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The impact of capital income on consumption

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Abstract. Against the backdrop of a complex and ever-changing global economy, with countries seeking effective policies to stimulate consumption, this paper aims to revisit the relationship between monetary policy and consumption. A dynamic model is constructed, and data from the United States spanning from 1972 to 2024 is collected for empirical analysis using methods such as OLS and GLS. The results show that the growth rate of personal consumption is positively correlated with the rate of capital return, while the impact of wage growth is not significant. When labor time remains unchanged, the wage growth rate is positively correlated with the capital return rate. The conclusion indicates that expansionary monetary policy has no direct link to increased consumption; rather, an increase in personal consumption is more dependent on capital income than labor income.

Keywords: monetary policy, interest rates, market return rate, consumption growth rate

1. Introduction

In today's complex and rapidly changing global economic environment, the impact of monetary policy on consumption has always been one of the core issues in economics, attracting the attention of both academia and policymakers. This issue not only relates to the stable operation of the macroeconomy but is also closely linked to the consumption decisions and welfare levels of individual micro-actors. As the global economic landscape undergoes profound adjustments, countries face many uncertainties and challenges. Therefore, delving into the intrinsic relationship between monetary policy and consumption is of great importance for formulating scientifically sound economic policies and promoting sustainable economic growth.

From a macroeconomic perspective, the structure of global economic growth is undergoing significant changes. In the past, international trade and investment were key engines driving world economic development. However, in recent years, the rise of anti-globalization sentiment, the prevalence of trade protectionism, intensifying international market competition, and ongoing trade frictions have severely impacted the import and export trade of many countries. Taking the China-US trade war as an example, the imposition of tariffs and other measures has led to a deterioration of the global trade environment. As the world's largest goods trading nation, China's export enterprises face difficulties such as reduced orders and rising costs, severely impacting the external driving forces of economic growth. At the same time, with the Federal Reserve initiating the US dollar interest rate hike cycle, global capital flows have been altered. A significant amount of international capital has returned to the United States, placing enormous pressure on the financial markets of emerging market economies and developing countries. The investment environment has worsened, investment scales have shrunk, and the endogenous driving forces of economic growth have been suppressed. In this context, expanding domestic demand and promoting consumption have become key measures for stabilizing economic growth in many countries.

In China, constructing a new development pattern that prioritizes domestic circulation and promotes mutual reinforcement between domestic and international circulations is a key strategic direction for current economic development. As one of the "three driving forces" of economic growth, consumption's fundamental role in economic development is becoming increasingly prominent. However, the development of China's consumer market has not been smooth. Despite the overall upward trend in residents' income levels, the speed of consumption growth remains relatively slow, and consumption potential has yet to be fully realized. To stimulate consumption and promote economic growth, China's central bank has implemented a series of monetary policy measures, such as multiple reserve requirement ratio reductions and increasing money supply to lower interest rates and stimulate investment and consumption. However, the actual effects have not been as expected, with the growth rate of consumption being much slower than the rate of increase in money supply. This suggests that the relationship between monetary policy and consumption is not simple and direct, and there may be complex transmission mechanisms and influencing factors at play.

On the theoretical level, there are various views and theories regarding the impact of monetary policy on consumption [1, 2]. Keynesianism emerged during the Great Depression of the 1930s, a period when the economy fell into a liquidity trap. Despite continuous increases in the money supply by monetary authorities, market interest rates were extremely low, and investors were still unwilling to increase investment, leading to serious doubts about the effectiveness of monetary policy [3]. As a result, Keynesianism advocated for using fiscal policy to stimulate the economy [4]. New Keynesianism, inheriting and developing Keynesian ideas, summarized four transmission channels of monetary policy: the interest rate channel, asset price channel, exchange rate channel, and credit channel [5-7]. New Keynesians believe that when expansionary monetary policy is adopted, it leads to a decrease in the real interest rate, which, as the cost of investment, encourages increased investment, thereby boosting total demand and output [8]. At the same time, according to Modigliani's Fisher intertemporal consumption choice model, assuming consumption smoothing, consumption and income are positively correlated in each period [9]. Therefore, New Keynesianism posits that expansionary monetary policy can increase consumption by raising money supply, lowering real interest rates, and promoting investment and total output [10].

