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THE (DIS)SAVING BEHAVIOR
OF THE AGED IN JAPAN

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Abstract: In this paper, I survey the previous literature on the saving behavior of the aged in Japan and then present some survey data on the saving behavior of the aged in Japan that became available recently.   To summarize the main findings of this paper, virtually all previous studies as well as the newly available data I analyze find that the retired aged dissave and that even the working aged dissave, at least at advanced ages.   Moreover, there has been a sharp increase in the dissaving of the retired aged since 2000, with the increase being due primarily to reductions in social security benefits, increases in consumption expenditures, and increases in taxes and social insurance premiums.   These findings are consistent with the life-cycle model and suggest that this model is highly applicable (and becoming increasingly applicable over time) in the case of Japan.

Keywords: Age structure of the population, aged, aging, consumption, dissaving, elderly, households, Japan, life-cycle model, life-cycle hypothesis, retirement, saving, saving rate

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1. Introduction

Weil (1994) notes in his seminal paper that there is a discrepancy between the macro evidence and the micro evidence on the applicability of the life-cycle model, with studies based on macro (cross-country) data suggesting that the age structure of the population has the expected impact on the saving rate but studies based on micro data on the saving behavior of the aged showing little tendency for the aged to dissave. Thus, the macro evidence suggests that the life-cycle model applies in the real world whereas the micro evidence suggests that it does not.

Does the same discrepancy exist in Japan? Horioka (1997) and Horioka and Yin (2009) have found using macro (time series) data for Japan that the age structure of the population has the expected impact on the saving rate, and in this paper, I analyze micro data on the saving behavior of the aged in Japan. I first survey the previous literature on the saving behavior of the aged in Japan and then present some survey data on the saving behavior of the aged in Japan that became available recently.

To summarize the main findings of this paper, virtually all previous studies as well as the newly available data I analyze find that the retired aged dissave and that even the working aged dissave, at least at advanced ages. Moreover, there has been a sharp increase in the dissaving of the retired aged since 2000, with the increase being due primarily to reductions in social security benefits, increases in consumption expenditures, and increases in taxes and social insurance premiums. These findings are consistent with the life-cycle model and suggest that this model is highly applicable (and becoming increasingly applicable over time) in the case of Japan. Thus, there does not appear to be any discrepancy between the macro and micro evidence in the case of Japan, with both types of evidence suggesting that the life-cycle model is highly applicable in the case of Japan.

This paper is organized as follows: in Section 2, I conduct a selective survey of the previous literature on the saving behavior of the aged in Japan; in Section 3, I present some survey data on the saving behavior of the aged in Japan that became available recently; in Section 4, I present other evidence on the applicability of the life-cycle model in the case of Japan; and Section 5 concludes and explores the policy implications of my findings.

2. A Survey of the Previous Literature on the Saving Behavior of the Aged in Japan

In this section, I conduct a selective survey of the previous literature on the saving behavior of the aged in Japan (see Horioka and Kan (2009) for a more exhaustive survey of the literature on Japan as well as that on other countries).

Although it is easy to speak about the saving of the aged in theoretical terms, it is notoriously difficult to measure it in actual practice, and as a result, no consensus has been reached about whether or not the aged dissave. Just to enumerate some of the problems that arise when one wants to measure the saving of the aged, one problem is that the unit of observation of the data that are available is almost always the household, and hence it is not possible to obtain direct data on the saving of the aged individuals who live in multi-generation households. This problem is especially severe in Japan, where there are so many extended families (households in which parents and their grown children live together). According to the Population Census of the Japanese Government, the proportion of the aged who live with their children was a full 73.4 percent in 1980, and although this proportion has declined steadily since then, it was still 49.6 percent in 2005, according to the Population Census (Statistics Bureau, Ministry of Internal Affairs and Communications, Government of Japan (2009)).

Second, households are usually classified by the age of the household head, and since aged household members are not necessarily the household head (in fact, they usually are not

because the head is defined as the household member with the highest income), data are not available on the saving of aged individuals who are *not* household heads (primarily aged individuals who live with their children, hereafter referred to as 'dependent aged'). This is especially unfortunate in the case of Japan because, as noted earlier, in the past, the majority of the aged in Japan lived with their children and most of them were *not* classified as the household head and because these dependent aged are very different from the independent aged (for example, they are presumably poorer, on average).

