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Global Consumption Disparities: Unveiling a Persistent Divide[a]

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This paper delves into global consumption inequality through empirical and theoretical analyses. First, countries are categorized into five groups according to their consumption levels to uncover worldwide consumption patterns using the Penn World Tables 10.01 dataset between 1970 and 2019. The results imply that the inequality in per capita consumption is significant and persistent across time. Moreover, there is a "Caste System" in world consumption: countries belonging to the lowest class struggle to climb up to the upper consumption groups, whereas the countries in the top class keep their seats over time. Second, the saving rate differences between "climbing" and "falling" countries are empirically tested based on the Solow-Swan framework, which shows that the level of the saving rate determines the level and the growth rate of per capita consumption. Since the analyses show that the climbing countries have significantly higher saving rates than falling countries, a higher saving rate is conducive to increasing a country's per capita consumption level and growth rate in the long run.

JEL codes: E21, O47, C21

Keywords: Consumption-saving decision, Solow Growth Model, Cross-sectional models

1 Introduction

Economists have long been interested in understanding how people's well-being is affected by various economic factors. Wealth, income (and its components), consumption and their distribution are the indicators commonly used in the literature to measure economic well-being. Consumption stands out among other indicators because it relates to people's everyday lives and experiences (Johnson & Shipp, 1995; Cutler & Katz, 1992). When there are significant changes in inequality or shifts in the distribution, measures other than consumption per capita may fail to reflect the experience of most individuals accurately. Moreover, the study of consumption can provide valuable insights into how people respond to changes in their economic environment and how policy interventions may affect their well-being. For these reasons, the discussion in the literature has expanded beyond income and earnings to encompass well-being indicators, focusing on the distribution of individual or household consumption (Krueger & Perri, 2006; Blundell & Preston, 1998; Slesnick, 1993). Based on

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this, a critical aspect of this analysis is the study of consumption, which can provide insights into how people use their resources to achieve a higher living standard. In contrast to the traditional focus on economic production, this approach highlights the role of individual and household behavior in shaping people's quality of life (Stiglitz et al., 2009). Economists can gain a more nuanced and comprehensive understanding of how economic forces influence people's well-being by focusing on consumption.

The problem of inequality through a more reliable well-being measure is crucial as incorrect measurements can lead to distorted decision-making. In the literature, inequality has been explored with different indicators, and which indicator reflects inequality correctly is controversial (Aitken, 2019; Bannister & Mourmouras, 2017). The gross domestic product (GDP) is a frequently used economic measure to compare the living standards of different countries despite ongoing debates about its appropriateness. As GDP does not consider production's negative or positive effects on society, simply increasing production does not necessarily lead to an improvement in the standard of living. Increased production could cause environmental pollution and indirectly lower the quality of life. More construction paves the way for more employment and output but may condemn people to live in crowded cities. Moreover, GDP does not take into account the growth rates of different sectors. The growing automotive industry may have a massive effect on GDP growth; however, it does not mean a more developed health sector. Therefore, examining the issues with GDP as a measure and considering what other data might be needed to create more meaningful indicators of social progress is crucial (Cerra et al., 2021; Jones & Klenow, 2016).

Although GDP provides limited information regarding welfare, it is still a useful metric for evaluating production due to its straightforward nature. Based on this, output growth is usually seen as a critical indicator of economic success. However, the benefits of economic growth must be distributed equally across society to improve every individual's welfare. This is also important globally, where the economic growth of the whole world and the equality of countries' shares in this growth are crucial factors to consider. Discussing the distribution of outputs as a result of incomes and earnings is insufficient to address the problem of inequality in the absolute sense.

Income data is another primary indicator that is used to discuss inequality. According to official income statistics, inferences about the increase or decrease in inequality can be made. However, these official statistics may not accurately show changes in economic well-being because they need to consider taxes and transfers and are based on accurate survey responses. Even if income measures are improved, they only show temporary changes and do not consider how much people consume from financial wealth and durable goods such as housing and cars. Therefore, how families spend money may give a clearer picture of their economic well-being (Meyer & Sullivan, 2017; Deaton, 1998; Gao & Zeng, 2010). As the literature is criticized since economic inequality is often evaluated solely in terms of income inequality and poverty (Sen, 1999), it is more appropriate to consider inequality in terms of consumption since it represents permanent income (Meyer & Sullivan, 2013). Atkinson (2015) emphasizes that as consumption inequality is the final phase of economic inequality, it is a central problem that many economists should focus on. All other financial concerns related to distribution, such as wealth or income distribution, are merely means of addressing this problem. He argues that inequalities escalate during a crisis, leading to disparities in access to goods and services, e.g., higher costs for the poor who rely on local markets, which face elevated energy prices and rent (due to landlord practices) and experience limited

availability of goods and services. Other socioeconomic factors, like credit scores, contribute to the denial of bank loans for the poor and must be considered when analyzing changes in consumption inequality patterns. Even without substantial wealth, poor individuals still consume goods and services, and they often face challenges in consumption smoothing over time (Fisher et al., 2020; Milanovic, 2016). Therefore, it would be inappropriate to overlook wealth and income disparities when examining consumption inequality.

