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INCOME AND WEALTH OVER THE LIFE CYCLE: EVIDENCE FROM PANEL DATA

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In this paper we examine household wealth and income in the Netherlands using data from the Socio Economic Panel (SEP) in the period 1987–89. We provide an evaluation of the quality of the data and some simple statistics which describe the behavior of wealth, saving, and income over the life cycle. We find there is substantial heterogeneity in the behavior of households, and wealth holdings vary substantially even among the same age group. By exploiting the panel feature of the SEP, we derive saving from first differencing wealth. We find that a sizeable fraction of households do not dissave when old and we find some evidence in favor of the bequest motive.

1. INTRODUCTION

Many recent works on saving and consumption behavior have emphasized the importance of examining household data to study the predictions of the life cycle-permanent income model.[1] Unfortunately, data sets that provide detailed household or individual information on saving, income, and wealth are scarce. Data sets that follow decision-making units over time are even more rare. Finally, micro data can suffer from serious problems of measurement error, which can distort the evaluation of the empirical findings.

In this paper, we examine micro data from the Dutch Socio-Economic Panel (SEP). The SEP contains detailed information about household characteristics, income, and wealth. It follows households over time, enabling the researcher to gain greater insight into their behavior. The fact that wealth data is collected

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[1]See, among others, Deaton (1992) and Browning and Lusardi (1996).

every year is a feature of the SEP which is not shared by many other data sets. For example, the U.S. Panel Study of Income Dynamics reports data on wealth in 1984 and then in 1989, while the Survey of Consumer Finances (SCF) collects wealth data in a three-year interval. In addition, this survey provided some valuable information about subjective expectations about income changes and the motives to save. This information allows a very careful examination of household behavior and, in addition, it provides the researcher with some instruments to account for the measurement error problem.

In our work, we examine wealth holdings, income, and saving and provide some simple statistics that describe the data and their main characteristics. Our aim is to provide a descriptive framework which highlights some basic facts that could be analyzed and developed in future research. These facts provide some prima facie evidence for judging the predictions of the life cycle-permanent income model.

One finding which emerges from the analysis is that there is considerable heterogeneity in saving and wealth accumulation. While almost every household holds some assets in the Netherlands, there is substantial variation even in the same age group. We also note that in order to study how wealth holdings evolve over the life cycle it is important to disentangle age and cohort effects. It is well-known that these effects cannot be distinguished if we only have one cross-section at our disposal. Our data set is a panel and allows the researcher a sharper evaluation of important aspects of the life cycle model. For example, the cross-sectional relationship between median (and mean) net worth and age is hump-shaped in our sample. However, when we calculate saving, we find that a large percentage of the elderly do not dissave.

This paper is organized as follows. In Section 2 we provide a description of the survey. We indicate how the SEP is organized, the sample frame and the information collected in this survey. In Section 3 we present the cross-sectional distribution of the asset and liability components which have been collected from 1987 and 1989. Finally, we examine the age-specific distributions of net worth, financial wealth, and income which have been derived by using non-parametric estimation techniques. In Section 4 we exploit the panel feature of the data set and examine the (age-specific) distribution of saving measures derived from first differencing wealth. In Section 5 we analyze in some detail the data on subjective expectations and the motives to save provided by the SEP. In Section 6 we provide a brief conclusion and describe future directions for research.

2. Description of the Survey

The SEP is a survey administered by the Central Bureau of Statistics (CBS) for a panel of approximately 5,000 households. The purpose of the SEP, as summarized in CBS publications (see, for example, CBS, 1991), is to provide a description of the most important elements of individual and household welfare and to monitor changes in these elements. The survey is representative of the Dutch population, excluding those living in special institutions like nursing homes. In order to arrive at a representative sample, the CBS applies a two-step sampling

procedure. In the first step, municipalities are drawn with probabilities that depend on the number of inhabitants (big cities are drawn with certainty). In the second step, addresses are selected randomly. All households present at the chosen address are interviewed, up to a maximum of three households.

The first survey was conducted in April 1984. The same households were interviewed in October 1984 and then twice a year (in April and October) until 1989. Since 1990 the survey has been conducted once a year in May. In the October interview, information is collected on socio-economic characteristics, income, labor market participation, hours of work, as well as demographic characteristics. The April waves of the SEP contain information about socio-economic characteristics as in the October interview, but rather than gathering information about income, from 1987 onwards the April questionnaires include questions concerning assets and liabilities. Information is collected on every person in the household who is at least 16 years old (respondent hereafter). For the purpose of this paper, we examine the SEP data from 1987 until 1989.

3. Cross-section Data

3.1. *Household Assets and Liabilities*

In the SEP questionnaire, a distinction is made between the ownership of a particular asset or liability on the one hand, and the value of the asset or liability on the other. Information is collected for the following assets: (1) Checking accounts; (2) Savings and deposit accounts; (3) Savings certificates (certificates of deposit); (4) Bonds, mortgage bonds; (5) Shares, options, and other securities; (6) Value of the primary residence; (7) Other real estate (not used for own residence); (8) Value of the car(s); (9) Net worth of own company (for the self-employed); (10) Cash value of the life insurance mortgage; (11) Cash value of other life insurances with a savings element; (12) Claims against private persons (friends, acquaintances); (13) Assets not mentioned above.[2]

The survey collects information on the liabilities of every respondent. In the SEP questionnaires of April 1987 and April 1988, the following categories are listed: (1) Personal loan or revolving credit; (2) Purchase on credit, hire-purchase; (3) Remaining mortgage debt; (4) Other loans; (5) Debt not already mentioned. In 1989, the CBS substantially revised the questions concerning the liabilities. Ten liability categories can now be distinguished. They are as follows: (1) Personal loans; (2) Revolving credit; (3) Debt with mail orders, retail debt; (4) Other purchases on credit; (5) Hire-purchase; (6) Remaining mortgage debt; (7) Equity-based loans; (8) Debt with relatives and friends; (9) Other outstanding debt, unpaid bills; (10) Debt not already mentioned.