Third, most household surveys survey only households with two or more persons, and hence no data are available on one-person aged households even though they comprise a non-negligible and growing share of all aged households (their share more than doubled from 10.8 percent in 1980 to 22.5 percent in 2005, according to the Population Census (Statistics Bureau, Ministry of Internal Affairs and Communications, Government of Japan (2009))) and even though they may be very different from aged households with two or more persons (for example, they are presumably poorer, on average).

Because of these data limitations, most previous researchers were forced to look at data on the saving of households with two or more persons whose head is aged and to make inferences about the saving of all aged individuals based on these data. However, the three aforementioned problems apply in the case of such data: first, such data pertain to the household as a whole and include the saving of not only the aged head but also of his/her spouse, cohabiting children, cohabiting grandchildren, etc., many of whom are not aged; second, such an analysis totally ignores the saving of aged individuals who are *not* household heads and implicitly assumes that their behavior is identical to that of aged heads; and third, such an analysis ignores one-person aged households and implicitly assumes that their behavior is identical to that of aged households with two or more persons.

Thus, even if one finds that households with two or more persons headed by an aged individual in Japan do not dissave, one cannot conclude that all aged in Japan do not dissave. First, the failure of the independent aged to dissave could merely reflect the positive saving of cohabiting children and other cohabiting family members. Second, aged heads are, on average, more affluent than dependent aged and hence are more likely to be able to save. Third, aged households with two or more persons are, on average, more affluent than one-person households and hence are more likely to be able to save.

The seminal paper by Hayashi, Ando, and Ferris (1988) is an important addition to the literature on the saving behavior of the aged because it is the first attempt to estimate the saving behavior of aged persons living in extended families. The ingenious method they use to indirectly infer the stock (flow) of saving of such aged is to assume that the stock (flow) of saving of younger generations living in extended families is identical to that of similarly aged nuclear families and to compute the stock (flow) of saving of older generations living in extended families as the total stock (flow) of saving of extended families minus the stock (flow) of saving of the younger generation.[1] They apply this method to micro data from the 1984 National Survey of Family Income and Expenditure, which is conducted every five years by the Statistics Bureau of the Ministry of Internal Affairs and Communications of the Government of Japan.

Hayashi, Ando, and Ferris (1988) present the results for both the stock and flow of saving, but in my opinion, the results for the flow of saving are more reliable because (1) they do not need to be adjusted for the so-called cohort effect, (2) they do not include intergenerational transfers, and (3) they do not include capital gains and losses, allowing us to focus on out-of-pocket saving. Therefore, I focus on the results for the flow of saving in what follows.

Hayashi, Ando, and Ferris's (1988) results show that the flow of saving of the aged living in extended families is positive for all but the oldest aged (i.e., those aged 87). Moreover, their results for the independent aged show that their flow of saving is also positive except for those aged 80 or older. They do find, however, that one-person aged households of all ages (who are relatively poor) dissave. Thus, Hayashi, Ando, and Ferris's (1988) results provide some (but not overwhelming) support for the life-cycle model, with the majority of the aged in Japan continuing to save and only the oldest aged (i.e., those aged 80 or older) and one-person aged households dissaving.

However, the fact that one-person aged households of all ages dissave and the fact that most aged dissave eventually (i.e., when they reach their eighties) provide some support for the life-cycle model. Moreover, one of the few defects of Hayashi, Ando, and Ferris's (1988) analysis is that it fails to control for the employment status of the aged. The life-cycle model predicts not that *all* aged will dissave but rather that the *retired* aged will dissave, and it is highly likely that Hayashi, Ando, and Ferris (1988) would have found more widespread evidence of dissaving if they had focused on the retired aged. Put differently, I believe that the fact that they find any evidence at all of dissaving, even though they include the working aged in their sample, constitutes strong evidence in favor of the life-cycle model.

