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The Dynamics of Consumer Spending in the COVID-19 Pandemic

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ABSTRACT**:** This cross-sectional research was conducted to assess the Marginal Propensity to Consume (MPC) among individuals residing at the regional level, both before and during the COVID-19 pandemic. The study aimed to understand the significance of the MPC values. These MPC values reflect the spending tendencies of the West Sumatra population, providing valuable insights into consumer behavior during distinct time periods. For this study, data was gathered using online surveys that were distributed to chosen samples across different regions and urban areas in West Sumatra. The analysis relied on the Ordinary Least Squares Method. This study aims to determine if the Covid-19 pandemic has altered public consumption patterns by counting the value of MPC. The research findings highlight a significant contrast in MPC values before and amid the COVID-19 pandemic. To be precise, the MPC value was higher before the pandemic than observed during the pandemic. This difference can be attributed to increased economic uncertainty during the pandemic, which reduced autonomous consumption. Additionally, this research goes beyond exploring spending habits by investigating the portion of income dedicated to consumption before and amidst the COVID-19 pandemic. The results reveal that the percentage of income directed towards consumption during the pandemic is less than observed before. These outcomes are in harmony with economic theories and underscore the influence of uncertain circumstances on how consumers allocate their funds.

Keywords: consumption, COVID–19, disposable income, marginal propensity to consume.

I. INTRODUCTION

The COVID-19 outbreak has significantly impacted global consumer expenditure. Customers' purchasing habits have drastically changed due to company closures, declining earnings, and heightened uncertainty. The McKinsey & Company study found that 40% of consumers in the United States had switched to cheaper brands during the COVID-19 pandemic [1]. These changes have been especially noticeable in developing nations, where the informal economy is more prevalent, and safety nets are frequently weaker. Households in poor nations cut back on non-essential spending during the pandemic on basic necessities due to job losses or income decrease. Pandemics and natural catastrophes are other variables affecting the resilience of small and medium-sized enterprises and households' economies [2, 11].

The decline of consumption can be seen in many contexts in many countries. For example, a study in China observed that daily offline consumption, including transactions made via UnionPay cards and QR scanners, experienced a substantial decline of 32% [3]. Both the purchase of goods and services were notably affected, with declines of 33% and 34%, respectively. Further analysis within specific categories revealed that dining, entertainment, and travel suffered the most significant drops, with declines of 64% and 59%, respectively. This decline in consumption was evident across cities, with the most significant reduction occurring in the epicenter, Wuhan, where it plummeted by 70% [13].

There is a common notion that the alterations in individuals' spending habits can be observed through the concept of the marginal propensity to consume. This value illustrates how fluctuations in people's income led to changes in their consumption patterns. A study conducted in Thailand and Vietnam amid the COVID-19 pandemic discovered that the marginal propensity to consume is notably higher in response to positive income shocks than to negative ones [4]. A European study found that marginal consumption propensities decrease with income but are not as clearly related to wealth [5]. The marginal propensity to consume (MPC) among single families in South Korea during the COVID-19 pandemic stood at around 0.40, and it exhibited a decline as the transfer amount increased. From this explanation, we can see that the Covid pandemic impacts developed and developing countries [6, 7].

Our paper investigates the marginal propensity to consume at the regional level. This study can contribute positively to the body of knowledge on the topic of shifts in consumer spending at the regional level during the COVID-19 pandemic. A notable gap in existing research is the absence of studies that break down data according to income level, age groups, and various demographic factors. This research, however, concentrates on examining alterations in consumption patterns linked to fluctuations in income levels in West Sumatra Province, Indonesia, by using the marginal propensity to consume theory. The ordinary Least Square method examines the marginal propensity to consume before and during COVID-19.

