The Determinants Of Personal Saving In The U.S.

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ABSTRACT

In this study, a number of internal and external variables that could affect personal saving are examined using regression to show how they are related to personal saving. The empirical study is performed using the time series data of the U.S. between the years 1950 and 2007. The findings reveal that personal saving is highly dependent on personal income, tax, credit outstanding and status of employment, while dependency ratio, current real estate loan, real interest rate and status of economic performance are indeterminate.

Keywords: Personal Saving; Life Cycle Model; Permanent Income Hypothesis

INTRODUCTION

The aim of saving is to stabilize consumption over time; in other words, individuals save money in good times to consume in bad. For both countries and individuals, saving is the key factor in increased future consumption. For countries, investments on capital stocks from individuals' savings increase the nation's productivity. Increased productivity raises wages and consumption. Also, increased capital stock results in increased employment. For individuals, saving provides funds for needs, such as health care, children's education or vacations.

Since the 1980s, the U.S. personal saving rate has been decreasing. It was about 9 percent in the 80s, 5 percent in the 90s, and nearly zero in 2000s, which was the lowest rate since the Great Depression (Guidolin and La Jeunesse, 2007). Some economists believe that this decrease may open the way for foreigners to invest in the U.S. and increase the current account deficit. Without personal savings, the U.S. economy is highly depending on foreign investments and, in the long run, this may cause a saving crisis. Unfortunately, the high dependency on foreign savings is not the only potential problem. Garner (2006) suggests that those 65 and older population will increase in the U.S. more than it has in past centuries, which will increase social security and Medicare expenditures and cause enormous pressures on federally paid programs.

The purpose of this paper is to examine the determinants of personal saving for individuals in the U.S. by using various types of income and saving measures. The organization of the paper is as follows: Section 2 gives an explanation of the determinants and the theoretical basis of personal saving. In Section 3, the model and data are introduced. Section 4 presents empirical results and discussion. Section 5 concludes the paper.

DETERMINANTS AND THEORETICAL BASIS OF SAVING BEHAVIOR

This section begins with the theoretical basis of private saving behavior and explains potential determinants that could affect personal saving. Extensive literature provides theoretical and empirical evidence on private saving and outlines relevant determinants. It is well known that individuals seek to stabilize consumption over time. There are two major hypotheses to explain individual saving for smooth consumption: the life cycle hypothesis and the permanent income hypothesis.

Life Cycle Hypothesis and Permanent Income Hypothesis

From childhood to retirement, people earn, save and consume. The life cycle hypothesis (LCH) explains the expectations of individuals for future consumption. The most important determinant of the LCH is the decision to

save, and this decision involves choices between current and future consumption. Consumption and saving behaviors can be explained by LCH. This relationship between consumption, income and income expectations is examined by Fisher (1930), Harrod (1948), and Modigliani and Brumberg (1954).

The second theory, permanent income hypothesis (PIH), was developed by Milton Friedman in 1957. This theory suggests that consumption choices are based on individual's permanent income rather than their current income (DeJuan *et al*., 2004). The PIH has many testable implications about the conjectural relationship between income and consumption. One of these implications, developed by Flavin (1981), is that, if income changes, consumption should change by the same amount that permanent income changes. Flavin (1981), and Kotlikoff and Pakes (1984) find that aggregate U.S. consumption reacts to income changes more than suggested in PIH. Dawson *et al*. (2001) support the previously discussed theories in their cross country study. They find that results from industrial countries support the PIH, but results from developing countries do not.

Internal Determinants of Saving

A variety of internal motives may play a decisive role in personal saving. Among them, we consider lagged private saving, income, tax, young/old dependency ratio, credit outstanding, status of employment and real estate loans. Metin-Ozcan *et al*. (2003) argue that saving rates contain inertia, even if they are serially correlated after controlling for other factors. Thus, the lagged private saving rate should be included as a determinant of savings. Many studies concerning the decline in the private saving rate have pointed to the fact that people consume more than their income, especially their net disposable income. Lack of self control results in people consuming more than their income, thus forcing increased borrowing.

