International Summit on Science Technology and Humanity
ISETH 2025
ISSN: 2615-1588 (online)

Determinants of Saving Rates in Japan

Sekar Anissa Hikmatul Aziz[1], Eni Setyowati[2*]

[1,2] Faculty of Economics and Business, Universitas Muhammadiyah Surakarta, Surakarta, Indonesia

Abstract

Purpose: This study aims to analyze the influence of Gross Domestic Product (GDP), labor force, and interest rates on savings rates in Japan during the period 2017 to 2024 in quarterly. In a dynamic economic context, people's saving behavior is one of the important indicators that influence economic stability and growth.
Methodology: The analytical method used in this study is multiple regression analysis with the Error Correction Model (ECM). Data used in this study are sourced from the Bank of Japan, the Ministry of Finance of Japan, and the World Bank.
Results: The results show that in the short term, savings rates are significantly influenced by the labor force, where increasing labor force participation implies an increase in income and savings capacity.
Applications/Originality/Value: In the long term, savings rates are significantly influenced by Gross Domestic Product (GDP), indicating that increasing national income encourages people to save more. However, interest rates show a negative influence on savings rates, where low interest rates tend to reduce people's incentives to save.

Introduction

After the major crisis in 2008-2009, there were global economic dynamics, making many developed countries, including Japan, in a condition of very low interest rates (Felici, Kenny, and Friz 2022). Japan itself is faced with a demographic challenge with its own characteristics, namely the large number of elderly people here, up to 28% of those aged 65 years and above, making it a country that is called a "super-old society" (Tiku 2023). This condition will force the company to make an adjustment that is considered important, as well as an effort to raise the retirement age limit and make a change to its pension policy. In similar conditions, Japan in the economy is also affected by various external factors, for example with the impact of the COVID-19 pandemic, making the economic performance in several sectors and regions there (Khomariyah, Setyowati, and Utomo 2022).

A privately owned savings is a very important marker to see economic prosperity in the future and becomes a major part in determining the total savings of a country (Alsedrah 2024). Since the breakup of the economic bubble in the early 1990s, Japan itself has experienced a long period of economic stagnation, often dubbed the "Thirty Years Lost", marked by weak growth and persistent deflationary pressures (Huang 2025). Although Japan once had one of the highest levels of household savings in several other industries, in reality it was not always at the highest level, either in absolute terms or compared to other countries, even at only 15% during the 25 years from 1961 to 1986 (Horioka 2024).

A level of household savings in Japan has long been the focus of global economic research, as it has played a role in spurring rapid growth after World War II (Horioka 2024) (Latsos and Schnabl 2021). Unexpectedly, since the mid-1970s, the level of savings has changed significantly, from one of the highest to one of the lowest in the OECD today (Latsos and Schnabl 2021). Although since 2016 there can be seen a resurgence, understanding several factors that influence the ups and downs of a personal savings is no less important because it will be a sign of economic prosperity in the future (Alsedrah 2024). Various existing studies provide clues, an income, changes in demographics, and monetary policy are the main factors behind this shift.

The phenomenon of declining savings levels in Japan, coupled with the Bank of Japan's very loose monetary policy, has reduced the benchmark interest rate to close to zero since the 1990s (Latsos and Schnabl 2021). Policymakers understand that nominal and real interest rates that are so low in the long term can weaken people's motivation to save (Latsos 2019). Beyond monetary factors, any effort to understand what influences a household's saving behavior is very important, especially because an individual's consumption and savings habits have such a big impact on economic growth and financial needs when entering retirement (Kitao and Takeda 2025).

* Corresponding author: es241@ums.ac.id

In Japan's own context, the value of GDP provides a hint that there have been significant changes over the past ten years due to the influence of global conditions and domestic policies. One study can make a discovery, a GDP growth has a very positive relationship with the level of national savings. Another study said that an increase in income can arise from economic growth, which can provide encouragement to people to be more selective in saving as a precautionary measure in terms of facing uncertainty in the future (Baiardi, Magnani, and Menegatti 2020). Both studies emphasized that GDP is not just a macroeconomic indicator but, has a very important role in shaping people's financial behavior itself.

The size of the labor force is also a very important variable in terms of determining how much a country's savings are. A workforce that is so large and productive, can provide an increase in national opinion, then it will give an impetus to increase savings. In Japan itself, demographic problems such as an aging population and a reduction in the number of workers of productive age are factors that directly affect the level of national savings. One study found that the size of the labor force has a positive relationship with regional income, which can be assumed to have an effect on savings (Tianto 2022). Meanwhile, other research confirms that a change in the structure of the labor force and per capita income together can shape people's consumption and saving habits (Ningsih, Juliprijanto, and Jalunggono 2020).