In this investigation, we focus on West Sumatra, Indonesia, to capture the dynamics of consumer spending. The choice of West Sumatra is motivated by several factors. Firstly, residents of the region are Muslim residents and traditionally experience an upsurge in consumption during religious holidays and the fasting month, events that unfortunately coincided with the onset of the COVID-19 pandemic. This study's primary objective is to analyze the shifts in consumption patterns and explore whether these changes are still influenced by variations in income, as outlined in the concept of the Marginal Propensity to Consume. The repercussions of the pandemic have been widespread across all regencies and cities in West Sumatra. Consequently, it is crucial to delve deeper into consumption behavior, particularly in areas most impacted by the pandemic, especially those with the highest population in the province. This exploration is essential for gaining insights into how consumption patterns adapt in response to income fluctuations caused by the effects of the COVID-19 pandemic. Thus, the primary objective of this research is to investigate whether the Covid-19 pandemic has influenced consumption behavior, essentially examining if the pandemic has affected people's propensity to engage in consumption activities.

The paper is organized into five sections: the introduction in section 1, a concise review of related literature in section 2, an explanation of the data and methodology in section 3, empirical results and discussion in section 4, and the conclusion provided in section 5.

II. REVIEW OF RELATED LITERATURE

The consumption theory posits a direct connection between the present level of consumption and income. This relationship between the two variables forms the foundation of the consumption function, which delineates how consumption levels correspond to different income levels [9]. John Maynard Keynes emphasized that, within an economy, household consumer spending fluctuates in direct proportion to the disposable income available to those households. The primary and most critical theory is the Keynesian theory of absolute income hypothesis, particularly concerning the short-term consumption function. In this theory, the general level of consumption spending is contingent upon the income level, expressed as $\boldsymbol{C = C0 + bY + e}$. When there is no income, often called autonomous consumption, the consumption level is denoted as *C0*. The parameter '*b*' that determines the slope represents the marginal propensity to consume (MPC), indicating the extent to which consumption changes when income increases by one unit. The '*e*' term introduces a random shock, such as the impact of unforeseen events like the COVID-19 pandemic in the present context. The relationship between consumption and income is known as Consumption Function. Marginal Propensity to Consume (MPC).

Some assumptions hold for the theory of marginal propensity to consume: The first is that the marginal propensity to consume is the amount consumed from the income received between zero and one. From this assumption, it is explained that if someone's income increases, the consumption and savings level will also be higher. According to Keynesian theory, a person's consumption level is primarily driven by income rather than interest rates. This theory's first assumption is that consumption increases with rising income. The second assumption is that the Marginal Propensity to Consume (MPC) indicates the increase in consumption resulting from a one-unit increase in disposable income. Keynes postulates that the additional amount consumed from each unit of additional income falls between zero and one. Moreover, he asserts that the consumption-to-income ratio, or the propensity to consume, decreases as income grows. Saving is a luxury, so he hopes the rich save a higher proportion of their income than the poor. The last assumption for the theory: Keynes argues that income is an important determinant of consumption and that the interest rate has no important role. In the short term, people can consume using past savings, so if this happens, then the person has made negative savings (dissaving). The subsequent graph theoretically depicts the connection between income and consumption.

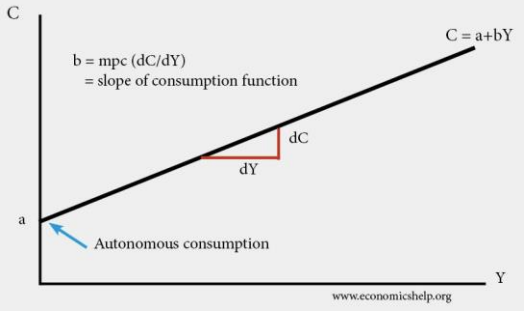

FIGURE 1. Consumption function

The consumption function outlined in the image and description above serves as the foundational theory for this research. By analyzing the income and consumption data collected from respondents, this study aims to determine the value of autonomous consumption. More importantly, it seeks to identify the Marginal Propensity to Consume (MPC), which is the primary focus of this research.