One analysis that is closely related to that of Hayashi, Ando, and Ferris (1988) and that takes account of the employment status of the aged to some extent is that of Ishikawa (1988), who uses data from the Family Saving Survey, conducted by the Statistics Bureau of the Ministry of Internal Affairs and Communications of the Government of Japan, to analyze the saving behavior of the dependent and independent aged in Japan. Ishikawa (1988) finds that the presence of cohabiting aged parents has virtually no impact on the saving rate of young households, which suggests that aged parents cohabiting with their children are neither saving

nor dissaving, but he has no information on whether the cohabiting parents are working or retired. However, he *can* break down the sample of independent aged into those who are working and those who are retired and finds that the average total saving rates of salaried workers (including corporate managers), self-employed and retired independent aged households are 15.8 percent, 11.5 percent, and 1.5 percent, respectively, and that their average financial saving rates are 8.5 percent, 4.7 percent, and –6.9 percent, respectively. Thus, he finds, as expected, that the saving rates of working and retired aged are very different, with the former being positive and much higher than the latter, and the latter being roughly zero in the case of the total saving rate and negative and large in absolute magnitude in the case of the financial saving rate. Thus, the clearest evidence of dissaving by the aged can be found in Ishikawa's (1988) analysis of the independent retired aged, which is the only analysis discussed so far that takes account of the individual's employment status.

Another related study is Dekle (1990), which analyzes micro data from the "Survey on the Living Behavior of the Aged (LBC Survey)," conducted by the Sociology Department of the University of Tokyo for the Postal Annuities Bureau of the former Ministry of Posts and Telecommunications, a unique survey that samples dependent as well as independent aged. Dekle (1990) finds that the total wealth of the dependent as well as independent aged in Japan *increases* with age and that age has a positive but insignificant impact on the wealth holdings of the aged in Japan, which implies that, if anything, the aged continue to save in Japan, but he does not control for employment status.

Finally, data from the Household Survey of Financial Asset Choice, conducted by the Institute of Posts and Telecommunications Policy of the former Ministry of Posts and Telecommunications, show that the independent retired aged dissave, on average, in Japan and that even the working aged dissave, on average, at least after the age of 70 (see Horioka, et al.,

1996, and Horioka et al., 2002).   This constitutes even stronger support for the applicability of the life-cycle model of saving in Japan.

Thus, the previous evidence on the saving behavior of the aged in Japan is mixed, but analyses that take account of employment status invariably find that the *retired* aged dissave, as predicted by the life-cycle model.

3. Newly Available Data on the Saving Behavior of the Aged in Japan

In this section, I present newly available survey data on the saving behavior of the aged in Japan.   Unfortunately, no direct data on the saving behavior of the retired aged were available in Japan until recently.   The Family Income and Expenditure Survey, conducted by the Statistics Bureau of the Ministry of Internal Affairs and Communications of the Government of Japan, collects information on saving rates ('ratios of surplus') by age group of the household head, but the problem is that, until recently, data on saving rates were collected only for salaried-worker households (households in which the household head is a salaried worker). Thus, even the data for aged households pertained only to aged households *whose head was still working as a salaried worker*, and no information was available on the saving rates of the *retired* aged even though it is their saving rate that is of most interest.

Table 1 shows data on saving rates by age group of the household head for salaried-worker households with two or more members for the 1990-2008 period, and as can be seen from this table, the saving rates of aged households (households whose head is aged 60 or older) is lower than that of younger households but is positive and large in absolute magnitude nonetheless, ranging from 7.8 to 22.6 percent.   Looking at trends over time, the saving rates of aged salaried-worker households declined more or less steadily during the 1995-2006 period, from 22.6 percent in 1993 and 1995 to 7.8 percent in 2006, but rose to 9 to 11 percent in

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2007-08 and has always been positive and relatively large in absolute magnitude, even in recent years. However, these figures are not necessarily contrary to the life-cycle model because they pertain to aged salaried-worker households. What is needed is information on the saving rates of *retired* aged households.

Fortunately, the Family Income and Expenditure Survey started collecting saving rate data and other data on various categories of aged households, including retired aged households, in 1995. Thus, it became possible for the first time to know the saving rate of the retired aged. Moreover, these data overcome two of the three data deficiencies discussed in section 2. First, data are available on aged couples, aged one-person households, and households all of whose members are aged, thus circumventing the problem of cohabiting non-aged household members, and second, data are available on one-person households beginning in 2005.

