



Mathematics in Economics: Consumption and Saving Functions from the Perspective of the Islamic Green Economy

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Abstract. This study aims to identify the consumption and saving functions of students at Syech M. Djamil Djambek State Islamic University of Bukittinggi within the framework of the Islamic Green Economy principles wasathiyyah (moderation), qana'ah (contentment), israf (extravagance), and tabdzir (wastefulness). The research adopts a descriptive quantitative approach with a population of 11,462 students and a sample of 100 respondents selected through purposive sampling based on the criteria of being active students with a steady source of income. Data were collected using questionnaires and analyzed through descriptive and quantitative methods employing a simple linear consumption and saving function model. The results indicate the consumption function $C = 67 + 0.9861Y$ and the saving function $S = -67 + 0.0139Y$. The average student income was IDR 871,200, with consumption averaging IDR 859,100 and savings IDR 12,100. The findings reveal a positive relationship between income, consumption, and savings, with consumption showing a higher growth tendency compared to savings. From the Islamic Green Economy perspective, the study highlights the importance of managing income wisely, avoiding excessive consumption, and saving as an expression of both economic and spiritual responsibility. Implementing the principles of wasathiyyah and qana'ah helps balance needs and savings, fostering more sustainable and Islamically aligned economic behavior. The study concludes that the consumption and saving functions reflect the mathematical relationship among economic variables and serve as instruments for shaping balanced, independent, and beneficial economic behavior among students, consistent with the principles of the Islamic Green Economy.

Keywords: onsumption function, Saving function, Income, Islamic Green Economy

1. Introduction

Mathematics plays a crucial role in various fields of study, one of which is economics. The application of mathematical principles in economics serves as an analytical tool for understanding the relationships among economic variables, formulating economic models, and predicting future economic behavior (Bailey, 2006). The use of mathematical concepts such as functions, equations, and graphs enables economists to explain economic phenomena in a more systematic and rational manner (Agus, 2024). One of the key applications of mathematics in economics lies in the development of consumption and saving functions. These two functions are essential for understanding how individuals or communities respond to their income levels. The consumption function represents the mathematical relationship between consumption and income, whereas the saving function describes the mathematical relationship between savings and income (Gregory, 2007).

From an economic perspective, according to (Nata, 2017), consumption is the act of reducing or using up the economic utility of an object or service to meet needs. Savings are the portion of a person's income that is not spent on consumption and is set aside for future use. (Dumairy, 2012), explains that the relationship between consumption and savings is inversely proportional, meaning that the greater the income used for consumption, the less remaining income can be saved. The balance between consumption and savings is crucial for maintaining financial stability (Alvin Algifari & Albahi, 2024). (Nuraeni et al., 2023), explains that understanding the relationship between consumption and savings can help someone plan their finances wiser and more sustainably.

Consumption and saving behavior are closely linked to the concept of the Islamic Green Economy, as both reflect moral, spiritual, and environmental sustainability dimensions. Islam teaches the principles of *wasathiyah* (moderation) and *qana'ah* (contentment) in managing wealth, while prohibiting *israf* (extravagance) and *tabdzir* (wastefulness). These prohibitions serve as fundamental moral foundations in shaping the economic behavior of Muslims. In Surah Al-A'raf verse 31, Allah SWT forbids His people from engaging in *israf* being excessive in spending, even for personal benefit. Similarly, in Surah Al-Isra' verses 26–27, Allah SWT prohibits *tabdzir*, or squandering wealth on things that bring no value. Examples include purchasing food beyond one's actual needs or buying excessive clothing that remains unused. The prohibitions against *israf* and *tabdzir* emphasize that Islam encourages a lifestyle of frugality, proportionality, balance, and sustainability values that align closely with the principles of the Islamic Green Economy.

University students are individuals pursuing higher education with the aim of developing their academic abilities, skills, and perspectives to prepare for future life challenges. As a group in the transitional stage from adolescence to adulthood, students carry the responsibility of managing their personal finances effectively (Fajrianti et al., 2023). Consumption reflects students' expenditures to meet daily needs such as food, transportation, housing, and academic necessities, whereas saving represents the portion of income set aside for emergencies or future needs. Applying the concepts of consumption and saving in financial management is essential for students, as it provides guidance in allocating income optimally between present consumption and future savings (Fitria Intan Novianti et al., 2025).

