*Original Article*

# Analysis of Income for Consumption: Before and During the World's COVID-19 Pandemic

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*Abstract: Throughout history, humanity and its civilizations have been recurrently afflicted by various disease outbreaks, such as the Black Death, Cholera, Spanish Influenza, SARS, Avian Influenza, and H1N1 Influenza. Such epidemics are unpredictable and invariably result in profound health and economic repercussions. A disease outbreak that extends across global boundaries is termed a pandemic. This research endeavors to investigate the relationship between income levels and consumption patterns by employing the absolute income hypothesis theory in the context of the pre-and during the COVID-19 pandemic periods globally. The methodology involves categorizing nations according to income levels defined by the World Bank's established criteria and conditions. The research utilizes cross-sectional data on Gross Domestic Product (GDP) per capita and household consumption expenditures per capita, analyzed through the Ordinary Least Square (OLS) regression technique. The findings of this study revealed several key insights: (1) There is a positive correlation between income and household consumption, validating the absolute income hypothesis theory. (2) The theory remains applicable even during crisis periods. (3) Populations in countries classified as low, lower-middle, upper-middle, and high-income exhibit rational economic behaviors.*

*Keywords: Income, Consumption, Absolute Income Hypothesis, COVID-19, World Bank Income Groups.*

## I. INTRODUCTION

At the end of 2019, an outbreak of a mysterious cough, fever, and pneumonia occurred in the city of Wuhan, China. It is suspected that this disease emerged from the animal market in the city. The WHO office in China was first informed about this disease on December 31, 2019, attributing it to a virus. Initially referred to as the Wuhan virus or nCov-2019, it was officially named COVID-19 by WHO on February 11, 2020, an acronym for 'coronavirus disease 2019.'

The recording of COVID-19 cases began in January 2020, with 332 cases initially reported. By mid-March 2020, as the spread became global, 130,031 cases were recorded. Figure 1 below illustrates the substantial spread in 2020, reaching 82.85 million cases.
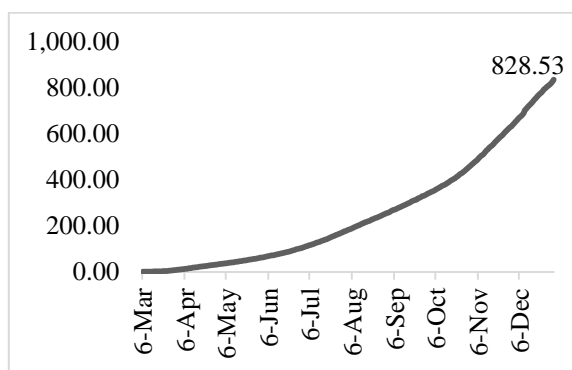


*Source: [1]*
**Figure 1: Number of COVID-19 cases in the World (in hundreds of thousands)**

Various events planned for 2020 had to be postponed, cancelled, or led to the closure of large industries, forcing factories to shut down or reduce production to curb the worsening spread of the disease. These events, including the Tokyo 2020 Olympics and Euro 2020, were postponed to 2021. Notably, car factories such as Volkswagen and Ferrari also experienced production delays. Cinemas, restaurants, and other public places were closed, and lockdowns were implemented at both city and regional levels.

The COVID-19 pandemic has precipitated profound and acute economic repercussions globally, stemming from the health crisis itself and the implementation of social and physical distancing measures mandated by governments. Forecasting the extent and duration of the pandemic-induced economic downturn on households and individuals poses significant challenges. This difficulty is compounded by the uncertainties related to the crisis's duration, including factors such as the length of lockdowns, the sectors impacted, and the patterns of consumption and economic recovery post-crisis [2].

Consumption is a critical measure of a population's welfare, encompassing expenditures on housing, energy, transportation, and food, and it accounts for approximately half of the total household expenditure. The economic activities of households are integral in shaping the broader national macroeconomic landscape. Household consumption expenditure encompasses the worth of all products and services at market acquired by households to satisfy their needs and wants. This category includes both durable goods, such as automobiles, washing machines, and televisions, as well as non-durable goods. Notably, household consumption expenditure excludes housing purchases but includes rent payments for properties occupied by the owners.

Households represent a pivotal economic entity across all nations, as evidenced by their substantial contribution to the Gross Domestic Product (GDP) [3]. The significant share of household consumption in the overall GDP has far-reaching implications for the impact of household consumption patterns on the economy. Consequently, household consumption emerges as a critical variable for economic analysis, particularly in the context of aggregate demand [4].

Income is a key determinant of household consumption, as postulated by the 'Absolute Income Hypothesis' consumption theory introduced by Keynes. In the Keynesian framework, planned real expenditures positively correlate with real income and government spending, whereas interest rates and taxes negatively influence [5]. Romer's research corroborates this theory, demonstrating a positive relationship between income and household consumption. Conversely, it reveals that inflation and savings rates adversely affect consumption, as observed in the context of the Czech Republic [6].