Table 2 shows data on the saving rates of various categories of retired aged households for the 1995-2008 period, and as can be seen from this table, the saving rate of all six categories of retired aged households is negative and large in absolute magnitude. For example, the saving rate of households with a retired head aged 60 or older ranged from -9.9 to –31.3 percent, that of households with a retired head aged 65 or older ranged from -8.8 to -25.5 percent, that of retired households all of whose members are aged ranged from -5.2 to -25.0 percent, that of retired aged couples with a husband aged 65 or older and wife aged 60 or older ranged from -4.0 to -25.5 percent, that of retired aged couples with both spouses aged 65 or older ranged from -0.5 to -20.5 percent, and that of retired one-person households aged 65 or older ranged from -20.0 to -28.0 percent. Thus, the retired aged are dissaving as much as 25 to 31 percent of their disposable income every year![2]

Trends over time differ from one category of retired aged households to another, but most categories show a sharp increase (in absolute magnitude) in dissaving over most of the

period for which data are available. For example, the dissaving rate of households with a retired head aged 60 or older increased sharply (in absolute magnitude) from -9.9 percent in 1997 to -31.3 percent in 2008, that of households with a retired head aged 65 or older increased sharply (in absolute magnitude) from -8.8 percent in 2000 to -25.5 percent in 2008, that of retired households all of whose members are aged increased sharply (in absolute magnitude) from -5.2 percent in 2000 to -25.0 percent in 2007 before declining slightly, that of retired aged couples with a husband aged 65 or older and a wife aged 60 or older increased sharply (in absolute magnitude) from -4.0 percent in 2000 to -25.5 percent in 2008, and that of retired aged couples with both spouses aged 65 or older increased sharply (in absolute magnitude) from -0.5 percent in 2000 to -20.5 percent in 2008 (data have not been available for a long enough period to discern trends in the dissaving rates of retired one-person households aged 65 or older). The main exceptions to the sharp upward trend in the absolute magnitude of dissaving rates are the 1995-1997 period in the case of households with a retired head aged 60 years or older and the 1995-2000 period in the case of retired aged households and retired aged couples with a husband aged 65 or older and a wife aged 60 or older, when their dissaving rates declined in absolute magnitude. Thus, all categories of retired aged households have shown a sharp downward trend in the absolute magnitude of their dissaving rates since at least 2000.

In order to shed light on the reasons for the sharp increase in dissaving during the 2000-08 period, I compare the income and expenditures of retired aged households in 2000 and 2008. Unfortunately, this comparison can be done only for retired aged couples. It cannot be done for households with a retired head aged 60 or older, households with a retired head aged 65 or older, or retired aged households because these groups do not include one-person households until 2004 and include such households beginning in 2005, making it impossible to obtain a consistent time series for the entire 2000-08 period, nor can it be done

for retired one-person households because data are not available for this group until 2005. Moreover, the data on retired aged couples are the "cleanest" data because they are not contaminated by the saving, etc., of cohabiting non-aged household members.

Table 3 shows a decomposition of the increase in the absolute magnitude of the dissaving rate of retired aged couples with a husband aged 65 or older and a wife aged 60 or older (retired aged couples with both spouses aged 65 or older) during the 2000-2008 period, and as can be seen from this table, the main cause of the increase is the 8.0 (7.3) percent decline in social security benefits (which explains 45.0 (42.8) percent of the increase in dissaving), the second most important cause is the 59.5 (59.4) percent increase in non-living expenditures (mostly direct taxes and social insurance premiums) (which accounts for 30.1 (30.1) percent of the increase in dissaving), and the third most important cause is the 4.8 (4.2) percent increase in consumption expenditures (which accounts for 27.7 (30.1) percent of the increase in dissaving).   The rate of increase in medical care spending was a whopping 19.3 (23.0) percent in the case of retired aged couples with a husband aged 65 or older and a wife aged 60 or older (retired aged couples with both spouses aged 65 or older) during the 2000-08 period, and thus the increase in medical care spending accounted for a full 21.7 (24.5) percent of the increase in consumption expenditures during this period.   This is a bit surprising because one would have expected the introduction of a public long-term care insurance system in 2000 to *reduce* the out-of-pocket medical care spending of aged households.

The decline in social security benefits and the increase in non-living expenditures presumably reduce consumer welfare, whereas the increase in consumption expenditures presumably increases consumer welfare, and since the former two account for 75.2 (72.8) percent or about three-quarters of the increase in dissaving in the case of retired aged couples with a husband aged 65 or older and a wife aged 60 or older (retired aged couples with both

spouses aged 65 or older) during the 2000-08 period, it seems likely that the increase in dissaving led, on balance, to a decrease in consumer welfare.