Nominal interest rates have traditionally been a crucial instrument of monetary policy (Statistical Research and Training Institute 2024). However, amid very low and even negative interest rates in some areas, the transmission of interest rate policy to savings can weaken or even reverse, a phenomenon called savings reversal (Felici, Kenny, and Friz 2022). A study shows that interest rates have a significant influence on savings, where a decrease in interest rates has a significant influence on savings (Fitri, Ansofino, and Ramayani 2014). This is reinforced by international findings in the book The General Theory of Employment, Interest, and Money by John Maynerd Keynes (revised edition 2019), which states that low interest rates can reduce the incentive to save and increase consumption, especially in stagnant economic conditions such as those experienced by Japan in recent years (Keynes 2019).

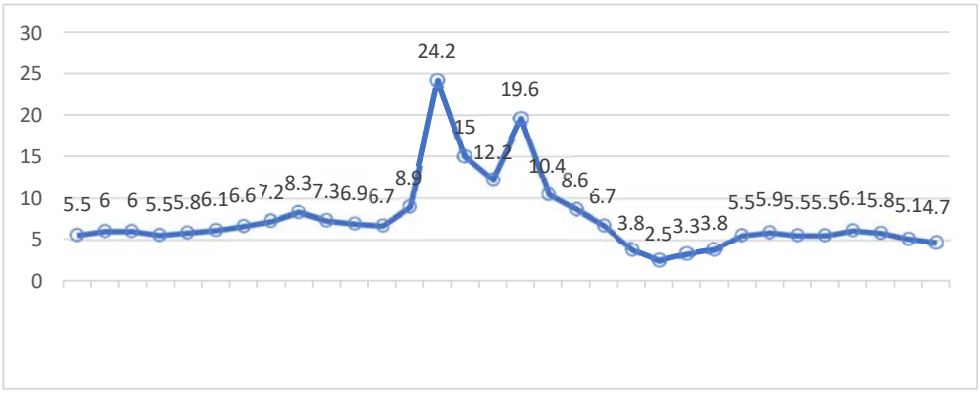

Figure 1. Japan's National Savings Rate 2017-2024

As shown in Figure 1, the dynamics of the national savings ratio from 2017 to 2024 were influenced by domestic and global macroeconomic factors. In general, the savings rate remained stable between 5% and 8% for most of the period, but there was a sharp spike in the second quarter of 2020 (24.2%) and the first quarter of 2021 (19.6%). This phenomenon of increase is very related to the early days of the COVID-19 pandemic, where household consumption fell due to mobility restrictions and economic uncertainty, while on the one hand income is still quite stable thanks to various fiscal stimuli and assistance from the government. After this period, the level of savings fell again and was in the range of 5-6%, providing a mirror of the recovery of consumption and the return of economic activities. However, another hike in 2024, precisely in the second to fourth quarters, to a level of around 14-15%, hints at the emergence of several new factors that provide a boost to the increase in savings, such as concerns about a global economic slowdown or changes in interest rate policy.

This study aims to provide an empirical analysis of how macroeconomic variables such as GDP, Employment, and Interest Rates have an influence on Savings Rates in Japan during the period 2017 to 2024. The analysis can use quarterly data and is processed with an Error Correction Model (ECM) method to visualize short-term and long-term relationships. This period is considered so important because it covers the continuation of very loose monetary policy and the acceleration of population aging, thus providing a special context to assess the incentive and ability of households to save (Latsos and Schnabl 2021). This research also hopes to benefit the Japanese Government in its efforts to develop an effective economic policy to increase people's savings itself, for the BoJ in setting monetary policies that can support consumption and investment, and for people in Japan to better understand several factors that can influence their saving behavior.

Literature Review

Saving and Economic Hypotheses

A behavior in household savings can generally be explained from two main theoretical frameworks, namely the Life-Cycle Hypothesis (LCH) and the Permanent Income Hypothesis (PIH) (Alsedrah 2024). LCH can provide a statement that a person regulates consumption patterns throughout life, where they will save while they are at a productive age in order to maintain the same level of consumption when entering retirement, which will usually make savings decrease (Latsos 2019). Meanwhile, PIH states that households try to level their consumption patterns based on average lifetime income (permanent income), saving when receiving transitory (one-off) income (Latsos and Schnabl 2021). The availability of underdeveloped social safety nets or credit constraints also encourages precautionary saving against the risk of unexpected income or expenses.

Effect of GDP or Income

National income is defined as the total goods and services (output) produced by a country's economy in a certain period (Khomariyah, Setyowati, and Utomo 2022). GDP measures economic output per individual and is often used as a proxy for a country's level of prosperity (Latsos and Schnabl 2021). In general, rapid GDP growth and rising household incomes tend to increase the savings rate (Horioko C. Y. and T. 2020)(Ningsih, Juliprijanto, and Jalunggono 2020). However, Japan's recent experience suggests a different trend. Despite rising GDP per capita in Saudi Arabia (KSA), a significant negative impact was found on personal savings, as measured by time deposits, suggesting that affluence may drive consumption more than savings (Latsos and Schnabl 2021). In the context of Japan, GDP also plays a role in analyzing employment issues, the GDP economic growth rate is able to increase employment and reduce unemployment (Itsni Azzahra and Prihadi Utomo 2024). Increases in household wealth such as asset values can also increase savings, suggesting a "wealth channel" that influences saving capacity.

