth in household consumption during a pandemic as a reserve and having positive effects still needs to be proven.

Various studies show that the role of household wealth on consumption is positive (Shen et al., 2015; Paiella & Pistaferri, 2017; Alp and Seven, 2019; Andreu, 2021). Household wealth is the accumulation of results owned by the household. Approaches to measuring household wealth in previous studies varied from stock prices to housing and equity markets. In contrast to previous studies, this study uses a district/city-level household wealth index derived from SUSENAS with the Principal Component Analysis (PCA). It determines the impact of household wealth on household consumption at the district/city level due to different policies and effects due to the COVID-19 pandemic.

The total household consumption in Java Island is the largest source of the

consumption component of the National GDP (BPS 2021). The wider the impact of COVID-19 from 2020 to 2021, the more the regencies/cities experience negative growth in household consumption. Differences in the status of mobility restrictions in each district/city on Java Island, which has the highest number of COVID-19 cases, affect households in maintaining their consumption levels.

Many studies have shown the impact of the COVID-19 pandemic and wealth on household consumption. This study aims to fill in some gaps left by previous research by exploring the effect of the COVID-19 pandemic on household consumption while considering the factor of household wealth, which is the source of restoring consumption level. The strength and novelty of this study lie in its use of a more extensive data set and building variable household wealth index using the Principal Component Analysis (PCA).

Given the limited literature on the topic and the background and formulation of the problem, this study aims to examine the determinants of household consumption by considering the factors of the COVID-19 pandemic and household wealth in Java Island. Based on the description above, this study aims to provide an overview of changes in household consumption patterns in Java before and during the COVID-19 pandemic and to analyze their determinants.

The result of this study is expected to provide helpful information for governments, specifically of Java Island, as they consider policies related to handling the COVID-19 pandemic and boosting household wealth that can increase household consumption. This research is also expected to be a valuable reference for future studies, particularly those focused on the relationship between the impacts of the COVID-19 pandemic, household wealth, and household consumption.

METHODS

The data used in this study are from the National Social and Economic Survey (SUSENAS) and the GRDP data according to expenditure from the Central Bureau of Statistics. Due to data availability, it used panel data from data from 119 regencies/cities in Java Island during the 2017-2021 period. The data was used from 6 provinces on Java Island with 119 districts/cities analysis units. The data used in the study is shown in the Table 1.

Table 1. Variables, Descriptions, and Data Sources in Research

Variables	Description and Source
Household Consumption Expenditures (C)	Data on average per capita household consumption expenditure per month (BPS)
Household Income (Y)	Gross Regional Domestic Product per capita can reflect the population's average income. (BPS)
Household Wealth (W)	Household wealth index approach formed from SUSENAS data using the Principal Component Analysis (PCA). (BPS)
Government Consumption Expenditures (G)	Data from the government spending component of GRDP by use.(BPS)
Total Population (Pop)	Total population in souls for each district/city. (BPS)
Pandemic	Dummy variable of the covid-19 pandemic

The analytical method used in this study is a descriptive statistical method to explain household consumption patterns and the condition of household wealth in Java Island before and during the Covid-19 pandemic. Meanwhile, the panel data regression analysis evaluates the impact of wealth and determinants of household consumption in Java before and during the Covid-19 pandemic. The descriptive statistical method used to explain household consumption patterns tests the difference in the averages of two populations to determine differences in patterns before and during the pandemic.

Test of the Average Difference of Two Independent Samples

Testing two independent samples is one of the parametric tests used to analyze differences between two independent samples with normally distributed data. The null hypothesis in this test is that the mean of each group is the same or not different. The statistical test used is as follows (Liao, 2011):

Assuming the variants are the same:

$$t = \frac{\overline{x_1} - \overline{x_2}}{s_p\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

Assuming the variants are not the same:

$$t = \frac{\overline{x_1} - \overline{x_2}}{s_p\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

Description:

$\overline{x_1}$: sample mean 1; $\overline{x_2}$: sample mean 2; s_1^2: sample standard deviation of 1; s_2^2: sample standard deviation of 2; s_p: combined standard deviation; n_1: number of samples 1; : number of samples 2.

Mann-Whitney test

This test has a non-parametric used to analyze the difference between two independent samples with non-normally distributed data. The results of the two samples are arranged, sorted, and given serial numbers.