Household assets and liabilities are obtained by summing all the assets and liabilities respectively of each respondent in the household. Net worth is obtained by subtracting total liabilities from total assets. For confidentiality

[2]In 1989, the questionnaire does not include the asset component "claims against private persons," but it retains the component "assets not mentioned above."

reasons, the values of the assets and liabilities have been top-coded for each category and set at the value of Dutch Guilder (DFL) 999,997 if the values exceed that amount.[3]

We have examined the relevance of non-responses at the respondent level regarding both the size and the ownership of assets and liabilities. Non-responses are of two types: "refuse to answer" and "do not know." Most respondents were prepared to answer the question concerning ownership properly. However, a sizable fraction of respondents refused to report or did not know the amount held in assets such as (mortgage) bonds, savings certificates, and shares, options, and other securities. These findings are common in survey data (see, for example, Avery, Elliehausen, and Kennickell, 1988). To calculate net worth at the household level, we have chosen the following criteria: we exclude those observations for which (i) the head of the household or the spouse "refuses to answer" one or more questions about their assets or debts; or (ii) at least one respondent answers with "do not know" to one or more questions about his/her assets and debt.[4] Given this, it is possible to calculate net worth at the household level for 4,241 out of the 4,990 households in the SEP survey in April 1987. The 1988 and 1989 figures are 4,292 out of 4,953 households and 4,585 out of 5,020 households respectively.[5]

Due to these exclusions, the sample is not fully representative of the Dutch population. For example, we find that one-person households are under-represented in the sample. The CBS reports population weights for the SEP data, but they are at the respondent level. Instead we have aggregated the data at the household level. We have constructed weights by comparing the following characteristics of the sample and the population distribution: household type (one-person versus multiperson household), household size, marital status, and age and gender.[6]

Tables 1(a), (b), and (c) report some simple descriptive statistics of household assets in the three years under consideration. The data are deflated and expressed in April 1987 Guilders by using the consumer price index. We report the percentage of households holding the asset components and both the unweighted and weighted means and their standard deviations. Note that the weighted and unweighted means and standard deviations are similar. Only for some components, such as "value of the primary residence" and "mortgage debt," are the unweighted means (slightly) higher than the weighted ones. Given that the

[3]For some asset categories, such as the value of real estate and the value of someone's own company, topcoded values are present. Note, however, that very few households are affected by the top-coding, and it seems to be concentrated among the self-employed. If one is willing to exclude the self-employed, top-coding is not a problem.

[4]"Refuse to answer" and "do not know" could concern the ownership as well as the value of assets and debts. Note, however, that the value question is only asked if the respondent reports that he/she owns the asset or debt under consideration.

[5]These figures refer to the cleaned SEP data set, after imputation and correction have been implemented. See Camphuis (1993) for details on the data imputation.

[6]Alessie and Zandvliet (1993) have weighted the sample taking into account household income as well. However, one disadvantage in using these weights is that many observations have to be dropped when merging the October and April waves. In their study, it appears that high income households are under-represented in the SEP. Slightly higher means are obtained when weights are calculated taking income into account.

percentages of households holding some asset components are low, and that the distribution is very skewed to the right, we also report unweighted means, medians and first and third quartiles of the assets conditional on ownership. We comment hereafter on the most common assets.

We have reported the net balance of *checking accounts*, i.e. in our calculations we take into account that some households borrow from the bank, thus we calculate their net balance in the checking accounts. In each year, the median value of the checking accounts is DFL 2,000. Together with housing, *savings and deposit accounts* are a popular form of investment for Dutch households. The mean amount invested in savings accounts increases between 1987 and 1989 and is approximately DFL 14,000 for the households that invest in these accounts. Note, however, that the distribution is skewed to the right and the median value is DLF 5,000 while the third quartile is DFL 11,800 in 1987 and approximately DFL 14,000 in 1988 and 1989. *Bonds*, *mortgage bonds*, and *shares and options* are held by a small percentage of households, but this percentage increases over the three-year period. The average amount held in these assets is sizeable. It is not surprising that the frequency distribution of these asset components is extremely skewed to the right. The means are DFL 44,700 for bonds and DFL 41,500 for shares and options in 1987. However, the median values are DFL 6,000 and DFL 10,400.

Housing represents one of the main components of household portfolios, and approximately 44 percent of the households in the sample own a house. Respondents have to report the market value of the house each year. Considering only those households which own homes, the mean home value is approximately DFL 149,000 in 1987, DFL 153,000 in 1988 and DFL 159,000 in 1989. The median values are DFL 135,000, DFL 139,000 and DFL 147,000 respectively. There is a steady increase in the value of the house reported in the survey, and this increase corresponds to the behavior of the housing market in the period under consideration.

A special type of mortgage, i.e. life insurance mortgage, is possible in the Netherlands when buying a house. With this contract, the mortgage debt remains constant during the contract period. The mortgage-holder pays life insurance premia and, at the end of the contract period, the value of the life insurance policy is used to redeem the mortgage. Interest payments on the mortgage debt are fully tax-deductible, while the interest received on the life insurance premia is not taxed. Given its tax-preferred nature, this contract became increasingly popular in the late 1980s. The *cash value of the life insurance mortgage* is not directly observed. However, we have imputed this value using the information provided in the survey (the starting date of the insurance, the balance of the mortgage, and assuming an interest rate of 3 percent and a 30 year maturity) and we report it in the table.[7] The survey also collects information about *other real estate*, which is held by approximately 6 percent of the sample. The median value of such real estate is

[7]The survey provides information about other life insurance contracts, and it is possible to calculate their cash value as well. However, the questionnaire does not clearly distinguish among different types of insurance, for example single premium annuities versus other types of life insurance. We calculated the cash value of life insurances, but we found that it varied too much across the sample years, indicating that the information provided was too imprecise. We have decided therefore not to include this component in the calculation of net worth.