Influence of Labor Force or Demographics

Japan has a high elderly labor force participation rate relative to other OECD countries, and this rate has been rising steadily since 2000 (Kitao and Takeda 2025). Changes in the age structure of the population (demographics) are considered to be the main determinant of shifts in Japan's savings rate (Latsos 2019) (Horioka 2024). The LCH hypothesis predicts that the old-age dependency ratio has a negative and significant impact on savings rates because older adults tend to dismantle assets (Horioko C. Y. and T. 2020). However, further research suggests that the recent decline in Japanese household savings rates may be due more to a decline in the savings rates of the elderly themselves (especially retirees), due to reduced pension income or property income, than simply to aggregate population aging (Latsos and Schnabl 2021). However, in general theory, the labor variable is considered as one of the given elements in the economic system that determines the distribution of national income (Keynes 2019). The increase in the labor force participation of married women in Japan was also found to be positively correlated with household savings rates, especially among the middle-income group and those aged 51-65, as their additional income was used for precautionary savings related to education or retirement (Guo and Tang 2025).

Effect of Interest Rates

The role of interest rates on savings is theoretically ambiguous because it involves both a substitution effect (interest rates rise, incentives to save increase) and an income effect (interest rates rise, the need to save for future targets decreases) (Latsos 2019) (Baiardi, Magnani, and Menegatti 2020). However, in the context of Japan's prolonged ultra-low interest rate policy (since the 1990s), low nominal interest rates have acted as a disincentive to saving (through the interest rate channel) by reducing the profitability of deposits. Empirical analysis finds that nominal interest rates have a positive and significant impact on household savings rates. This indicates that a decrease in interest rates can reduce the level of savings, as can be seen from the results of the study that gives clues, a cut in interest rates by one percentage point can reduce the level of savings by around 0.43 to 0.65 percentage points (Latsos 2019) (Latsos and Schnabl 2021). Another study also found that the implementation of a negative interest rate (NIRP) will actually make household savings increase so significantly because people have businesses to cover the reduction in profits, so that this NIRP can be a less effective policy to encourage consumers (Staal 2023). The importance of interest rates can be seen in the calculation of the time value of money in the fields of finance and accounting, where the value can be obtained by using logarithmic formulas when the future value and the current value are known (Nainggolan 2024). Meanwhile, in Indonesia itself, a study on savings interest rates found that this variable had no significant influence on the money supply in East Kalimantan (Arnika, Busari, and Junaidi 2022).

In this study, several economic theories can be used as a basis for analyzing how Gross Domestic Product (GDP), Labor, and Interest Rates affect Savings Rates in Japan. One of them is: (1) The Keynesian Savings Theory introduced by John Maynard Keynes, which explains that the amount of a person's savings is greatly influenced by his income level. Based on this theory, when the income increases, automatically the share of income set aside for savings will also have a tendency

to increase (Muttaqin 2020) (Haneef n.d.). (2) Life Cycle Theory developed by Franco Modigliani and Richar Brumberg, provides an explanation for a person to plan his consumption and savings patterns throughout his life. In this theory, individuals tend to save more when their income is high and then reduce their savings when their income decreases (Alsedrah 2024) (Latsos 2019) (Horioko C. Y. and T. 2020). (3) Interest Rate Theory discusses the relationship between interest rate levels and a decision to save. Higher interest rates will provide an incentive for the individual to save because the results they get from savings will also increase. By using these theories as a foundation, this study aims to provide a clearer understanding of how GDP, labor force, and interest rates affect savings levels in Japan (Lubis, Panjaitan, and Lumbantoruan 2024) (Itsni Azzahra and Prihadi Utomo 2024).

Several previous studies have discussed the influence of Gross Domestic Product (GDP), Labor Force, and Interest Rates on Savings Rates in Japan, including: (1) Research by Donatella Baiardi, Marco Magnani, and Mario Menegatti discussed how GDP and economic expectations affect saving behavior in developed countries such as Japan. The study highlights the latest developments in a theory of just in case, namely people's tendency to save as a form of protection against future income uncertainty. The article provides an economic model that hints at an increase in GDP and opinions are not always followed by an increase in consumption, but will instead give a boost to savings when people feel they are faced with economic risks or job uncertainty (Baiardi, Magnani, and Menegatti 2020). This study uses a theoretical analysis and comparison between developed countries, including Japan, and concludes that savings have a tendency to increase when risk expectations increase even though income also increases. (2) Research conducted by Charles Yuji Horioka and Akiko Terada Hagiwara provides empirical evidence regarding the influence of interest rates and demographic factors on savings in Japan, This study that has been compiled by the Asian Development Bank examines several factors that can determine the level of savings in various Asian countries, including Japan. With the use of panel data and regression methods, this study can measure the influence of interest rates, income growth, and demographic structure on household savings (Horioko C. Y. and T. 2020). The results may suggest that in Japan, savings levels have declined due to an aging population and very low interest rates. Even so, savings remain high in the productive age group due to future uncertainty and limitations in the pension system. (3) Research by Reza Tianto is used as a basis for looking at the relationship between labor and savings in Japan. The results of the study can give an indication that the number of workers has such a positive and significant influence on PAD, meaning that the larger the number of workers, the higher the regional income (Tianto 2022). Although this study does not directly discuss savings, the increase in regional income can be assumed to also increase people's ability to save. (4) Research conducted by Yulia Fitri, Dr. Ansofino, and Citra Ramayani provides empirical evidence to investigate whether the low interest rate policy in Japan can really have an impact on declining savings levels. This study uses quantitative data from the banking sector in Indonesia to provide an assessment of the influence of interest rates and inflation on people's savings (Fitri, Ansofino, and Ramayani 2014). The results of the study provide clues that interest rates have a very positive influence on people to save. On the other hand, inflation has a negative impact due to the weakening of people's purchasing power.

