A Comparative Time Series Analysis of Income-Consumption Relationships in the US and Japan

Abstract

This study examines the nature of the relationship between consumption and income in the United States and Japan over the period 1975–2021, motivated by the differences in saving behavior between these two economies. Japan is characterized by traditionally high household saving rates and conservative consumption patterns, while the United States exhibits lower saving rates and higher consumption propensities (Horioka, 2010). Using annual data from the World Bank on adjusted net national income per capita and household final consumption expenditure, a comprehensive econometric framework including unit root tests, cointegration analysis, and Vector Autoregression (VAR) modeling is employed to examine interdependence of income and consumption series. Results show that while US income and consumption are both integrated of order one, Engle-Granger tests fail to detect a stable long-run equilibrium relationship. In Japan, income is I(1) while consumption is trend-stationary, preventing cointegration analysis due to mismatched integration orders. VAR modeling reveals no significant Granger causality between income and consumption in either country, indicating that short-term income fluctuations do not reliably predict consumption changes. Variance decomposition further supports this finding, showing that consumption variance is primarily driven by its own shocks rather than income fluctuations. While income has a minimal impact on consumption variance, consumption shocks explain 70% of income variance in the US and 60% in Japan, suggesting the relationship operates more strongly through consumption's influence on income rather than the other way around. Additionally, a Chow test identifies a structural break in Japan's income-consumption relationship in 1991, coinciding with the "Lost Decades". Further analysis could refine the VAR framework by either estimating separate models for before and after 1991 or integrating the breakpoint through dummies, thereby examining how economic stagnation altered income-consumption dynamics.

1. Literature Review

The study of the relationship between income and consumption builds on foundational consumption theories, the first influential one being the Absolute Income Theory by John Maynard Keynes (1936). There is extensive literature on this topic including theories by Simon Kuznets, Irving Fisher and Milton Friedman (1957). Campbell (1987) tested Friedman's Permanent Income Hypothesis (PIH) and concluded that consumption and disposable income are cointegrated in the United States based on quarterly aggregate data. King et al. (1991) presented a version of the PIH with a constant intertemporal elasticity of substitution which implies that the difference of log consumption and log income is stationary, and their findings indicated that cointegration could not be rejected for the US data. More recent studies analyze the cointegrating relationship between consumption, income and wealth. A study by Lettau and Ludvigson (2003) shows that these three variables must be cointegrated if households observe an intertemporal budget constraint in their consumption behavior. Another study by Jiri Slacelek (2004) also examines the evidence for cointegration between consumption, labor income and wealth. Little evidence of a stable cointegrating relationship was detected in most countries examined.

2. Data

The data used in this study consists of annual time series on income *(Adjusted net national income per capita (constant 2015 US$))* and consumption *(Households and NPISHs Final consumption expenditure (constant 2015 US$))* for Japan and the US. The source of the data is World Bank (World Development Indicators Database), and it spans the period from 1975 to 2021.

3. Visual Inspection and Descriptive Analysis

Before starting econometric analyses, visual inspection and descriptive statistics of the time series data on income and consumption are provided below with the intention of giving an initial idea about the data.

In the US data (Figure 1), income and consumption show a strong upward trend over time and move closely together. This parallel trajectory could imply a long-run equilibrium relationship, yet confirmation requires further empirical testing. In Japan, there is a flatter increasing trend, potentially reflecting Japan's "Lost Decade" since the 1990s (Figure 2). A structural break will be examined using the Chow test to determine whether significant shifts have occurred in this period. Overall, consumption appears to be less responsive to income changes in Japan compared to the US.