TABLE 1(a)

HOUSEHOLD ASSETS IN APRIL 1987

Asset Components	% holding assets	Mean	Standard Deviation	Weighted Mean	Weighted Std. Dev.	Conditnl Mean	Conditnl Std. Dev.	First Quartile	Median	Third Quartile
Net balance checking acc.	98.9	4,341	12,172	4,426	12,397	4,389	12,230	950	2,000	4,100
Savings & deposit acc.	64.5	8,633	31,467	8,799	32,044	13,378	38,353	1,600	5,000	11,800
Savings certificates	4.3	554	5,243	546	5,108	12,783	21,902	2,734	5,000	14,500
Bonds, mortgage bonds	2.8	1,235	19,941	1,308	20,279	44,762	112,113	2,000	6,000	30,000
Shares, options & other sec.	6.1	2,547	24,992	2,712	26,240	41,556	92,725	3,000	10,442	40,000
Primary residence	44.0	65,651	91,624	62,409	91,176	149,292	81,254	100,000	135,000	170,000
Other real estate	6.1	8,801	61,466	8,836	61,323	145,245	206,593	20,000	70,000	180,000
Car(s)	66.3	6,959	10,149	6,706	10,073	10,492	10,873	3,000	8,000	15,000
Net worth of own company	5.4	6,908	50,949	6,735	50,274	126,275	180,301	15,000	50,000	161,000
Cash value life ins. mortgage	2.9	517	4,218	485	4,066	17,572	17,504	5,019	11,826	24,529
Claims against priv. persons	5.0	502	6,557	533	6,835	10,045	27,708	500	2,000	6,000
Other assets	5.6	704	7,356	712	7,405	12,595	28,666	1,300	3,500	10,000
Gross assets	99.4	107,378	178,319	104,233	179,064	108,066	178,480	6,000	37,925	158,000
Net worth	99.6	70,367	149,526	70,366	151,840	70,633	149,746	3,400	20,000	85,800

Note: This table reports, in the first column, a list of the asset components of the SEP. In the second column, it reports the percentage of households holding the assets and in columns 3 through 6, it reports the weighted and unweighted means and standard deviations. It then reports, in columns 7 through 11, the mean, standard deviation, first quartile, median, and third quartile conditional on ownership of the assets. The number of observations is 4,241.

TABLE 1(b)

HOUSEHOLD ASSETS IN APRIL 1988

Asset Components	% holding assets	Mean	Standard Deviation	Weighted Mean	Weighted Std. Dev.	Conditnl Mean	Conditnl Std. Dev.	First Quartile	Median	Third Quartile
Net balance checking acc.	99.3	3,270	9,214	3,371	9,273	3,292	9,242	793	1,984	3,842
Savings & deposit acc.	67.5	9,827	31,136	10,193	32,758	14,549	36,969	1,587	4,960	13,789
Savings certificates	4.7	685	8,119	724	8,831	14,648	34,769	1,984	5,952	12,416
Bonds, mortgage bonds	3.5	1,640	26,694	1,841	29,275	46,329	134,780	1,984	6,944	24,800
Shares, options & other sec.	6.8	2,491	21,451	2,600	22,030	36,875	74,565	2,976	10,406	39,681
Primary residence	43.5	66,639	90,872	64,385	90,904	153,277	75,583	109,124	138,885	178,567
Other real estate	5.6	7,871	55,541	7,885	54,930	141,354	191,496	24,800	69,442	178,567
Car(s)	67.1	7,818	10,603	7,648	10,561	11,656	11,085	3,968	9,424	16,864
Net worth of own company	5.1	6,842	54,390	6,764	54,235	134,102	202,694	14,880	49,601	160,710
Cash value life ins. mortgage	2.9	522	4,500	499	4,372	18,073	19,669	4,230	9,562	26,603
Claims against priv. persons	5.7	701	10,251	730	10,442	12,290	41,291	744	2,480	9,920
Other assets	5.3	941	10,172	898	9,938	17,882	40,855	1,230	3,521	14,582
Gross assets	98.7	109,597	178,049	107,868	108,446	110,993	178,747	6,437	40,612	163,289
Net worth	99.7	71,481	153,146	72,191	156,344	71,699	153,328	3,372	20,545	88,149

Note: See Table 1(a). The number of observations is 4,292.

TABLE 1(c)

HOUSEHOLD ASSETS IN APRIL 1989

Asset Components	% holding assets	Mean	Standard Deviation	Weighted Mean	Weighted Std. Dev.	Conditnl Mean	Conditnl Std. Dev.	First Quartile	Median	Third Quartile
Net balance checking acc.	99.3	3,594	10,676	3,734	10,815	3,619	10,708	785	1,962	3,925
Savings & deposit acc.	70.2	10,284	31,122	10,590	31,829	14,657	36,283	1,663	5,397	14,176
Savings certificates	3.8	470	4,444	458	4,384	12,465	19,391	1,962	5,780	14,523
Bonds, mortgage bonds	3.7	1,260	15,124	1,341	15,724	33,993	71,311	2,256	9,322	29,438
Shares, options & other sec.	7.8	4,347	39,252	4,430	39,332	55,841	130,216	3,434	13,738	44,158
Primary residence	45.0	71,775	95,143	69,317	95,075	159,288	78,408	112,849	147,194	186,446
Other real estate	5.3	7,666	52,834	7,659	52,412	143,477	181,321	34,345	78,503	176,633
Car(s)	67.7	7,703	9,715	7,586	9,747	11,386	9,878	3,925	9,322	16,191
Net worth of own company	5.2	5,652	44,860	5,610	44,646	108,443	166,036	14,719	39,251	107,942
Cash value life ins. mortgage	4.1	651	4,894	624	4,797	15,984	18,547	3,148	8,402	22,403
Other assets	7.1	1,336	14,954	1,359	15,154	18,855	53,322	981	3,925	14,719
Gross assets	98.2	114,989	172,680	112,941	173,806	117,083	173,540	7,212	51,616	172,147
Net worth	99.8	75,281	145,888	75,738	147,528	75,462	146,017	3,925	23,060	94,204

Note: See Table 1(a). The number of observations is 4.585.

about DFL 70,000 in 1987 and 1988 and DFL 78,000 in 1989.[8] The mean values of *gross assets* correspond approximately to DFL 108,000 in 1987 and DFL 117,000 in 1989, and their distribution is skewed to the right. The conditional mean is very close to the third quartile rather than to the median.

Tables 2(a), (b), and (c) describe the composition of household debt. To be able to compare the values over time we have classified liabilities into five components for the 1989 data as well. More than 54 percent of the households in the sample report some type of debt. The most important debt component is the *mortgage*, and, as with the frequencty of home-ownership, the mean mortgage debt increases over time. More than 20 percent of the sample report a *personal loan or revolving credit*, and the median value is around DFL 7,000. In general, the distribution of *gross debt* is similar across years; the median is DLF 50,000 in 1987 and DFL 52,100 in 1989.

