E C O N O M I C S B U L L E T I N

Did lower interest rates reduce Japan's household savings rate since the 1990s? Evidence based on the maturation of postal savings certificates

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Abstract

Japan's traditionally high household saving rate has declined substantially since the early 1990s. While this decline is often explained as a result of the rapid increase in the population share of the elderly who are dissaving, we argue that the cause is a decline in interest income triggered by falling interest rates. To examine our hypothesis, we focus on the effect of the maturation of relatively high-yielding postal savings certificates. Estimating a savings function, we find that the reduction in interest income caused by the maturation of the postal saving certificates reduced household saving rates by more than 3 percentage points.

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1. Introduction

Japanôs savings rate has traditionally been exceptionally high in international comparison ï a fact that numerous studies have sought to explain, either from a domestic or from an international perspective (Hayashi (1997), Horioka (1997)). Adding to the mystery is that Japanôs legendary household savings rate has declined substantially since the early 1990s. This decline has not always been gradual and a large drop can be observed around the year 2000. According to the new SNA series (93SNA), the household savings rate fell by 2.1 percentage points in FY2000 and another 2.7 percentage points in FY2001 for a total of 5 percentage points in only two years.[1]

Several of studies have argued that this decline can be accounted for by the rapid increase in the share of the elderly in the population (Horioka (1997), Koga (2006)), a larger proportion of liquidity-constrained households (Ogawa (2007)) and changes in total factor productivity (Chen et. al. (2006)). Although those explanations may be fitted with the long-term trend in the saving rate, what we observe in reality are large annual changes in the household savings rate.

We propose an alternative explanation for the decline in the household savings rate which has been unexplored: a decrease in interest rate income as a result of falling interest rates during the 1990s. Interest on deposits, which had been in the region of 3 or 4 % at the end of the bubble period in 1991, fell to zero around the turn of the millennium, leading to a decline in household interest income. In order to illustrate our argument, we are going to focus on postal savings certificates (*teigaku chokin*; henceforth: PSC), which are among the most common financial instruments used by households. We examine the effect of the maturation of PSCs around 2000 ï which can be considered as an exogenous change in interest rates since they were fixedï on household saving which experienced the large drop by 5 % points. By examining the effect of interest income on household saving, this study aims to contribute to the large literature on the determinants of household savings rates.

In what follows, Section 2 overviews PSCs and the data set used in this study. Section 3 outlines our empirical strategy and presents our results. Section 4 concludes.

2. Description of PSCs and the data

PSCs are fixed-term instruments paying a fixed interest rate unless cancelled

[1] The SNA measure of the household savings rate is the broadest and the most consistent with the concept of the savings rate (Horioka (2004)).

prematurely. The longest term is 10 years. In 1990 and 1991, the interest rate on PSCs with a maturity of more than three years was 6.33 % per annum.[2] Yielding relatively high returns at no risk, PSCs were extremely popular and new purchases amounted to 62 trillion yen in FY1990 and another 44 trillion yen in FY1991.[3] Since the maximum term of PSCs is ten years, the last date PSCs purchased in 1990/1991 reached maturity is around the year 2000. The total amount of PSCs reaching maturity in FY2000 amounted to 54 trillion yen, with a further 47 trillion yen coming due in FY2001. Given the low-interest rate environment at that time, most households experienced a substantial decline in the returns on their assets and, in fact, most of the funds coming due were reinvested PSCs, but at interest rates that were close to zero.

This situation represents an exogenous change in interest rates. The overall effect of an exogenous change in interest rates on household savings can go either way, as it depends on the magnitude of both the income and the substitution effect. However, we think there is good reason to believe that the maturation of PSCs payer higher rates of interest had a negative impact on household savings, since the marginal propensity to save out of interest income on PSCs can be higher than that on other types of income. This is because as long as PSCs are not cancelled, the marginal propensity to save (MPS) out of interest income on PSCs is 100 % since interest payments are automatically reinvested. Moreover, households which purchased PSCs at the beginning of the 1990s were likely to face strong incentives to keep those deposits as long as possible until these reached maturity since those households enjoyed returns of more than 6 % even as interest rates on other financial products declined during the 1990s.