The World Bank, a global financial institution comprising 189 member nations, offers assistance through funding, advisory services, and research to foster economic development in the developing World. This institution has established various classifications for countries, as available in the World Development Indicators database of the World Bank. These classifications include geographic regions, income groups, and operational lending categories. Countries are categorized into four income groups - low-income, lower-middle-income, upper-middle-income, and high-income-based on their Gross National Income (GNI) per capita, expressed in US dollars and converted from each country's local currency.

In examining the correlation between income, consumption, and GDP across various income categories globally, Diacon and Maha observed more pronounced consumption and wealth relationships in high- and low-income countries relative to those in the middle-income bracket [7]. Dey's research yielded somewhat differing outcomes for Asian countries, revealing a stronger link between financial status and consumption in countries with lower and upper-middle incomes than in high-income countries [8].

This research seeks to scrutinize the influence of income levels on consumption patterns globally, both before and during the COVID-19 era. The pandemic has significantly impacted societal norms across low, middle, and high-income countries. Employing comparative regression analysis, this research seeks to elucidate how income affects consumption in the periods preceding and during the pandemic.

## II. RESEARCH METHODS

### A) Description of Operational Variable

In this research, the primary independent variable is income, denoted by GDP per capita per the World Bank's criteria. GDP per capita is derived by dividing the Gross Domestic Product by the midyear population count. Gross Domestic Product itself constitutes the total gross value produced by all producers and entities that are residents of the economy, including product taxes but excluding subsidies that are not included in the product value. This aggregate is calculated without factoring in the depletion and degradation of the earth's resources or the decreased value of manufactured assets. GDP per capita is thus indicative of the disposable income of a population. The GDP figures utilized in this data are expressed in US Dollars, with 2015 as the reference year.

The dependent variable in this study is consumption, indicated by per capita household final consumption expenditure or per capita private consumption. As defined by the World Bank, this final household consumption expenditure per capita measurement is assessed based on private consumption, adjusted for constant 2015 prices and population estimates. The current market price of all household products and services, including expensive items like computers, washing machines, and cars, is included in the household's final consumption expenditure. However, this measure excludes the purchase of homes while including rent for residences occupied by their owners.

## B) Data Types and Sources

According to consumption theory, one key determinant of household consumption is income. The research utilizes a combination of both quantitative and qualitative data types. Primary reliance is placed on secondary data sources, employing qualitative data to provide the necessary contextual background for the study and quantitative data for conducting regression analysis. The essential data for this regression analysis comprises per capita household expenditure and GDP per capita. Additionally, supplemental data, which includes statistics on COVID-19 cases, fatalities attributed to COVID-19, and the count of patients who have recuperated from COVID-19, is also incorporated. These datasets were gathered through the Bloomberg L.P. Terminal and the World Bank Data's World Development Indicators.

## C) Data Analysis Method

This analysis uses a cross-section data regression tool in the form of a natural logarithm (Ln). According to Gujarati and Porter, using natural logarithms can minimize the occurrence of deviations in the classical assumption, namely heteroscedasticity [9]. The equation of the cross-section regression model is stated as follows:

$$LnKons_i = \beta_0 + \beta_1 LnGDP_i + e_{1i} \qquad (1)$$

| | | |
|---|---|---|
| LnKons | = | consumption in the form of natural logarithm |
| LnGDP | = | Income in the form of natural logarithm |
| $\beta_0$ | = | Intersep |
| $\beta_1$ | = | Regression coefficient |
| *e* | = | Error |

## III. RESULTS AND DISCUSSION

### A) Country Classification

The World Bank categorizes nations into four distinct income brackets - low, lower-middle, upper-middle, and high - based on their Gross National Income (GNI) per capita, expressed in US dollars. This classification is executed using the World Bank Atlas method, which undergoes an annual update every July 1.

Nations with a GNI per capita at or below 1,045 US Dollars are designated as low-income. This group includes countries such as Chad, the Democratic Republic of the Congo, Ethiopia, Guinea, Guinea-Bissau, Liberia, Madagascar, Mali, Rwanda, Sierra Leone, Sudan, and Togo.

The lower-middle-income category encompasses countries with GNI per capita between 1,046 and 4,095 US Dollars. Included in this group are nations like Cabo Verde, Cambodia, Cameroon, India, Indonesia, Nicaragua, Nigeria, Republic of the Congo, Djibouti, Egypt, El Salvador, Haiti, Honduras, Vietnam, Iran, Kyrgyzstan, Mauritania, Mongolia, Morocco, Nepal, Uzbekistan, Pakistan, Philippines, Senegal, Sri Lanka, Tanzania, Ukraine, and West Bank & Gaza.

Countries with a GNI per capita ranging from 4,096 to 12,695 US Dollars fall into the upper-middle-income bracket. This group consists of countries such as Argentina, Armenia, Belarus, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Colombia, Costa Rica, Dominican Republic, Ecuador, Equatorial Guinea, Georgia, Guatemala, Jamaica, Jordan, Kosovo, Lebanon, Malaysia, Mauritius, Mexico, Moldova, Montenegro, Namibia, North Macedonia, Paraguay, Peru, Romania, Russia, Serbia, South Africa, Thailand, and Turkey.