Alessie, Pradhan, and Zandvliet (1993) compare the asset and liability data with some external data sources, in particular with (aggregate) data from the "Collective Bank Study" (CBO), the Dutch Central Bank, and the Society of Real Estate Agents. The comparison with external data sources is limited, however, since there are no aggregate statistics for some of the asset and liability components. For example, aggregate data on the value of stocks and bonds held by households are not available. In addition, the SEP does not oversample rich households, which is important for comparisons with macro data. Alessie, Pradhan, and Zandvliet (1993) show that the data on homeownership (the most important asset category) are consistent with external data sources. The same is true for checking accounts and the debt items. However, savings and deposit accounts seem to be underestimated in the SEP. This problem is also encountered in the U.S. SCF and is rather common in wealth surveys (Avery, Elliehausen, and Kennickell, 1988; Davies, 1979). Meuwissen (1994) compares the SEP data with a data set constructed from administrative sources (e.g. tax and social security records). While the ownership rate of most asset components compares reasonably well across the two data sets, the conditional mean of shares and options is dramatically higher in the data from tax records than in the SEP.[9] He also finds that savings accounts are under-estimated, while the SEP data for the value of the house and the mortgage seem to be reliable.

3.2. *The Distribution of Wealth over the Life Cycle*

In this subsection, we present some prima facie evidence concerning the validity of (a simple version of) the life cycle hypothesis. In particular, we investigate one of the key predictions of this model, namely, that households run down their assets when old. In addition, we consider wealth inequality across age groups. We examine the distribution of wealth across the life cycle non-parametrically by

[8]However, due to the order of the question, there is a possibility that the self-employed would report the value of the real estate twice: once under this category and later on under the component "net worth of own company." In the 1987 wave, we also noticed that top-coding did affect this component for six households; the mean of this variable therefore underestimates the value of other real estate. In all six cases, the head of the household is either self-employed or owns a firm.

[9]Note, however, that in order to derive the value of stock and bonds and shares and options from the tax records, much imputation was necessary.

TABLE 2(a)

HOUSEHOLD LIABILITIES IN APRIL 1987

Debt Components	% holding liabilities	Mean	Standard Deviation	Weighted Mean	Weighted Std. Dev.	Conditnl Mean	Conditnl Std. Dev.	First Quartile	Median	Third Quartile
Loans or credit	21.5	2,925	22,830	2,663	19,838	13,590	47,729	3,000	7,000	12,500
Installment credit	3.3	106	1,091	101	1,051	3,267	5,144	450	1,000	3,600
Mortgage debt	36.7	32,540	58,127	29,708	56,236	88,578	65,070	45,000	80,000	119,000
Other loans	7.9	1,277	9,762	1,230	9,318	16,225	31,150	2,000	6,500	17,000
Other debt	3.0	139	2,008	141	2,023	4,710	10,728	400	850	2,375
Gross debt	54.6	37,011	68,066	33,866	65,016	67,774	79,998	9,933	50,000	101,653
Net worth	99.6	70,367	149,526	70,366	151,840	70,633	149,746	3,400	20,000	85,800

TABLE 2(b)

HOUSEHOLD LIABILITIES IN APRIL 1988

Debt Components	% holding liabilities	Mean	Standard Deviation	Weighted Mean	Weighted Std. Dev.	Conditnl Mean	Conditnl Std. Dev.	First Quartile	Median	Third Quartile
Loans or credit	21.2	2,294	9,210	2,173	8,875	10,819	17,553	2,976	6,497	12,400
Installment credit	2.7	80	1,022	75	972	3,022	5,541	595	1,281	3,044
Mortgage debt	36.3	33,495	60,293	31,208	58,750	92,390	67,724	47,617	80,355	121,580
Other loans	7.7	1,713	23,919	1,699	24,924	22,280	83,680	1,884	5,902	16,864
Other debt	2.3	189	3,370	194	3,491	8,207	20,759	297	992	5,952
Gross debt	54.9	38,115	72,918	35,677	71,790	69,377	86,660	8,928	50,594	104,164
Net worth	99.7	71,481	153,146	72,191	156,344	71,699	153,328	3,372	20,545	88,149

TABLE 2(c)

HOUSEHOLD LIABILITIES IN APRIL 1989

Debt Components	% holding liabilities	Mean	Standard Deviation	Weighted Mean	Weighted Std. Dev.	Conditnl Mean	Conditnl Std. Dev.	First Quartile	Median	Third Quartile
Loans or credit	22.2	2,673	13,895	2,626	14,033	12,030	27,509	2,943	6,869	12,756
Installment credit	4.9	134	1,440	136	1,572	2,737	5,927	392	981	2,428
Mortgage	38.3	35,245	60,220	32,837	58,500	92,027	65,143	49,064	81,730	122,662
Other loans	9.4	1,301	9,416	1,266	9,298	13,877	27,793	1,471	4,528	14,719
Other debt	3.7	108	1,335	107	1,281	2,951	6,365	294	588	2,071
Gross debt	58.1	39,708	67,729	37,202	65,883	68,316	77,060	8,177	52,106	107,942
Net Worth	99.8	75,281	145,888	75,738	147,528	75,462	146,017	3,925	23,060	94,204

Note: These tables report, in column 1, a list of the liability components in the SEP. In the second column, they report the percentage of households holding these components and in columns 3 through 6, they report the unweighted and weighted means and standard deviations. They then report, in columns 7 through 11, the mean, standard deviation, first quartile, median, and third quartile conditional on ownership of the components. The number of observations is 4,241 for 1987, 4,292 for 1988, and 4,585 for 1989.

using a kernel-smoothed quantile estimator. For data description purposes, non-parametrically estimated quantiles are very useful.[10] First, data sets on wealth often include observations for very wealthy households that will have a big impact on the estimator of the means. As we have seen before, the distribution of assets and debts is quite skewed to the right; thus means and medians tend to be very different. Second, we do not have to put restrictions on either the shape of the wealth profile or the distribution of wealth across the life cycle.

As we have noted previously, there are several problems with the data for the self-employed. Apart from the possibility of some double counting, it is also very difficult to distinguish between private and company wealth for components such as checking and savings accounts. We have therefore decided to exclude the self-employed from the sample. As a result, the variance of net worth drops substantially, and comparisons across years are easier and more reliable.

