Wealth Dynamics during Retirement: Evidence from Population-Level Wealth Data in Sweden

By Martin Ljunge, Lee Lockwood, and Day Manoli

September 2014

ABSTRACT

In this paper, we document the wealth dynamics of retirees in Sweden. We focus on periods surrounding changes in household composition, due to divorce or spousal death. We find patterns similar to the case of the US, as documented by Poterba et al. (2011). In particular, during periods in which household composition remains unchanged wealth declines slowly, if at all, whereas periods in which household composition changes are characterized by large declines in wealth. The similarity of these patterns of wealth evolution during retirement in Sweden to those documented in the US is somewhat surprising given the large differences in these countries' institutions, especially the extent of coverage of long-term care costs. These findings suggest that the large declines in assets around the time of spousal death in the US documented by Poterba et al. (2011) are unlikely to be entirely driven by increased medical expenditure around that time, and that even the apparently quite comprehensive social insurance programs in Sweden may not completely insure retirees against household composition shocks.

This research was supported by the U.S. Social Security Administration through grant #RRC08098400-06-00 to the National Bureau of Economic Research as part of the SSA Retirement Research Consortium. The findings and conclusions expressed are solely those of the author(s) and do not represent the views of SSA, any agency of the Federal Government, or the NBER.

1. Introduction

Retirees' decisions about how quickly to draw down their assets have important implications for their own and their families' welfare, for means-tested government programs, and for economies more generally. In many countries there has been a shift in retirement financing from government pensions and employer-based pensions, which mandate particular levels of saving during working years and provide income for life during retirement years, to retirement accounts managed by individuals and households, which leave up to households the important decisions of how much to save and how to draw down their assets during retirement. Moreover, this shift has been occurring at the same time as population aging, which means that the consequences of retirees' choices have larger impacts on the aggregate economy, given their increased share of the population. For example, government spending on means-tested programs that provide benefits to retirees who have little resources of their own depends strongly on the choices retirees' make in terms of how quickly to draw down their assets.

In this paper, we study the evolution of wealth during retirement in Sweden. We start by documenting how the distribution of wealth evolves throughout the retirement years, focusing on households whose composition remains constant during the time period in question. This establishes a "baseline" of how wealth evolves during "normal" periods without major shocks. Next we move to the heart of our paper, which is an analysis of the effects of household composition shocks (such as divorce and spousal death) on the evolution of wealth. Our analysis follows closely Poterba, Venti, and Wise's (2011) analysis of US retirees.

In terms of both the evolution of wealth during retirement and the effects of household composition shocks, we find patterns that are strikingly similar to the US case. In particular, we find that, during "typical" years that do not include a major change in household composition, wealth is not drawn down rapidly and in fact increases during many periods, especially during the early years of retirement up to the early 70s. One factor that likely contributes to this pattern during the period we study is the contemporaneous rise in asset prices. Despite this, the patterns do not indicate that retirees are drawing down their wealth rapidly. This finding matches the findings from the US. This match is interesting given the very different institutional environments facing retirees in Sweden and the US, and is consistent with the idea that saving in the US might not be that affected by, say, reforms that increased coverage of long-term care costs.

In contrast to the mostly slow evolution of assets in "normal" periods of constant household composition, we find that changes in household composition have a large and immediate effect on household assets and assets per person. Both divorce and spousal death lead to large declines in household assets, even if assets are measured on a per-person basis in the case of divorce. This finding, especially the finding of the large effect of spousal death, is somewhat surprising given the extensive nature of social insurance programs in Sweden. Its similarity with the US case as documented by Poterba, Venti, and Wise (2011) suggests that the fundamental cause of the asset declines is likely to lie in some feature of the economic environment that is common across the American and Swedish cases. This suggests looking beyond explicit costs of medical spending and long-term care to a broader set of costs that arise at the time of changes in household composition.

Relation of our paper to the literature

A growing literature examines the financial decisions in the retirement-phase of the life cycle. This literature has largely, although not exclusively, focused on the US. One of the main facts this literature seeks to understand is households' relatively slow drawdown of wealth during retirement, which stands in sharp contrast to the predictions of the simplest life cycle models. Recent work has focused on the importance of medical spending risk (e.g., De Nardi et al. 2010, Ameriks et al. 2011,

Poterba et al. 2011). This work and other related work has also emphasized the role of means-tested programs in mitigating the effects of various risks and crowding out private saving (e.g., Hubbard et al. 1995 and Seshadri et al. 2006).