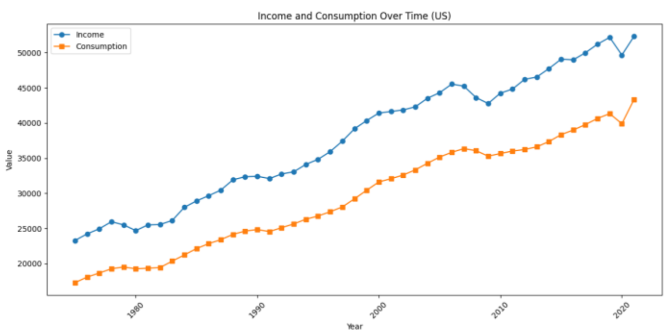


Figure 1

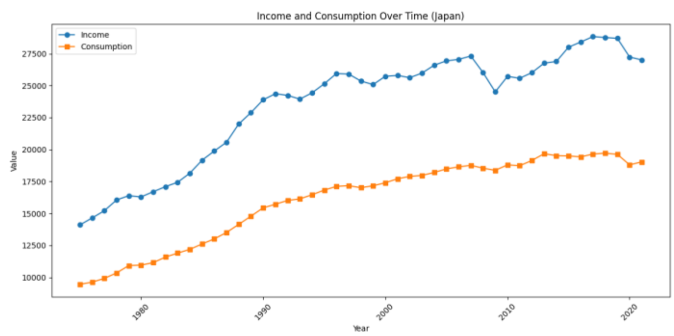


Figure 2

The US scatterplot in Figure 3 demonstrates a strong relationship between income and consumption (R^2 = 0.993), with data points tightly clustered around the trend line, indicating that consumption rises nearly proportionally with income. On the other hand, Japan's plot shows a weaker correlation (R^2 = 0.968) with more scattered data points.

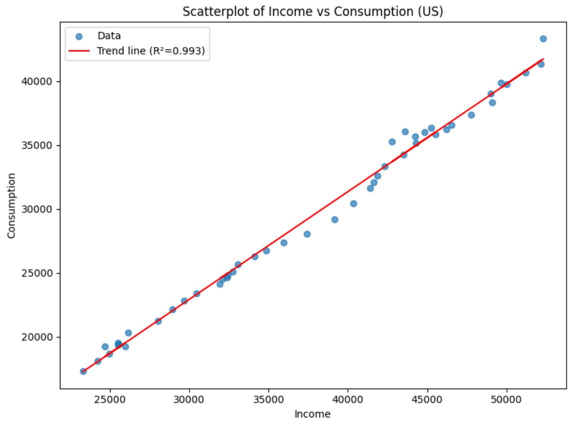


Figure 3

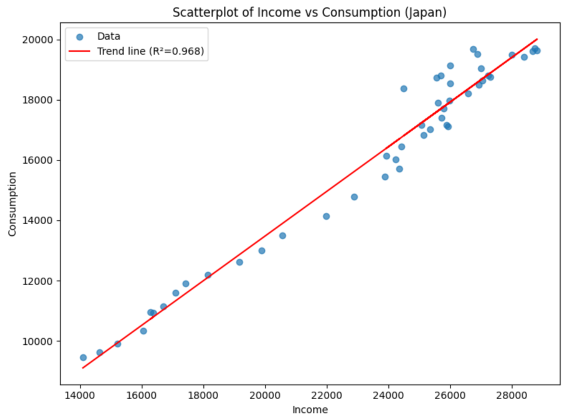


Figure 4

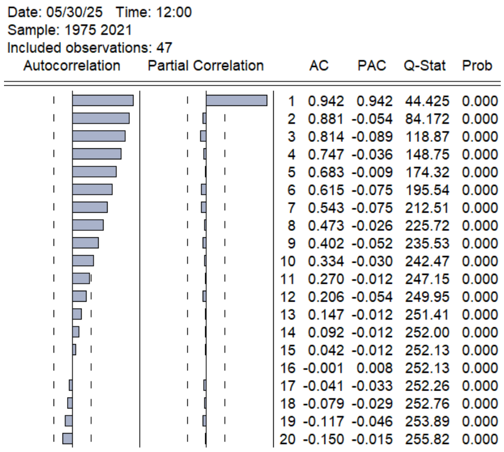
Descriptive Statistics (US, Not Normalized)								
	count	**mean**	**std**	**min**	**25%**	**50%**	**75%**	**max**
Income	47.00	37,754.44	9,034.53	23,284.39	30,053.07	39,174.16	45,036.34	52,320.66
Consumption	47.00	29,457.87	7,642.62	17,285.15	23,114.80	29,211.03	36,031.34	43,330.52