However, real-world economic phenomena challenge traditional theories. Some empirical studies have found that expansionary monetary policy does not always effectively promote consumption growth [10, 11]. In certain cases, an increase in the money supply may lead to rising inflationary pressures and a decline in real income, thus suppressing consumption. Furthermore, different income groups may respond differently to monetary policy. Low-income groups may focus more on short-term income and consumption needs, while high-income groups are more concerned with preserving and increasing the value of their assets. The impact of monetary policy on consumption may differ significantly across these groups [12, 13]. These phenomena suggest that the traditional theoretical models of the relationship between monetary policy and consumption may have certain limitations and need further expansion and refinement.

The model demonstrates that the views of New Keynesianism are inconsistent with data from the United States. When real interest rates fall, the growth rate of consumption does not increase. In fact, there is no clear direct relationship between the two. Based on data from the United States, personal consumption growth is influenced by the capital multiplier and is positively correlated with the market portfolio return rate. However, both real interest rate and wage growth rate are unrelated to the growth rate of personal consumption expenditure. When labor time remains unchanged, wage growth is positively correlated with capital returns.

The structure of the remaining sections of this paper is as follows: the second section presents the theoretical model; the third section discusses the data and methodology; the fourth section presents the main results and analysis; the fifth section provides the conclusion.

2. Theoretical model

2.1. Transmission of monetary policy in New Keynesianism

Feenstra (1986) demonstrated that the utility of money for households is given by equation (1):

$$\Gamma(\frac{M_t}{P_t}) = \frac{(M_t/P_t)^{1-v}}{1-v},\ v > 0 \tag{1}$$

The utility of consumption is (see equation 2):

$$U(C_t) = \frac{C_t^{1-\theta}}{1-\theta} \tag{2}$$

The first-order condition for the optimal money holding is (see equation 3):

$$\Gamma'(\frac{M_t}{P_t}) = \frac{i_t}{1+i_t} U'(C_t) \tag{3}$$

which yields (see equation 4):

$$\frac{M_t}{P_t} = Y_t^{\theta/v}(\frac{1+i_t}{i_t})^{1/v} \tag{4}$$

Where, M_t represents the money supply in period t, P_t represents the price level in period t, C_t represents consumption in period t, i_t represents the nominal interest rate in period t, and Y_t represents output in period t.

When the money supply increases, due to price rigidity in the short term, the nominal interest rate will fall, the real interest rate will also decrease, investment will rise, and output will increase to ensure that the money supply equals the money demand [14].

2.2. Life-cycle theory

Modigliani argued that consumers are rational. To maximize lifetime utility, consumers plan their expenditures over a longer time horizon, transferring high income to low-income periods to achieve optimal consumption distribution over their life cycle [15], [16, 17]. Modigliani assumes that a person's life consists of two phases: the working years and the retirement years. To ensure a quality life after retirement, people need to use their income during the working years and initial wealth to prepare for old age. The life-cycle consumption theory suggests that people's income follows this pattern: when young, income is low, and people often incur debt to meet necessary living standards; during middle age, income is at its peak, allowing them to repay debts incurred during youth and save for retirement; after retirement, when there is no work income, they need to consume their accumulated wealth to support their retirement life. Assuming that consumers expect to live for *T* years, with initial wealth *W*, and earn labor income *R* years during the working period, the consumer will have *W+RY* as their total income for lifetime consumption distribution. To avoid fluctuations in living standards and maintain stability, the consumer smooths consumption by evenly distributing their total income *W+RY* over T years, with annual consumption *C=(W+RY)/T*.

This consumption function can be rewritten as *C=(1/T)W+(R/T)Y*. Using α to replace *1/T* and β to replace *R/T*, the consumption function becomes (see equation 5):

$$C = \alpha W + \beta Y \tag{5}$$

Where, α represents the marginal propensity to consume out of wealth and β represents the marginal propensity to consume out of labor income.

2.3. Theoretical model

I have constructed a dynamic model to study the impact of asset returns on individual consumption and labor time. Suppose there is no inflation in the economy. The individual's utility function in a given period is (see equation 6):

$$u(c_t, l_t) \tag{6}$$

Where, c_t represents the individual's consumption in period t, and l_t represents the individual's standardized leisure in period t. In other words, the individual's utility in period t depends only on consumption and leisure, with the utility functions being increasing functions of c_t and l_t, i.e., $\frac{\partial u}{\partial c_t} > 0$ and $\frac{\partial u}{\partial l_t} > 0$.