Further, the increase in home prices can be one reason for people to borrow more. Economists view consumption and saving as highly related with future expectations. As we mentioned above, many economists relate this behavior to LCH and PIH. Using these hypotheses, economists calculate that one dollar increase in household income increases consumption about 3-5 cents.[1] We, therefore, may assume that high increases in home prices may have an effect on consumption and saving rates. Furthermore, Dylan and Maki (2001), and Maki and Polumbo (2001) argue that the consuming boom is related to the "wealth effect." The authors suggest that an increase in the real value of assets drives up consumption. Moreover, the rise in housing prices has a large effect on the decline of the private saving rate, because real estate is a part of tangible assets, and tangible assets account for one third of total household asset holdings. Recent studies also argue that the change in house prices has a larger effect on consumers than do other changes in income.[2] Poterba (2000), Bayoumi and Edison (2003), and Dvornak and Kohler (2007) find a positive relationship between house price changes and other consumption types. The large gains from the housing market may create new arguments in the future.

The relationship between saving rate and age is imperative critical factor. As seen in LCH and PIH, people have expected income or profit returns. Using micro data, Wachtel (1984), Kennickell (1990) and Bosworth *et al*. (1991) find that the U.S saving rate has a small relationship with the population age. On the other hand, Heller (1989), and Masson and Tyron (1990) estimate that saving depends strongly on population age. By doing a regression between the saving rate ratios of people aged 65 and over compared to working age people, Houthakker (1965) and Modigliani (1970) show that the larger the percentage of population of 65 and older, the greater the negative effect on the saving ratio. Feldstein (1977), Barro and MacDonald (1979), Feldstein (1980), Koskela and Viren (1983), and Slemrod (1988) show that saving rate is indirectly related to the population age and should be examined to find whether there is a relationship.

External Determinants of Saving

In addition to internal factors for the personal saving, economic performance/provision of the country may be a major potential determinant of saving. Numerous studies discuss the relationship between saving and growth,

[1] Please see Gramlich (2002), and Dvornak and Kohler (2007) for more details.
[2] Please see Case *et al*. (2001), Ludwig and Slok (2002), Aoki *et al*. (2002), and Dvornak and Kohler (2007) for more details.

and suggest that countries with higher income levels tend to have higher saving rates.[3] Another variable under consideration is real interest rate. The effect of this variable is ambiguous in the literature, since research shows that the interest rate leads to opposing substitution and income effects. Yet, empirical studies show that the interest elasticity of private saving is weak, implying that the negative income effect of higher interest rates is likely to deactivate its positive substitution effect.[4]

The next domestic external factor for consideration is a country's social security system. Evans (1983) and Feldstein (1980, 1995) argue that saving will tend to decline as benefits available from the social security system increase. Finally, foreign capital inflows discourage domestic saving but, on the other hand, it increases personal income. The increased personal income raises the growth rate. According to Chenery and Eckstein (1970), foreign capital inflows and domestic saving are substitutes, but foreign capital inflows raise the personal income so that the relationship between saving and foreign capital is positively related.

Empirical analyses demonstrate that foreign shock to the domestic economy affects saving through a number of channels. Perry (2001) argues that the economic impact of instable oil supply is not the only factor of increased oil price. For instance, the crude oil price rose to $75 per barrel, which drove gasoline prices up to $2.78 per gallon. This caused the nation's bill for products of crude oil to increase by about 7 percent of gross domestic product (GDP), and the GDP to drop approximately 5 percent. Thus, positive shocks increase saving through the positive effect on wealth and income, and negative shocks cause a decline in private saving.

In sum, empirical evidence for a relationship between personal savings and internal and external variables can show positive, negative, and insignificant relationships, depending on the time period of the study and the specification of the model. Given the persuasive arguments regarding personal saving, an empirical puzzle exists. In this study, we provide an alternative explanation that may help to solve this puzzle.