Descriptive Statistics (Japan, Not Normalized)								
	count	**mean**	**std**	**min**	**25%**	**50%**	**75%**	**max**
Income	47.00	23,496.76	4,373.90	14,102.69	20,227.65	25,355.32	26,676.79	28,832.86
Consumption	47.00	16,059.59	3,290.15	9,456.63	13,259.75	17,163.92	18,748.08	19,715.40

4. Autocorrelations and Partial Autocorrelations

The autocorrelation (ACF) and partial autocorrelation (PACF) plots are essential for diagnosing stationarity and identifying the appropriate ARIMA model structure. The ACF reveals whether a series is non-stationary or stationary, while the PACF helps distinguish between direct and lagged effects.

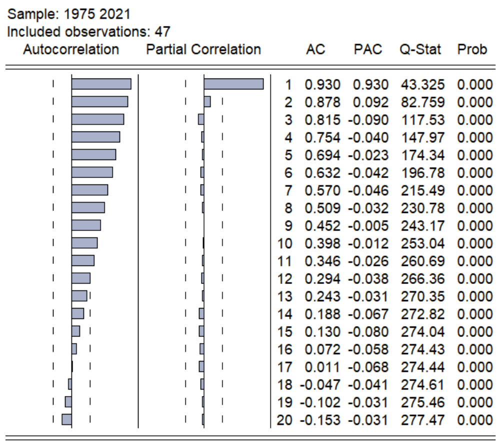
Correlograms (levels) of consumption are provided below. In all correlograms in levels, autocorrelations die down regularly after lag 1 but large autocorrelations persist. The partial autocorrelations are small after the first lag. This suggests that we should either remove the trend or difference the series.



Date: 05/30/25 Time: 12:00
Sample: 1975 2021
Included observations: 47

	AC	PAC	Q-Stat	Prob
1	0.942	0.942	44.425	0.000
2	0.881	-0.054	84.172	0.000
3	0.814	-0.089	118.87	0.000
4	0.747	-0.036	148.75	0.000
5	0.683	-0.009	174.32	0.000
6	0.615	-0.075	195.54	0.000
7	0.543	-0.075	212.51	0.000
8	0.473	-0.026	225.72	0.000
9	0.402	-0.052	235.53	0.000
10	0.334	-0.030	242.47	0.000
11	0.270	-0.012	247.15	0.000
12	0.206	-0.054	249.95	0.000
13	0.147	-0.012	251.41	0.000
14	0.092	-0.012	252.00	0.000
15	0.042	-0.012	252.13	0.000
16	-0.001	0.008	252.13	0.000
17	-0.041	-0.033	252.26	0.000
18	-0.079	-0.029	252.76	0.000
19	-0.117	-0.046	253.89	0.000
20	-0.150	-0.015	255.82	0.000

Figure 5: US consumption correlogram



Sample: 1975 2021
Included observations: 47

	AC	PAC	Q-Stat	Prob
1	0.930	0.930	43.325	0.000
2	0.878	0.092	82.759	0.000
3	0.815	-0.090	117.53	0.000
4	0.754	-0.040	147.97	0.000
5	0.694	-0.023	174.34	0.000
6	0.632	-0.042	196.78	0.000
7	0.570	-0.046	215.49	0.000
8	0.509	-0.032	230.78	0.000
9	0.452	-0.005	243.17	0.000
10	0.398	-0.012	253.04	0.000
11	0.346	-0.026	260.69	0.000
12	0.294	-0.038	266.36	0.000
13	0.243	-0.031	270.35	0.000
14	0.188	-0.067	272.82	0.000
15	0.130	-0.080	274.04	0.000
16	0.072	-0.058	274.43	0.000
17	0.011	-0.068	274.44	0.000
18	-0.047	-0.041	274.61	0.000
19	-0.102	-0.031	275.46	0.000
20	-0.153	-0.031	277.47	0.000

Figure 6: Japan consumption correlogram

In the differenced consumption series, autocorrelations and partial autocorrelations are near zero for most lags in the US, with no significant spikes (all |AC| < 0.15 for lags 1–20). Q-statistics are insignificant ($p > 0.05$), suggesting no residual serial correlation. These observations signal that US consumption series is integrated of order 1. The results are very similar for the US income series.