The study by Canbari et al. (2019) [5], found that households exhibiting elevated socio-economic status display a reduced inclination to consume marginally. It indicated a heightened marginal propensity to consume following the financial crisis of 2007-2009. This research aligns with the proposition that lower-income groups face more pronounced credit constraints. Christelis et al. (2020) [8], found that financial concerns stemming from the pandemic led to a substantial decrease (increase) in the marginal propensity to consume when faced with a positive (negative) income shock. This pattern aligns with the predictions of precautionary saving and liquidity constraint models. These findings remain robust even when addressing endogeneity concerns using panel fixed effects models and partial identification methods considering time-varying unobservable variables. Furthermore, the study offers informative identification regions for the average treatment effect of COVID-19-induced financial concerns, relying on weak assumptions.

III. METHODS AND MATERIALS

1. *DATA COLLECTION*

The research focuses on the residents of West Sumatra, encompassing various regencies and cities. The sample for this study has been selected not only from areas with the highest number of positive COVID-19

cases but also from regions with the largest populations. These specific areas include Padang City, Padang Pariaman Regency, Bukittinggi City, Pesisir Selatan Regency, Agam Regency, and Tanah Datar Regency. The total sample size amounts to 155 individuals. According to [18], the sample represents a portion of the overall population, reflecting its characteristics. The researchers employed a purposive sampling method to choose respondents or samples based on their suitability to address the research questions. The study employs a cross-sectional design.

The data collection method for this study involves primary data through the distribution of online questionnaires. Additionally, data related to the research topic will be collected from surveys conducted on relevant websites.

2. *RESEARCH DESIGN*

MPC theory is a concept that gives an idea of how much consumption will increase if disposable income increases by one unit. MPC is a number that shows a comparison between the magnitude of changes in consumption expenditure (ΔC) with the magnitude of changes in the disposable income balance or national income (ΔY) received resulting in consumption expenditure.

$$MPC = \Delta C/\Delta Yd \quad (1)$$

MPC = Marginal Propensity to consume, ΔC= change in consumption, ΔYd= change in disposable income, a= autonomous consumption. The level of consumption must be met, even though the level of income is zero, that is what is called autonomous consumption. The graph shows the relationship between consumption and income.

3. *DATA ANALYSIS DESIGN AND HYPOTHESIS TESTING*

The population for this research comprises residents of West Sumatra, distributed across various regencies and cities. The sample selection focuses on regions with the most COVID-19 cases and the largest populations. These areas include Padang City, Padang Pariaman Regency, Bukittinggi City, Pesisir Selatan Regency, Agam Regency, and Tanah Datar Regency, with a total sample size of 155. Sugiyono (2010) [19], states that a sample represents a population subset, reflecting its characteristics. The purposive sampling method selects respondents or samples based on specific characteristics deemed relevant to addressing the research questions. The study employs a cross-sectional design. This approach enables researchers to choose participants who meet specific characteristics or criteria crucial to the study's aims, thus improving the accuracy and richness of the gathered data.

The primary data for this study is collected mainly by distributing online questionnaires to the target respondents. Prior to data processing, the research questionnaire undergoes both validity and reliability assessments. The validity test assesses the accuracy of the questionnaire to ensure it effectively captures the intended information [2]. The degree of validity is determined by examining the tolerance scores in the columns and rows; the presence of asterisks signifies that the question is significant [3].

The reliability test is designed to determine the reliability of the questionnaire, ensuring that respondents provide consistent answers over time. Reliability can be measured using two methods: Cronbach's Alpha and Composite Reliability. Cronbach's Alpha is employed to test construct reliability, and a questionnaire is considered reliable if it yields a Cronbach's Alpha value (α) greater than 0.60 [10].