Next, let's consider the individual's optimal decision-making. Suppose the individual prefers current consumption. Let the individual's subjective discount rate be ρ, then the utility in period t is discounted to period 0 as $u(c_t, l_t)e^{-\rho t}$. Assuming the individual is rational and aims to maximize lifetime utility, the objective is shown in equation (7):

$$\max_{c_t, l_t} \int_0^{+\infty} u(c_t, l_t) e^{-\rho t} dt \tag{7}$$

Thus, the individual will adjust the consumption and leisure quantities in each period to achieve lifetime utility maximization.

At the same time, the individual faces a capital accumulation equation in each period (see equation 8):

$$k_t' = h_t(k_t) + w_t(1 - l_t) - c_t \tag{8}$$

Where, k_t represents the capital held by the individual in period t, w_t represents the individual's real wage in period t, and $h_t(\cdot)$ represents the capital income function in period t. Therefore, the individual's capital accumulation in period t equals capital income ($h_t(k_t)$) plus labor income ($w_t(1 - l_t)$), minus personal consumption (c_t).

Assume that the individual's utility function is a constant relative risk aversion utility function, in the form (see equation 9):

$$u(c_t, l_t) = \alpha \frac{c_t^{1-\theta} - 1}{1-\theta} + \beta \frac{l_t^{1-\theta} - 1}{1-\theta} \tag{9}$$

Where, $\alpha > 0$, $\beta > 0$, θ is the coefficient of risk aversion, $\theta > 0$ and $\theta \neq 1$.

Assume that the individual's capital income function has the following form (see equation 10):

$$h_t(\cdot) = A_{jt} \cdot \tag{10}$$

Where, $h_t(\cdot)$ has a linear form with respect to current capital k_t, and A_{jt} represents the capital multiplier of individual j in period t.

By combining equation (13) and equation (14), and solving using the Hamiltonian optimization method (the computation process is provided in the appendix), the following result is obtained:

$$\frac{c_t'}{c_t} = \frac{A_{jt} - \rho}{\theta} \tag{11}$$

$$\frac{l_t'}{l_t} = -\frac{\frac{w_t'}{w_t} + \rho - A_{jt}}{\theta} \tag{12}$$

From equation (11), it can be observed that the growth rate of personal consumption in period t is unrelated to labor income. The growth rate of personal consumption in period t is influenced by the capital multiplier. When the individual can increase capital more in period t, the capital multiplier becomes larger, and the consumption growth rate increases. Conversely, when the capital multiplier decreases, the consumption growth rate decreases. More specifically, if an individual invests all their funds in the market portfolio of the stock market, then $A_{jt} = 1 + rm_t$. Combining with the assumption that $\theta > 0$, there is a positive correlation between consumption growth rate and market portfolio returns. When market portfolio returns rise, the consumption growth rate also increases.

From equation (12), it can be seen that the growth rate of leisure in period t is influenced by both the growth rate of real wages and the capital multiplier. When the wage growth rate in period t increases, the growth rate of leisure decreases. When the capital multiplier in period t increases, the growth rate of leisure increases. Conversely, when the wage growth rate in period t decreases, the growth rate of leisure increases, and when the capital multiplier decreases, the growth rate of leisure decreases.

If a firm wants to maintain constant labor hours for its employees, then leisure time will also remain unchanged, i.e., $\frac{l_t'}{l_t} = 0$. In this case, the following equation can be derived (see equation 13):

$$\frac{w_t'}{w_t} = A_{jt} - \rho \tag{13}$$

Equation (13) indicates that when labor hours are unchanged, there is a positive correlation between the growth rate of real wages and the capital multiplier. When the firm observes that the ability of employees to increase capital diminishes, i.e., when the capital multiplier declines, the firm will lower the real wage growth rate to balance labor hours.