This study takes advantage of household-level data from the *NEEDS-RADAR Financial Behavior Survey (Kinyu Kodo Chosa)*, which is compiled annually by Nikkei Media Marketing, Inc. The survey covers households with household heads aged between 25 and 69 randomly chosen within a 40-kilometer radius of the center of Tokyo. This survey is cross-sectional and the sample size each year is 5,000 households. The questionnaires mailed to the chosen households contain questions on household asset portfolios and on detailed household demographics. This study utilizes data from the 2000 survey since, to our knowledge, the survey is the only to provide data on householdsôholdings of PSCs and whether the PSCs reached maturity or not. The sample size is 2,510 households (response rate: 50.2 %).

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[2] Interest on a PSC with a maturity of three or four years is set using the semiannual compound interest method. The minimum unit of transaction is 1,000 yen.

[3] Data are from the Japan Post website: <http://www.zaimu.japanpost.jp/tokei/index-e.html>.

In order to distill the effect of holding PSCs on household saving, we confine our sample to households which held PSCs that reached maturity in 2000 or were reaching maturity soon. We exclude households without PSCs reaching maturity around 2000 since it is possible that households choosing to invest in PSCs may be inherently more inclined to have a higher savings rate. For example, it is possible that households holding PSCs are wealthier and hence more inclined to save. If this were the case, richer households should also display a higher savings rate (Dynan, et. al.(2004)) and the different savings rates observed among the different groups around 2000 are the result of a self-selection process. Moreover, we remove observations for which data necessary for our analysis are not available or those having received any incidental income worth 1 million yen within the preceding five years or those whose head is less than 28 years old.[4] As a result, the sample size dropped to 320 (see Appendix Table 1 for detail).

Table 1 provides the summary statistics of the main variables both for the pooled sample and by groups; households with PSCs reaching maturity and those with PSCs that had reached maturity. We notice that the summary statistics are homogenous across the groups except savings rate and holding PSCs. Households with PSCs reaching maturity had an average saving rate of 14.3 % and the corresponding figure for households with PSCs that had reached maturity was 11.8 %. The saving rate is defined as the amount saved in the previous year divided by household annual income.[5] The share of households holding PSCs that had reached maturity was 55 %. Turning to household demographics, we find that the average age and educational attainment of the household head, family size, the shares of detached house owner, head being unemployed, and households paying housing loans are homogenous between the group holding PSC and that with PSCs that had reached maturity.

3. Estimation strategy and results

We estimate a standard household savings function as follows:

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[4] We excluded households that received any incidental income worth 1 million yen within the preceding five years since their saving rates are often extraordinary. Moreover, we implicitly assumed that all households in the sample purchased PSCs reaching maturity around 2000 when the head was 18 and over since the longest term of PSCs is 10 years.

[5] The surveys divide possible answers to certain questions relating to income or assets into brackets. The summary statistics are calculated based on the average of the range for each choice.

$$\frac{S_i}{Y_i} = F(Age, Age^2, PSC_i, X_i) \qquad (1)$$

where the dependent variable is the household savings rate (on a flow basis). S_i stands for household savings defined as the amount invested in financial assets or deposited in bank or postal accounts in the preceding year and Y_i is household annual income.[6] We employ the OLS method to regress the household savings rate on a quadratic term of household headsôage, the dummy variable for households with PSCs reaching or having reached maturity in 2000 (PSC_i) and controlling factors including household demographics (X_i), which includes the variables explained in the previous section.

Table 2 reports the results. First, the coefficient on age is positive and significant and that on age squared is negative and significant, which is consistent with a standard life-cycle saving model. Second, the key result of this paper, the coefficient on the dummy variable for households whose PSCs had reached maturity is negative and significant. This means that PSCs contributed to higher household savings rates before they reached maturity, but once PSCs had reached maturity, households that had owned PSCs no longer had a significantly higher savings rate. The coefficient on the dummy for households that held PSCs that were reaching maturity implies that PSCs raised household saving rates by about 3 percentage point. Third, households whose head attained higher educational level are more likely to have a higher saving rate, implying a household with a larger lifetime income tend to save more. Fourth, the coefficient on the dummy for households paying housing loans is negative and significant.