Meanwhile, the panel data analysis method was used to analyze the impact of wealth and household consumption determinants in Java before and during the Covid-19 pandemic. The statistical descriptive method used to explain household consumption patterns tested the difference in the averages of two populations to determine differences in patterns before and during the pandemic. The model specifications in this study refers to researches by Alp and Seven (2019) and Wu (2020), modified to be:

$$LnC_{it} = \alpha_0 + \beta_1\,LnY_{it} + \beta_2\,W_{it} + \beta_3\,LnG_{it} + \beta_4\,D_{it} + \beta_5\,LnPop_{it} + \varepsilon_{it}$$

Where:

LnC: Average household consumption expenditure per capita; LnY: GRDP per capita; W: Household wealth index; LnG: Government spending; D: dummy economic crisis

during the covid-19 pandemic (before 2020=1, from 2020=0); LnPop: Total population; ε: term error; i: District/City ; t: Period. This model is estimated using tha panel data econometrics.

RESULTS AND DISCUSSION

The COVID-19 pandemic has caused changes in household consumption patterns with negative effects on household consumption. Meanwhile, wealth has a positive impact on household consumption in Java. Household consumption includes food and non-food consumption and can be grouped by sub-group according to SUSENAS. During the last five years, when the pandemic started in 2020, there was a change in people's consumption on the island of Java. Table 2 shows the difference in the percentage of household consumption by commodity groups, including food and non-food, before and during the pandemic, which has been tested statistically with an average difference test with a significance level of 5%.

Based on the Shapiro-Wilk normality test, the data used is usually normally distributed. The data for the commodity groups of processed food and beverages, clothing, durable goods, taxes, and party supplies were usually distributed. Meanwhile, the data for the commodity group of foodstuffs, cigarettes, housing, and goods and services had yet to be distributed. The test for a normally distributed data group is the Independent Sample Test, and the non-normally distributed data group is the Mann-Whitney Test. The results of the tests are shown in Table 2. Table 2 shows the change in the percentage of commodity groups for household consumption of food and non-food before and during the pandemic.

Table 2. Results of Testing the Percentage of Household Consumption Expenditure by Commodity Groups Before and During the Pandemic on Java Island

Commodity	Average of Household Consumption (%age)		Testing	p-value
	Before Pandemic	**During Pandemic**		
Food Material	14.9	16.33	Mann-Whitney test	0.692
Processed Food and Beverage	18.07	17.42	Independent Sample test	0.046**
Cigarette	15.22	15.9	Mann-Whitney test	0.851
Housing	14.50	17	Mann-Whitney test	0.465
Goods and Service	15.89	14.92	Mann-Whitney test	0.787
Clothes	2.79	2.51	Independent Sample test	0.007***
Durable Goods	5.7	5.1	Independent Sample test	0.460
Taxes	3.1	3.8	Independent Sample test	0.000***
Party requirement	1.9	1.5	Independent Sample test	0.035**

Source: Author Computation, 2023

Note: *** is significant at the 1% level, ** at the 5% level, and * at the 10% level

The commodity group that experienced a significant increase was the tax commodity group. In contrast, the commodity groups that experienced decreases were the food and beverage, clothing, and party necessities. The average consumption allocations for the prepared food and beverage, clothing, and party commodity groups decreased around 0.64%, 0.28%, and 0.38%, respectively. The results of changes in this commodity group align with Hean and Chairassamee (2021), explaining that total consumption dropped dramatically. These spending patterns are consistent with those found in developed countries, where households increase their spending on at-home activities but reduce out-of-home expenditures. These results are in line with Xiong (2021), which shows that the clothing consumption group has decreased during the pandemic (2020 and 2021) in Zhejiang, China, and Trianto (2021), which states that prepared food consumption has decreased in 2020 in 30 provinces in Indonesia. Meanwhile, based on the results of a survey on public behavior during a pandemic conducted by BPS, around 40% of stalls/restaurants selling prepared food and drinks and about 20.4% of shopping centers were temporarily closed during the implementation of the PPKM in June 2021 (BPS 2021). These results indicate that there are restrictions on mobility due to the COVID-19 pandemic, forcing people to adjust their consumption needs.

The food commodity group experienced an increase in several provinces in Java, although this change was not statistically significant. The average consumption allocation for the food commodity group experienced an increase of 0.38% during the pandemic, around 23.92%. These results indicate that people prefer to meet their food needs by processing their food. Trianto (2021) shows that the average percentage of spending on groceries after the COVID-19 pandemic has increased compared to before the pandemic. This result is also in line with the research by Grunert et al. (2021,) proving that the consumption of food ingredients such as fruit and vegetables increased during the pandemic in 2020 in 10 European countries.