Additionally, data related to the research topic will be collected from surveys conducted on relevant websites. Descriptive and inferential statistics will be applied to process the collected data to address the research questions. The Ordinary Least Square (OLS) method will be utilized to transform the data into useful information that aligns with the research objectives. Multiple linear regression analysis is the chosen analytical tool to assess the impact of independent variables on the dependent variable, employing the Ordinary Least Square (OLS) method as outlined by Gujarati (2007) [12]. The OLS method minimizes discrepancies between the calculated results (regression) and actual conditions. To ensure the production of

a well-estimated equation, each OLS estimator must meet the BLUE (Best Linear Unbiased Estimators) criteria, which are:
1. The parameter estimator (βi) is linear to the dependent variable
2. The parameter estimator (βi) is unbiased, or the expected average value is the same as the actual value (βi).
3. The estimator βi has a minimum variance and is called efficient.
The subsequent step involves conducting a test before data processing:

3.1 Validity Test: Validity test is used to measure the validity of the questionnaire in order to use it to explain something from the questionnaire. The level of validity can be measured by looking at the column and row tolerance scores. If there are asterisks (a sign) in column and rows it means the question is significant.

3.2 Reliability Test: The reliability test is aimed to determine whether the questionnaire is reliable or not. Questionnaires is said reliable if the respondents answer the questionnaire consistently overtime. In measuring reliability, there are two ways, namely Cronbach Alpha and Composite reliability. The use of Cronbach alpha is used in testing the construct reliability which will be declared reliable if it produces a Cronbach Alpha value (a)> 0.60 [10].

3.3 Classic assumptions test: Research with regression processing must be free of deviations from classical assumptions

a. Normality Test: This test ensures that both the dependent and independent variables are normally distributed. One method to perform the normality test is by using the residual value. If the residual value exceeds the significance threshold of 0.05, it indicates that the data is normally distributed. Another approach for testing normality is through statistical analysis, such as the Kolmogorov-Smirnov (K-S) non-parametric statistical test [10].

b. The linearity test. It assesses whether the relationship between the dependent and independent variables is linear. This test is conducted using the Ramsey RESET Test. If the F-statistic value is greater than 0.05, the regression model satisfies the linearity assumption; if the F-statistic value is less than 0.05, the model does not meet the linearity assumption [14].

c. The Autocorrelation test. Autocorrelation occurs when the disturbance term in one period correlates with the disturbance term in another. When autocorrelation is present, the estimated parameters become biased, and their variances are minimized, leading to inefficiency. The Durbin-Watson test is the most commonly used method for detecting autocorrelation [12].

d. The Heteroskedasticity Test. It assesses whether the variance of the data used to create the model is inconsistent. It aims to detect if there is unequal variance in the residuals from one observation to another within the regression model. The absence of heteroskedasticity is indicated when the Chi-square Probability value is greater than 0.05. This test is conducted using the Breusch-Pagan-Godfrey test [16].

e. Multicollinearity occurs when two or more variables are highly linearly related. The criteria for determining the presence of multicollinearity are as follows [16]:

i. If the tolerance value is greater than 0.10 and the VIF value is less than 10, it can be concluded that there is no multicollinearity between the independent variables in the regression model.

ii. If the tolerance value is less than 0.10 and the VIF value is greater than 10, it can be concluded that multicollinearity is present.

3.4 Regression Test

Regression analysis is the study of the relationship between dependent variable and one and more independent variables. The method used in analyzing the data in this research is Ordinary Least Squares

(OLS). This method estimates the line regression by minimizing the total squares of error for every single observation on the line [17].

a. Test R2 (coefficient of determination). The coefficient of determination test (R2) is a tool used to measure how far the model's ability to explain the dependent variable The value of the coefficient of determination is between zero or one. The small value of R2 indicates the ability of the independent variable in explaining the dependent variable is limited, but the value of R2 close to 1 indicates all the information needed is provided by the independent variable in predicting the dependent variable [18].

b. F test is performed to determine whether all independent variables included in the model have simultaneous influence on the dependent variable. The results of the F test can be seen by looking at a significant probability number that is if the significance probability number is greater than 0.05, it means that the independent variables do not affect he dependent variable together. However, if the significance probability number is less than 0.05 then the independent variables influence the dependent variable together [10].

c. The t test explains how far the influence of one independent variable individually in explaining the variation of the dependent variable. If the significance value is smaller than the error rate (alpha) which is equal to 0.05, it can be said that the independent variable has a significant effect on the dependent variable. If the calculated significance value is greater than the error rate (alpha) which is 0.05, it can be said that the independent variable does not significantly influence the dependent variable.