In Japan consumption series, ACF and PACF plots show significant spikes at lags 1, 5, and 11, indicating short-term persistence. Q-statistics are significant up to lag 20, implying residual autocorrelation. In conclusion, the differenced series seems stationary but exhibits short-run dynamics requiring AR/MA terms. Plots of income are again very similar to Japan consumption plots. Tests of stationarity will be conducted next.

Sample (adjusted): 1976 2021
Included observations: 46 after adjustments

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.096	-0.096	0.4480	0.503
		2	0.056	0.048	0.6077	0.738
		3	0.002	0.012	0.6080	0.895
		4	-0.020	-0.022	0.6292	0.960
		5	-0.095	-0.101	1.1142	0.953
		6	-0.044	-0.061	1.2195	0.976
		7	-0.025	-0.025	1.2555	0.990
		8	-0.091	-0.092	1.7403	0.988
		9	-0.137	-0.163	2.8684	0.969
		10	-0.066	-0.108	3.1337	0.978
		11	0.112	0.100	3.9282	0.972
		12	-0.115	-0.105	4.7931	0.965
		13	-0.142	-0.231	6.1449	0.941
		14	-0.020	-0.121	6.1731	0.962
		15	0.002	-0.037	6.1735	0.977
		16	0.037	0.014	6.2717	0.985
		17	0.073	-0.002	6.6765	0.987
		18	0.076	-0.026	7.1319	0.989
		19	0.019	-0.031	7.1627	0.993
		20	-0.068	-0.105	7.5600	0.994

Figure 7: US consumption correlogram (1st difference)

Date: 05/30/25 Time: 12:10
Sample (adjusted): 1976 2021
Included observations: 46 after adjustments

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.366	0.366	6.5877	0.010
		2	0.173	0.045	8.0935	0.017
		3	0.149	0.084	9.2374	0.026
		4	0.164	0.093	10.660	0.031
		5	0.259	0.186	14.269	0.014
		6	0.242	0.094	17.490	0.008
		7	0.006	-0.173	17.492	0.014
		8	0.015	0.002	17.505	0.025
		9	0.104	0.075	18.148	0.033
		10	0.038	-0.079	18.238	0.051
		11	0.278	0.290	23.113	0.017
		12	0.172	0.012	25.031	0.015
		13	0.020	-0.065	25.059	0.023
		14	-0.074	-0.175	25.437	0.030
		15	-0.092	-0.121	26.037	0.038
		16	0.020	0.050	26.067	0.053
		17	0.085	-0.008	26.622	0.064
		18	-0.007	0.048	26.626	0.086
		19	-0.202	-0.146	29.958	0.052
		20	-0.150	-0.062	31.870	0.045

Figure 8: Japan consumption correlogram (1st difference)

5. Unit Root Tests

We observe from the line graphs presented in the beginning that both income and consumption have an increasing trend in both countries and there is no obvious convergence to a long-run mean, which implies non-stationarity. Formal tests, such as the Augmented Dickey-Fuller (ADF) and Phillips Perron Test, are conducted to examine this stationarity property along with other time series properties of the data.

In the US data, ADF test fails to reject the null hypothesis of a unit root for consumption (t = 0.391, p = 0.981) and income (t = -0.314, p = 0.915) in levels. However, the first differences are stationary (consumption: t = -5.832, p < 0.001; income: t = -6.214, p < 0.001), satisfying the I(1) condition for cointegration analysis.