MODEL AND DATA

To examine the relationship between personal saving and various internal and external variables, discussed in Section 2, we estimate the following statistical model:

$$\begin{aligned} Saving_t = {} & \beta_0 + \beta_1 Saving_{t-1} + \beta_2 Income_t + \beta_3 Tax_t + \beta_4 Young\ Dependency_t + \beta_5 Old\ Dependency_t \\ & + \beta_6 Credit\ Outstanding_t + \beta_7 Employment_t + \beta_8 Real\ Estate\ Loan_t + \beta_9 GDP_t + \beta_{10} Interest_t \\ & + \beta_{11} Social\ Security_t + \beta_{12} Current\ Account_t + \beta_{13} TOT_t + \beta_{14} Oil_t + \beta_{15} Ression + \sum_t \Phi_t T_t + \varepsilon_t \end{aligned} \quad (1)$$

where:

- *Saving* denotes personal saving,
- *Income* denotes personal income,
- *Tax* denotes personal income tax,
- *Young Dependency* denotes the number of young dependents per 100 persons of working age,
- *Old Dependency* denotes the number of old dependents per 100 persons of working age,
- *Credit Outstanding* denotes the consumer credit outstanding,
- *Employment* denotes the civilian employment-population ratio,
- *Real Estate Loan* denotes real estate loans at all commercial banks,
- *GDP* denotes real GDP,
- *Interest* denotes the real interest rate (1-Year Treasury Constant Maturity Rate-Inflation),
- *Social Security* denotes the contributions for social insurance,
- *Current Account* denotes the balance on current account,
- *TOT* denotes the terms of trade (the ratio of an export price index to an import price index),
- *Oil* denotes average crude oil prices,

[3] Please see Edwards (1996), Dayal-Ghulati and Thimann (1997), and Loayza et al. (2000).
[4] Please see Boskin (1978), Giovannini (1983), McKinnon (1991), and Metin-Ozcan and Ozcan (2005).

- *Recession* denotes a dummy variable that takes the value of 1 if the country is in recession,
- *T* denotes a comprehensive set of time fixed effects,
- β and Φ denotes the vectors of nuisance coefficients,
- ε represents the omitted influences on the personal saving and is assumed to be well behaved.

We obtained data on saving, income, tax, GDP, social security and current account from the U.S. Bureau of Economic Analysis. Dependencies data were obtained from the Congressional Research Service for Congress. Credit outstanding, real estate loan and interest were obtained from the Federal Reserve. Data on employment, TOT, oil and recession were obtained from the U.S. Bureau of Labor Statistics, the International Monetary Fund, inflationdata.com, and U.S. National Bureau of Economic Research, respectively. The simple average correlation among the variables is 0.022 (absolute value = 0.245). A low correlation would allow for some justification of the argument that we have constructed: Economic variables are mostly uncorrelated with other variables. Our dataset includes time series data from the U.S. between the years 1950 and 2007.

RESULTS

To explain the determinants for personal saving in the U.S., we begin the estimation process by testing the time series properties of the data. We use the augmented Dickey-Fuller (ADF) test to determine the order of integration of the variables. We perform the unit root tests at level, first difference and second difference.

Table 1
Unit Root Tests

Variable	Level[+]	1st Difference[†]	2nd Difference[‡]
Personal Saving	-1.121	-9.692	
Personal Income	3.190	-4.835	
Tax	0.246	-4.658	
Young Dependency	0.765	-1.501	-4.822
Old Dependency	-9.483		
Credit Outstanding	2.754	-3.162	
Employment	-0.865	-6.217	
Real Estate Loan	11.828	-1.175	-9.372
GDP	5.155	-4.357	
Interest Rate	-2.857	-7.130	
Social Security	1.810	-6.447	
Current Account	1.250	-5.351	
Terms of Trade	-1.007	-7.594	
Oil Price	-1.203	-5.571	

Note: [+] Critical values are -3.570, -2.924 and -2.597 at 1, 5, and 10 percent significance levels, respectively. [†] Critical values are -3.572, -2.925 and -2.598 at 1, 5, and 10 percent significance levels, respectively. [‡] Critical values are -3.573, -2.926 and -2.598 at 1, 5, and 10 percent significance levels, respectively. Optimum lag length is selected by using Akaike information criterion (1974).

The test results in Table 1 suggest that the variables have different orders of integration. Old dependency is found to be I(0). Personal saving, personal income, tax, credit outstanding, employment, GDP, interest rate, social security, current account, TOT and oil price are found to be I(1). Young dependency and real estate loan are found to be I(2). Given the status of both non-stationary and stationary data, we use the general-to-specific modeling procedure.[5] This method aims to avoid the risk of deleting an important variable that should ideally be retained in the final model specification along any single search path and to minimize the risk of retaining too many variables as proxies for the missing variable, with the result that the final model is over-parameterized.