Syech M. Djamil Djambek State Islamic University of Bukittinggi is an Islamic-based higher education institution with a vision to become an internationally recognized university of excellence in Islamic studies, science, and technology grounded in local wisdom by the year 2047. In the even semester of the 2024/2025 academic year, the university had a total of 11,462 students. Based on observations, many students face challenges in managing their personal finances due to limited income sources, which in turn affects their consumption and saving behavior. Student income generally comes from several sources, including parental support, scholarships, and part-time employment. Their consumption behavior is often influenced by lifestyle choices such as spending time at cafés, purchasing fashion items, cosmetics, or internet vouchers for social media use, among others. Such habits lead students to allocate expenditures unrelated to their academic activities, often exceeding their financial capacity and reducing their ability to save. Some students without savings also expressed concerns about being unable to pay their tuition fees (Uang Kuliah Tunggal or UKT) for the following semester, which may force them to take academic leave or discontinue their studies. In light of these conditions, this study aims to examine students' consumption and saving patterns from the perspective of the Islamic Green Economy. This approach is expected to provide new insights into the importance of

balanced, ethical, and environmentally conscious financial management in accordance with Islamic values.

2. Methods

This study employed a descriptive quantitative research approach. According to (Sugiyono, 2020), the descriptive quantitative method aims to describe a phenomenon, event, symptom, or occurrence factually, systematically, and accurately using numerical data. The purpose of this research is to analyze the relationship between students' income, consumption, and savings using a mathematical model of consumption and saving functions. The study also integrates the results of quantitative analysis with the values of the Islamic Green Economy, namely wasathiyyah (moderation), qana'ah (contentment), israf (extravagance), and tabdzir (wastefulness). The research was conducted at Syech M. Djamil Djambek State Islamic University of Bukittinggi during the even semester of the 2024/2025 academic year, involving a population of 11,462 active students. A total of 100 respondents were selected using a purposive sampling technique based on specific criteria, such as being active students and having a stable source of income. Data were collected through questionnaires distributed to the students.

The data analysis techniques employed in this study consisted of descriptive and quantitative analyses. According to (Ghozali, 2022), quantitative analysis refers to the examination of numerical data (measured on interval or ratio scales). Meanwhile, descriptive analysis involves statistical techniques used to describe data by presenting measures such as the mean, median, standard deviation, maximum, and minimum values. The descriptive analysis in this study was applied to illustrate the characteristics of respondents as well as their consumption and saving patterns. Quantitative analysis, on the other hand, was conducted using a simple linear model of the consumption and saving functions, expressed through the following equations:

Income equality

$$Y = C + S$$

consumption Function Equation

$$C = a + bY$$

Saving Function Equation

$$S = -a + (1 - b)Y$$

Description:

C = Level of consumption

S = Level of saving

a = Consumption when income is zero

b = Marginal propensity to consume

Y = Level of national income (Dumairy, 2012)