Figure 1 illustrates the portfolio composition over the life cycle by examining the fraction of households holding specific assets or liabilities across age.[11] The

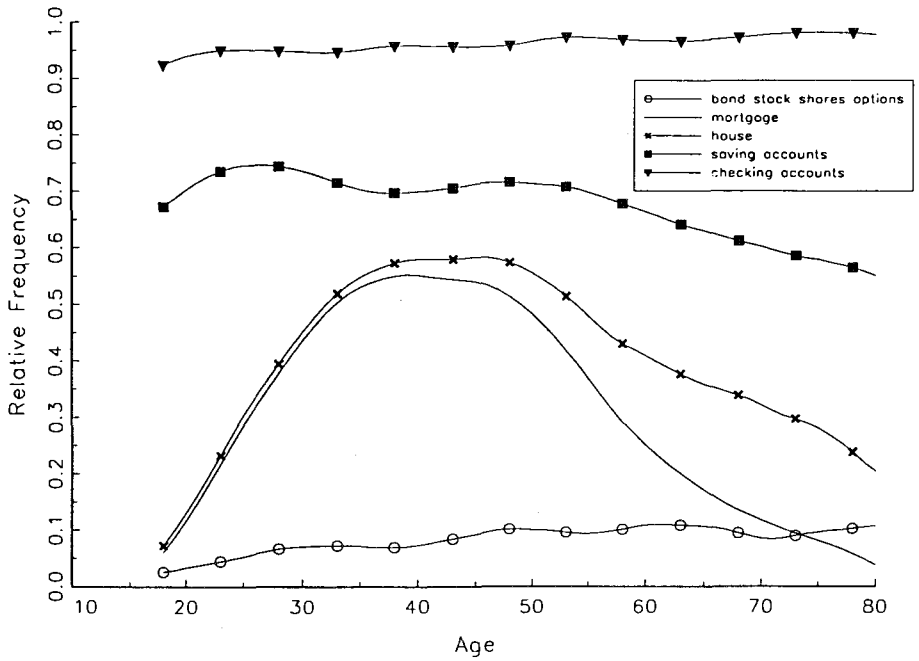

Figure 1. Portfolio Composition across Age

[10]For details on the nonparametric estimation and the algorithm used, see Magee, Burbidge, and Robb (1991).

[11]The bandwidth of Figure 1 is 14. Intuitively, $f(\text{age} - x)$ is the kernel function which determines the weights to place on ages in the neighborhood of x. We assume f to be a parabola with a peak at age x. The bandwidth is the distance between the two age values where the parabola cuts the age-axis. Since the shape of the kernel-smoothed quantiles depends on the bandwidth chosen, we have experimented with different choices for the bandwidth. As leading principle for the bandwidth choice, we have employed the "L1 loss function with cross validation." See Magee, Burbidge and Robb (1991) for technical details and Burbidge and Davies (1994) for another application using Canadian data.

percentage of households holding checking accounts is stable across age, while the fraction of households holding savings accounts decreases, particularly after age 50. The fraction of households holding bonds and shares tends to increase with age. Approximately 10 percent of the elderly hold bonds and stocks. There is a pronounced hump-shaped profile for the frequency of home ownership and mortgage debt. These frequencies decrease substantially after age 50.

On the basis of Figure 1, one might be tempted to conclude that the elderly sell their house in order to finance consumption after retirement. However, it should be realized that Figure 1 is constructed taking into account only the cross-sectional aspect of the SEP. Consequently, cohort and age effects are not disentangled in this figure. We have checked the historical data on home ownership and find that there are substantial cohort-time effects. We have compared the home ownership data between 1967 and 1987 across five age groups.[12] Looking at households in the same age group, we find that homeownership was substantially lower in 1967 when compared with 1987. For example, home ownership was only 19 percent in 1967 for young households whose head is less than 30, while it was 28 percent in 1987. However, the most relevant increase concerns the group between 40 and 64 years of age. While for the households whose head is 40–50 years old, homeownership was 33 percent in 1967, it almost doubled in 1987 (61 percent). For the households whose head is 50–64 years old, home ownership was 35 percent in 1967 and 48 percent in 1987. Inference from the cross-sectional distribution can therefore be very misleading.

It is useful to look at the profiles of net worth across the life cycle in the three years under consideration. As in the tables, we are interested in looking at the entire distribution rather than concentrating on the mean values. Figure 2(a) shows median net worth over the life cycle in the three year period. In every year there exists a hump-shaped age profile for median net worth. While the age wealth profile for 1987 has a clear hump-shape, the profile for 1989, in particular, shows some "peakiness" in the neighborhood of age 50. Note also that the peak moves to the right as time evolves and that for almost every age group, median net worth in 1989 is higher than in 1987 and 1988.

We cannot conclude from this figure that the elderly dissave. To be able to examine this issue, we need to look at data on saving. However, since in Figure 2(a) age-wealth profiles have been drawn for three years, one can disentangle, at least approximately, age effects from cohort effects by looking at the evolution of median net worth for households at a particular age in 1987. For example, we can consider the households whose head is 50 in 1987 (and therefore 52 in 1989). As before, we find that the cross-sectional evidence can be very misleading. Median net worth for such households increases from 1987 to 1989, while the 1987 cross section profile indicates a fall.

The strong increase in net worth presented in Figure 2(a) could be due to the change in housing and stock market prices, which increase substantially in the 1987–89 period. We have investigated how much of the change in wealth can be attributed to these price changes. Figure 2(b) reports the age profile of net

[12]The historical data for home ownership are taken from several CBS bulletins and are based on the Housing Needs Surveys.

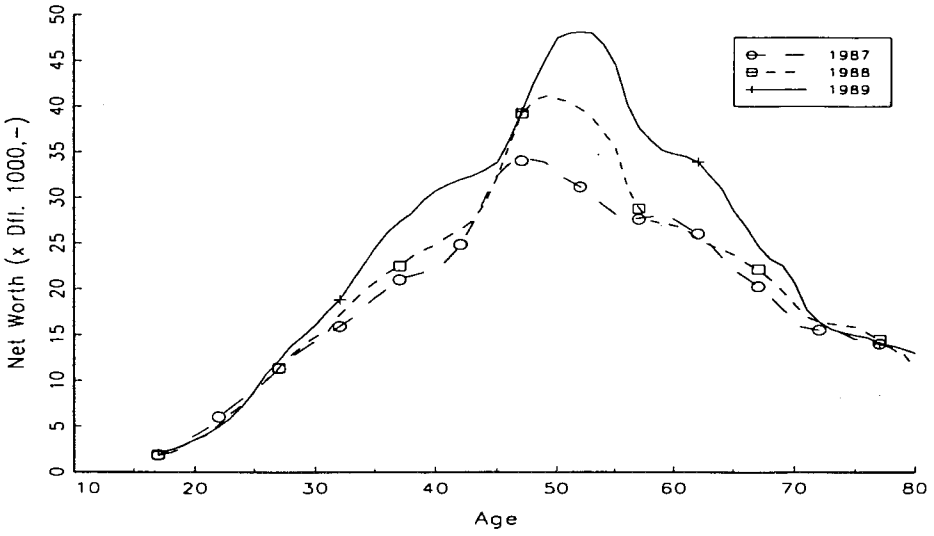

Figure 2(a). Median Net Worth across Age: 1987–89.