Table 3. Estimates of Household Consumption Determinants

Variables	Coefficient
C	-2.1366
LnY	0.6049***
LnG	0.0853*
W	0.1501***
D	-0.6058***
LnPop	0.5738***
R-Squared	0.9793
Adjusted R-Squared	0.9739
F-statistic	181.4641
Prob	0.0000
Chow Test Statistic	28.7465
(p-value)	0.0000
Hausman Test Statistic	112.4985
(p-value)	0.0000

Source: Author Computation (2023)

Note: *** is significant at the 1 % level, ** at the 5 % level, and * at the 10 % level

The tax commodity group experienced a significant increase. The average allocation for tax payments paid by households has increased to 3.83% during the pandemic, or an increase of 0.72% compared to before the pandemic (3.12%). This tax commodity group is a tax paid by households, including land and building taxes, vehicle taxes, levies, and insurance. The increase in this tax commodity group could be due to several regulations regarding tax rates, such as land and building taxes, which experienced an increase. One example is the regulation regarding the rise in land and building tax rates regarding the increase in rates in 2021 in the DI Yogyakarta Province based on the Regional Regulation of the City of Yogyakarta Number 10 of 2020.

This study uses a panel data analysis method to answer the second objective, the impact of household wealth and other determinants on household consumption. The testing begins with choosing the best model between the standard effect model (CEM) and the fixed effect model (FEM) using the Chow test. The test results suggest selecting the fixed effect model (FEM). It is followed by choosing the best model between the fixed effect model (FEM) and the random effect model (REM) using the Hausman test. The test results indicate that the fixed effect model (FEM) is the best. The estimation results of the model, together with the Chow and Hausman tests, are in Table 3.

After several tests, the selected panel data regression equation is the fixed effects model with cross-section weight and generalized least squares to overcome the violated classical regression assumptions. From the results of processing using Eviews 12, the statistical values are presented in Table 3. The total household consumption model has a significant statistical F value at the 1% level, meaning that the model is feasible to use because it can explain the diversity of independent variables. Based on Table 3, the Adjusted R squared value of 0.973937 indicates that 97.39% of the variability in household consumption can be explained by the variability in the independent variables with a confidence level above 95%.

The variables affecting total consumption are household income, household wealth index, government expenditure, the dummy variable of the COVID-19 pandemic, and population. The negative direction of the dummy variable of the economic crisis due to covid-19 in the total household consumption model and the household food consumption model followed those of other studies that have analyzed the effect of the pandemic on household consumption (Wu, 2020; Baker et al., 2020; Chirtelis et al., 2020).

The random walk theory states that consumption follows a random walk or depends on unpredictable circumstances. Unpredictable circumstances such as the COVID-19 pandemic cause uncertainty and make households adjust their consumption levels. The dummy variable of the COVID-19 pandemic has a negative and significant effect on household consumption on the island of Java. These results align with Wu (2020), which shows a negative effect of the pandemic uncertainty index (PUI) on household consumption in 138 countries. The same results from this study are also in line with Baker et al. (2020) and Chirtelis et al. (2020), which state that household consumption has decreased due to the COVID-19 pandemic. Even though the approach used to measure

the impact of the COVID-19 pandemic in this study is different, the results obtained are the same as in other studies related to the impact of the COVID-19 pandemic.

The pandemic dummy variable with a negative and significant effect occurs in almost all provinces on Java Island (Table 4). It shows that the economic crisis when the covid-19 pandemic occurred decreased public consumption, including consumption throughout the island of Java. According to BPS data, as much as 30% to 50% of regions/cities in each province will experience a decline in household consumption growth during 2020-2021. Most COVID-19 cases are on the island of Java, which causes stricter restrictions on mobility compared to other regions. Uncertain circumstances and large-scale restrictions make it difficult for households to buy necessities. This significant decline destabilized the Indonesian economy because a large consumption share of economic growth came from the island of Java.

Table 4. Estimating Determinants of Household Consumption by Province

Province	Coefficient				
	LnY	W	LnG	D	LnPop
Jakarta	0.20412	0.1379	-0.0373	-0.0817*	0.1671**
West Java	0.1561	0.1848***	1.2453***	-0.0385***	0.0573
Central Java	0.4973***	0.1699**	0.5254**	-0.0833**	0.4790
Yogyakarta	0.1934	0.2190*	1.5219**	-0.0308***	0.3303***
Eat Java	0.5308**	0.0938**	0.0679	-0.0509***	0.6539**
Banten	0.3493***	0.4307***	0.1463*	-0.1179***	0.3013**

Source: Author Computation, 2023
Note: *** is significant at the 1 % level, ** at the 5 % level, and * at the 10 % level

The amount of household consumption expenditure depends on the household's income level. The household income variable using the per capita GRDP approach positively and significantly influences household consumption. If household income increases by 1%, household consumption will increase by 0.6%. These results show that income can increase household consumption according to consumption theory. This result aligns with Varlamova and Larionova (2015), Iheonu and Nwachukwu (2020), and Alp and Seven (2019). It can be seen in Table 4 that the per capita GRDP variable has a positive and significant effect on Central Java Province, East Java Province, and Banten Province. The most significant influence is the Province of East Java. When household income increases by 1 %, total consumption in East Java Province increases by 0.53 %. Alp and Seven (2019) stated that changes in consumption are more sensitive to changes in income because, in the long term, the most influential dominant factor is income (the per capita GRDP).