Increasing inequality worldwide is primarily associated with income distribution, including wages and earnings. One of the drawbacks of the discussion of inequality over income and its elements is that the basic utility function consists only of consumption and leisure. From this point of view, consumption inequality, which measures the distribution of household spending, has been proposed by some economists as a more accurate indicator of changes in welfare than income (Attanasio & Pistaferri, 2016). This is because consumption tends to be more stable and predictable than income, which can fluctuate significantly from one year to the next. Two influential theories that describe how households make consumption decisions (Modigliani & Brumberg (1955)'s life-cycle and Friedman (1957)'s permanent income hypotheses) suggest that people prefer a consistent level of consumption over time rather than relying on a fluctuating income. Therefore, consumption may better reflect a household's actual standard of living, as it takes into account their ability to smooth out income shocks and maintain a consistent level of spending through the use of tools such as savings, credit, insurance, and government or interpersonal transfers.

These discussions imply that further research is needed to understand better the role of saving in the presence of consumption inequality. Motivated by the arguments above, this study jointly reexamines the relationship between saving and consumption using theoretical and empirical analyses. For this purpose, the paper utilizes the Solow growth model, showing the determinants of consumption growth, and then tests the implications of this model using cross-country analyses. Understanding consumption inequality is essential for policy-makers and researchers seeking to promote more equitable and sustainable economic development. By examining the patterns and determinants of consumption inequality across countries, we can gain insights into how to reduce economic disparities and improve the well-being of people around the world. Understanding the dynamics of inequality across countries is important as variations in per capita income across countries rather than within countries are its main source. Without inequality within countries, approximately 70% of global inequality would still be present (Sala-i Martin, 2002, p. 39). Therefore, Sala-i Martin (2002) states that the best way to decrease global income inequality is by promoting economic growth in poorer countries, and examining consumption inequality across countries by following his determination will help produce policies to increase the welfare of poorer countries.

While the standard approach in the theoretical growth literature relies on GDP and its components, consumption inequality has not yet been fully explored. Besides, although research on consumption inequality within countries has been quite active, to the best of our knowledge, none of the existing studies systematically examine how consumption differs across countries. Studies on consumption inequality often draw comparisons between trends in consumption and income inequality (Krueger & Perri, 2006; Attanasio et al., 2015; Fisher et al., 2013; Meyer & Sullivan, 2017; Aguiar & Bils, 2015). Using the theoretical background of Solow (1956) and Mankiw et al. (1992), this paper focuses explicitly on systematically studying global consumption disparities and determining the factors influencing the consumption ranking of countries.

Unlike existing studies that typically concentrate on single countries or small sets of countries (e.g., Attanasio & Pistaferri, 2014; Cutler & Katz, 1992; Slesnick, 1993; Attanasio et al., 2004; Blundell & Preston, 1998; Zaidi & de Vos, 2001; Pendakur, 1998; Barrett et al., 2000; Ohtake & Saito, 1998), our study, building upon a theoretical model, empirically assesses variations in savings rates among countries with upward and downward trajectories to better understand global consumption trends comprehensively. Two main methods were employed. Firstly, a one-tailed t-test was utilized to examine the impact of savings rates on country consumption rankings, categorizing them by per capita consumption levels in 1970 and 2019. Countries[1] were then classified into five consumption categories, allowing for a nuanced exploration of the savings rate's effects on changing country rankings over the period. Additionally, the ordinary least squares (OLS) method is employed in line with the insights from the Mankiw et al. (1992) framework. This facilitated an investigation into the relationship between consumption growth and its determinants. The analyses reveal a substantial disparity, with ascending nations demonstrating significantly higher saving rates than their descending counterparts. This suggests that a higher savings rate positively influences sustained increases in per capita consumption levels for countries in the long run. These empirical findings contribute valuable insights into the role of the savings rate in driving consumption growth globally.