3. Data and methodology

3.1. Data sources

The time series data used in this paper are sourced from the iFind database, the Federal Reserve Bank of St. Louis, the U.S. Bureau of Labor Statistics, and the Federal Reserve, including the following: the year-on-year CPI for the United States in the current month, the S&P 500 Index, the NASDAQ Index, the Dow Jones Industrial Average Index, the total population of the United States, seasonally adjusted U.S. Personal Consumption Expenditures (PCE), seasonally adjusted average weekly hours worked by all employees in U.S. private non-farm enterprises (monthly data), seasonally adjusted average weekly wages for all employees in U.S. private non-farm enterprises (monthly data), and the Federal Funds Rate (FFR). The dataset covers the period from the first quarter of 1972 to the third quarter of 2024 and includes the following variables: U.S. monthly year-on-year CPI, S&P 500 Index, NASDAQ Index, Dow Jones Industrial Average Index, total U.S. population, seasonally adjusted U.S. personal consumption expenditures, and the Federal Funds Rate. Additionally, for the seasonally adjusted average weekly hours worked by all employees in U.S. private non-farm enterprises (monthly data) and the seasonally adjusted average weekly wages for all employees in U.S. private non-farm enterprises (monthly data), data from March 2007 to December 2024 was collected.

3.2. Empirical methodology

To study the impact of the capital multiplier on the consumption growth rate and real wage growth rate, OLS and GLS methods are employed, and correlation coefficients are calculated for estimation. By comparing the signs and significance of the coefficients, the direction of the impact of the capital multiplier on the consumption growth rate and real wage growth rate can be determined.

As the model does not account for inflation, personal consumption expenditure, average hourly wages in private non-farm enterprises, S&P 500 index returns, NASDAQ index returns, DJIA index returns, and the Federal Funds Rate (FFR) are adjusted using CPI data. This adjustment results in the calculation of real personal consumption expenditure, real average hourly wages in private non-farm enterprises, real Federal Funds Rate (FFR), real S&P 500 index returns, real NASDAQ index returns, and real DJIA index returns. These adjusted values are then used to calculate the real consumption growth rate and real wage growth rate. The descriptive statistics for each indicator are presented in Table 1.

Table 1. Descriptive statistics

	FFR (%)	Average Hourly Wage in Private Non-Farm Enterprises (USD)	CPI (%)	S&P 500 Monthly Return (%)	NASDAQ Monthly Return (%)	DJIA Monthly Return (%)	PCEC (Billion USD)	Average Weekly Hours in Private Non-Farm Enterprises
Mean	4.88	26.13	3.99	9.17	12.82	8.66	7,063.80	34.40
Variance	15.40	18.22	8.73	262.64	566.68	245.11	258,522,10.28	0.05
Sample Size	211	226	211	636	635	636	211	226

Based on Table 1, the average hourly wage in private non-farm enterprises is $26.13, while the quarterly average personal consumption expenditure is $706.38 billion. The average weekly hours worked in private non-farm enterprises is 34.40, with a variance of only 0.05. This indicates that from March 2006 to April 2023, the fluctuation in working hours in private non-farm enterprises was relatively small and stable, which approximately satisfies the condition of zero leisure growth rate mentioned in our theoretical model.

4. Main results and analysis

4.1. Consumption growth rate and capital return rate

When analyzing the relationship between the consumption growth rate and the capital return rate, the regression methods used are Ordinary Least Squares (OLS) and Generalized Least Squares (GLS). The theoretical model indicates that the regression coefficient of the capital return rate should be positive; when the capital return rate increases, the consumption growth rate will also increase. The benchmark regression model is shown in equation (14):

$$\frac{c_t'}{c_t} = \alpha_1 + \alpha_2 rm_t + \alpha_3 r_t + \alpha_4 \frac{w_t'}{w_t} + \varepsilon_t \quad (14)$$

From equation (6), it can be seen that when an individual invests their funds in a market portfolio, the return rate obtained is the market portfolio return rate, i.e., rm_t. In this case, there is a linear relationship between the consumption growth rate and the market portfolio return rate. When performing the regression, if the regression coefficient α_2>0, it indicates a positive correlation between the two variables; if α_2<0, it indicates a negative correlation. According to equation (3), it is expected that $\alpha_2 > 0$, and $\alpha_4 = 0$.