Null Hypothesis: CONSUMPTION has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on AIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.391159	0.9805
Test critical values:	1% level	-3.581152	
	5% level	-2.926622	
	10% level	-2.601424	

Null Hypothesis: D(CONSUMPTION) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on AIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.831655	0.0000
Test critical values:	1% level	-3.584743	
	5% level	-2.928142	
	10% level	-2.602225	

Figure 9: US consumption ADF Test

Null Hypothesis: INCOME has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on AIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.313664	0.9147
Test critical values:	1% level	-3.581152	
	5% level	-2.926622	
	10% level	-2.601424	

Null Hypothesis: D(INCOME) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on AIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.213712	0.0000
Test critical values:	1% level	-3.584743	
	5% level	-2.928142	
	10% level	-2.602225	

Figure 10: US income ADF Test

In Japan data, consumption is trend stationary (I(0)) in levels (ADF: t = -3.647, p = 0.008) which means it is non-stationary in raw form but stationary after detrending, while income is trended I(1) (ADF on levels: t = -0.895, p = 0.948; on differences: t = -5.112, p = 0.001). Since consumption and income are integrated of different orders, it will not be possible to conduct a cointegration analysis for Japan.

Null Hypothesis: JCONSUMPTION has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.647167	0.0084
Test critical values:	1% level	-3.581152	
	5% level	-2.926622	
	10% level	-2.601424	

Figure 11: Japan consumption ADF test (on constant)

The time series plots of differenced income and consumption for the United States and Japan are shown below.

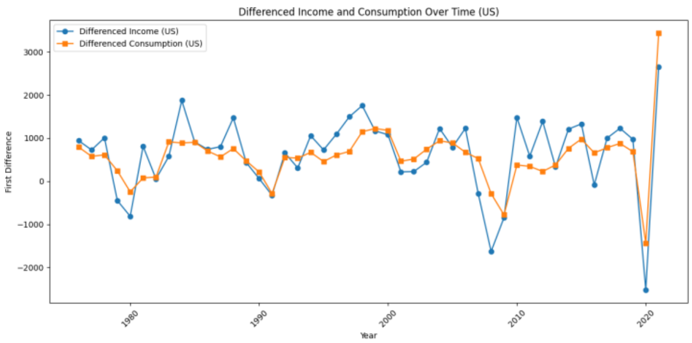


Figure 12: US Differenced Series

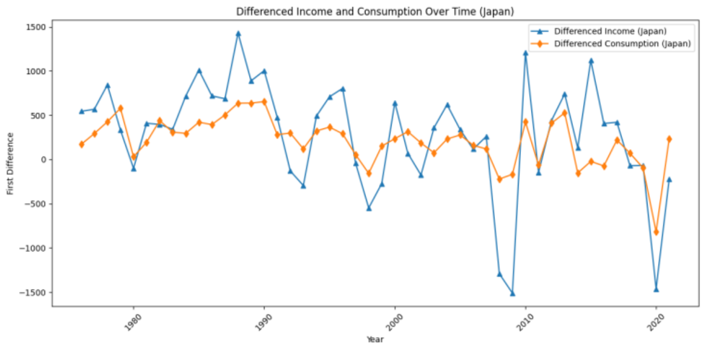


Figure 13: Japan Differenced Series

6. Cointegration Tests

The concept of cointegration was introduced by Granger in 1981 and it provides a framework for analyzing long run relationships between nonstationary variables. Specifically, cointegration implies that two or more nonstationary variables that are integrated of same order move jointly in the long run and there exists a short run error correction mechanism between the variables. Although the variables are nonstationary individually, the linear combination of them constitutes a stationary cointegrated series. Engle-Granger and Johansen Tests are commonly used formal tests of cointegration.

The idea of cointegration is closely linked to economic theories of consumption and income, specifically Permanent Income Hypothesis by Friedman (1957) and Absolute Income Hypothesis by Keynes (1936). AIH posits that current income is the main determinant of current consumption. The theory states that consumption is a positive but diminishing function of income.[1] A common linear form of the consumption function in AIH is as follows[2]:

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[1] Perm.income

[2] 441

$$C = a + bY$$

Where:
C is current real consumption (total or households)
Y is individual current real disposable income and total real national income
a is autonomous consumption, which is accepted as bigger than zero (a > 0)
b is the marginal propensity to consume (MPC), which is accepted as bigger than zero but smaller than one (0 < b < 1) in the Keynesian model.