Several previous studies can provide clues that the relationship between Gross Domestic Product (GDP), labor force, interest rates, and savings rates in Japan is complicated and involves many aspects, because each variable has an influence on economic mechanisms such as income growth, changes in labor market conditions, and monetary policies that can adjust to the global situation. This complexity can be seen in the interrelationships that include: GDP growth can give a boost to savings as incomes rise, but low interest rates can reduce motivation to save, while a strong labor force will reinforce this pattern amid Japan's demographic challenges. However, there are still many important gaps in previous research, especially those related to the comprehensive analysis, combining these three variables in a stimulating manner. Many previous studies have examined a variable separately or only focused on a specific period, so there is no ability to capture the long-term impact of interdependence between variables or an influence of external events such as the COVID-19 pandemic. This study has an attempt to fill this gap by conducting an in-depth analysis of the combined influence of GDP, labor force, and interest rates on savings levels in Japan, for the period 2017-2024, using quarterly data and a more advanced econometric method in order to provide a more comprehensive understanding and relevance for economic policy formulation.

Data and Methods

Data Types and Source

This research is a quantitative study using secondary data in the form of quarterly time series data. The observation period used is from the first quarter of 2017 (2017.Q1) to the fourth quarter of 2024 (2024.Q4). The dependent variable used is the Household Savings Rate in Japan (SR), and the independent variables include Gross Domestic Product (GDP), Labor Force (Labor), and Interest Rate (IR) (Latsos and Schnabl 2021) (Statistical Research and Training Institute 2024). Historical data on Japan's Savings Rate, GDP, Labor Force, and Nominal Interest Rate can be obtained from publications by institutions such as the OECD and the Bank of Japan.

Model Specifications

The regression model used is a multiple linear regression model with an Error Correction Model (ECM) to measure the influence of Gross Domestic Product (GDP), Labor Force, and Interest Rates on Savings Rates in Japan. The long-term estimator model is as follows:

$$SR_t = \beta_0 + \beta_1 GDP_t + \beta_2 LABOR_t + \beta_3 IR_t + \varepsilon_t \quad (1)$$

Where SR is the savings rate (%), GDP is Gross Domestic Product (%), LABOR is the labor force (%), IR is the interest rate (%), β0 is the long-run constant, β1... β3 are the long-run regression coefficients of the independent variables, t denotes the research period 2017-2024, and ε is the error term.

Following the approach of Domowitz and Elbadawi, the partial adjustment behavior of the ECM is obtained by minimizing a single quadratic cost function. Structuring and parameterizing the standard short-run ECM equations yields the following short-run ECM estimator model:

$$\Delta SR_t = \gamma_0 + \gamma_1 \Delta GDP_t + \gamma_2 \Delta LABOR_t + \gamma_3 \Delta IR_t + \gamma_4 GDP_{t-1} + \gamma_5 LABOR_{t-1} + \gamma_6 IR_{t-1} + \gamma_7 ECT + \omega_t \quad (2)$$

Where, ECT is the Error Correction Model, γ_7 is λ, γ_0 is $\lambda\beta_0$, $\gamma_1 \ldots \gamma_3$ is $\alpha_1 \ldots \alpha_3$, γ_4 is $-\lambda(1-\beta_1)$, γ_5 is $-\lambda(1-\beta_2)$, γ_6 is $-\lambda(1-\beta_3)$, ω is error term.

Result and Discussion

Estimated Result

As previously described, an Error Correction Model (ECM) regression analysis was applied to investigate the impact of Gross Domestic Product (GDP), Labor Force, and Interest Rates on Savings Rates. The results of the short-term ECM estimator model and its diagnostic tests are summarized in Table 1.