Table 2 reports the p-values obtained from the ADF test for the actual growth rates of each indicator. As shown in Table 2, the p-value for the actual growth rate of the Dow Jones Index is greater than 0.1, indicating non-stationarity. Therefore, in subsequent regressions, this data is not used to avoid issues such as spurious regression. The p-values for the other indicators are all less than 0.1, suggesting that they have good stationarity.

Table 3 presents the univariate test results, showing the impact of the actual return rate of the S&P500, actual FFR, and actual wage growth rate on the growth rate of U.S. personal consumption expenditure. The dependent variable is the consumption growth rate adjusted for CPI. In column (1), the coefficient of the explanatory variable, the S&P500, is 0.055, which is significantly positive at the 1% level. This indicates a positive correlation between the actual return rate of the S&P500 and the consumption growth rate. Moreover, for each 1% increase in the S&P500 return rate, the consumption growth rate increases by 0.055%, which aligns with our expectations. The explanatory variables in column (2) are the same as in column (1), with robust standard errors used in the regression. In column (3), the coefficient of the explanatory variable, the actual Federal Funds Rate (FFR), is 0.115, which is significantly positive at the 10% level. This indicates a positive correlation between the actual FFR and the consumption growth rate, meaning that for each 1% increase in the actual FFR, personal consumption expenditure increases by 0.115%. In column (4), the explanatory variables are the same as in column (3), with robust standard errors used in the regression, and the regression coefficient is not significant. This suggests that the actual FFR does not significantly affect the consumption growth rate. In columns (5) and (6), the explanatory variable is the actual wage growth rate, and the coefficients in both columns are not significant. This aligns with the theoretical model and expectations, indicating that the actual wage growth rate has no effect on personal consumption expenditure.

Table 4 presents the multivariate test results, with columns (2), (4), and (6) showing results with robust standard errors. It can be observed that in all columns, the coefficient of the S&P500 is significant at the 1% level, while the coefficients of the FFR and actual wage growth rate are not significant. This indicates that the actual personal consumption expenditure is affected by the S&P500, but not by the FFR or actual wage growth rate.

Table 2. ADF test p-values for the actual growth rates of each indicator

Index	S&P500	NASDQ	DJIA	PCEC	Wage	Working-Hours
P-value	0.0305**	0.0001***	0.1933	0.0335**	0.0576*	0.0274**

Note: *p < 0.1, **p < 0.05, ***p < 0.01.

Table 3. Relationship between the real returns of the S&P 500, the real Federal Funds Rate, the real wage growth rate, and the growth rate of U.S. real Personal Consumption Expenditures (OLS method, univariate)

Variable	(1)	(2)	(3)	(4)	(5)	(6)
S&P500	0.055*** (0.009)	0.055*** (0.009)				
FFR			0.115* (0.062)	0.115 (0.088)		
Wage Growth					0.106 (0.089)	0.106 (0.95)
Sample Size	207	207	207	207	207	207

Note: *, *, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 4. Relationship between the real returns of the S&P 500, the real Federal Funds Rate, the real wage growth rate, and the growth rate of U.S. real Personal Consumption Expenditures (OLS method, multivariate)

Variable	(1)	(2)	(3)	(4)	(5)	(6)
S&P500	0.054*** (0.009)	0.054*** (0.011)	0.054*** (0.010)	0.054*** (0.011)	0.054*** (0.016)	0.054*** (0.011)
FFR	0.064 (0.058)	0.064 (0.083)			0.045 (0.079)	0.045 (0.086)
Wage Growth			0.056 (0.078)	0.056 (0.090)	0.040 (0.031)	0.040 (0.035)
Sample Size	207	207	207	207	207	207

Note: *, *, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Tables 5 and 6 report the results of replacing the S&P 500 with NASDAQ. Comparing Table 3 with Table 5 and Table 4 with Table 6, it is observed that the sign and significance of each coefficient remain unchanged across different tables. This confirms that the growth rate of personal consumption expenditures is positively influenced by the real growth rate of the S&P 500, while the impacts of the real Federal Funds Rate and the real wage growth rate are relatively minor and not statistically significant.