The paper most closely related to ours is Poterba et al. 2011. They examine the effects of changes in household composition on the evolution of wealth during retirement in the US. They find that changes in household composition immediately and significantly reduce wealth levels relative to households whose composition remains unchanged. Poterba et al. discuss a variety of explanations for these patterns, and highlight the role of health costs as an important area for further research. We follow their methods closely in our analysis.

One paper that is similar in spirit to ours in making explicit comparisons between Sweden and the US is Nakajima and Telyukova (2013). They document wealth drawdown during retirement in the US and many European countries. Due to data limitations, they focus on cross-sectional (as opposed to panel) age-wealth profiles and show that these profiles are more steeply decreasing with age in Sweden than in the US. They show that these facts can be reconciled with a numerical life cycle model in which the key difference driving faster apparent drawdown in Sweden is the smaller medical spending risk there. Our paper is an important addition to this literature in that we have access to a much richer data source that also enables us to construct (panel) life cycle profiles. These life cycle profiles suggest slower rates of drawdown in Sweden than the rates from the cross-sectional relationship between age and wealth. This is important for quantifying the importance of medical spending risk in retirees' saving behavior.

This paper proceeds as follows. The next section provides background on the Swedish institutions most relevant to the saving decisions of retirees and describes

the data. The following section describes the empirical approach and the results. The final section concludes.

2. Institutional Background and Data

The key feature of Sweden that makes it such a promising setting for our analysis is the extensive social insurance programs it has. In contrast to US social insurance programs, Swedish social insurance programs cover not only acute medical care but also long-term care, such as home health care and nursing home stays. In the US, such care is not covered by the universal social insurance program for the elderly, Medicare, and is instead only covered for people with very little in the way of income or assets, through the means-tested Medicaid program. This means that retirees must nearly exhaust their wealth before qualifying for coverage. Yet despite the significant financial risk posed by uninsured long-term care costs, only about 10% of retirees in the US own long-term care insurance to cover these costs. As a result, retirees in the US face much greater financial risk from health problems than retirees in Sweden do.

Data

We use registry data on individual panels over the period 1999 to 2007. The data draw information from several sources; demographic information from the population registry, and income and wealth information from the tax authorities. We use a full population sample of the 1999 population who are followed for 9 years. The only individuals that disappear from the data are those who die or emigrate.

2.1 Wealth

Data on wealth are from the wealth data base. The main content of the data base is market values of real assets, financial assets, and debt. Most of the holdings are reported by third parties like banks and registries of real estate ownership. The data covers the full population from year 1999 through 2007. Nominal wealth is transformed into real 1999 SEK using the consumer price index. Inflation was quite low during the period, on average 1.5% per year.

Household wealth is computed by summing the wealth over the household members. Total wealth includes both real and financial assets. Net wealth is computed as assets minus debts. Real assets include residential housing, apartments ("condos"), summer homes, farms, and rental residences. Financial assets include bank accounts, stock holdings, bonds, mutual funds, and insurance products. Debt includes mortgages, private loans, and student loans.

The basis for wealth data collection was the wealth tax. The tax was abolished in 2006, and 2007 was the last year the data was collected. There is no registry data source for later years.

2.2 Pure life cycle samples

We study several cohorts of people in order to describe fully the evolution of wealth over the latter part of the life cycle. To study pure life cycle profiles of wealth we restrict the sample to households who do not change size or civil status over the period. Constant single households have one member and no civil status change and constant two person households have two members and no civil status change between 1999 and 2007. For the two member households we consider the characteristics (age) of the husband. Basic summary statistics are presented in Table 1.

The two constant household samples are studied both on average for individuals age 36 and above and for specific cohort groups.¹ Seven groups are defined to

¹ There is also a requirement that there is information on age, civil status, and wealth.

include five birth cohorts. The youngest group is those born between 1959 and 1963, followed by those born between 1949 and 1953, and so on until the oldest group for those born between 1899 and 1903. 1451 centennials are observed in 2007.

	1 person cor	nstant	2 persons constant			
	households		households			
	Mean	St. Dev.	Mean	St. Dev.		
Age	64.4	15.0	62.5	12.4		
Household net						
wealth	574,423	2,566,063	1,596,027	5.19e+07		
Observations	11,751,121		6,989,570			
	1	A A A	D 1 1 1 0 0 0 0			

Table 1. Summary statistics.

Note: Sample of birth year 1963 and earlier. Period: 1999-2007. 2 person households consider husband characteristics.