The plan of the paper is as follows: In Section 2, the key features of global consumption distribution across countries are outlined, and various indicators explaining these patterns are examined. Section 3 introduces the developed theoretical model, and Section 4 presents a detailed analysis of the empirical results based on the theoretical model. Finally, the main findings are summarized, and the potential policy implications of the empirical results are considered in Section 5.

2 Stylized Facts

Empirical regularities or stylized facts provide a simple yet powerful way to understand complex systems by highlighting key characteristics and tendencies. This section aims to analyze the stylized facts relevant to the research question of why some countries consume more than others. To this end, a basic overview of the trend in the distribution of consumption across countries is provided using various measures using Penn World Table (PWT) version 10.01 for the period of 1970-2019. The results show that a severe consumption distribution problem across countries has persisted over the years.

Before examining the change in consumption inequality, a Lorenz curve is constructed for global consumption distribution across countries in 2019 to provide evidence about current consumption inequality.[2] The Lorenz curve is a tool used to visualize the distribution of an economic variable, such as income or wealth, among a population. To do so, the population and consumption of each country are proportioned to the total world population and consumption. Then, starting from the country with the lowest consumption, the cumulative consumption levels are plotted on the vertical axis, and the cumulative population levels

[1] Following Mankiw et al. (1992), countries that export oil and have a population of less than 1 million were excluded from the sample. The list of these countries is available in Appendix B. The sample comprises 116 countries with complete data for 1970-2019.

[2] Unlike the sample used in the analyses, the Lorenz curve encompasses 183 countries to capture a comprehensive view of global consumption inequality.

are on the horizontal axis, as depicted in Figure 1. Like the conventional Lorenz Curve, the 45-degree line shows perfect consumption equality, whereas the blue line represents the actual distribution worldwide. Figure 1 reveals that the poorest 70 countries, which comprise nearly half of the world's population, account for a mere 18.8% of the world's total consumption. On the other hand, the upper echelon with 20 countries of the curve illustrates that a mere 8% of the world's population holds a disproportionate 30% of global consumption. These findings show the stark variations in the standard of living across countries.

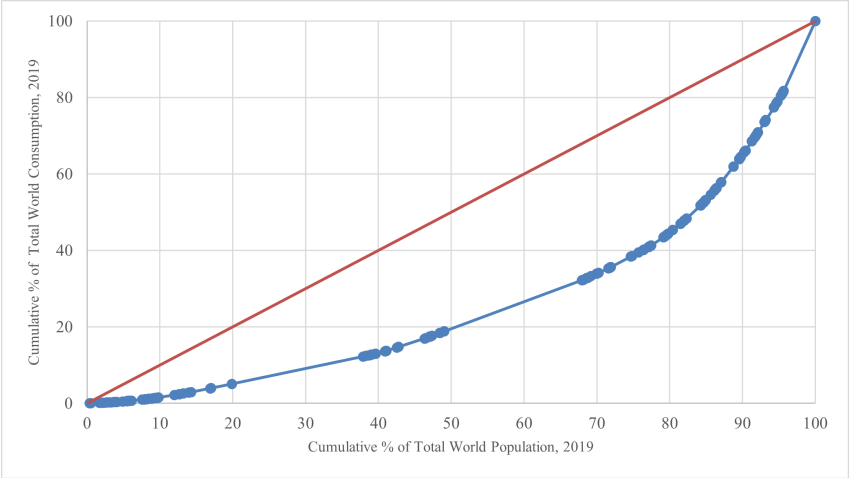

Figure 1: Consumption Inequality of the World, 2019

This study employs a two-step approach to understand how the massive current inequality depicted in Figure 1 has changed over time. As a first step, countries are ranked and assigned into five consumption categories based on their per capita consumption levels in 1970 and 2019: the top class, upper-middle class, middle class, lower-middle class, and lowest class. This classification enables observing the progress or decline in countries' consumption levels over time (Tümer, 2019, 2021; Kane, 2016).

Table 1: Threshold Values of Consumption Groups

Consumption Group	**Threshold Consumption Level**
The Top Class	$2 * \mu_t \leq X_{it}$
The Upper-Middle Class	$1.5 * \mu_t \leq X_{it} < 2 * \mu_t$
The Middle-Class	$\mu_t \leq X_{it} < 1.5 * \mu_t$
The Lower-Middle Class	$0.5 * \mu_t \leq X_{it} < \mu_t$
The Lowest Class	$X_{it} < 0.5 * \mu_t$

Note: X_{it} stands for real consumption per capita level of country i in year t, μ_t is the mean consumption level in the world in year t.