Public pension benefits were reduced in a number of ways as part of the 2000 reforms (for example, the earnings-related component was reduced by 5 percent for new retirees, the wage indexation of benefits was temporarily suspended, an earnings test was imposed on those aged 65-69, and it was decided to gradually raise the pensionable age from 60 to 65 starting in 2001 (see Horioka (2001) and Horioka, Suzuki, and Hatta (2007) for more details)), and thus it is not surprising that public pension benefits fell so sharply after 2000. The fact that there was an especially sharp decline in social security benefits in 2001 suggests that the impact of the aforementioned five percent cut in social security benefits was especially significant.

As for why social insurance premiums have increased so sharply, the main reason is presumably the introduction of the public long-term care insurance program in 2000, which collects premiums from everyone over the age of 40 with no upper limit. Social insurance premiums for public old-age pensions are not collected after the age of 65 so increases therein cannot explain increases in the social insurance premiums of retired aged couples (except when the wife is less than 65).

Note, finally, that there are a number of conceptual defects in the saving rate concept used in the Family Income and Expenditure Survey. First, gross concepts of saving and disposable income (gross of depreciation) are used even though net concepts are preferable. Second, the imputed rent on owner-occupied housing is not included in consumption or in disposable income, even though it should be. Thus, the saving rate concept used in the Family Income and Expenditure Survey is as follows:

SYG = SG/YDG,

where SYG = the gross household saving rate

SG = gross saving

YDG = gross disposable income

Converting saving and disposable income to net terms and adding the imputed rent on owner-occupied housing to disposable income yields the following saving rate:

$SYN = (SG - D)/(YDG - D + IR)$,

where SYN = the net household saving rate

D = depreciation on owner-occupied housing

IR = imputed rent on owner-occupied housing

If we assume that depreciation can be calculated as

$D = d*H$,

where d = the depreciation rate

H = the market value of owner-occupied housing

and that imputed rent on owner-occupied housing can be calculated as

$IR = (r + d)*H$,

where r = the interest rate

then the "correct" household saving rate can be rewritten as follows:

$SYN = (SG - d*H)/(YDG - d*H + (r + d)*H)$

which reduces to

$SYN = (SG - d*H)/(YDG + r*H)$

Thus, in the case of negative saving rates, the saving concept used in the Family Income and Expenditure Survey is upward biased (in absolute magnitude) because the numerator is upward biased by the inclusion of depreciation but is downward biased (in absolute magnitude) by the exclusion of the foregone interest income from holding one's wealth in the form of owner-occupied housing, meaning that the direction of the net bias is indeterminate *a*

priori. However, since interest rates have been close to zero in recent years, the former bias is presumably larger (in absolute magnitude) than the latter bias, leading to an upward bias (in absolute magnitude), on balance, meaning that correcting these biases would cause the dissaving rates of the retired aged in Japan to be even larger (in absolute magnitude) than the unadjusted figures suggest.[3]

I look finally at the rates of financial decumulation of retired households, which are defined as the negative of the ratio of net financial saving (net purchases of financial assets minus the net increase in liabilities) to beginning-of-period financial net worth (holdings of financial assets net of liabilities). I do not look at rates of total decumulation because no data are available on the stock of real assets (land/housing) and because most Japanese households do not draw down their stock of real assets (land/housing). Table 4 shows data on the rates of financial decumulation of retired aged couples with a husband aged 65 or older and a wife aged 60 or older (retired aged couples with both spouses aged 65 or older) during the 2003-2008 period, and as this table shows, the rates of financial decumulation of such households ranged from 1.94 to 2.39 percent (1.01 to 1.98 percent), which implies a time horizon of 41.8 to 51.6 (50.5 to 98.8) years if we assume that households decumulate their assets at a constant rate from now until they pass away. Thus, retired households in Japan decumulate their financial saving, as predicted by the life-cycle model. Their rates of financial decumulation seem low at first glance but are in the right ballpark if we take account of the defect in the saving data noted earlier (the upward bias caused by the inclusion of depreciation, etc.), lifespan uncertainty, and/or the presence of a bequest motive. Another possibility is that unexpectedly large increases in life expectancy made it necessary for the aged to reduce their rate of decumulation.[4]

As for trends over time in the rates of financial decumulation of retired aged couples, they show no clear trend in the case of retired aged couples with a husband aged 65 or older and

a wife aged 60 or older but some evidence of an inverted U-shaped trend during the 2003-2008 period in the case of retired aged couples with both spouses aged 65 or older, with such households showing an increase in their rates of financial decumulation from 1.01 percent in 2003 to 1.98 percent in 2006 followed by a drop back down to the original level of 1.01 percent in 2008.   Thus, trends over time in the rates of financial decumulation of retired households are broadly consistent with trends over time in the saving rates of such households in the case of retired aged couples with both spouses aged 65 or older during the 2003-2006 period but not for other households or other time periods.