2.3 Household transition groups

Four household transition groups are defined to allow for an analysis of how household transitions affect wealth similar to PVW. First, there are the constant single households $(1 \rightarrow 1)$ who are defined as having one household member both in the current and the previous year. Second, there are the constant two person households $(2 \rightarrow 2)$ who are defined as having two household members in the current and previous year, as well as the same civil status code in both years. Third, there are households who go from two persons to one due to divorce $(2 \rightarrow 1,$ divorce). They are defined by having 1 person in the current year, 2 persons in the previous year, the current year civil status code being divorced, and the previous year's civil status code not being divorced. Fourth, there are households who transition from two persons to one due to death $(2 \rightarrow 1, widow)$. The definition is analogous to that for the (2 -> 1, divorce) group but uses the civil status code widow/widower instead of divorced.

The sample when studying household transitions is restricted to individuals born 1943 and earlier. Individuals are hence age 56 and above in our initial sample year 1999. This corresponds to our objective to study wealth dynamics during the latter part of the life cycle, in particular around and following retirement.

In 2000 there are about 940,000 stable one-person households and 1,138,000 individuals in stable two-person households. There are 1,378 transitions to one-person households due to divorce and 25,552 due to death. In 2007, there are just over a quarter of one million individuals in the first group, a 775,696 in the second, 581 in the third, and 21,366 in the fourth group.

There are relatively few observations for transitions to divorce. These four household transition groups don't cover the full sample. In addition, there are for example transitions from one to two person households and single households who die.

For each household transition group and pair of years, percentiles of net household wealth are computed for both year t and t-1 in the year pair. Means of the percentiles across the years are presented in Table 2. Table 2. Summary statistics, household transition groups.

Household transition group										
	1 -> 1		2 -> 2		2 -> 1, divorced		2 -> 1, widowed			
	Mean by year									
	t-1	t	t-1	t	t-1	t	t-1	t		
Household net wealth:										
50th percentile	269226	278112	1015886	1075553	495351	199692	746400	498689		
75th percentile	834204	874027	1963864	2074543	1365103	746624	1545259	1158585		
90th percentile	1723152	1803494	3334431	3501602	2755877	1630876	2742096	2112418		
95th percentile	2518072	2629987	4602942	4811753	4095460	2445879	3855007	2930513		

Note: Household wealth percentiles are computed by pairs of years. Means are computed of percentiles across years. Amounts in 1999 SEK. The period t runs from 2000 through 2007.

3. Empirical Analysis

3.1 Lifecycle Profiles of Net Wealth, Financial Assets, Real Assets and Debt

This section presents a graphical empirical analysis of wealth accumulation and decumulation patterns in Sweden. We start by examining net wealth measures by age, and then turn to measures of financial assets, real assets and debt. To make the analysis more transparent, we focus on households that are constant single persons or constant married couples over the analysis time period.

Before turning to the specific graphs, we describe how the graphs are constructed. For the constant single person graphs, we start by selecting individuals who are ages 36 to 40 in age 1999. For this group, we assign a mid-cohort age of 38 (the midpoint between 36 and 40), and we follow these individuals from 1999 to 2007, at which time the mid-cohort age is 46. For this set of individuals, we compute and the 25th, 50th, 75th, 90th and 95 percentiles of a specified wealth variable at each midcohort age. In particular, separate series are plotted for each percentile. Next, we repeat these steps for individuals who in 1999 are ages 46 to 50, 56 to 60, 66 to 70, 76 to 80, 86 to 90 and 96 to 100. This yields a total of seven birth cohort groups that are separately followed from 1999 through 2007, and for each of these birth cohort groups, we compute the 25th, 50th, 75th, 90th, 95th and 99th percentiles of a specified wealth variable. The plots for constant two person households are constructed similarly. In this case, the households are selected based on at least one household member being in the appropriate age group in 1999, and then both household members are tracked between 1999 through 2007.

Figure 1 presents patterns in net wealth for constant single (panel A) and twoperson (panel B) households. These plots highlight several noteworthy features. First, many of the higher percentile series for constant single person households show a strong increasing pattern across ages. This pattern is likely driven more by increases in the values of portfolios between 1999 and 2007 and less by life-cycle patterns. With the exception of the 25th percentile for constant single person households, each of the series illustrates a hump-shaped pattern across age, and the hump appears to peak near age 70. This pattern indicates that there appears to be significant wealth accumulation for most individuals and households prior to retirement. The Normal Retirement Age in Sweden is 65, and by age 70, most individuals have ceased work and claimed a social security pension. Because individuals are no longer working, it is intuitive that they would draw down their wealth during retirement. There do not appear to be any significant changes in net wealth at age 65, so it is possible that social security pensions do not affect net wealth significantly.