Table 1. Estimation Result of the ECM Short-Term Estimator Model

$$\widehat{\Delta SR_t} = 105.1238 - 0.0028\Delta GDP_t - 4{,}5676\Delta LABOR_t + 4.1717\Delta IR_t - 0.3788 GDP_{t-1} - 1.9228 LABOR_{t-1}$$
$$(0.2431) \quad (0.0356)^{**} \quad (0.4136) \quad (0.0182)^{**} \quad (0.1899)$$
$$-0.0755 IR_{t-1} + 0.3786 ECT_t$$
$$(0.9787) \quad (0.0181)^{**}$$

R^2 = 0.7912; DW-Stat. = 2.5586; F-Stat. = 12.4495; Prob. F-Stat. = 0.0000

Diagnostic Test

(1) Multiolinierity (VIF)

ΔGDP_t = 9.0297; $\Delta LABOR_t$ = 6.0686; ΔIR_t = 1.3671; GDP_{t-1} = 1624225.8; $LABOR_{t-1}$ = 5.0482; IR_{t-1} = 4.9731; ECT_t = 1622803.2

(2) Residual Normality (Jarque-Bera)

JB(2) = 57.9336; Prob. JB(2) = 0.0000

(3) Autocorrelation (Breusch-Godfrey)

$\chi^2(3)$ = 5.6648; Prob. $\chi^2(3)$ = 0.1291

(4) Heteroscedasticity (White)

$\chi^2(13)$ = 14.0987; Prob. $\chi^2(13)$ = 0.3669

(5) Linearity (Ramsey Reset)

F(2,21) = 0.0666; Prob. F(2,21) = 0.9358

Data Source: World Bank, authors' calculations. Note: *Significant at α = 0.01; ** Significant at α = 0.05; *** Significant at α = 0.10. Values in parentheses represent the probability of the t-statistic.

From Table 1., it can be seen that the ECT regression coefficient (coefficient adjustment, λ) has a value of 0.3786, which means it meets the requirements $0 < \lambda < 1$. This coefficient has a p-value or empirical probability (significance) of 0.0181, meaning the adjustment coefficient is significant at α = 0.05. These two conditions show that the estimated model is truly an ECM model, so that through the error correction mechanism, the long-term theoretical equilibrium relationship

between the independent and dependent variables specified in the econometric model will be achieved. The calculation of the long-term estimated ECM model parameters is as follows:

Table 2. Estimated Long Term ECM

Variables	Parameters	Calculation	Result
	$\lambda = \gamma_7$	0.3786	0.3786
Constant	$\beta_0 = \frac{\gamma_0}{\lambda}$	$\frac{105.1238}{0.3786}$	277.6646
GDP	$\beta_1 = \frac{\gamma_4 + \lambda}{\lambda}$	$\frac{-0.3788 + 0.3786}{0.3786}$	-5.2826
LABOR	$\beta_2 = \frac{\gamma_5 + \lambda}{\lambda}$	$\frac{-1.9228 + 0.3786}{0.3786}$	-4.0787
IR	$\beta_3 = \frac{\gamma_6 + \lambda}{\lambda}$	$\frac{-0.0755 + 0.3786}{0.3786}$	0.8006

Source: Secondary data that have been processed authors

Based on the definition of short-term parameters, the following long-term estimated ECM model is obtained from the calculations:

$$\widehat{SR_t} = 277.6646 - 5.2826GDP_t^* - 4.0787LABOR_t + 0.8006IR_t \quad (3)$$

From the diagnostic test in table 1., it can be seen that the empirical probability of the Residual Normality test statistic is 0.0000 (< 0.01), indicating that the estimated model has a non-normal residual distribution. For the empirical probability of the Autocorrelation, Heteroscedasticity, and Linearity test statistics, the values are 0.1291 (> 0.10), 0.3669 (> 0.10), 0.9358 (> 0.10), respectively. This indicates that the estimated model is free from autocorrelation and heteroscedasticity problems, with the model specifications being appropriate (linear). All VIF values are < 10, except for PDB_{t-1} and ECT, which are 1624225.8 and 1622803.2, which means that these two variables cause multicollinearity problems in the estimated model.

The goodness of fit statistic shows that the model exists, as seen from the empirical probability value of the F statistic, which is 0.0000 (< 0.01), with a moderate R2 or predictive power of 0.7912. This means that the GDP, Labor Force, and Interest Rate variables can explain 79.12 percent of the variation or rise and fall of the Savings Rate variable in Japan.

In the short term, the Savings Rate (SR) is significantly influenced by the Labor Force (LABOR). Meanwhile, Gross Domestic Product (GDP) and the Interest Rate (IR) have no significant influence. In the long term, the Savings Rate (SR) is significantly influenced by Gross Domestic Product (GDP). Meanwhile, Labor Force (LABOR) and the Interest Rate (IR) have no significant influence.

In the short term, Gross Domestic Product (GDP) has no significant influence on the Savings Rate (SR). In the long term, this variable has a regression coefficient of -0.3788. The relationship between this variable and the Savings Rate (SR) is linear. This means that if Gross Domestic Product (GDP) increases by $1 billion, the Savings Rate (SR) will decrease by 0.3788%. Conversely, if Gross Domestic Product (GDP) decreases by $1 billion, the Savings Rate (SR) will increase by 0.3788%.