Once all the tests have been successfully completed, data processing can proceed accordingly.

IV. RESULTS AND DISCUSSION

The study's empirical results consist of two conditions, explaining the marginal propensity to consume before the pandemic Covid 19 and during the Covid 19, based on regression statistics.

4. BEFORE PANDEMIC COVID 19

The following tables show the result of the data regression before the pandemic Covid-19:

Table 1. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	503218.413	222748.312		2.259	.025
	Income Before Covid	.643	.044	.764	14.625	.000
a. Dependent Variable: Consumption before Pandemics b. Independent Variable: Income before Pandemic						

The value of significance is lower than 0.05. Based on the table of regression, the Consumption Function will become:

$$C = a + bY \quad (1)$$

$$C = 503.218{,}41 + 0.643Y \quad (2)$$

The subsequent graph illustrates the correlation between income and consumption prior to the onset of the COVID-19 pandemic, with the Marginal Propensity to Consume (MPC) value being equivalent to 0,643.

FIGURE 2. Income before pandemic COVID-19

The findings indicate that respondents finance their consumption through various means, such as borrowing from conventional or Syariah banks, utilizing personal savings, or receiving assistance from neighbors, friends, or close family members. The results show that the autonomous consumption, denoted as 'a', has a value of Rp 503,218.41. This implies that if respondents do not have any income, their consumption remains at Rp 503,218.41.

The coefficient 'b' is calculated to be 0.643, which signifies that 64.3% of respondents' income is allocated to consumption, with the remaining percentage designated for other uses, thereby indicating that the Marginal Propensity to Consume (MPC) before the pandemic is 0.643.

5. DURING THE PANDEMIC COVID 19

The following tables show the result of the data regression during the pandemic Covid.

Table 2. Coefficient

Model		Unstandardized Coefficients	Standardized Coefficients		t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.022E6	407908.633		4.957	.000
	Income During Covid	.625	.102	.443	6.116	.000
a. Dependent Variable: Consumption during Pandemics b. Independent Variable: Income during pandemics						

Based on the table of regression, the Consumption Function will become:

$$C = a + bY \quad (3)$$

$$C = 2.022.000 + 0.625Y \quad (4)$$

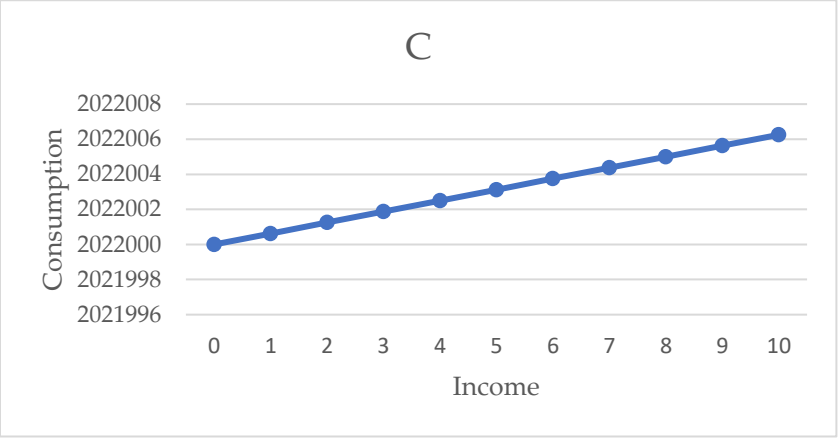

FIGURE 3. Income during the pandemic COVID-19

The regression analysis reveals that the coefficient for autonomous consumption is Rp 2,022,000. This indicates that respondents tend to consume, regardless of their income status. In other words, respondents are willing to spend their money on consumption, even without their own income. They may source this money from various means, such as friends, neighbors, banks, and other sources.