High-income countries are those with a GNI per capita exceeding 12,696 US Dollars, including nations like Australia, Austria, Canada, Chile, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, Israel, Italy, South Korea, Latvia, Lithuania, Netherlands, Poland, Portugal, Puerto Rico, Saudi Arabia, Slovakia, Slovenia, Spain, Sweden, and Switzerland.

Given the relatively small number of countries in the low-income group, this study amalgamates them with the lower-middle-income category for analytical purposes.

### B) Data Interpretation

Referring to Table 1, the analysis of low and lower-middle-income countries before the 2019 pandemic reveals from the regression equation Y = 0.504 + 0.886 (X) that a 1 percent increment in income correlates to a 0.886 percent rise in consumption. This outcome is consistent with Keynes' absolute income hypothesis theory, which posits a direct positive relationship between income and consumption, where an escalation in income is followed by an increase in consumption, though not in an exact one-to-one ratio.

During the 2020 pandemic, in the same income categories, the regression equation Y = 0.500 + 0.886 (X) demonstrates a similar trend: a 1 percent increase in income is associated with a 0.886 percent increase in consumption. This finding further

substantiates Keynes' absolute income hypothesis theory, affirming the positive impact of income on consumption [10]. Here, too, the rise in consumption is observable with an increase in income, but the magnitude of the increase in consumption is not as substantial as that of income.

**Table 1. Comparison of Regression Results**

| Group by Income | Period | |
|---|---|---|
| | **2019** | **2020** |
| *Low and lower-middle-income* | $Y = 0,504 + 0,886\ (X)$ | $Y = 0,500 + 0,886\ (X)$ |
| *Upper Middle Income* | $Y = 1,672 + 0,767\ (X)$ | $Y = 2,076 + 0,721\ (X)$ |
| *High Income* | $Y = 0,232 + 0,919\ (X)$ | $Y = 0,365 + 0,904\ (X)$ |

**Source:** *Results by author data*

Analyzing upper-middle-income countries before the 2019 pandemic, the regression equation Y = 1.672 + 0.767 (X) reveals that a 1 percent rise in income leads to a 0.767 percent increase in consumption. This aligns with Keynes' absolute income hypothesis, which asserts a positive correlation between income and consumption, indicating that an uptick in income results in a corresponding but not equivalent increase in consumption.

During the 2020 pandemic within the same income bracket, the regression equation Y = 2.076 + 0.721 (X) suggests that each 1 percent increment in income influences consumption by 0.721 percent. This outcome upholds Keynes' absolute income hypothesis, demonstrating a positive relationship between income and consumption, where consumption escalates with rising income. Yet, the proportional rise in consumption is not as large as income.

In high-income countries before the 2019 pandemic, the regression analysis with the equation Y = 0.232 + 0.919 (X) indicates that a 1 percent increase in income impacts consumption by 0.919 percent. This finding aligns with Keynes' absolute income hypothesis theory, which posits a beneficial effect of income on consumption. As income grows, consumption similarly increases, though the rate of increase in consumption is not as pronounced as that of income.

For high-income countries amid the 2020 pandemic, the regression equation Y = 0.365 + 0.904 (X) demonstrates that each 1 percent rise in income corresponds to a 0.904 percent increase in consumption. These results, too, are consistent with Keynes' theory, suggesting that income enhances consumption. Here, increased income leads to elevated consumption levels, yet the relative growth in consumption is somewhat less marked than the income growth.

## IV. CONCLUSION

From the deliberations of this study, we can deduce several key conclusions, particularly concerning the influence of income on household consumption: (1) Income supports the absolute income hypothesis notion by having a favorable effect on household expenditures. (2) The absolute income hypothesis theory remains applicable even during periods of crisis. (3) In countries across the spectrum of low-, middle-and high-income categories, the populace generally exhibits rational economic behavior.

The findings demonstrate a significant and positive correlation between income and household consumption. Across various global income brackets, including low-lower-middle, middle-upper, and high-income groups, both in times of normalcy and crisis, an increase in income (Y) is associated with an increase in consumption (C).

The role of income as a critical factor influencing household consumption, which in turn serves as a gauge of economic stability under both normal and crisis conditions, underscores the necessity of policy measures to augment people's incomes in both the short and long term. For instance, governments can implement fiscal policies like social assistance programs and tax reductions during a crisis to boost disposable income.

This study, focusing exclusively on income as the independent variable under the Absolute Income Hypothesis framework, does not encompass extended time series data or a broad range of independent variables in its regression model. Therefore, future research is encouraged to incorporate more extensive data during the pandemic and to broaden the scope to include variables beyond income. This would facilitate a more holistic analysis of income and consumption relationships.

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