In sum, it appears that the tendency of the retired aged in Japan to dissave has always been observed (at least since 1995) and that this tendency has become even more pronounced in recent years.   This suggests that the life-cycle model of saving is highly applicable in Japan and that it has become even more applicable in recent years.

4. Other Evidence on the Applicability of the Life-Cycle Model in Japan

Note, moreover, that various other types of data and evidence also provide strong support for the applicability of the life-cycle model of saving in Japan (see, for example, Hayashi, 1986, 1997; Horioka, 1984, 1993, 2002; and Horioka et al., 2000).   For example, Horioka and Watanabe (1997) decompose total household saving in Japan into saving for individual motives and find that saving for retirement is by far the largest component, accounting for a full 62.5 percent of total household saving.

As another example, econometric analyses based on time series data as well as cross-country data (see, for example, Horioka, 1989, 1997, and Horioka and Yin, 2009) provide strong evidence that the age structure of the population has a significant impact on household, private, and national saving rates, as predicted by the life-cycle model of saving.

As yet another example, Horioka (2002) and Horioka et al. (2000) find that the vast majority of bequests in Japan are either unintended or accidental, arising from lifespan uncertainty or are selfishly motivated bequests that are left in exchange for care, attention, and/or financial assistance provided by one's children during old age, both of which are consistent with the life-cycle model of saving.

As a final example, Movshuk (2009) finds evidence of a double-humped age-saving profile in Japan as well as in the other countries he studies, and although his results do not yield information on the absolute level of the saving rate at each age, the sharp decline he finds at older ages strongly suggests that saving rates become negative in old age.

5. Conclusion

In this paper, I surveyed the previous literature on the saving behavior of the aged in Japan and then presented some survey data on the saving behavior of the aged in Japan that became available recently.   To summarize the main findings of this paper, virtually all previous studies as well as the newly available data I analyze have found that the retired aged dissave and that even the working aged dissave, at least at advanced ages.   Moreover, there has been a sharp increase in the dissaving of the retired aged since 2000, with the increase being due primarily to reductions in social security benefits, increases in consumption expenditures, and increases in taxes and social insurance premiums.   These findings are consistent with the life-cycle model and suggest that this model is highly applicable (and becoming increasingly applicable over time) in the case of Japan.

Thus, there does not appear to be any evidence of the discrepancy between the macro evidence and the micro evidence found by Weil (1994) in the case of Japan, with both types of evidence suggesting that the life-cycle model is highly applicable in the case of Japan.

Moreover, most studies of dissaving behavior of the aged for countries other than Japan do not take account of employment status, and if they did, I believe that they would also find more evidence of dissaving, at least by the retired aged, and hence no discrepancy between the macro evidence and the micro evidence.

I turn next to directions for further research. Few studies have examined the saving behavior of the dependent aged (the aged who live with their children) in Japan (the only ones of which I am aware are Hayashi, Ando, and Ferris (1988) and Ishikawa (1988)), and moreover, none of these studies have looked at the saving behavior of the *retired* dependent aged. Since the proportion of the aged who live with their children is still high (about one-half) in Japan and since a crucial implication of the life-cycle model is that the retired aged dissave, it is important to analyze the saving behavior of the retired dependent aged and to examine whether they dissave, as predicted by the life-cycle model.

I turn finally to the policy implications of my findings. Japan's population is aging at the fastest rate in human history, and Japan will soon have the most aged population in the world. My finding that the (retired) aged dissave in Japan and that their dissaving rate has been increasing over time (in absolute magnitude) implies that this rapid population aging will cause a sharp decline in Japan's household saving rate. Since Japan's household saving rate had already fallen to about 3 percent by 2007, according to national accounts data, a further decline implies that Japan's household saving rate, which was formerly one of the highest in the world, will soon become zero or negative, which has important ramifications for global imbalances.