Table 1 overviews the classification scheme and the threshold values, which offer a more nuanced view of the evolution of global consumption inequality over time. After the classification, it was seen that 74.5% of the world's population consumed less than the world average in 2019, whereas it was 71.9% in 1970. The proportional constancy of the population consuming less than the world's average consumption during these five decades is sufficient to see that the distribution of consumption is a persistent problem.

Secondly, a Markov transition matrix is constructed to examine how countries perform in terms of consumption and to uncover different trends in the evolution of global consumption distribution over time. The matrix in Table 2 displays the probability of transitioning from one consumption group to another in each period. The numbers in parentheses under the headings show the number of countries belonging to a specific class in the corresponding year. The diagonal elements indicate the proportion of countries that remained in the same income category over the studied period, representing the percentage of "stagnating" countries in each class. Meanwhile, each row's off-diagonal elements show the countries' distribution in the end year, which was initially in a particular class in 1970.

Table 2: Transition Matrix for Countries, 1970-2019

2019 → / **1970 ↓**	**Top Class (27)**	**Upper-Middle Class (10)**	**Middle Class (10)**	**Lower-Middle Class (23)**	**Lowest Class (46)**
Top Class (24)	87.5	8.33	4.17	0	0
Upper-Middle Class (6)	16.67	33.33	33.33	0	16.67
Middle Class (11)	27.27	9.09	18.18	45.45	0
Lower-Middle Class (28)	7.14	14.29	10.71	35.71	32.14
Lowest Class (47)	0	2.13	4.26	17.02	76.6

Source: Author's calculations based on Penn World Table version 10.01.

Two salient findings jump out from Table 2. First, 75 out of 116 (65%) countries belonged to the two lowest groups in 1970. In 2019, 69 of 116 (60%) countries belonged to these two groups. On the other hand, the number of countries consuming twice the world average was 24 (21%) in 1970 and 27 (23%) in 2019. Considering the table, compared to 1970, the number of countries in the top two groups increased while the number of countries in the bottom two groups decreased in 2019. Before presenting this situation as evidence of a reduction in consumption inequality, it should be noted that the rate of countries included in the subgroups is still very high, and the period is 50 years.

Second, the transition from and to the lowest and highest classes is less likely, whereas it is not valid for those in the intermediate categories. For instance, 87.5% and 76.6% of the countries in the top and the lowest classes in 1970 remained in the same category in 2019, respectively. Only 45 out of 116 countries (38.8%) shifted their consumption category from the one they were in at the start of the period. Out of the 116 countries analyzed, 25 moved to a higher consumption category in 2019 than their initial classification. On the other hand, the consumption category of 20 countries worsened over the same period.

3 Theoretical Framework

Stylized facts illustrated in the previous section play a crucial role in comprehending the driving forces of economic phenomena. These patterns enable economists to create models and theories that help them understand and anticipate these occurrences more accurately. The truth revealed in this section is this: between 1970 and 2019, consumption inequality

was high and persistent worldwide. This persisting and ongoing situation can be evaluated using Solow's convergence hypothesis (Solow, 1956; Mankiw et al., 1992). The Solovian growth model presented below can explain the success (failure) of countries that have made progress (decline) in consumption level. In addition, empirical applications of the theoretical model revealing the determinants of consumption and its growth are also presented in this study. In this way, the main factors that feed consumption inequality will be revealed.

According to the conditional convergence hypothesis, countries' per capita income can converge to each other if they are identical in their structural characteristics, including saving rate, population growth rate, initial productivity level, and technology growth rate. As a result, differences in these factors yield different steady-state income values. Considering consumption instead of income based on the Solow model helps to examine the consumption disparities across countries.

In the model, it is assumed that the production process exhibits constant returns to scale and is characterized by the following form of the Cobb-Douglas function:

$$Y(t) = K(t)^{\alpha}[A(t)\ L(t)]^{(1-\alpha)}, \quad 0 < \alpha < 1 \tag{1}$$

The notation is standard: Y is output, K is capital, L is labor, and A is the level of technology. L and A are assumed to grow exogenously at rates n and x:

$$L(t) = L(0)\ e^{nt} \quad , \quad A(t) = A(0)\ e^{xt}$$

A constant fraction of output, s, is saved and used for investment. Lower case k defines the stock of capital per effective unit of labor, $\hat{k} = K/AL$, and lower case y defines the output level per effective unit of labor $\hat{y} = Y/AL$. So, output per effective labor is

$$\hat{y}(t) = \hat{k}(t)^{\alpha} \tag{2}$$

By using the gross investment $I(t) = \dot{K}(t) + \delta K(t)$ and gross savings sY in the investment-savings equation, the following dynamic equation is obtained.