The Permanent Income Hypothesis, on the other hand, emerged to address limitations of theories like the AIH, suggesting consumption behavior is adjusted according to "permanent income" or long-term consumption opportunities, rather than solely current income level.[3]

A very simple mathematical representation of the PIH is as follows:

$$cp = k(i, w, U)yp, \qquad y = yp + yt, c = cp + ct$$

Permanent consumption is proportional to permanent income. Measured income and consumption include transitory components.

6.1 Engle-Granger Methodology

As mentioned above, the Engle-Granger (1987) methodology tests for cointegration under the critical assumption that both series are integrated of the same order. However, in Japan's case, while income is I(1), consumption is trend stationary (I(0)). This integration order mismatch violates the foundational requirement of cointegration analysis. Proceeding despite the mismatch would yield unreliable results, as trend-stationary series exhibit fundamentally different dynamics. Their long-run behavior is driven by deterministic trends rather than stochastic trends. Hence, only US data will be examined for possible cointegration.

The Engle Granger test is a residual-based test.[4] It operates on the principle that if a linear combination of I(1) variables is stationary (I(0)), then those variables are cointegrated. If consumption and income are I(1), their difference should be stationary if they are cointegrated. The steps that will be followed are:

1. Estimate the long-run equilibrium relationship using OLS:

   $$c_t = \beta_0 + \beta_1 y_t + \varepsilon_t$$

   Obtain residuals $\hat{\varepsilon}_t$.

2. Test for stationarity of residuals (ADF test):

   $$\Delta\hat{\varepsilon}_t = \gamma\hat{\varepsilon}_{t-1} + \sum_{j=1}^{p} \phi_j \Delta\hat{\varepsilon}_{t-j} + u_t$$

   If $\gamma < 0$ is statistically significant, then $\hat{\varepsilon}_t \sim I(0)$, implying cointegration.

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[3] 441

[4] sla

6.2 Engle-Granger Methodology

The first step is to regress consumption on income and a constant and save the residuals of this regression for the US.

Dependent Variable: CONSUMPTION
Method: Least Squares
Date: 06/01/25 Time: 14:46
Sample: 1975 2021
Included observations: 47

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2368.713	407.5808	-5.811641	0.0000
INCOME	0.842989	0.010505	80.24479	0.0000

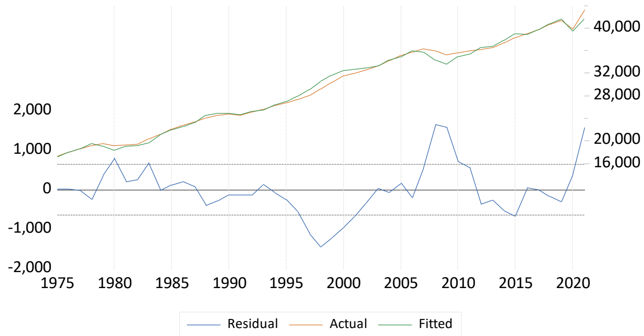

Figure 14: Actual Residual Plot of the First Regression

Then the residuals (resid01) saved from this regression is tested for unit root. No strong evidence of cointegration found when accounted for trends/constants. Phillips Perron Test produced very similar results.

Null Hypothesis: RESID01 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.430543	0.3597
Test critical values:	1% level	-4.175640	
	5% level	-3.513075	
	10% level	-3.186854	

*MacKinnon (1996) one-sided p-values.

Figure 15: ADF Test with Constant and Trend

Null Hypothesis: RESID01 has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.475174	0.1281
Test critical values:	1% level	-3.584743	
	5% level	-2.928142	
	10% level	-2.602225	

*MacKinnon (1996) one-sided p-values.

Figure 16: ADF Test with Constant only

Additionally, the built-in EG Cointegration Test is conducted. The null hypothesis of the test is that the series are not cointegrated. The output results provide the Engle-Granger tau-statistic (tt-statistic). Both p-values associated with tau-statistic (0.2501, 0.2818) exceed 5% significance, failing to reject the null. Hence, the residuals are non-stationary (I(1)), implying no cointegration. Overall, there's *weak* evidence of cointegration only when the ADF test on the residuals is conducted *without* a trend and intercept (the option "None" in E-Views). The results table is shown below.