In the short term, the Labor Force (LABOR) has a regression coefficient of -4.5676, and the relationship between this variable and the Savings Rate (SR) is linear. This means that if the Labor Force (LABOR) increases by 1%, the Savings Rate (SR) will decrease by 4.5676%. Conversely, if the Labor Force (LABOR) decreases by 1%, the Savings Rate (SR) will increase by 4.5676%. In the long term, the Labor Force (LABOR) variable does not have a significant effect. Meanwhile, the Interest Rate (IR) variable in the short term and long term does not have a significant effect on the Savings Rate (SR).

The negative relationship between interest rates and savings indicates that if interest rates are raised by monetary authorities, public savings will decline. When interest rates rise, banks may experience a disincentive to further mobilize savings, resulting in a decline in public savings (Fatimah and Utomo 2023). In the concept of "Gibson's Paradox" it is explained that there is empirical evidence about the tendency of prices and interest rates to move together (Purnomo n.d.). If prices increase, interest rates also tend to rise, and conversely, if prices decrease, interest rates also tend to fall.

Discussion

The effect of Gross Domestic Product (GDP) on savings rates shows no significant effect between the two in the short run in accordance with the view that savings behavior in the short period may be more influenced by volatile factors or labor market variables, while adjustment to macro income changes may take time (Aizenman, Cheung, and Ito 2017). Temporary changes in income may not immediately produce large changes in consumption, and hence in savings, according to the Permanent Income Hypothesis (PIH).

In the long run, the Life Cycle Hypothesis (LCH) and the Permanent Income Hypothesis (PIH) predict that income levels such as GDP should be positively correlated with savings, because higher incomes increase the ability to save (Lubis, Panjaitan, and Lumbantoruan 2024). However, these negative results can be interpreted based on reasons such as increasing consumption due to prosperity, these findings are in line with empirical studies conducted in certain countries, such as Saudi Arabia (KSA), where increasing GDP per capita (GDPPC) is associated with a decrease in personal savings in the long run (Alsedrah 2024). This may occur because increasing economic prosperity encourages people to increase consumption spending rather than saving. Another reason is investment diversion, where people may tend to allocate their wealth to more profitable investment assets, such as the stock market, which offers higher returns compared to traditional savings products. Although classical Keynesian theory emphasizes that the amount of saving is determined by the level of household income, this specific finding shows that in the Japanese context (or relevant studies), the long-run effect of GDP on the saving rate is negative, implying that the consumption-inducing effect outweighs the ability to save in the long run for accurate data (Muttaqin 2020).

The influence of the labor force on the savings rate in the short term shows that a significant increase in the labor force can increase the number of unemployed (Munthe 2019) (Agustina 2020). Unemployment represents uncertainty about labor income. An increase in the labor force facing difficulties in finding employment can put economic pressure on households, forcing those with limited liquidity to reduce savings to cover consumption costs. If the increase in the labor force reflects an increase in individuals seeking work (including the unemployed and the unemployed), this can be associated with a reduction in real income (through the labor income channel), which is inversely related to savings (Opoku 2020). The significant negative effect of the labor force in the short run, where the income effect dominates, indicates that most households may face liquidity constraints. The fact that the labor force has no significant effect in the long run suggests that over a longer period, the labor market may reach a certain equilibrium, or that other structural factors such as the rate of capital accumulation and technological development, rather than just the size of the labor force, determine economic growth and savings stability.

The most consistent result is that the interest rate variable has no significant effect on savings rates, either in the short run or the long run. This finding is highly relevant to the macroeconomic theory debate regarding the determinants of savings. This result is in line with the Keynesian view, which rejects the classical view that savings are determined by interest rates (Muttaqin 2020) (Lubis, Panjaitan, and Lumbantoruan 2024). According to Keynes, interest rates are determined by the supply and demand for money, and the amount of savings is determined by the level of household income. Theoretically, the effect of interest rates on savings is ambiguous because it involves two opposing effects: the substitution effect, where higher interest rates encourage saving, and the income effect, where higher interest rates mean greater future interest income, thus motivating people to save less (Aizenman, Cheung, and Ito 2017) (Opoku 2020). This finding implies that in the market studied, the two effects cancel each other out or the income effect (including income and psychological factors) is much more dominant, thus making interest rates insignificant as a determinant of savings.

Conclusion

The analysis of "Analysis of the Effect of GDP, Labor Force, and Interest Rates on Savings Rates in Japan 2017-2024" shows that there are differences in the influence of macroeconomic variables. In the short run, the labor force is shown to be the sole determinant for significant and strong negative influence on savings rates. Economically, this finding can be interpreted in the context of the Japanese labor market which can increase savings rates because their income exceeds consumption, the high negative coefficient in the short run model may reflect that the addition of labor is faced with income uncertainty or liquidity constraints (Masayuki 2017) (Kohara and Yuji Horioka 2024). This forces households to prioritize immediate consumption or spending over discretionary savings, a behavior common in households with a strong precautionary motive.