Abosedra et al. (2021) stated that changes in consumption are more responsive to changes in declining income. As the results of those studies show, the number of regions/cities that experienced a decline in household consumption growth in line with the decline in per capita GRDP growth reached more than half of the regions/cities in

Java Island. It shows that the amount of income or the more prosperous the household influences, increasing the household's consumption.

In contrast to the current and future income received by a household, the wealth owned by a household is an accumulation of income and savings owned by the household. More accumulation in a certain period can affect household consumption at a certain point. In the long run, the life cycle theory explains that consumption will depend on wealth when income suddenly drops. The results of the household wealth index obtained in this study show a positive role of household wealth on household consumption. An increase of 1% in household wealth will increase household consumption by 0.15%. The positive impact of household wealth is in line with Alp and Seven (2019), Hanspal et al. (2020), and Andreu (2021). In each province, household wealth has a positive and significant influence, except for DKI Jakarta, on total household consumption. The most significant influence of the household wealth index on household consumption is in Banten Province.

Household wealth includes financial assets, non-financial assets, and durable goods. The limitations of this study's approach to measuring household wealth are using a household wealth index constructed from household characteristics and durable goods ownership due to limited data availability. The results of this study indicate that households with a higher wealth index also have high consumption levels in the 2017-2021 period. The existence of a pandemic quickly reduced income, but wealth, which was the accumulation of assets owned by households, did not decline quickly. This result aligns with May et al. (2020), which stated that increased household wealth supported household consumption when disposable income growth was weak between 2013 and 2017 in Australia.

Government spending has a positive relationship with household consumption. The positive influence of government spending is in the research of Varlamova and Larionova (2015). If government spending increases by 1%, total household consumption will increase by 0,085%. The positive and significant influence of government spending on total consumption occurs in West Java Province, Central Java Province, and D.I. Province. These results differ from Wu (2020), which states that government spending negatively and significantly affects household consumption during a pandemic. The positive impact of government spending can show that government programs are on target. Chirtelis (2021) shows that targeted government intervention can reduce the financial problems of low-income households and households with unstable jobs. Government interventions such as social assistance, assistance for MSME business actors, and health insurance assistance intended for the community can help people deal with uncertainties during a pandemic, such as decreased income and health problems. The assistance received helps households maintain their consumption levels. Government spending effects such as fiscal policy can reduce the duration and intensity of shocks caused by the pandemic and stimulate economic activity to survive the pandemic (Faria-e-Castro, 2021). Thus, the intervention will support household consumption and contribute to economic recovery.

Another factor that affects household consumption is population. According to the Malthus model, the higher the population, the higher the consumption needs. The total population positively and significantly influences household consumption. An increase of 1% of the population consumption will increase the total household consumption by 0.75%. Varlamova and Larionova (2015) mention that the population positively influences household consumption. This result is supported by the modeling results in each province, which also show that population size positively influences the household consumption model except in Central Java Province.

CONCLUSION

The results of the descriptive analysis indicate that changes in household consumption patterns have significant changes in consumption patterns for food and beverage commodities, clothing, taxes, and party needs. The estimation results of panel data regression analysis on the total household consumption model show that the variables of household income, household wealth, population, and government spending have a positive and significant effect on household consumption. The dummy variable of the economic crisis in the COVID-19 pandemic has a negative effect on household consumption. Panel data regression analysis by province is in line with and supports the results of the household consumption model in Java.

The government should pay more for household consumption of non-food goods and services, such as durable goods and valuables because these commodities will become household assets. Providing incentives for business actors, increasing employment opportunities, and job training for people of productive age can be one of the efforts to increase household income. Household wealth has a positive impact on household consumption. Efforts to improve household welfare can be carried out by allowing households to increase their asset ownership. For example, adding assets such as gold by buying mini gold and the livable housing program for the underprivileged is easy. In future research, the dynamic panel analysis method can explore the short-term and long-term effects of determinants of household consumption and use a pandemic variable approach using the ratio of the number of cases to the population.

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