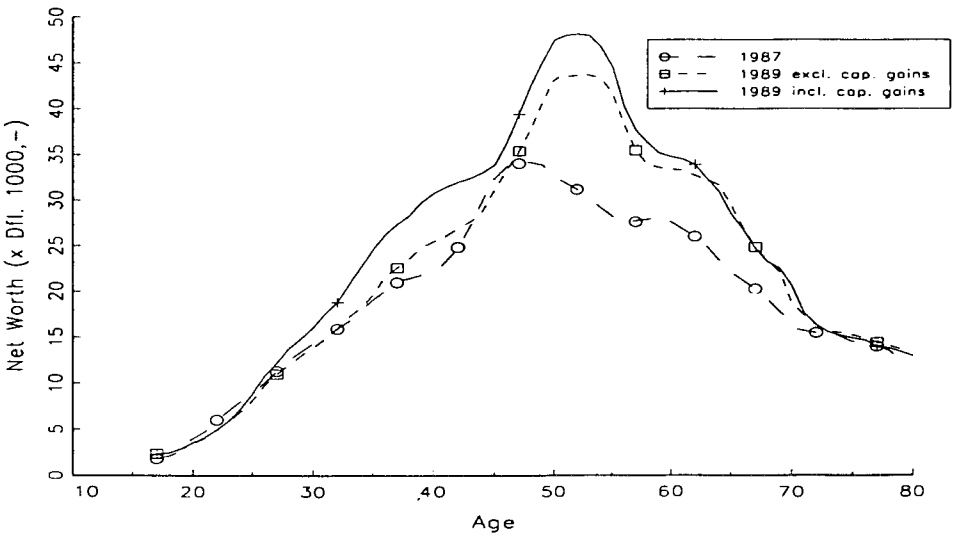

Figure 2(b). Median Net Worth adjusted for Capital Gains

worth in 1987 and the profile of net worth in 1989 including and excluding the unrealized capital gains on housing and on stocks.[13] While for the young households (households whose head is younger than 40) the increase in wealth is much reduced if we correct for the changes in housing and stock market prices, for

[13]We have corrected the wealth data for 1989 as follows: As far as housing is concerned, we first distinguish between movers and non-movers. In the latter case, we have deflated the value of the house using the housing price index. In the former case, we have kept the value reported by the household. As far as stocks are concerned, we have deflated the value of stocks using the stock price index.

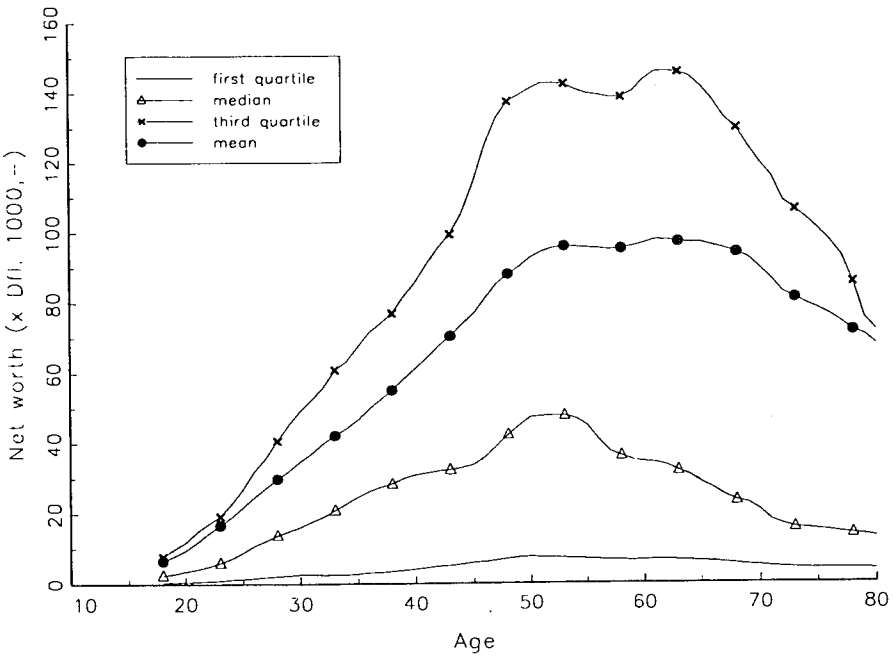

Figure 3(a). Distribution of Net Worth across Age in 1989

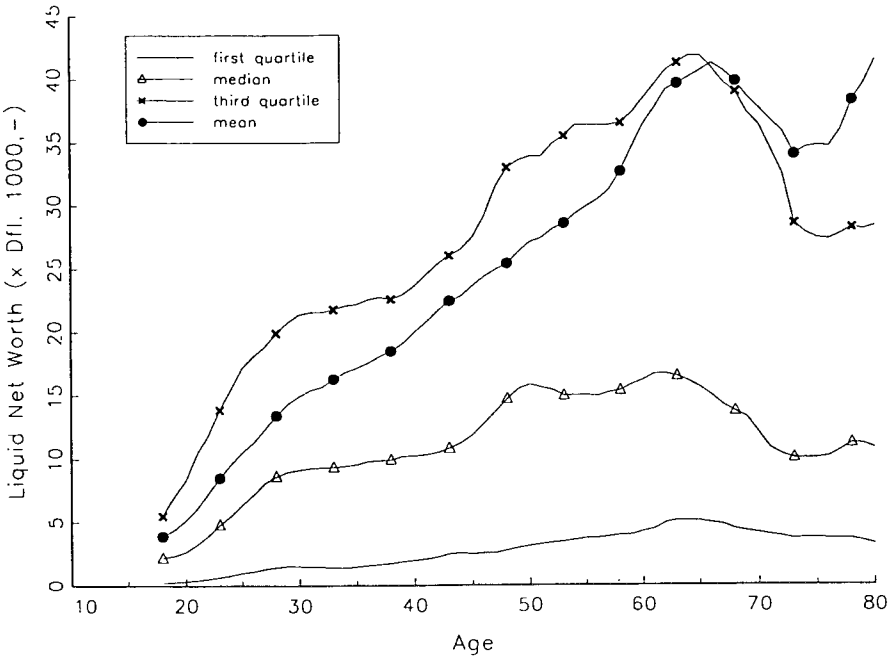

Figure 3(b). Distribution of Financial Wealth across Age in 1989

households whose head is older than 45 the increase in wealth is still large even when accounting for capital gains. The age profile corrected for capital gains maintains a peak in the neighborhood of age 50, which moves to the right as time evolves.