[5] The general-to-specific specification search was particularly popularized by Hendry (1980 and 1995), Hendry and Mizon (1990), and Mizon (1995). Hendry and Krolzig (2001) recommend the use of multiple search paths in the process of moving from a generalized unrestricted model (GUM) to a parsimonious specification. A major advantage of this method is that, unlike a simple first-differenced equation, it appropriately retains long-run information embodied in the data.

Table 2
Zivot-Andrews Structural Break and Unit Root Test

		Level		1st Difference	
Variable	**Model**	**Structural Break**	**Minimum t-statistic**	**Structural Break**	**Minimum t-statistic**
Personal Saving	A	1993	-2.511	1992	-11.255
Personal Income		1997	-3.130	1973	-5.190
Tax		1996	-6.370	1994	-5.097
Young Dependency		1966	-5.863	1965	-3.513
Old Dependency		1997	-5.022	1961	-3.226
Credit Outstanding		1998	-2.907	1993	-6.954
Employment		1984	-4.973	1989	-6.569
Real Estate Loan		1997	0.765	1997	-3.930
GDP		1996	-1.865	1995	-5.778
Interest Rate		1978	-5.534	1981	-7.371
Social Security		1984	-3.821	1988	-7.345
Current Account		1998	-3.698	1997	-4.962
Terms of Trade		1990	-4.543	1980	-8.026
Oil Price		1986	-3.420	1980	-8.118
Personal Saving	B	1985	-4.846	1971	-10.957
Personal Income		1994	-3.855	1993	-4.819
Tax		1992	-5.475	1965	-5.016
Young Dependency		1998	-5.310	1967	-4.312
Old Dependency		1991	-4.343	1963	-3.214
Credit Outstanding		1993	-4.323	1980	-6.083
Employment		1962	-3.848	1987	-6.516
Real Estate Loan		1997	-1.713	1996	-5.173
GDP		1983	-2.837	1980	-5.460
Interest Rate		1982	-3.042	1978	-7.016
Social Security		1963	-3.880	1966	-7.116
Current Account		1996	-3.700	1989	-4.376
Terms of Trade		1978	-3.590	1966	-7.675
Oil Price		1978	-2.280	1997	-5.821
Personal Saving	C	1984	-4.833	1992	-11.353
Personal Income		1991	-3.822	1973	-5.172
Tax		1997	-6.370	1995	-5.150
Young Dependency		1998	-5.155	1965	-5.049
Old Dependency		1986	-4.713	1968	-3.594
Credit Outstanding		1990	-4.368	1993	-7.037
Employment		1984	-4.555	1983	-6.659
Real Estate Loan		1996	-1.673	1990	-5.761
GDP		1980	-2.934	1995	-5.980
Interest Rate		1978	-5.819	1972	-7.328
Social Security		1961	-3.875	1973	-7.281
Current Account		1991	-3.887	1987	-5.197
Terms of Trade		1989	-4.588	1986	-8.007
Oil Price		1986	-2.902	1980	-8.200

Note: The 5 percent critical values are -4.80, -4.42 and -5.08 for the Model A, B and C, respectively. Model A: a shift in the intercept; Model B: a shift in the trend; and Model C: a shift in the both.

However, Perron (1989) shows that, if there is a structural break, the power to reject a unit root hypothesis decreases when the stationary alternative is true and the structural break is ignored. Therefore, failure to find significant evidence of stationarity from the conventional unit root tests may reflect misspecification of the deterministic trend. To examine whether there is a structural break or not, the Zivot-Andrews test (Zivot and Andrews, 1992)[6] is performed, which is extended from the Perron test (1989). As we explained earlier, it is well known that the conventional unit root tests lack power if there is a structural break. Thus, to correct for this problem,

[6] Zivot and Andrews' procedure search endogeneously for the structural break instead of choosing it arbitrarily. The test is performed using three models: Model A (a shift in the intercept), Model B (a shift in the trend) and Model C (a shift in the both).

we conduct Zivot-Andrews test, and the results are shown in Table 2. Either a one time parallel shift, or a shift in the trend, or a combination of the two, all the test statistics show that the variables are nonstationary at level and stationary at first difference. Therefore, we conclude that variables are nonstationary and integrated at order one.