While the figures in both panels reflect the hump-shaped pattern, the key difference between the figures is in the levels of wealth. The wealth levels are higher for constant two-person households, but interestingly the wealth levels are less than double the values of the constant single person households. This may be driven by some secondary earners not working full-time.

The next set of figures decomposes wealth into financial assets, real assets and debt. Figure 2 presents the lifecycle patterns in financial assets for constant one and two person households. The patterns in financial assets are very similar to the patterns in net wealth in that there are hump-shaped patterns over the lifecycle, with the humps peaking at roughly age 70 when individuals are entering into retirement. Similar to the patterns in net wealth, there is accumulation in financial assets prior to retirement and then decumulation after entering retirement. The decumulation patterns seem to be less pronounced in panel B.

Figure 3 examines lifecycle patterns in real assets, such as housing. At first past, the increasing pattern for each set of birth cohort is striking. This pattern is driven by the increase in real estate values between 1999 and 2007. Over the course of the lifecycle, the patterns in real assets for constant single person households in panel A indicate that housing is an important source of wealth for over half the population of single households. Across cohorts there is a hump-shaped pattern. Within cohorts most single households experience increasing real assets as housing values appreciate over the period. The patterns for constant two person households in panel B indicate a hump-shape for lower percentiles, but then mostly increasing and persistent patterns for higher percentiles. These patterns indicate that lower wealth households may finance part of their retirement by downsizing their housing and reducing their real assets. In contrast, wealthier households may have less need to reduce their housing to finance their retirement.

Lastly, Figure 4 examines lifecycle patterns in debt. The patterns in panel A for constant single person households and panel B for constant two person households

indicate mostly monotonic declining patterns for most percentiles. These figures illustrate that most households appear to be paying down their debts between ages 40 and 50 so that by the time of retirement, many households have little to no debt at all. These patterns are consistent with households accumulating debt earlier in the lifecycle and then paying down debt prior to retirement. During retirement, there appears to be some increase in debt amongst the highest percentiles, but for the most part, debt is continually paid down and eliminated even during retirement. These patterns indicate the debt is not likely to be a significant factor to finance consumption during retirement. It is important to note that the patterns of debt during retirement in Sweden may be different than those patterns in the United States because health care costs are covered under universal health insurance in Sweden but not in the United States. Households in the United States may take on more debt during retirement than in Sweden because of health shocks to households' members that are not fully insured.

3.2 Changes in Household Composition and Wealth Dynamics

Having described lifecycle patterns in wealth variables for constant one and two person households in the previous section, this section presents a graphical analysis of how anticipated and unanticipated changes in household composition affect wealth accumulation and decumulation. Specifically, this analysis of wealth dynamics with household composition changes is presented in Figure 5. This figure presents 4 separate plots. For each plot, we create four household transition groups to study wealth dynamics and household transitions as in PVW. For example, we consider households between 1999 and 2000, and for these two years, there are four possible groups: (1) households that were single in 1999 and 2000, (2) households that were married in 1999 and 2000, (3) households that were married in 1999 and then divorced in 2000, and (3) households that were married in 1999 and then widowed in 2000. Within each group, we examine the 50th, 75th, 90th and 95th percentiles of net wealth in the separate plots. Overall, the plots in Figure 5 illustrate that changes in household composition are a significant factor in explaining changes in wealth during retirement.

The patterns highlight the role of health shocks, or specifically spousal death, in describing wealth dynamics at older ages. This conclusion is similar in spirit to results from PVW. To see this conclusion, we highlight three key features of the plots. First, across all of the percentiles, wealth for constant two person households appears to be roughly double or more than double the wealth of single person households. This could be driven by dual-earning households having more financial resources to save than single earning households. Second, households that transition from two persons to one person, whether through divorce or death of a spouse, both experience significant decreases in wealth. However, when comparing the declines in wealth associated with death of a spouse to declines associated with divorce, the plots indicate that households that experience divorce experience wealth declines so that their wealth levels are actually below those of constant single person households. Third, the plots in Figure 5 indicate that lower wealth households are more likely to experience death of a spouse and divorce at younger ages since the wealth levels of these groups are below those of constant two person households.

Conclusion

Our analysis of the evolution of wealth during retirement in Sweden produces several facts that should help inform subsequent efforts to model households' saving decisions over the life cycle, and especially in retirement. Some of the facts that are likely to be most useful to subsequent modeling efforts are those that come from comparing the patterns of wealth evolution in Sweden to the much betterknown patterns from the US. The main reason that the relationship between the two sets of patterns from these countries is likely to be informative is the large difference in institutions between these countries.