4. Conclusion

Thus study suggested that the observed decline in Japanôs household savings rate may be the result of a reduction in interest rates. We supported our argument by examining the effect of the maturation of high-yielding postal savings certificates. We found that the reduction of interest income around 2000 contributed to the decline in household savings rates and our estimation shows that the maturation of PSCs around 2000 lowered household savings rates by 3 percentage points. While this study has exclusively concentrated on the effect of the maturation of PSCs around the year 2000, our empirical results provide evidence for the more general argument that interest income is a key factor contributing to the decline in Japanôs household savings rate since the early 1990s.

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[6] Since information on disposable income is not available, we use pre-tax income for Y_t.

References

Dynan, Karen, Jonathan Skinner and Stephan Zeldes (2004). ñDo the Rich Save More?ò, *Journal of Political Economy*, vol.112, no.22, 397-444.

Hayashi, Fumio (1997). *Understanding Saving*, MIT Press.

Horioka, Charles (1997). ñA Cointegration Analysis of the Impact of the Age Structure of the Population on the Household Saving Rate in Japan,ò *Review of Economics and Statistics*, vol.79, no.3, 511-516.

Horioka, Charles (2004). ñChochikuritsu to Koreika [The Savings Rate and Population Aging,ò *Nihon Keizai Shimbun,* September 9th,

Koga, Maiko (2006). ñThe Decline of Japanôs Saving Rate and Demographic Effects,ò , *Japanese Economic Review*, vol.57, no.2, 312-321.

Ogawa, Kazuo (2007). ñWhy Did Japanôs Household Savings Rate Fall in the 1990s?ò *Applied Economics*, vol.39, no.18, 2341-2353.

Table 1: Descriptive Statistics

	All households		Households with PSCs reaching maturity		Households with PSCs that had reached maturity	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Household saving rate	12.901	11.530	14.298	13.035	11.772	10.050
Dummy for holding PSCs which had reached maturi	0.553	0.498	0	0	1	0
Age of household head	50.878	11.580	50.965	11.599	50.808	11.596
Educational attainment（household head)						
Junior high school (dummy variable)	0.075	0.264	0.112	0.316	0.045	0.208
High school (dummy variable)	0.319	0.467	0.294	0.457	0.339	0.475
Junior colledge (dummy variable)	0.116	0.320	0.091	0.288	0.136	0.343
University / Grad school (dummy variable)	0.491	0.501	0.503	0.502	0.480	0.501
Family size	3.156	1.262	3.210	1.272	3.113	1.256
Dummy for detached house owner	0.781	0.414	0.769	0.423	0.791	0.408
Dummy for unemployment (household head)	0.016	0.124	0.014	0.118	0.017	0.129
Dummy for paying housing loan	0.341	0.475	0.371	0.485	0.316	0.466
Annual income (in 100,000 yen)	82.294	49.734	78.245	39.217	85.565	56.729
Number of observations	320		143		177	

Table 2: The Determinants of Household Savings Rate

Dependent variables	Estimated Coefficient	Std. Err.	
Age of household head	1.693	0.464	***
Age of household head ^{2}	-0.016	0.005	***
Dummy for holding PSC which had reached maturi	-3.365	1.279	***
Educational attainment (household head)			
High school	3.932	2.230	*
Junior Colledge	7.361	2.776	***
University / Graduate school	5.022	2.134	**
Detached-house owner	0.390	1.751	
Family size	-2.230	0.734	***
Unemployed (household head)	9.152	11.032	
Dummy for paying housing loan	-3.989	1.428	***
Intercept	-25.579	10.774	**

Number of observations = 320
R-squared = 0.1382

Note: 1. Heteroskedastic robust standard errors are calculated.
2. ***, ** and * indicate that significant at the 1 percent, 5 percent and 10 percent, respectively.
3. The baseline for educational attainment is junior high school.

Appendix Table 1: Excluding observations

Criteria	Number of Excluded Observations	Remaining Observations
Original number of observations		2,510
Not having PSC	1,811	699
Incomplete saving data	132	567
Receiving incidental income	173	394
Incomplete explanatory variables	58	338
under 28 years old	16	
Final number of observations		320