Table 5. Relationship between the real returns of NASDAQ, the real Federal Funds Rate, the real wage growth rate, and the growth rate of U.S. real Personal Consumption Expenditures (OLS method, univariate)

Variable	(1)	(2)	(3)	(4)	(5)	(6)
NASDQ	0.029*** (0.007)	0.029*** (0.007)				
FFR			0.115* (0.062)	0.115 (0.088)		
Wage Growth					0.106 (0.089)	0.106 (0.95)
Sample Size	207	207	207	207	207	207

Note: *, *, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 6. Relationship between the real returns of NASDAQ, the real Federal Funds Rate, the real wage growth rate, and the growth rate of U.S. Real Personal Consumption Expenditures (OLS method, multivariate)

Variable	(1)	(2)	(3)	(4)	(5)	(6)
NASDQ	0.028*** (0.007)	0.028*** (0.007)	0.028*** (0.007)	0.028*** (0.007)	0.028*** (0.007)	0.028*** (0.007)
FFR	0.088 (0.060)	0.088 (0.086)			0.053 (0.066)	0.053 (0.070)
Wage Growth			0.069 (0.056)	0.069 (0.084)	0.045 (0.060)	0.045 (0.082)
Sample Size	207	207	207	207	207	207

Note: *, *, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Tables 7 through 10 present regression results using the GLS method instead of OLS. The signs and significance of the coefficients remain consistent with those in Tables 3 through 6. The coefficients for S&P 500 and NASDAQ remain significant at the 1% level, while the other two variables remain statistically insignificant.

Table 7. Relationship between the real returns of the S&P 500, the real Federal Funds Rate, the real wage growth rate, and the growth rate of U.S. Real Personal Consumption Expenditures (GLS method, univariate)

Variable	(1)	(2)	(3)	(4)	(5)	(6)
S&P500	0.055*** (0.009)	0.055*** (0.009)				
FFR			0.115* (0.062)	0.115 (0.088)		
Wage Growth					0.106 (0.089)	0.106 (0.95)
Sample Size	207	207	207	207	207	207

Note: *, *, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 8. Relationship between S&P 500 real returns, real Federal Funds Rate, real wage growth rate, and U.S. real Personal Consumption Expenditure growth rate (GLS method, univariate)

Variable	(1)	(2)	(3)	(4)	(5)	(6)
S&P500	0.054*** (0.009)	0.054*** (0.011)	0.054*** (0.010)	0.054*** (0.011)	0.054*** (0.016)	0.054*** (0.011)
FFR	0.064 (0.058)	0.064 (0.083)			0.045 (0.079)	0.045 (0.086)
Wage Growth			0.056 (0.078)	0.056 (0.090)	0.040 (0.031)	0.040 (0.035)
Sample Size	207	207	207	207	207	207

Note: *, *, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 9. Relationship between NASDAQ real returns, real Federal Funds Rate, real wage growth rate, and U.S. real Personal Consumption Expenditure growth rate (GLS method, univariate)

Variable	(1)	(2)	(3)	(4)	(5)	(6)
NASDQ	0.029*** (0.007)	0.029*** (0.007)				
FFR			0.115* (0.062)	0.115 (0.088)		
Wage Growth					0.106 (0.089)	0.106 (0.95)
Sample Size	207	207	207	207	207	207

Note: *, *, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 10. Relationship between NASDAQ real returns, real Federal Funds Rate, real wage growth rate, and U.S. real Personal Consumption Expenditure growth rate (GLS method, multivariate)

Variable	(1)	(2)	(3)	(4)	(5)	(6)
NASDQ	0.028*** (0.007)	0.028*** (0.007)	0.028*** (0.007)	0.028*** (0.007)	0.028*** (0.007)	0.028*** (0.007)
FFR	0.088 (0.060)	0.088 (0.086)			0.053 (0.066)	0.053 (0.070)
Wage Growth			0.069 (0.056)	0.069 (0.084)	0.045 (0.060)	0.045 (0.082)
Sample Size	207	207	207	207	207	207

Note: *, *, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Based on the results of Tables 2 and 3, the Effective Federal Funds Rate (EFFR) exhibits a positive correlation with consumption. This may be attributed to the fact that a larger proportion of individuals derive capital income from sources such as deposit interest, bonds, and fixed-income financial products, which are highly correlated with the benchmark interest rate.