$$\dot{K}(t) = sY - \delta K \tag{3}$$

where δ is the capital depreciation rate. Using the fundamental equation for economic growth in per capita effective labour unit would generate the following steady-state values for capital, output, and consumption, respectively.

$$k^* = A(t)\left[\frac{s}{n+x+\delta}\right]^{1/(1-\alpha)} \tag{4}$$

$$y^* = A(t)\left[\frac{s}{n+x+\delta}\right]^{\alpha/(1-\alpha)} \tag{5}$$

$$c^* = A(t)(1-s)\left[\frac{s}{n+x+\delta}\right]^{\alpha/(1-\alpha)} \tag{6}$$

These basic equations from the Solow growth model are critical to understanding the differences in income and consumption levels across countries. It is seen in the equations that the same exogenous factors, namely savings rate and capital depreciation rate, determine both consumption and income. However, the effect of the savings rate on consumption is controversial. Saving requires consuming less in the short run, but individuals should also consider saving for future consumption by increasing investment today. Therefore, saving as a determinant of consumption theoretically has an indefinite effect. Consequently, it is an empirical question whether the impact of saving on consumption is positive or negative.[3]

Lastly, taking the natural logarithm of both sides of equation (6) would yield a testable equation that can be used as a baseline for the empirical analysis:

$$lnc^*(t) = lnA(0) + xt + ln(1-s) + \left(\frac{\alpha}{1-\alpha}\right) lns - \left(\frac{\alpha}{1-\alpha}\right) - ln(n+x+\delta) \tag{7}$$

At a given point in time, considering the controversial effect of savings rate over consumption level, equation (7) can be rewritten in the following regression form:

$$lnc^* = a + b_1\ lns + b_2\ ln(n+x+\delta)\ + \epsilon \tag{8}$$

Equation (8) allows empirical testing of the relationship between consumption and its determinants. Thus, when the variables are proxied, it is possible to obtain information about the level effects of the savings rate and the effective depreciation rate on consumption.

After having an empirical model to analyze the level effects, the next objective is to address the convergence implications of the saving rate. The Solovian framework also suggests the following convergence equation to predict the short-term growth rate of consumption.

$$\begin{aligned} lnc(t) - lnc(0) = xt - [1-e^{-\vartheta t}]\ lnc(0) + [1-e^{-\vartheta t}]\ lnA(0) + [1-e^{-\vartheta t}]\ ln(1-s) \\ +[1-e^{-\vartheta t}] \left(\frac{\alpha}{1-\alpha}\right) lns\ -\ [1-e^{-\vartheta t}]\ \left(\frac{\alpha}{1-\alpha}\right)\ ln(n+x+\delta) \end{aligned} \tag{9}$$

where $\vartheta = (1-\alpha)(n+x+\delta)$, and $-\vartheta$ is the convergence rate. Equation (9) can be simplified for empirical analysis as

$$lnc(t) - lnc(0) = \mu + \beta_1\ lnc(0)\ + \beta_2 lns\ +\ \beta_3 ln(n+x+\delta)\ +\ \epsilon \tag{10}$$

Equation (10) is employed for the convergence analysis in the following section. The expectation for the signs of the coefficients can be deduced from equation (9). Thus, β_1 and β_3 are negative, and the sign of β_2 remains an empirical question.

4 Data, Methodology, and Empirical Results

Within the framework of the Solow model, both the steady-state determinants of consumption and the determinants explaining the growth of consumption are presented in the previous section. Accordingly, we will use regression models enabling cross-section analysis that is defined for the steady state value in equation (8) and growth in equation (10). The dependent variables in these models are the average per capita consumption and its growth

[3] See Appendix A for further explanation.

rate, and the independent variables are average savings (proxied by gross capital formation) and average effective depreciation rate. The first model uses these two independent variables, while the second adds the "initial level of consumption" as an additional independent variable for convergence analysis. The data for the variables used in the empirical analysis is from PWT 10.01 and covers all countries except those with a population under 1 million in 2019 and oil-exporting nations.[4]

Before presenting the empirical results of the regression models, the effect of average savings rate over the ranking of countries based on their per capita consumption levels is examined for three time periods: 1970-2019, 1980-2019, and 1990-2019. The ranking is determined by the countries' consumption per capita levels at the beginning and end of each specified time frame. Following this, the disparity in rankings between the initial and final years is calculated.