3. Results and Discussion

3.1. Descriptive Analysis

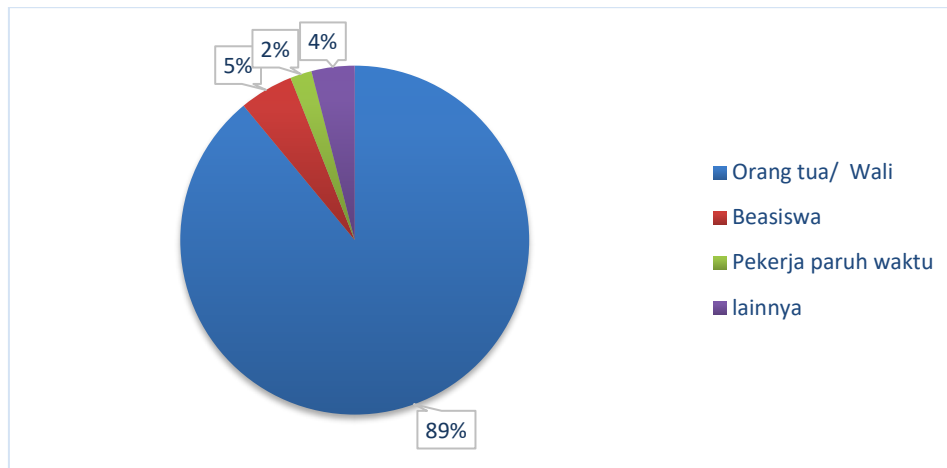


Figure 1. Sources of Student Income

Figure 1 illustrates the sources of student income, showing that 89% comes from parents or guardians, 5% from scholarships, 2% from part-time jobs, and 4% from other sources. The results of the analysis indicate that the primary source of income for students at Syech M. Djamil Djambek State Islamic University of Bukittinggi is financial support from their parents or guardians.

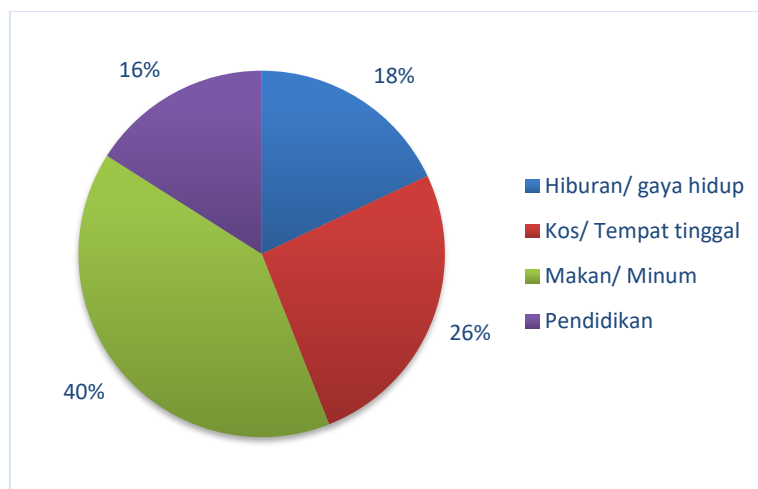


Figure 2. Student Consumption Allocation

Figure 2 illustrates the allocation of student consumption, showing that 18% is spent on entertainment or lifestyle, 26% on housing or accommodation, 40% on food and beverages, and 16% on education. The analysis results indicate that the largest portion of student expenditure at Syech M. Djamil Djambek State Islamic University of Bukittinggi is allocated to food and beverages.

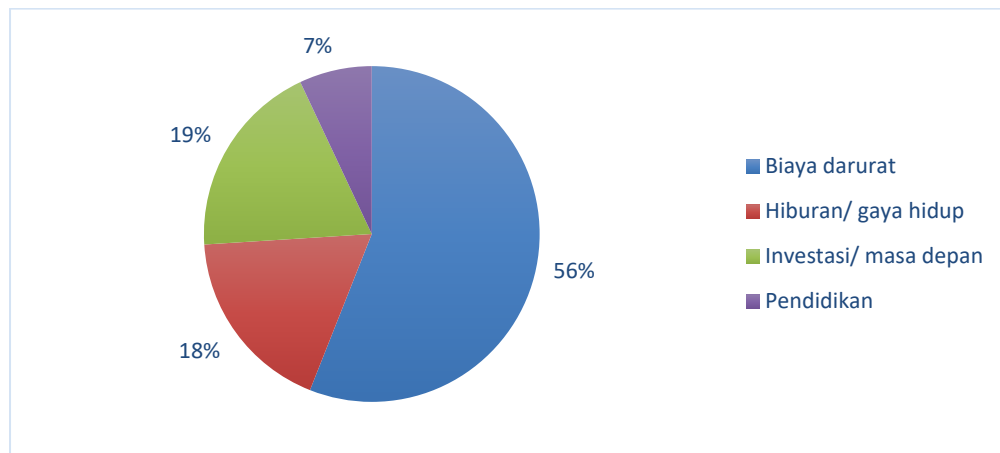
**Figure 3. Students' Saving Objectives**

Figure 3 illustrates the purposes of student saving, showing that 56% save for emergency expenses, 18% for entertainment or lifestyle, 19% for investment or future needs, and 7% for educational purposes. The analysis results indicate that the primary saving objective among students at Syech M. Djamil Djambek State Islamic University of Bukittinggi is to prepare for emergency expenses.