To examine the relationship between wealth and age in more detail we look at the distribution of net worth in Figures 3(a) and (b).[14] We have chosen 1989 as a reference year, but the results are similar for the other years. We consider two definitions of net worth, one that includes the net value of the house and one that excludes it, which we call "financial wealth".[15] The distribution shows that there is considerable heterogeneity in household wealth holdings. The age profile of financial wealth is fairly flat for the first two quartiles of the distribution, while a fraction of households hold a sizable amount of wealth. The mean generally increases with age and is well above the median (and the third quartile after age 60) since the distribution is skewed to the right. The elderly hold a substantial amount of financial wealth, while young people hold a relatively small amount of assets.

As noted above, the house is a major component in household portfolios. Looking at the age profile of net worth, we can see a very pronounced hump-shaped profile. Only the first quartile shows a flat profile, while the median and, in particular, the mean and the third quartile show a steep rise, particularly in the first part of the life cycle. The frequency of home ownership (see Figure 1), which is also hump-shaped, certainly contributes to this pattern. Looking at the quartiles, we can see that the distribution is quite skewed to the right and the mean lies well above the median.

We also look at the frequency of zero or negative net worth. This is important since it could identify the group of households more likely to be liquidity constrained (see, for example, Zeldes, 1989). These groups represent approximately 11 percent of the sample (and the percentage remains stable in the three years under consideration). The frequency of zero or negative net worth varies with age. There is a monotonic decrease of the frequency as the head of the household ages. For example, while 18 percent of households headed by an individual younger than 30 have zero or negative net worth, only 8–9 percent of households whose head is older than 50 hold such a low amount of wealth. The results from a probit regression indicate that zero or negative net worth is more likely when the head of the household is young, does not work, is not married, is a renter, has a low level of education, and when children are present in the household.

We have also examined the wealth profiles across different groups of households. We have split the sample according to three education groups: low, middle, and high education. We find that the profile of median net worth both with and without housing equity is relatively flat for the first two education groups, while it is hump-shaped for the high education group. This is similar to the evidence for the U.S. provided by Hubbard, Skinner and Zeldes (1995), but it contrasts

[14]These figures refer to unweighted data. We have performed the analysis with the weighted data, also considering net worth per equivalent adult, and the results are similar. The graphs are available from the authors upon request. The bandwidth for Figures 2(a), (b), and 3(a) is 14 and for Figure 3(b) is 12.

[15]Note, however, that this measure also includes the value of the car.

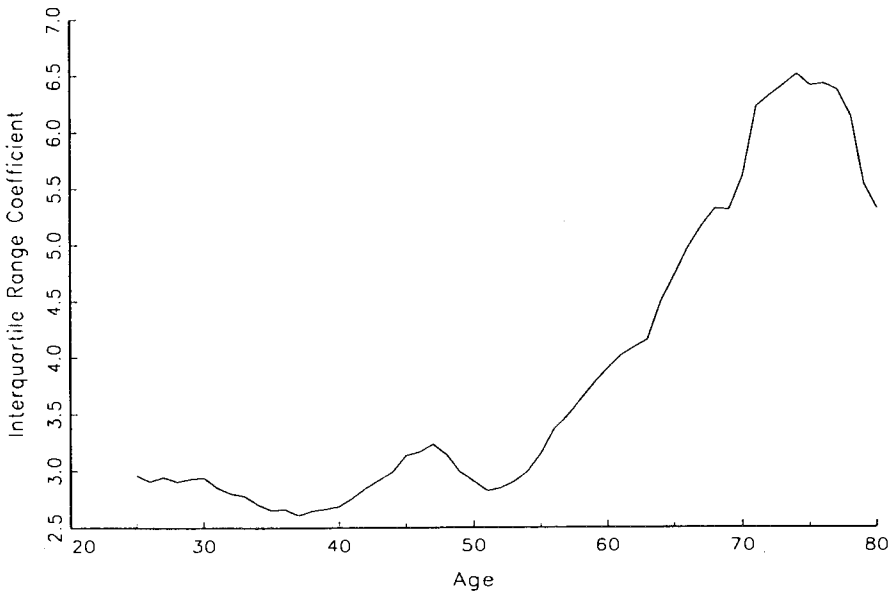

Figure 4(a). Interquartile Range Coefficient of Net Worth in 1989

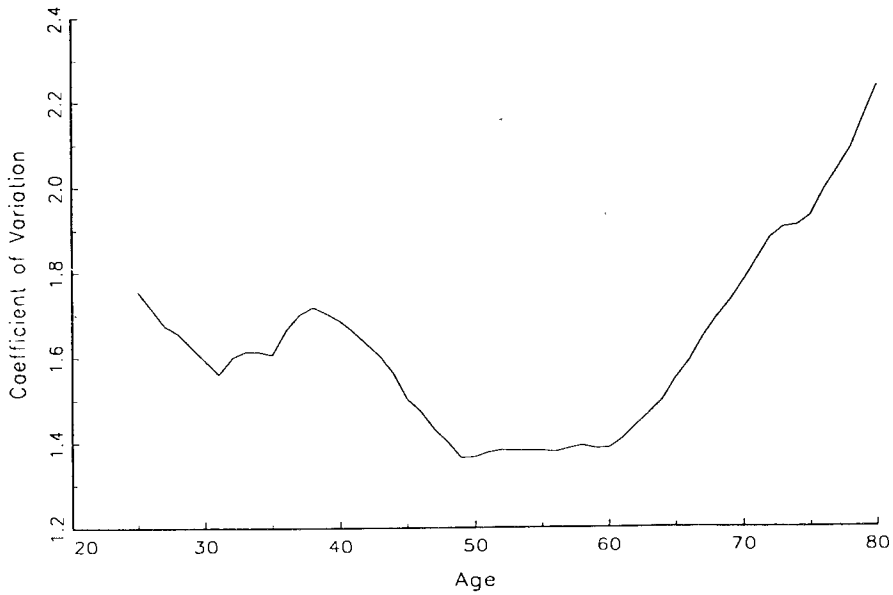

Figure 4(b). Coefficient of Variation of Net Worth in 1989

with studies from some other countries. For example, Burbidge and Robb (1985) found that education affects only the height but not the shape of the age-wealth profile in Canada.