Meanwhile, in the long-term analysis, the dominant influence shifts to Gross Domestic Product (GDP), which exhibits a significant but negative effect on the savings rate. This negative correlation between GDP growth and the aggregate savings rate aligns with findings in other developed countries (Aizenman, Cheung, and Ito 2017). Historically, Japan's high savings rate in the post-war era was driven by rapid economic growth, but the current negative findings suggest that in a Japanese economy that has transitioned to a low-growth phase since the 1990s, long-term increases in income appear to be directed more towards increasing consumption (via the wealth effect) than towards accumulating further savings (Latsos 2019).

The most consistent result across both the short and long term is that interest rates have no significant effect on savings rates. Although the results of this model indicate a lack of direct significance of interest rates, their role in the Japanese economy cannot be ignored. The Bank of Japan's (BoJ) long-term low policy interest rate (since the 1990s) is known to have a significant impact on savings behavior through three channels: the interest rate channel, the redistribution channel, and the wealth channel (Latsos and Schnabl 2021). The prolonged low interest rate policy has suppressed households' ability to save, highlighting that Japanese households' current saving motives are driven by non-price factors, particularly precautionary motives against future uncertainties, such as longevity risk and uncertain social security costs. In conclusion, over the 2017-2024 period, household saving rates in Japan are critically affected by short-term labor market dynamics and negatively constrained by long-term economic growth (Guo and Tang 2025) (Masayuki 2017). To stimulate Japan's sluggish household consumption, policy should focus on improving predictability and long-term social security, including reforming the pension system, which would reduce the need for households to save excessively for precautionary reasons.

Acknowledgement

The authors would like to express their sincere gratitude to all those who contributed to the completion of this research. Special appreciation is extended to their supervisors for their valuable guidance, insightful suggestions, and constructive feedback throughout the research process. Finally, the authors thank their family and friends for their continued encouragement and moral support throughout the completion of this work.

Reference

Agustina, Niken laras. 2020. Badan Pusat Statistik *Indikator Pasar Tenaga Kerja Indonesia*.

Aizenman, Joshua, Yin-wong Cheung, and Hiro Ito. 2017. ADBI Working paper series *The Interest Rate Effect on Private Saving : Alternative Perspectives Asian Development Bank Institute*. https://www.adb.org/sites/default/files/publication/239546/adbi-wp715.pdf.

Alsedrah, Ibrahim Tawfeeq. 2024. "Determinants of the Personal Savings Rate in the Kingdom of Saudi Arabia Using Time Savings Deposits, 2012–2022." *Heliyon* 10(3): e24980. doi:10.1016/j.heliyon.2024.e24980.

Arnika, Arnika, Arfiah Busari, and Agus Junaidi. 2022. "Analisis Pengaruh Konsumsi Rumah Tangga Dan Investasi Serta Suku Bunga Tabungan Terhadap Jumlah Uang Beredar." *Kinerja* 18(4): 672–79. doi:10.30872/jkin.v18i4.10559.

Baiardi, Donatella, Marco Magnani, and Mario Menegatti. 2020. "The Theory of Precautionary Saving: An Overview of Recent Developments." *Review of Economics of the Household* 18(2): 513–42. doi:10.1007/s11150-019-09460-3.

Fatimah, S, and Y P Utomo. 2023. "Analisis Pengaruh Jumlah Angkatan Kerja, Upah Minimum, Penanaman Modal Dalam Negeri, Proporsi Pdrb Sektor Industri, Proporsi …." *Jurnal Bisnis dan Manajemen* 3(3): 355–63. https://ejournal.penerbitjurnal.com/index.php/business/article/view/207.

Felici, Marco, Geoff Kenny, and Roberta Friz. 2022. "Working Paper Series Consumer Saving Behaviour at Low and Negative Interest Rates." *ECB Working Paper Series* (No 2736).

Fitri, Yulia, Ansofino, and Citra Ramayani. 2014. "Pengaruh Tingkat Suku Bunga, Pendapatan, Tingkat Inflasi Dan Tingkat Pendidikan Terhadap Tabungan Masyarakat Kota Padang." *Pendidikan Ekonomi* 1(1): 29891. https://www.neliti.com/id/publications/29891/pengaruh-tingkat-suku-bunga-pendapatan-tingkat-inflasi-dan-tingkat-pendidikan-te.

Guo, Yilin, and Cheng Tang. 2025. "Effect of Married Women's Labor Force Participation on Japan's Household Saving Rate." *Institute Of Economic Research*.

Haneef, Mohammad A. "Keynesian Interpretation of Saving and Investment." : 46–48.

Horioka, Charles Yuji. 2024. "Household Saving in Japan: The Past, Present, and Future." *SSRN Electronic Journal* 2024. doi:10.2139/ssrn.5032545.

Horioko C. Y., and Hagwara A. T. 2020. "The Determinants and Long-Term Projections of Saving Rates in Developing Asia." *NBER Working Paper Series* W.P. 17581: 1–37.