Table 3
Regression Results

Variables	Internal Variables	Government Variables	External Variables	Cochrane-Orcutt†
Personal Saving $_{(t-1)}$	-0.288**	-0.236**	-0.189	-0.229**
	(0.118)	(0.111)	(0.116)	(0.112)
Personal Income	0.280***	0.529***	0.598***	0.648***
	(0.080)	(0.103)	(0.108)	(0.108)
Tax	-0.672***	-0.704***	-0.791***	-0.803***
	(0.143)	(0.136)	(0.142)	(0.149)
Young Dependency	-11.559	-12.656	-5.419	-3.627
	(12.778)	(12.827)	(13.202)	(14.445)
Old Dependency	-4.032**	-0.723	0.350	-0.124
	(1.744)	(2.319)	(2.359)	(3.195)
Credit Outstanding	-0.434***	-0.370**	-0.287*	-0.321*
	(0.146)	(0.143)	(0.148)	(0.163)
Employment	0.040	0.135**	0.124**	0.137**
	(0.051)	(0.061)	(0.061)	(0.067)
Real Estate Loan	-0.281*	-0.097	-0.088	-0.073
	(0.164)	(0.171)	(0.168)	(0.149)
GDP		-0.002***	-0.002***	-0.002***
		(0.001)	(0.001)	(0.001)
Interest Rate		-0.006	0.010	0.005
		(0.020)	(0.022)	(0.023)
Social Security		-0.020	0.528	0.541
		(0.631)	(0.690)	(0.695)
Current Account		0.114	0.114	0.066
		(0.145)	(0.166)	(0.171)
Terms of Trade		0.133	-0.018	-0.038
		(0.088)	(0.405)	(0.395)
Oil Price			0.008*	0.008*
			(0.005)	(0.005)
Recession Dummy			0.082	0.133
			(0.091)	(0.096)
Constant	0.688**	0.083	-0.108	-0.048
	(0.322)	(0.412)	(0.420)	(0.583)
Observations	56	54	54	53
R^2	0.479	0.630	0.661	0.721

Note: Standard errors in parenthesis. † Correct the regression for the serial correlation (Durbin-Watson statistic after transformed: 1.887). *, ** and *** denote statistically significant at level of 10, 5 and 1 percent, respectively.

The estimates of equation (1) using the ordinary least squares (OLS) method are shown in Table 1. When we consider only the internal factor for personal saving (Column 1 in Table 3), the coefficients of the lagged private saving, tax, old dependency, credit outstanding, and real estate loan are negative and statistically significant, while, as we expected, personal income is positive and statistically significant. Once we include the external factors (Column 2 in Table 3), old dependency and real estate loan turn to statistically insignificant, whereas employment turns to statistically significant at the 5 percent level. Finally, when we include all the internal and external factors (Column 3 in Table 3), lagged private saving is not statistically significant and GDP negatively affects personal saving.

The striking result that emerges from our analysis is that external factors are not statistically significant, except for oil price shock. Even if it is small number, the coefficient for the oil price is positive and significant at the

10 percent level. This implies that, when there is a negative external shock to the U.S. economy, people tend to save more. This result is a consistent with recent survey by pollster Scott Rasmussen who asked investors what they would do with new money; 32 percent said they would save it.[7] However, this increase in saving during a slack period means that the U.S. economy falls into the "paradox of thrift."[8]

Table 4
Specification Tests

Tests	Test Statistics	Probability
Mean VIF[1]	3.010	
Breusch-Pagan / Cook-Weisberg[2]	0.050	0.822
LM test (ARCH effects)[3]	5.934	0.015
Breusch-Godfrey LM[4]	1.307	0.253
Durbin-Watson *d*[5]	1.756	
Ramsey RESET[6]	2.120	0.116

Note: [1] The VIF shows us how much the variance of the coefficient estimate is being inflated by multicollinearity (VIF>10.0 indicates a multicollinearity problem). [2] Breusch-Pagan / Cook-Weisberg tests the null hypothesis that the error variances are all equal versus the alternative that the error variances are a multiplicative function of one or more variables (A large chi-square would indicate that heteroskedasticity was present.). [3] The null hypothesis is that there is no ARCH effect. [4] Test for higher-order serial correlation in the disturbance. While the Durbin–Watson h statistic is only valid for stochastic regressors and first order autoregressive schemes (e.g., AR(1)), the BG test has none of these restrictions, and is statistically more powerful than Durbin's *h* statistic. [5] Its value always lies between 0 and 4 (A value of 2 indicates there appears to be no autocorrelation.). [6] For an adequately specified model, *F* should be non-significant.