Engle-Granger Cointegration Test

Date: 05/28/25 Time: 02:14
Series: INCOME CONSUMPTION
Sample: 1975 2021
Included observations: 47
Null hypothesis: Series are not cointegrated
Cointegrating equation deterministics: C
Automatic lags specification based on Akaike criterion (maxlag=9)

Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
INCOME	-2.612893	0.2501	-19.50132	0.0343
CONSUMPTION	-2.532246	0.2818	-19.10955	0.0382

*MacKinnon (1996) p-values.

Intermediate Results:

	INCOME	CONSUMPTION
Rho - 1	-0.295155	-0.289487
Rho S.E.	0.112961	0.114320
Residual variance	255696.1	183730.4
Long-run residual variance	551220.8	395365.4
Number of lags	1	1
Number of observations	45	45
Number of stochastic trends**	2	2

**Number of stochastic trends in asymptotic distribution

7. Vector Autoregression Modelling

While our analysis found no evidence of cointegration between income and consumption in either country, we can still employ Vector Autoregression (VAR) modeling with stationary variables to examine short-term dynamics. The optimal lag structure is determined using information criteria (AIC and BIC). For both the US and Japanese datasets, two lags are selected as optimal.

7.1 Granger Causality

Granger causality tests examine whether past values of one variable help predict another variable beyond what is captured by its own lags. The analysis evaluates two directional hypotheses: whether income "Granger Causes" consumption, and whether consumption "Granger Causes" income.

The analysis reveals no statistically significant predictive relationships between income and consumption in either direction in either country. In other words, short-term innovations in income or consumption do not Granger-cause changes in the other.

VAR Granger Causality/Block Exogeneity Wald Tests
Date: 06/01/25 Time: 16:47
Sample: 1975 2021
Included observations: 44

Dependent variable: DINCOME

Excluded	Chi-sq	df	Prob.
DCONSUMPTION	1.113308	2	0.5731
All	1.113308	2	0.5731

Dependent variable: DCONSUMPTION

Excluded	Chi-sq	df	Prob.
DINCOME	1.946106	2	0.3779
All	1.946106	2	0.3779

Figure 17: US Granger Causality Test

VAR Granger Causality/Block Exogeneity Wald Tests
Date: 06/02/25 Time: 02:30
Sample: 1975 2021
Included observations: 44

Dependent variable: DETRENDED_CONSUMPTION

Excluded	Chi-sq	df	Prob.
DJINCOME	0.679448	2	0.7120
All	0.679448	2	0.7120

Dependent variable: DJINCOME

Excluded	Chi-sq	df	Prob.
DETRENDED_CONS...	1.559245	2	0.4586
All	1.559245	2	0.4586

Figure 18: Japan Granger Causality Test

7.2 Variance Decompositions

Variance decomposition analysis is conducted to assess the relative importance of different shocks in explaining fluctuations in our variables. By decomposing the forecast error variance into each variable's own shocks versus cross-variable shocks, we investigate their dynamic interdependence. This analysis is included in this paper because it reveals whether income or consumption shocks dominate each other, it complements Granger causality tests, and it helps evaluate the Permanent Income Hypothesis.

The results show consumption variance is primarily explained by its own shocks, suggesting consumption follows strong internal dynamics rather than immediate income responsiveness. However, income shocks contribute very little or none to consumption variance even at longer horizons, contradicting the Permanent Income Hypothesis which predicts greater income shock transmission. While income explains little of consumption variance, consumption shocks account for 70% (US) and 60% (Japan) of income variance, indicating the relationship operates more through consumption's impact on income.