4.2. Wage growth rate and capital return rate

Descriptive statistics in Table 1 indicate that the average weekly working hours in private nonfarm enterprises is 34.40 hours, with a variance of only 0.05. Calculating the statistical characteristics of the growth rate of average weekly working hours in U.S. private enterprises (Figure 2) reveals that from March 2007 to December 2024, the mean growth rate is 0, with a variance of 0.49. This suggests that fluctuations in weekly working hours in private nonfarm enterprises between March 2006 and December 2024 are relatively small, remaining largely stable around 34.40 hours. This observation approximately satisfies the assumption proposed in the theoretical model: $\frac{l_t'}{l_t} = 0$. Figure 1 presents a line chart illustrating the changes in weekly working hours in private nonfarm enterprises over time, with the horizontal axis representing time and the vertical axis representing weekly working hours. The figure shows that nearly all values fall within the range of 33.8 to 35.0, with the majority concentrated between 34.2 and 34.6. Under the assumption that working hours remain approximately constant, Equation (11) implies a positive correlation between capital return rate and wage growth rate. To assess whether wage growth increases alongside capital returns, the correlation coefficient between the two variables was computed. Additionally, due to significant fluctuations in weekly working hours during certain periods, data from September 2008 to August 2010 and from May 2020 to November 2022 were excluded. The correlation coefficient was then recalculated using the adjusted sample.