Huang, Z. 2025. "The 30 Years of Japan's Economic Recession." *International Journal of Global Economics and Management* 8(2). doi:https://doi.org/10.62051/ijgem.v8n2.05.

Itsni Azzahra, Nabila, and Yuni Prihadi Utomo. 2024. "Analisis Faktor-Faktor Yang Mempengaruhi Tabungan Di

Indonesia Tahun 2000 Hingga 2021." *Journal Of Social Science Research* 4(5). doi:10.54593/awl.v5i1.257.

Keynes, J. M. 2019. "The General Theory of Employment Re-Stated." *Quarterly Journal of Economics* 51(2): 209–23. doi:10.2307/1882087.

Khomariyah, Risma Nur, Eni Setyowati, and Yuni Prihadi Utomo. 2022. "Analysis of the Effect of Inflation, Interest Rate, Exchange Rate, and National Income on Financial Deepening in Indonesia From 2000 to 2020." *Proceedings of the International Conference on Economics and Business Studies (ICOEBS 2022)* 655(Icoebs): 154–61. doi:10.2991/aebmr.k.220602.020.

Kitao, Sagiri, and Nozomi Takeda. 2025. "Japan's Aging Workforce: Determinants and Outlook." *Asian Economic Policy Review* 20(2): 251–60. doi:10.1111/aepr.12506.

Kohara, Miki, and Charles Yuji Horioka. 2024. "Are Japanese Households Really Not Saving Anymore?" *Journal of Economic Literature Classification Codes: D12, D14, D15, E21, G51, H31*.

Latsos, Sophia. 2019. "The Low Interest Policy and the Household Saving Behavior in Japan Working Paper , No . 159 Sophia Latsos The Low Interest Policy and the Household Saving Behavior in Japan." *Working Paper* (159).

Latsos, Sophia, and Gunther Schnabl. 2021. "Determinants of Japanese Household Saving Behavior in the Low-Interest Rate Environment." *Economists' Voice* 18(1): 81–99. doi:10.1515/ev-2021-0005.

Lubis, Deastri Natalia, Grancia Panjaitan, and Endang Feronika Lumbantoruan. 2024. "Analisis Faktor-Faktor Yang Mempengaruhi Tabungan Di Indonesia Tahun 1990 Hingga 2020." *Jurnal Widya* 5(1): 311–21.

Masayuki, Morikawa. 2017. "Impact of Policy Uncertainty on Consumption and Saving Behavior : Evidence from a Survey on Consumers." *Discussion papers from Research Institute of Economy, Trade and Industry (REITI)*.

Munthe, Mario Nicolas. 2019. "Pengaruh Tingkat Investasi Dan Angkatan Kerja Terhadap Pertumbuhan Ekonomi Di Indonesia." *Jurnal Manajemen dan Bisnis*: 163–79. doi:10.54367/jmb.v18i2.428.

Muttaqin, Hidayatullah. 2020. "Makroekonomi KEYNESIAN." *Https://Iesp.Ulm.Ac.Id/*: 29.

Nainggolan, Rexon. 2024. "Measurement of Interest Rate and Period Using Logarithm Equations: A Study of Time Value of Money." *Assets: Jurnal Akuntansi dan Pendidikan* 13(3): 188–201. doi:10.25273/jap.v13i3.21770.

Ningsih, Bekti Kumoro, Whinarko Juliprijanto, and Gentur Jalunggono. 2020. "Analisis Pengaruh Pendapatan Per Kapita, Inflasi, Tingkat Simpanan Dan Nilai Tukar Terhadap Konsumsi Masyarakat Di Indonesia Tahun 2000-2018." *Dinamic: Directory Journal of Economic* 2(1): 51–64.

Opoku, Philemon Kwame. 2020. "The Short-Run and Long-Run Determinants of Household Saving: Evidence from OECD Economies." *Comparative Economic Studies* 62(3): 430–64. doi:10.1057/s41294-020-00123-2.

Purnomo, Didit. "Kausalitas Suku Bunga Domestik Dengan Tingkat Inflasi Di Indonesia." *Jurnal Ekonomi Pembangunan* 5(1): 50–56.

Staal, Klaas. 2023. "Household Savings and Negative Interest Rates." *International Advances in Economic Research* 29(1–2): 1–13. doi:10.1007/s11294-023-09870-1.

Statistical Research and Training Institute, M I C. 2024. Statistic Japan *Statistical Handbook of Japan 2024*. https://www.stat.go.jp/english/data/handbook/pdf/2020all.pdf.

Tianto, Reza. 2022. "Pengaruh Jumlah Angkatan Kerja Dan Investasi Terhadap Pendapatan Asli Daerah." *Jurnal Samudra Ekonomi dan Bisnis* 13(1): 113–24. doi:10.33059/jseb.v13i1.3982.

Tiku, Sarvesh. 2023. "AI-Induced Labor Market Shifts and Aging Workforce Dynamics: A Cross-National Study of Corporate Strategic Responses in Japan, USA, and India." *SSRN Electronic Journal* (Ml). doi:10.2139/ssrn.4535534.