The key difference for understanding behavior during retirement is the large differences in the financial risk from health shocks facing retirees in these countries. This difference in turn is largely due to the differences in the coverage of long-term care expenses by the universal government insurance programs. In Sweden, universal government programs shield people fairly completely from the financial risk associated with their long-term care needs. In the US, by contrast, the universal government program (Medicare) pays for very little in the way of long-term care. These costs are instead mostly either paid for out of pocket by the affected households or paid for by the government program for the poor (Medicaid). This means that households in the US must nearly exhaust their wealth before gaining coverage from government programs. Households in the US are thus exposed to much greater financial risk from health problems than households in Sweden.

Given that the financial risk from health problems is widely believed to be central to the saving decisions and relatively slow decumulation of wealth by many retired households in the US, it is therefore surprising to find as many similarities as we do between the behavior of households in Sweden to the known patterns from the US. These similarities suggest that it might be valuable for future work to increase the attention devoted to investigating the possible role of other factors (aside from financial risks from health shocks) in explaining the slow drawdown of wealth during retirement in the US and other countries.

References

Ameriks, John, Andrew Caplin, Steven Laufer, and Stijn Van Nieuwerburgh. "The joy of giving or assisted living? Using strategic surveys to separate public care aversion from bequest motives." The Journal of Finance 66, no. 2 (2011): 519-561.

De Nardi, Mariacristina & Eric French & John B. Jones, 2010. "Why Do the Elderly Save? The Role of Medical Expenses," Journal of Political Economy, University of Chicago Press, vol. 118(1), pages 39-75, 02.

Edin, Per-Anders and Peter Fredriksson, 2000. "LINDA - Longitudinal INdividual DAta for Sweden." Working paper, University of Uppsala.

Hubbard, R Glenn & Skinner, Jonathan & Zeldes, Stephen P, 1995. "Precautionary Saving and Social Insurance," Journal of Political Economy, University of Chicago Press, vol. 103(2), pages 360-99, April.

Makoto Nakajima & Irina A. Telyukova, 2013. "Housing in Retirement Across Countries," Working Papers, Center for Retirement Research at Boston College wp2013-18, Center for Retirement Research.

Poterba, James M. & Steven F. Venti & David A. Wise, 2011. "Family Status Transitions, Latent Health, and the Post-Retirement Evolution of Assets," NBER Chapters, in: Explorations in the Economics of Aging, pages 23-69, National Bureau of Economic Research, Inc.

Scholz, John Karl, Ananth Seshadri, and Surachai Khitatrakun. "Are Americans Saving "Optimally" for Retirement?." Journal of Political Economy 114.4 (2006).

Figures

Figure 1: Net Wealth

Panel A: Constant 1-Person Households



Panel B: Constant 2-Person Households



Note: Symbols depict different percentiles; 99th percentile is depicted by triangles, 95th by x:s (x), 90th by squares, 75th by pluses (+), 50th by diamonds, and 25th by circles. Each cohort, illustrated by connected symbols, is followed from year 1999 through 2007. All individuals survive through 2007. Net wealth measured in 1999 SEK.

Figure 2: Financial Assets





Panel B: Constant 2-Person Households



Note: Symbols depict different percentiles; 99th percentile is depicted by triangles, 95th by x:es (x), 90th by squares, 75th by pluses (+), 50th by diamonds, and 25th by circles. Each cohort, illustrated by connected symbols, is followed from year 1999 through 2007. All individuals survive through 2007. Financial assets measured in 1999 SEK.

Figure 3: Real Assets



Panel A: Constant 1-Person Households

Panel B: Constant 2-Person Households



Note: Symbols depict different percentiles; 99th percentile is depicted by triangles, 95th by x:es (x), 90th by squares, 75th by pluses (+), 50th by diamonds, and 25th by circles. Each cohort, illustrated by connected symbols, is followed from year 1999 through 2007. All individuals survive through 2007. Real assets measured in 1999 SEK.

Figure 4: Debt



Panel A: Constant 1-Person Households

Panel B: Constant 2-Person Households



Note: Symbols depict different percentiles; 99th percentile is depicted by triangles, 95th by x:es (x), 90th by squares, 75th by pluses (+), 50th by diamonds, and 25th by circles. Each cohort, illustrated by connected symbols, is followed from year 1999 through 2007. All individuals survive through 2007. Debt measured in 1999 SEK.



Figure 5: Changes in Household Composition and Wealth Dynamics

Note: Data from years 1999-2007. Constant 2 person households depicted by circles (red), constant 1 person households by triangles (green), transitions to divorce by squares (blue), and transitions to widow/widower by diamonds (green). Vertical axes measure net wealth in 10,000s of 1999 SEK.