To be acceptable, the final equation must satisfy various diagnostic testing procedures. This is the established practice in modeling with annual data. As seen in Table 4, our model survives various specification tests. The variance inflation factor (VIF) shows us how much the variance of the coefficient estimate is being inflated by multicollinearity. As a rule of thumb, VIF>10.0 indicates a multicollinearity problem. Breusch-Pagan / Cook-Weisberg tests the null hypothesis that the error variances are all equal versus the alternative that the error variances are a multiplicative function of one or more variables. (A large chi-square would indicate that heteroskedasticity is present.).[3] The null hypothesis is that there is no ARCH effect.[4] While the Durbin-Watson *h* statistic is only valid for stochastic regressors and first order autoregressive schemes (e.g., AR(1)), the Breusch-Godfrey (BG) test has none of these restrictions and is statistically more powerful than Durbin's *h* statistic.[5] Its value always lies between 0 and 4 (A value of 2 indicates there appears to be no autocorrelation.).[6] For an adequately specified model, *F* should be non-significant.

CONCLUSION

In this paper, we investigate the relationship between personal saving and a number of internal and external variables that may affect it. Using time series data in the U.S. between the years 1950 and 2007, we show that personal saving is highly depend on personal income, tax, credit outstanding and status of employment, while dependency ratio, current real estate loan, real interest rate, and status of economic performance are indeterminate.

Empirical analysis shows that the personal saving rate is more sensitive to changes in internal variables (e.g., personal income, tax, credit outstanding and status of employment), than changes in external variables (e.g., real interest rate and status of economic performance). In January 2009, with the economy in its 16th month of recession, saving rate increased from 0.4 percent (in the fourth quarter of 2007) to 5 percent of disposable personal income.[9] However, as we all know, the U.S. economy is derived from consumers, and this increase in saving in the U.S. economy falls into a "paradox of thrift."

[7] Please see Gross (2009) for more details.
[8] The paradox of thrift is propounded by Keynes, who states that, if everyone saves more money during times of recession, then aggregate demand will fall and will, in turn, lower total saving in the population because of the decrease in consumption and economic growth.
[9] Please see Personal Income and Outlays published by BEA in January 2009 for more details.