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Calendar year	All ages	29 years or younger	30-39 years	40-49 years	50-59 years	60 or older
Table 1: Saving Rates by the Age Group of the Household Head, 1990-2008						
1990	24.7	24.0	27.1	24.0	25.1	19.0
1991	25.5	25.8	27.2	25.1	25.9	21.0
1992	25.5	26.0	28.3	25.2	24.7	20.7
1993	25.7	25.3	29.0	24.9	24.9	22.6
1994	26.6	27.6	28.5	25.2	28.2	20.5
1995	27.5	28.0	31.3	25.4	28.3	22.6
1996	28.0	28.1	31.4	27.1	28.4	21.8
1997	28.0	30.4	31.3	26.9	28.3	22.4
1998	28.7	29.5	32.8	28.0	28.7	22.5
1999	28.5	28.8	32.7	28.5	27.3	21.0
2000	27.9	25.9	32.3	29.1	26.8	17.9
2001	27.9	24.0	33.8	27.5	27.0	18.4
2002	27.0	26.1	33.3	27.8	25.5	13.7
2003	25.9	28.4	32.3	27.0	24.1	12.1
2004	25.7	24.6	31.4	27.9	23.5	9.4
2005	25.3	26.9	29.7	28.3	25.3	8.6
2006	27.5	22.7	32.6	29.8	27.8	7.8
2007	26.9	26.3	32.5	30.1	25.5	10.8
2008	26.6	23.9	30.8	30.3	26.5	8.2

Notes: The figures show the saving rates ("ratios of surplus") of salaried worker households with two or more members.

Source: Statistics Bureau, Ministry of Internal Affairs and Communications, Government of Japan, ed., *Annual Report on the Family Income and Expenditure Survey (Income and Expenditure)* (Tokyo: Japan Statistical Association), various editions.

Table 2: Saving Rates of the Retired Aged in Japan, 1995-2008

Calendar year	Households with a retired head aged 60 years or older	Households with a retired household head aged 65 years or older	Retired aged households	Retired aged couples with a husband aged 65 or older and a wife aged 60 or older	Retired aged couples with both spouses aged 65 or older	Retired one-person households aged 65 or older
1995	-11.5	na	-9.2	-9.3	na	na
1996	-10.8	na	-6.0	-5.8	na	na
1997	-9.9	na	-6.3	-5.1	na	na
1998	-11.3	na	-6.1	-5.4	na	na
1999	-14.6	na	-7.4	-6.0	na	na
2000	-16.2	-8.8	-5.2	-4.0	-0.5	na
2001	-20.4	-13.3	-14.5	-14.3	-8.3	na
2002	-26.0	-17.5	-19.6	-18.3	-13.4	na
2003	-24.6	-16.8	-16.4	-15.7	-8.9	na
2004	-29.2	-23.2	-22.0	-21.4	-15.2	na
2005	-27.4	-20.7	-21.0	-17.4	-12.9	-28.0
2006	-26.8	-21.2	-21.8	-23.0	-18.7	-20.0
2007	-28.8	-24.9	-25.0	-24.2	-17.7	-26.1
2008	-31.3	-25.5	-24.4	-25.5	-20.5	-22.4

Notes: The figures show saving rates ("ratios of surplus"). The first two columns include only households with two or more persons until 2004, and all households from 2005 onwards. Until 2004, "retired aged households" denote households with two or more persons in which all males are 65 years or older, all females are 60 years or older, and there is at least one member who is 65 years or older. From 2005 onwards, "retired aged households" denotes retired one-person households aged 65 or older and retired households with two or more persons in which all males are 65 or older, all females are 60 years or older, and there is at least one member who is 65 or older.

Source: Statistics Bureau, Ministry of Internal Affairs and Communications, Government of Japan, ed., *Annual Report on the Family Income and Expenditure Survey (Income and Expenditure)* (Tokyo: Japan Statistical Association), various editions.