Table 3: Results of One-Tailed T-Test for Climbing and Falling Countries (Ranking Difference)

	1970-2019	1980-2019	1990-2019
Average Saving Rate of Climbing Countries	21.73 (47)	22.16 (48)	21.41 (64)
Average Saving Rate of Falling Countries	19.9 (65)	19.61 (67)	19.94 (72)
p-value (one-tailed) $H_0 : \mu_1 = \mu_2$ $H_1 : \mu_1 < \mu_2$	0.10	0.03**	0.09*
Number of Total Observations	112	115	136

Notes: Number of observations are reported below the average scores. μ_1 (μ_2) is the average savings rate of climbing (falling) countries. Significance at the 1%, 5% and 10% levels are represented by ***, ** and *, respectively.

Table 3 reports the results of the one-tailed t-test applied to three time spans to question the relationship between countries' rankings and their average saving rates. Accordingly, 47 countries improved their ranking between 1970 and 2019, and 65 countries worsened their order in the same years. There is an improvement in ranking for 47 countries, while 65 countries fail to have a higher ranking between 1970-2019; however, the test is not statistically significant. For 1980-2019 and 1990-2019, it can be concluded that there is a statistically significant positive effect from average saving rates to countries' ranking.

Table 4 includes the results of a one-tailed t-test for a sample of countries that have either climbed at least ten rankings or suffered a fall of at least ten rankings. The t-test is used to see if there is a correlation between the average savings rate of a country and the ranking differences between the initial and final years. According to the results, the average savings rate has a statistically significant effect in explaining these ranking differences. The countries with lower average savings rates are more likely to have worsened, while countries with higher average savings rates are more likely to have improved.

[4] The PWT 10.01 data includes the following definitions and abbreviations for consumption and saving: real consumption at a constant 2017 prices in a million US dollars denoted as *'rconna'*, and the share of gross capital formation at current purchasing power parities denoted as *'csh_i'*. For the list of excluded countries, see Appendix B.

Table 4: Results of One-Tailed T-Test for Countries Climbing and Falling at Least 10 Rankings (Ranking Difference)

	1970-2019	1980-2019	1990-2019
Average Saving Rate of Countries Climbing at Least 10 Rankings	21.71 (29)	22.12 (29)	22.86 (30)
Average Saving Rate of Countries Falling at Least 10 Rankings	18.36 (34)	18.80 (28)	17.95 (35)
p-value (one-tailed) $H_0 : \mu_1 = \mu_2$ $H_1 : \mu_1 < \mu_2$	0.05*	0.05*	0.00***
Number of Total Observations	63	57	65

Notes: Number of observations are reported below the average scores. μ_1 (μ_2) is the average savings rate of climbing (falling) countries. Significance at the 1%, 5% and 10% levels are represented by ***, ** and *, respectively.

As mentioned earlier, the regression models that reveal the main determinants of steady-state per capita consumption and enable convergence applications for consumption have emerged in the theoretical model. More clearly, the impact of saving and effective depreciation rates[5], as the long-run determinants, on per capita consumption is explored. Afterwards, it is shown that per-capita consumption growth is explained by savings rate, effective depreciation rate, and initial real consumption per capita. This process can be specified by equation (11) and equation (12), which are convenient for cross-sectional analysis.

$$lnc_i \;=\; \mu_c \;+\; \beta_{c_1}\, lns_i \;+\; \beta_{c_2}\, ln(n+x+\delta) \;+\; \epsilon_{c_i} \tag{11}$$

$$g_i \;=\; \mu_g \;+\; \beta_{g_1}\, lnc(0) + \;\beta_{g_2}\, lns_i \;+\; \beta_{g_3}\, ln(n+x+\delta) \;+\; \epsilon_{g_i} \tag{12}$$

In equation (11), the dependent variable c_i is the steady-state level of consumption per capita in country i. μ_c, s_i, and $(n+x+\delta)$ are the independent variables representing constant term, savings, and effective depreciation rate, respectively. In equation (12), g_i is the per capita consumption growth rate in country i. Unlike the independent variables of the first empirical model, the initial level of consumption, $c(0)$, is one of the exogenous factors that affect the dependent variable, g_i. Finally, ϵ_{c_i} and ϵ_{g_i} respective random error terms.

Table 5 displays the correlation between the natural logarithm of average real per capita consumption and its long-term determinants across three distinct periods. The findings consistently reveal a statistically significant positive association between the natural logarithm of the average savings rate, lns, and the dependent variable. Concurrently, a negative and statistically significant relationship emerges between the natural logarithm of the effective depreciation rate, $ln\delta$, and the natural logarithm of average real per capita consumption.