REFERENCES

1. Akaike, Hirotugu, A New Look at the Statistical Model Identification, *The Institute of Electrical and Electronics Engineers Transactions on Automatic Control*, Vol. 19, pp. 716–723, 1974.
2. Aoki, Kosuke, James Proudman and Gertjan Vlieghe, Houses as Collateral: Has the Link between House Prices and Consumption in the UK Changed? *Federal Reserve Bank of New York Economic Policy Review*, Vol. 8, pp. 163–178, 2002a.
3. Barro, Robert J. and Glenn M. MacDonald, Social Security and Consumer Spending in an International Cross Section, *Journal of Public Economics*, Vol. II, pp. 275-289, 1979.
4. Bayoumi, Tamim and Hali Edison, Is Wealth Increasingly Driving Consumption? De Nederlandsche Bank, DNB Staff Reports, No. 101, 2003.
5. Boskin, Michael J., Taxation, Savings and the Rate of Interest, *Journal of Political Economy*, Vol. 86, pp. 3-27, 1978.
6. Bosworth, Barry, Gary Burtless and John Sabelhaus, The Decline in Saving: Evidence from Household Surveys, *Brookings Papers on Economic Activity*, pp. 183-241, 1991.
7. Case, Karl E., John M. Quigley and Robert J. Shiller, Comparing Wealth Effects: The Stock Market versus the Housing Market, *Advances in Macroeconomics*, Vol. 5, pp. 1-34, 2005.
8. Chenery, Hollis B. and Peter Eckstein, Development Alternatives for Latin America, *Journal of Political Economy*, Vol. 78, pp. 966-1006, 1970.
9. Dawson, John W., Joseph P. Dejuan, John J. Seater and E. Frank Stephenson, Economic Information versus Quality Variation in Cross-Country Data, *Canadian Journal of Economics*, Vol. 34, pp. 988-1009, 2001.
10. Dayal-Ghulati, Anuradha and Christian Thimann, Saving in Southeast Asia and Latin America Compared: Searching for Policy Lessons, International Monetary Fund Working Paper WP/97/110, 1997.
11. Dejuan, Joseph P., John J. Seater and Tony S. Wirjanto, A Direct test of the Permanent Income Hypothesis with an Application to the US States, *Journal of Money, Credit and Banking*, Vol. 36, pp. 1091-1103, 2004.
12. Dvornak, Nikola and Marion Kohler, Housing Wealth, Stock Market Wealth and Consumption: A Panel Analysis for Australia, *Economic Record*, Vol. 83, pp. 117-130, 2007.
13. Dynan, Karen E. and Dean M. Maki, Does Stock Market Wealth Matter for Consumption? Finance and Economics Discussion Series 2001-23, Board of Governors of the Federal Reserve System, 2001.
14. Edwards, Sebastian, Why are Latin America's Savings Rates So Low? An International Comparative Analysis, *Journal of Development Economics*, Vol. 51, pp. 5-44, 1996.
15. Evans, Owen, Social Security and Household Saving in the United States: A Re-Examination, *International Monetary Fund Staff Papers*, Vol. 30, pp. 601-618, 1983.
16. Feldstein, Martin S., Social Security and Private Savings: International Evidence in an Extended Life Cycle Model, in M. Feldstein and R. Inman (eds.), *The Economics of Public Services*, An International Economic Association Conference Volume, 1977.
17. Feldstein, Martin, International Differences in Social Security and Saving, *Journal of Public Economies*, Vol. 14, pp. 225-244, 1980.
18. Feldstein, Martin, Social Security and Saving New Time Series Evidence, NBER Working Paper 5054, National Bureau of Economic Research, 1995.
19. Fisher, Irving, *The Theory of Interest*, New York: Macmillan, 1930.
20. Flavin, Marjorie A., The Adjustment of Consumption to Changing Expectations about Future Income, *Journal of Political Economy*, Vol. 89, pp. 974-1009, 1981.
21. Friedman, Milton, *A Theory of the Consumption Function*, Princeton, NJ, Princeton University Press, 1957.
22. Garner, C. Alan, Should the Decline in the Personal Saving Rate Be a Cause for Concern? *Federal Reserve Bank of Kansas City Economic Review*, Vol. 91, pp. 5-28, 2006.
23. Giovannini, Alberto, The Interest Elasticity of Savings in Developing Countries: The Existing Evidence, *World Development*, Vol. 11, pp. 601-607, 1983.
24. Gramlich, Edward, Consumption and Wealth Effect: The United States and the United Kingdom, Remarks before the International Bond Congress. London, UK, 2002.
25. Gross, Daniel, *Stop Saving Now!* Newsweek, March 14, 2009.
26. Guidolin, Massimo and Elizabeth A. La Jeunesse, The Decline in the U.S. Personal Saving Rate: Is It Real and Is It a Puzzle? *Federal Reserve Bank of St. Louis Review*, Vol. 89, pp. 491-514, 2007.
27. Harrod, Roy, *Towards A Dynamic Economics*, London: Macmillan, 1948.