3.2 Consumption Function and Saving Function

Tabel 1. Students' Income, Consumption, and Saving Data

Variabel	Sum
Income (Y)	Rp 871.200
Consumption (C)	Rp 859.100
Saving (S)	Rp 12.100

Table 1 presents the monthly financial data of students at Syech M. Djamil Djambek State Islamic University of Bukittinggi, showing an average income of IDR 871,200, consumption of IDR 859,100, and savings of IDR 12,100. The analysis indicates that consumption is lower than income, resulting in positive savings. Based on these data, the consumption and saving functions were determined as follows:

Consumption Function Equation

$$C = 67 + 0,9861Y$$

Saving Function Equation

$$S = -67 + 0,0139Y$$

Based on the consumption and saving functions, the corresponding function graph is as follows:

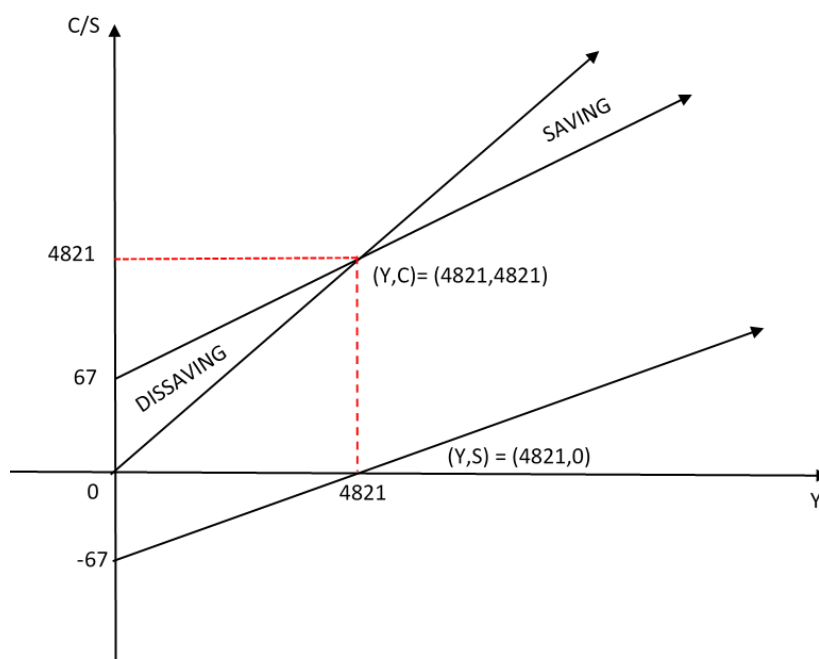


Figure 4. Graph of the Consumption and Saving Functions

Figure 4 illustrates the relationship between income (Y), consumption (C), and saving (S) with income, formulated through the following mathematical functions: $C = 67 + 0.9861Y$ and $S = -67 + 0.0139Y$. The consumption line, which begins at 67, represents autonomous consumption, or expenditures that occur even when income is zero. Meanwhile, the saving line intersects the vertical axis at -67 , indicating a dissaving condition, where consumption exceeds income. At the equilibrium point, income equals consumption ($Y = C$), resulting in zero savings ($S = 0$). Beyond this point, any increase in income leads to higher savings, as a portion of income is no longer consumed, representing a saving condition.

At the equilibrium or break-even point, consumption equals income ($Y = C$), and savings are zero ($S = 0$). This point marks the boundary between dissaving and saving. Below the break-even point, students still experience dissaving because all of their income is used for consumption, while above the break-even point, students begin to save as part of their income is not spent. Based on the graph, the equilibrium occurs at $(Y, C) = (4,821, 4,821)$, meaning that at an income level of IDR 4,821, student consumption is also IDR 4,821, with savings precisely zero.

The analysis further shows that as income increases, both consumption and savings increase, with consumption rising at a higher rate than savings. This indicates a positive relationship among income, consumption, and saving. This phenomenon aligns with the concept of Marginal Propensity to Consume (MPC), which reflects the tendency of individuals to allocate a larger portion of additional income to consumption rather than saving. In other words, each increase in income is primarily directed toward meeting consumption needs, while only a small portion is set aside as savings (Meiriza et al., 2024).