Additionally, the coefficient for the variable Y or Disposable Income is 0.625, signifying that 62.5% of their income is allocated towards consumption. This percentage illustrates the portion of respondents' income that is devoted to their consumption habits.

Comparing the value of autonomous consumption (a) before and during the pandemic, we observe a significant increase from Rp 503,218.41 to Rp 2,022,000. The coefficients of the Y (disposable income) variable are 0.643 and 0.625, respectively, when we compare them to values obtained before and during the pandemic. According to these numbers, the Marginal Propensity to Consume (MPC) value decreased both before and during the epidemic. Put more simply, this means that for an increase of 1% in income, consumption will rise by around 0.634.

The primary reason for this surge can be attributed to the phenomenon of panic buying, driven by the prevailing uncertainty during the pandemic. This finding aligns with studies conducted in Britain (Dimitris et al., 2020). Crossley et al. (2021) revealed that the recorded Marginal Propensity to Consume (MPC) stands at an average of approximately 11%. While slightly higher, it remains within the modest range for individuals residing in households with elevated current needs. A noteworthy portion of respondents indicates intentions to utilize a windfall to reduce debt or adjust transfer payments with family and friends.

V. CONCLUSIONS

The existence of a pandemic has been found to either directly or indirectly affect people's income in both theoretical and empirical studies. The middle class of society is represented in this study by the income levels of the local population. According to the MPC theory, this decline in income has the consequence of lowering public consumption.

Before the pandemic, autonomous consumption was Rp 503,218.41, while during the COVID-19 pandemic, it increased to Rp 2,022,000.00. This surge in consumption during the pandemic can be attributed

to widespread panic buying in response to the crisis. As a result, there was a noticeable increase in people's consumption habits amidst the pandemic. Analyzing the Marginal Propensity to Consume (MPC) values before and during the pandemic reveals a decrease in the proportion of income spent by the population. The MPC value was 64.3% before the pandemic and decreased to 62.5% during the pandemic, indicating a slight reduction in the percentage of income that people allocated to consumption during this challenging period.

Preceding the pandemic, autonomous consumption exceeded Rp 503,218.41, but amid the COVID-19 crisis, it surged to Rp 2,022,000.00. This increase in consumption during the pandemic can be attributed to the widespread panic buying prompted by the crisis. Consequently, there was a noticeable shift in people's consumption patterns amidst the pandemic. A closer examination of the Marginal Propensity to Consume (MPC) values before and during the pandemic highlights a decrease in the proportion of income spent by the population. The MPC value was 64.3% before the pandemic and reduced to 62.5% during the pandemic, signifying a slight decrease in the portion of income that individuals directed towards consumption during this challenging period.

These results align with the findings from a study conducted in six European Union countries, indicating that worries about the financial consequences of the COVID-19 pandemic result in a substantial decrease in the marginal propensity to consume. It's important to note that the data utilized in this study focused exclusively on household income and consumption levels, without considering any financial stimulus provided by either the central or regional governments. The results of this study are in accordance with surveys conducted in Thailand and Vietnam amid the COVID-19 pandemic, the marginal propensity to consume is markedly higher for positive income shocks compared to negative ones, Bui et al. l (2022). This outcome contradicts expectations derived from the lifecycle permanent income model with borrowing constraints and empirical evidence from developed nations.

Research conducted by Albuquerque and colleagues in 2022 revealed a crucial factor influencing variations in Marginal Propensity to Consume (MPC) among households. The study found that households hide their concerns about their financial stability, specifically their ability to meet basic needs, exhibiting a 20% higher MPC than households without such concerns.

Conflict of Interest

No potential conflict of interest or any other similar divergence associated with this research article by the authors.

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