28. Heller, Peter S., Aging, Savings, and Pensions in the Group of Seven Countries: 1980-2025, *Journal of Public Policy*, Vol. IX, pp. 127-153, 1989.
29. Hendry, David F. and Grayham E. Mizon, Procrustean Econometrics: Or Stretching and Squeezing Data, in C. W. J. Granger (ed.), *Modelling Economic Series*, Clarendon Press, Oxford, pp. 121-136, 1990.
30. Hendry, David F. and Hans-Martin Krolzig, *Automatic Econometric Model Selection Using PcGets*, Timberlake Consultants Press, London, 2001.
31. Hendry, David F., Econometrics-Alchemy or Science? *Economica*, Vol. 47, pp. 387-406, 1980.
32. Hendry, David F., *Dynamic Econometrics*, Oxford University Press, Oxford, 1995.
33. Houthakker, Hendrik S, On Some Determinants of Saving in Developed and Underdeveloped Countries, in E.A.G. Robinson (ed.), *Problems in Economic Development*, Macmillan, London, 1965.
34. Kennickell, Arthur B., Demographics and Household Saving, Finance and Economics Discussion Series, Paper 123, Board of Governors of the Federal Reserve System, 1990.
35. Koskela, Erkki and Matti Viren, Social Security and Household Saving in an International Cross Section, *American Economic Review*, Vol. 73, pp. 212-216, 1983.
36. Kotlikoff I, Pakes A., Looking for the News in the Noise: Additional Stochastic Implications of Optimal Consumption Choice, National Bureau of Economic Research, Working Paper 1492, 1984.
37. Loayza, Norman, Klaus Schmidt-Hebbel and Serven Lui, What Drives Private Savings Across the World? *The Review of Economics and Statistics*, Vol. 82, pp. 165-181, 2000.
38. Ludwig, Alexander, and Torsten Sløk, The Impact of Changes in Stock Prices and House Prices on Consumption in OECD Countries, International Monetary Fund Working Paper, 02/1, 2002.
39. Maki, Dean M. and Michael G. Polumbo, Disentangling the Wealth Effect: A Cohort Analysis of Household Saving in the 1990s, Finance and Economics Discussion Series 2001-21, Board of Governors of the Federal Reserve System, 2001.
40. Masson, Paul R. and Ralph W. Tryon, Macroeconomic Effects of Projected Population Aging in Industrial Countries, International Monetary Fund Staff Papers, Vol. 37, pp. 453-485, 1990.
41. McKinnon, Ronald I., *The Order of Economic Liberalization: Financial Control in the Transition to a Market Economy*, Johns Hopkins University Press, Baltimore, 1991.
42. Metin-Ozcan, Kivilcim and Yusuf Ziya Özcan, Determinants of Private Savings in the Middle East and North Africa, *Research in Middle East Economics*, Vol. 6, pp. 95-117, 2005.
43. Metin-Ozcan, Kivilcim, Asli Gunay and Seda Ertac Handle, Determinants of Private Savings Behaviour in Turkey, *Applied Economics*, Vol. 35, pp. 1405-1416, 2003.
44. Mizon, Grayham E., Progressive Modeling of Macroeconomic Time Series: The LSE Methodology, EUI Working Paper, ECO No. 95/10, 1995.
45. Modigliani, F., The Life Cycle Hypothesis of Saving and Intercountry Differences in the Savings Ratio, in W. A. Eltis, M. F. G. Scott and J. N. Wolfe (eds.), *Induction, Trade and Growth: Essays in Honour of Sir Roy Harrod*, Oxford: Oxford University Press, 1970
46. Modigliani, Franco, and Richard H. Brumberg, Utility Analysis and the Consumption Function: An interpretation of Cross-section Data, in Kenneth K. Kurihara (ed.), *Post-Keynesian Economics*, New Brunswick, NJ. Rutgers University Press. pp. 388-436, 1954.
47. Perron, Pierre, The Great Crash, the Oil Price Shock and the Unit Root Hypothesis, *Econometrica*, Vol. 57, pp. 1361-1401, 1989.
48. Perry, George L.. The War on Terrorism, the World Oil Market and the U.S. Economy, The Brookings Institution Analysis Paper, 7, 2001.
49. Poterba, James M., Stock Market Wealth and Consumption, *Journal of Economic Perspectives*, Vol. 14, pp. 99-118, 2000.
50. Slemrod, Joel, Fear of Nuclear War and Intercountry Differences in the Rate of Saving, National Bureau of Economic Research Working Papers 2801, 1988.
51. Wachtel, Paul, Household Saving and Demographic Change, 1950-2050, *Research in Population Economics*, Vol. 5, pp. 217-233, 1984.
52. Zivot, Eric and Donald W. K. Andrews, Further Evidence on the Great Crash, the Oil Price Shock and the Unit Root Hypothesis, *Journal of business and Economic Statistics*, Vol. 10, pp. 251-270, 1992.

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