Table 3: Decomposition of the Decline in Household Saving of Retired Aged Couples, 2000-08						
Component	2000	2008	2008 (2000 prices)	Real change	Percentage change	Contribution of each factor
Retired aged couples with a husband aged 65 or older and a wife aged 60 or older						
Income	244,293	226,043	227,154	-17,139	-7.02	42.16
Social security benefits	228,619	209,282	210,311	-18,308	-8.01	45.04
Other forms of income	15,674	16,761	16,843	1,169	7.46	-2.88
Consumption expenditures	232,697	242,773	243,967	11,270	4.84	27.72
Medical care	12,706	15,432	15,153	2,447	19.26	6.02
Non-living expenditures	20,576	32,657	32,818	12,242	59.49	30.11
Direct taxes	10,220	15,223	15,298	5,078	49.69	12.49
Social insurance premiums	10,326	17,406	17,492	7,166	69.39	17.63
Other non-consumption expenditures	29	28	28	-1	-2.97	0.00
Surplus (saving)	-8,979	-49,388	-49,631	-40,652	-452.74	100.00
Retired aged couples with both spouses aged 65 or older						
Income	245,615	228,767	229,892	-15,723	-6.40	39.82
Social security benefits	231,782	213,848	214,899	-16,883	-7.28	42.75
Other forms of income	13,833	14,919	14,992	1,159	8.38	-2.94
Consumption expenditures	226,651	237,369	238,536	11,885	5.24	30.10
Medical care	12,661	15,860	15,573	2912	23.00	7.37
Non-living expenditures	20,014	31,739	31,895	11,881	59.36	30.09
Direct taxes	10,007	14,517	14,588	4,581	45.78	11.60
Social insurance premiums	9,972	17,200	17,285	7,313	73.33	18.52
Other non-consumption expenditures	35	22	22	-13	-36.83	-0.03
Surplus (saving)	-1,050	-40,340	-40,538	-39,488	-3,760.79	100.00

Notes: The figures for 2008 were converted to 2000 prices by dividing the figures for 2008 by the ratio of the 2008 Consumer Price Index (CPI) to the 2000 CPI. The overall CPI was used in all cases except in the case of medical care expenditures, in which case the CPI for medical care expenditures was used.

Source: Statistics Bureau, Ministry of Internal Affairs and Communications, Government of Japan, ed., *Annual Report on the Family Income and Expenditure Survey (Income and Expenditure)* (Tokyo: Japan Statistical Association), various editions.

Table 4: Rates of Decumulation of Retired Aged Couples, 2003-08

Calendar year	Beginning of year financial net worth (10,000 yen)	Flow of financial saving per month (yen)	Rate of decumulation (percent per year)	Implied Time horizon (years)
Retired aged couples with a husband aged 65 or older and a wife aged 60 or older				
2003	2,331.0	-38,024	1.96	51.09
2004	2,345.0	-46,765	2.39	41.79
2005	2,428.5	-39,307	1.94	51.49
2006	2,442.5	-47,602	2.34	42.76
2007	2,376.0	-46,575	2.35	42.51
2008	2,354.0	-38,024	1.94	51.59
Retired aged couples with both spouses aged 65 or older				
2003	2,351.0	-19,825	1.01	98.82
2004	2,317.0	-31,867	1.65	60.59
2005	2,384.5	-30,824	1.52	65.66
2006	2,439.0	-40,297	1.98	50.51
2007	2,360.5	-33,769	1.71	58.63
2008	2346.0	-19,825	1.01	98.61

Notes: The flow of financial saving is defined as net purchases of financial assets minus the net increase in liabilities, financial net worth as beginning-of-year holdings of financial assets net of liabilities, and the rate of financial decumulation as the negative of the ratio of financial saving to beginning-of-year financial net worth, and the implied time horizon as the reciprocal of the rate of financial decumulation.

Holdings of financial assets and liabilities are available for the year as a whole only, so I estimated beginning-of-year financial net worth by taking the average of the annual averages for the previous and current calendar years.

Sources: Statistics Bureau, Ministry of Internal Affairs and Communications, *Annual Report on the Family Income and Expenditure Survey (Income and Expenditure* and *Savings and Liabilities)*, various issues (Tokyo, Japan: Japan Statistical Association).

Endnotes

[1] Hayashi, et al. (1988) also use another method in which they examine how the stock (flow) of saving of extended families in which the younger generation is of a certain age changes as the age of the older generation increases, but the results based on this method are not discussed here due to space limitations.

[2] The saving rate of unemployed households is a good proxy for the saving rate of retired aged households because the vast majority of unemployed households (92 to 95 percent) are retired aged households (defined as households with a retired head aged 60 or older), and the saving rate of unemployed households fluctuated in the -10 to -25 percent range during the 1989-1994 period. Thus, it appears that the retired aged have been dissaving considerable portions of their incomes since at least 1989. I am grateful to Oleksandr Movshuk for this point.

[3] The fact that the household saving rate was about 3 percent in 2007 according to the National Accounts but about 27 percent in the same year according to the Family Income and Expenditure Survey suggests how large the upward bias in the saving rate data from the Family Income and Expenditure Survey is.

[4] I am grateful to Kenichi Ueda for this point.