In Table 6, the results of the cross-sectional regression analysis across three periods are presented. The findings indicate an inverse relationship between the average growth of real consumption per capita and the natural logarithm of the initial real consumption per

[5] Using the formula $(n_{i,0-T} + \delta_{i,0-T} + \%2)$ from empirical growth literature, the effective depreciation rate is computed. Mankiw et al. (1992) and Islam (1995) assumed a constant sum of depreciation rate and technology growth rate, $(x+\delta)$, at 5% for all countries over time, and defined the effective depreciation rate as $(n + \%5)$. Following their approach, the technology growth rate is set at 2% based on data on the depreciation rate from PWT 10.01. The definitions and abbreviations for the variables are as follows: *'pop'*, population (in millions), and *'delta'*, average depreciation rate of the capital stock.

Table 5: Long-run Determinants of Consumption: OLS Estimates

Dependent Variable: Natural Log of Average Real Consumption Per Capita (lnc)	1970-2019	1980-2019	1990-2019
Constant	4.554***	4.961***	5.895***
lns	1.150***	1.325***	1.519***
lnδ	-2.333***	-2.299***	-2.059***
R-squared	0.454	0.465	0.473
Sample Size	116	116	139
Durbin Watson	1.972	1.615	1.695

Notes: ***, **, and * indicate that the coefficient is significant at 1%, 5%, and 10%, respectively.

capita, $lnc(0)$, aligning with theoretical expectations. Additionally, the natural logarithm of the average savings rate, lns, shows a positive correlation with real consumption per capita growth. While the previous section, discussing the theoretical background, did not reveal a clear positive or negative relationship between the average growth rate of consumption and the average savings rate, it was demonstrated that the savings rate significantly influences real consumption per capita growth, suggesting a positive connection between the two. In synthesis, the concurrent examination of Table 5, highlighting level effects, and Table 6, illustrating growth effects, underscores the nuanced dynamics at play.

Table 6: Determinants of Consumption Growth: OLS Estimates

Dependent Variable: Average Growth of Consumption Per Capita (g_i)	1970-2019	1980-2019	1990-2019
Constant	0.073***	0.086***	0.086***
lnc(0)	-0.005***	-0.004***	-0.005***
lns	0.014***	0.016***	0.017***
lnδ	-0.002	0.003	-0.002
R-squared	0.138	0.145	0.146
Sample Size	116	116	139
Durbin Watson	1.922	1.954	1.933

Notes: ***, **, and * indicate that the coefficient is significant at 1%, 5%, and 10%, respectively.

The regression analysis results on the relationship between effective depreciation rate and consumption growth are inconclusive as the coefficients of $ln\delta$ are all statistically insignificant and vary in magnitude in regression models for different periods. Despite the theoretical expectation of a negative coefficient, it may not always be possible to find a statistically significant coefficient in empirical studies (Mankiw et al., 1992; Kılınç & Yetkiner, 2013).

5 Conclusion

Alternative growth models, such as demand-led growth models, differ from mainstream ones. Stiglitz (2018) emphasizes real-world adjustment processes' decentralized and complex nature, in contrast to models assuming instant equilibrium. For example, a decline in wages due to unemployment can lead to a reduction in aggregate demand, potentially exacerbating unemployment levels. This effect may be more pronounced when there are variations in the marginal propensity to consume (MPC) among different groups. If wages decrease, shifting income toward profits, and if capitalists' MPC is lower than that of workers, this can further reduce aggregate demand (Kaldor, 1957; Pasinetti, 1962). Ultimately, the growth rate

of consumption and income will be affected negatively. This is the exact opposite of the empirical results presented in this paper. At this point, it is essential to remember (Stiglitz, 2018, p. 90): *"Assumptions matter. All models make simplifications. The question is, as we have said, what simplifications are appropriate for asking what questions? The danger is that the simplifications bias the answers, sometimes in ways that we are not aware of."*. Nevertheless, it is crucial to clarify that the primary aim of this study is to demonstrate the decisive role of savings rates on consumption within a specific model. The theoretical framework, rooted in the Solow (1956) model, provides a valuable empirical tool for examining global consumption disparities and consumption growth. While acknowledging the flaws in mainstream growth models, it's important to note that these issues merit separate and comprehensive research, distinct from the specific focus of this study.