The relationship between consumption and saving behavior from the perspective of the Islamic Green Economy can be understood through the principles of *wasathiyyah* (balance) and *qana'ah* (contentment) in spending, alongside the prohibition of *israf* (extravagance) and *tabdzir* (wastefulness) as stated in the Qur'an (Surah Al-A'raf, verse 31; Surah Al-Isra, verses 26–27). These principles emphasize that dissaving behavior resulting

from excessive lifestyle choices is inconsistent with Islamic values, whereas proportionate saving behavior reflects adherence to Islamic teachings in maintaining a balance between worldly needs and accountability in the hereafter (Maisyarah & Nurwahidin, 2022). From the Islamic Green Economy perspective, consumption and saving behavior are guided by balanced values in financial management, environmental sustainability, and social welfare. A faithful Muslim is expected to consume wisely, selecting goods that are halal, thayyib (good and wholesome), and environmentally friendly. Consumption is not merely viewed as an economic activity but also as an act of worship, reflecting moral responsibility toward the environment created by Allah (Hidayat, 2022).

The financial condition of students at Syech M. Djamil Djambek State Islamic University of Bukittinggi shows an average income of IDR 871,200, with consumption expenditures reaching IDR 859,100 and savings of IDR 12,100. These figures indicate that students are in a condition of $Y > C$, meaning that a small portion of their income has successfully been set aside as savings (positive S). Although the total savings are relatively small, this reflects the initial stage of healthier economic behavior, where students begin to balance the fulfillment of needs with the allocation of funds for the future. The low average savings also suggest that many students are still in a $Y < C$ position, experiencing dissaving. Students' limited income, derived from parental support, scholarships, and part-time work, is insufficient to match relatively high consumption levels, such as spending on cafés, clothing, cosmetics, and other entertainment. This situation makes it difficult for some students to save and even creates challenges in meeting tuition obligations for subsequent semesters. In the context of students, the break-even point can be interpreted as the ability to manage income proportionally between needs and savings, meaning that students are debt-free and have begun to establish a financial reserve (Bomantara et al., 2023).

The implementation of Islamic Green Economy principles encourages students to increase the gap between income and consumption ($Y - C$) by enhancing savings through a frugal, simple (qana'ah), and balanced (wasathiyyah) lifestyle (Pratama & Waid, 2025). From an Islamic perspective, saving is both an economic effort and an act of worship, embodying social and spiritual responsibility to achieve just and sustainable economic welfare (Amsal, 2023). The consumption and saving function graph represents the mathematical relationship between income, consumption, and savings while reflecting Islamic values of life balance. The equilibrium point in Islamic economics symbolizes harmony between needs and capabilities, as well as between worldly and spiritual orientations. Through the Islamic Green Economy approach, students and society can cultivate economic behavior grounded in balance, sustainability, and collective welfare. Consumption and saving functions thus play a crucial role in fostering a more prosperous, independent, and Islamically aligned life.

4. Conclusions

This study concludes that the consumption and saving functions of students at Syech M. Djamil Djambek State Islamic University of Bukittinggi exhibit a positive relationship among income, consumption, and savings, where increases in income are followed by increases in both consumption and savings, although consumption tends to rise more than savings. Based on the mathematical functions $C = 67 + 0.9861Y$ and $S = -67 + 0.0139Y$, the autonomous consumption of 67 reflects fixed expenditures even in the absence of income, while the equilibrium point ($Y = C = 4,821$) marks the threshold between dissaving and saving conditions. Students with an average income of IDR 871,200, consumption of IDR

859,100, and savings of IDR 12,100 demonstrate that some are beginning to save, albeit in small amounts, while others remain in a dissaving state due to high consumption expenditures. From the perspective of the Islamic Green Economy, this behavior can be interpreted through the principles of wasathiyah (balance) and qana'ah (contentment), which emphasize the importance of managing income wisely, avoiding israf (extravagance), and saving as a form of economic and spiritual responsibility. The application of Islamic Green Economy values is key to shaping student economic behavior that is balanced, sustainable, and aligned with Islamic teachings, ultimately contributing to just and welfare-oriented prosperity.

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