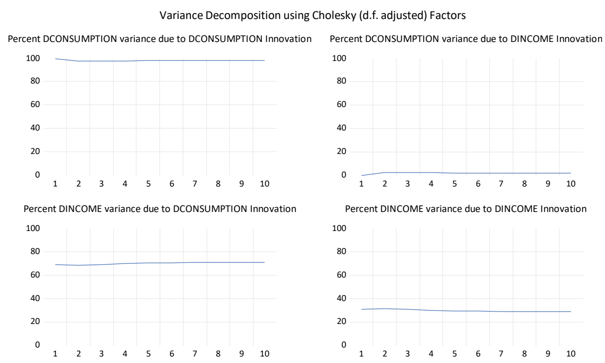

Figure 19: US Variance Decompositions

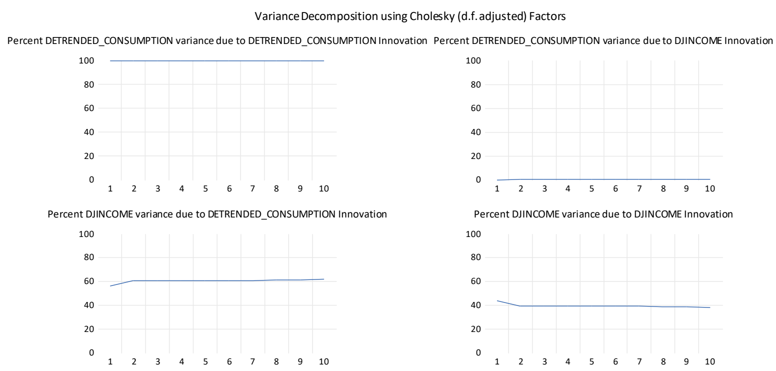

Figure 20: Japan Variance Decompositions

It's important to note that these variance decompositions are based on *differenced series*, which removes the long-run trends. The previous findings of no cointegration for both countries (especially with deterministic components) suggest that a stable long-run relationship in levels may not hold as expected by the PIH. The variance decomposition confirms that even in the short-run changes, the variables are largely independent or have limited cross-predictive power.

8. Structural Break Anlaysis

The Chow test (1991 as the breakpoint) is conducted to assess whether Japan's economic stagnation period ("Lost Decades") significantly altered the income-consumption relationship. All three test statistics (F-stat=4.19, p=0.022; LR=8.36, p=0.015; Wald=8.37, p=0.015) reject the null hypothesis at 5% significance, confirming a structural break in 1991.

Chow Breakpoint Test: 1991
Null Hypothesis: No breaks at specified breakpoints
Varying regressors: All equation variables
Equation Sample: 1975 2021

F-statistic	4.187414	Prob. F(2,43)	0.0218
Log likelihood ratio	8.363566	Prob. Chi-Square(2)	0.0153
Wald Statistic	8.374829	Prob. Chi-Square(2)	0.0152

Given the structural break in 1991, we could refine the analysis by estimating separate VARs for pre-1991 and post-1991 periods to compare how income-consumption dynamics shifted after Japan's economic stagnation began but this would reduce the sample size which needs to be accounted. Additionally, dummy variables could be added to integrate the breakpoint directly into the model (e.g., interaction terms between a post-1991 dummy and key variables). With this method, the full sample could be preserved while testing for structural differences in coefficients.

Conclusion

This study analyzed the relationship between income and consumption in the US and Japan from 1975 to 2021. A central finding is the absence of cointegration between income and consumption in the US. This contradicts the PIH's prediction of a stable long-run relationship and differs from earlier studies (e.g., Campbell, 1987; Jin, 1995), which found cointegration using different datasets and methodologies. The lack of cointegration in our annual US data suggests the observed relationship may be spurious. In Japan, standard cointegration tests were not applicable due to mismatched integration orders, indicating a fundamental difference in the time series properties of consumption and income between the two countries studied.

Comparative analysis reveals key structural differences between the two economies that may help explain these results. The US has a more consumption-driven growth model, greater access to credit, and more flexible labor and financial markets, which may allow households to smooth consumption more effectively. In contrast, Japan's higher household savings rate, aging population, and prolonged periods of economic stagnation may have disrupted the expected income-consumption link, as evidenced by the structural break detected around 1991. These factors likely explain why the two countries show different patterns over time and react differently to economic changes.

Overall, the findings suggest that the income-consumption relationship is more nuanced than standard models. Future research should explore alternative determinants of consumption such as wealth, credit constraints, and financial conditions, and consider structural changes and heterogeneity across countries or time periods. Using models that account for breaks or use panel data may provide deeper insights into evolving income-consumption dynamics and inform macroeconomic policy.

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