This study makes two significant contributions to the literature. First, over the past 50 years of world history, consumption inequality has been notably high and persistent, challenging the expectation of lower levels of consumption inequality in individuals' lives compared to wealth inequality. Crucially, this study uncovers the existence of a persistent "Caste System" in world consumption. The findings highlight the challenges faced by lower-class countries striving to ascend to higher consumption groups while upper-class countries maintain their privileged positions over time. This enduring inequality prompts a deeper exploration into the underpinnings of the observed phenomenon.

The second contribution of the study is its empirical finding that the long-term effects of saving on consumption are more significant. Even though individuals prefer saving over consumption in the present, saving will indirectly turn into consumption in the future. Drawing on a simplified Solow-type theoretical framework, the analysis demonstrates that both the level and growth rate of per capita consumption are predominantly determined by the savings rate. This theoretical insight provides a valuable lens to understand the root causes of the identified "Caste System" in world consumption. Empirical evaluations affirm that countries on an upward trajectory exhibit significantly higher saving rates than their downward counterparts. This substantiates that increased savings are pivotal in elevating per capita consumption levels in the long run.

This criticism of the literature concerning its focus on income inequality and poverty is built on the premise that income inequality fails to fully encompass crucial variables influencing inequality, including health disparities, lack of access to education services, and social exclusion. The focus of this study on consumption inequality is an effort to underscore the necessity of addressing the broader spectrum of the inequality issue. While the extent to which consumption inequality represents the facts mentioned above is open to debate, the primary motivation of this study is to highlight the global prevalence and persistence of such high levels of inequality in consumption as a final stage of economic activity. It is emphasized that although the two main income components are savings and consumption, saving does not ultimately mean giving up consumption. Acting with this understanding of "today's moments will be tomorrow's memories." is essential. The success of societies that embrace the fact that savings will turn into consumption in the future is evident. In this context, stemming policy recommendations from this study emphasizes the urgency of addressing low savings rates. Recognizing that increased savings indicate forward-looking perspectives, policymakers should consider initiatives that create a conducive environment for savings growth.

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Appendices

Appendix A: Additional Proof

Taking the derivative of equation (6) with respect to s yields

$$\begin{aligned}
\frac{dc^*}{ds} &= A(t)\left\{-\left[\frac{s}{n+x+\delta}\right]^{\alpha/(1-\alpha)} + (1-s)\left[\frac{s}{n+x+\delta}\right]^{\alpha/(1-\alpha)}\frac{\alpha}{1-\alpha}\, s^{\frac{\alpha}{1-\alpha}-1}\right\} \\
&= A(t)\left\{-\left[\frac{s}{n+x+\delta}\right]^{\alpha/(1-\alpha)} + \frac{1-s}{s}\,\frac{\alpha}{1-\alpha}\left[\frac{s}{n+x+\delta}\right]^{\alpha/(1-\alpha)}\right\} \\
&= A(t)\left[\frac{s}{n+x+\delta}\right]^{\alpha/(1-\alpha)}\left\{-1+\frac{1-s}{s}\,\frac{\alpha}{1-\alpha}\right\}
\end{aligned}$$

As a result of this procedure, the following conclusion emerges.

$$\frac{dc^*}{ds}\begin{cases} > 0, \frac{1-s}{s} > \frac{1-\alpha}{\alpha} \\ = 0, \frac{1-s}{s} = \frac{1-\alpha}{\alpha} \\ < 0, \frac{1-s}{s} < \frac{1-\alpha}{\alpha} \end{cases}$$

As the above exercise shows, the ambiguity of the relationship between s and c has to do with technical conditions in relation to the saving rate. Thus, the conclusion that higher $s \rightarrow$ higher consumption becomes suspect. For $\alpha \cong 0.5$, for example, the conclusion would be true (according to the model) for any $s < 0.5$.

Appendix B: Excluded Countries from the Sample

Oil-exporting countries: Qatar, United Arab Emirates, Kuwait, Bahrain, Saudi Arabia, Oman, Iran (Islamic Republic of), Iraq and Gabon.

Countries with less than one million population: Bermuda, Brunei Darussalam, Cayman Islands, Luxembourg, Bahamas, Barbados, Iceland, Montserrat, Suriname, Antigua and Barbuda, British Virgin Islands, China, Macao SAR, Saint Lucia, Djibouti, Cyprus, Aruba, Saint Kitts and Nevis, Malta, Seychelles, Anguilla, St. Vincent and the Grenadines, Guyana, Fiji, Belize, Turks and Caicos Islands, Dominica, Comoros, Grenada, Bhutan, Cabo Verde, Sao Tome and Principe, Maldives.