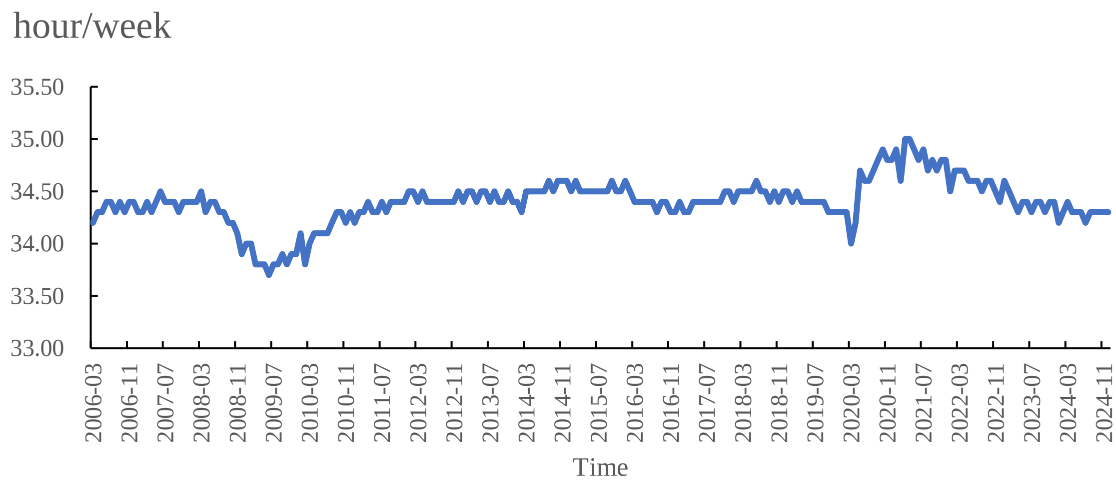

Figure 1. Changes in weekly working hours in private nonfarm enterprises

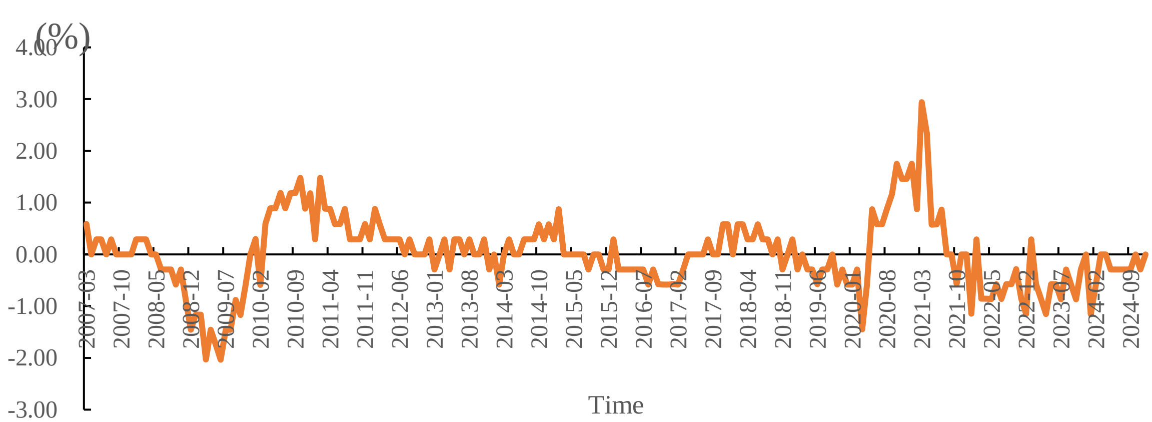

Figure 2. Growth rate of average weekly working hours in U.S. private enterprises

Table 11 reports the correlation coefficients between wage growth rate and the real returns of the S&P 500 and Nasdaq under both the full sample and the adjusted sample. The results in Table 11 indicate that the correlation coefficients between real wage growth and the real S&P 500 returns, as well as between real wage growth and the real Nasdaq returns, are positive in both the full and adjusted samples. Specifically, in the full sample, the correlation coefficient between real wage growth and real S&P 500 returns is 35.42%, while that between real wage growth and real Nasdaq returns is 34.71%. In the adjusted sample, these values are 33.45% and 33.73%, respectively. These findings align with the theoretical expectation discussed earlier: when working hours remain approximately constant, there exists a positive correlation between real wage growth and capital return rates.

Table 11. Correlation coefficients between real wage growth and S&P 500, NASDAQ in full and adjusted samples

	Full Sample	Adjusted Sample
S&P500	60.16%	66.51%
NASDQ	56.92%	60.36%

5. Conclusion

This study constructs a theoretical model to analyze the intrinsic relationships between monetary policy, consumption growth rate, wage growth rate, and capital return rate, followed by empirical verification using U.S. data. The theoretical model and empirical results indicate that personal consumption growth rate is influenced by the capital multiplier and is positively correlated with market portfolio returns, whereas the federal funds rate and wage growth rate have an insignificant effect on personal consumption growth. Furthermore, when working hours remain approximately constant, wage growth rate and capital return rate exhibit a positive correlation. These findings diverge from traditional Keynesian and New Keynesian perspectives, suggesting that expansionary monetary policy, which leads to a decline in real interest rates, does not have a direct relationship with increased consumption. Instead, personal consumption growth is primarily driven by capital income rather than labor income. This provides a new perspective on understanding the interrelationships among economic variables and offers valuable insights for policymakers in designing measures to stimulate consumption.

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Appendix

Definition of Standardized Leisure l_t:

$$l_t = (Actual\ leisure\ time\ in\ period\ t)/(Total\ time\ in\ period\ t) \tag{15}$$

Proof for the Main Text Sections [3], [4]:
Establish the Hamiltonian function:

$$\Psi = \alpha \frac{c_t^{1-\theta}-1}{1-\theta} + \beta \frac{l_t^{1-\theta}-1}{1-\theta} + m_t[A_{jt}k_t + w_t(1-l_t) - c_t] \tag{16}$$

Optimality Conditions:

$$\frac{\partial \Psi}{\partial c_t} = 0: \alpha c_t^{-\theta} - m_t = 0 \tag{17}$$

$$\frac{\partial \Psi}{\partial l_t} = 0: \beta l_t^{-\theta} - m_t w_t = 0 \tag{18}$$

Multiplier Equation:

$$\frac{\partial \Psi}{\partial k_t} = \rho m_t - m_t': A_{jt} m_t = \rho m_t - m_t' \tag{19}$$

State Equation:

$$\frac{\partial \Psi}{\partial m_t} = k_t': k_t' = A_{jt}k_t + w_t(1-l_t) - c_t \tag{20}$$

Transversality Condition:

$$\lim_{t\to\infty} k_t = k^* \tag{21}$$

From the multiplier equation $\frac{m_t'}{m_t} = \rho - A_{jt}$, combined with the optimality conditions, the following expression is obtained:

$$\frac{c_t'}{c_t} = \frac{A_{jt}-\rho}{\theta} \tag{22}$$

$$\frac{l_t'}{l_t} = -\frac{\frac{w_t'}{w_t}+\rho-A_{jt}}{\theta} \tag{23}$$