It is useful to examine wealth inequality across age. The interquartile range coefficient, i.e. the difference between quartiles over the median, can be used as a

measure of wealth inequality.[16] Figure 4(a) shows that wealth inequality remains fairly constant across the life cycle, but it then increases around retirement (after age 75 there seems to be a decrease, but the number of observations becomes very small so no clear inference can be made). In Figure 4(b), we consider an alternative measure of inequality: the coefficient of variation. According to this measure, wealth inequality decreases with age up to approximately age 55, and it increases thereafter. From both measures, we find, therefore, that wealth inequality increases close to and after retirement.

It is useful to compare again our findings with the evidence from other countries. Börsch-Supan (1994, p. 216) reports that wealth inequality (measured by both the coefficient of variation and the ratio of mean to median financial net wealth) increases with age in Germany. This contrasts with the evidence from other countries. For example, the evidence from Jappelli (1995) indicates that wealth inequality (measured by the interquartile range coefficient) decreases with age in Italy until close to the retirement and it increases thereafter. On the other hand, the evidence from Magee, Burbidge and Robb (1991) suggests that wealth inequality (using a measure similar to the interquartile range coefficient) decreases with age in Canada, even after retirement.

3.3. *Household Income*

In addition to the wealth data, the SEP provides information about household income. Data on income are available from 1984 and are divided into many components. We concentrate on household income for the period October 1987–October 1989, for which data on assets and liabilities are also available. We consider total household income, and we also split it into three main components: labor income, capital income, and transfers. The first component includes the earnings of each member of the household from temporary and permanent work, net of taxes, social security and health insurance premia. Capital income is the sum of interest income, dividends, other capital income minus interest paid on mortgages and other loans and wealth taxes. Transfer income is a very broad component and it includes pensions, social security pensions, widows' pensions, disability benefits, child allowances and alimony, unemployment benefits, rent subsidies, and student grants and subsidies.

Figures 5, 5(a), (b), and (c) report the distribution of income and its main components over the life cycle in 1989.[17] Total income has a steep profile for those below the age of 30 and subsequently shows a moderate increase over the life cycle. Even for the first quartile, income increases over the life cycle and starts decreasing around the age of 50. The age-earnings profile shows a steep profile for the young and declines sharply well before the mandatory retirement age of 65 (Figure 5(a)). This is particularly true for the first quartile, where earnings start decreasing around the age of 50–52. It is important to note that approximately 800,000 persons in the Netherlands receive disability pensions which are

[16]This measure has also been used by Pudney (1993) in his non-parametric analysis of wealth inequality.

[17]The bandwidth for Figures 5, 5(a) and (b) is 7, while for Figure 5(c) the bandwidth is 12. A larger bandwidth is necessary since fewer households report capital income.

quite generous. In addition to disability pensions, early retirement was introduced at the beginning of the 1980s. These schemes are also relatively generous: early retirees receive up to 70–80 percent of their last year's salary. Indeed, we see that the median value of earnings starts decreasing at 55. The distribution of transfers shows the relevance of early retirement and disability pensions (Fig. 5(b)) and explains why we see a sharp decline in earnings but a smooth profile for total income. Transfers increase sharply at the age of 50 when labor income starts decreasing. Households also receive some transfers when young or middle aged, mainly because of child allowances and unemployment benefits.

Figure 5(c) shows that within the group of households whose head is younger than 55, a large percentage has negative capital income. This result can be explained by the fact that households undertake mortgage contracts early in their

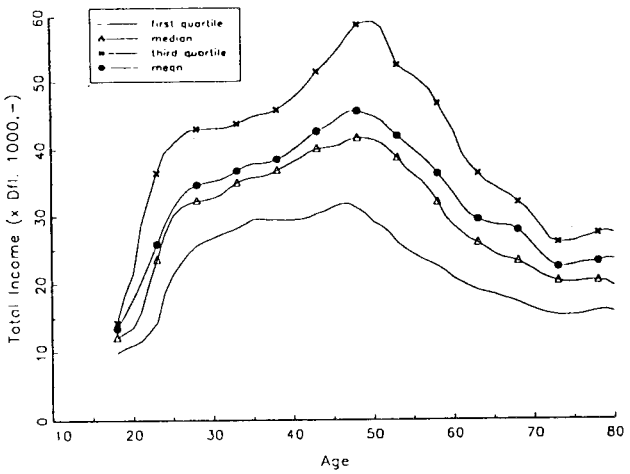

Figure 5. Distribution of Total Income in 1989

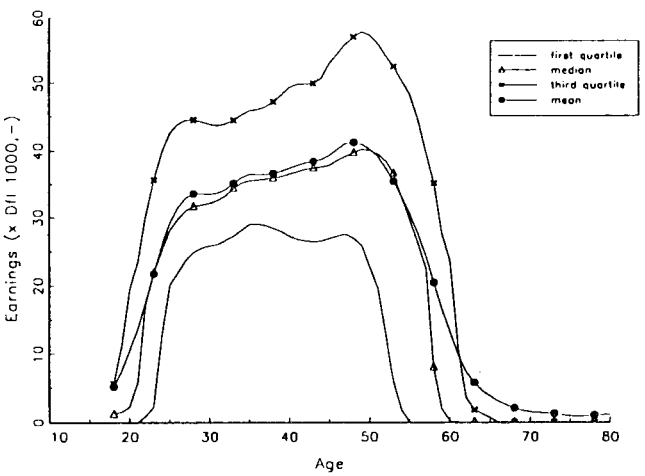

Figure 5(a). Distribution of Earnings across Age

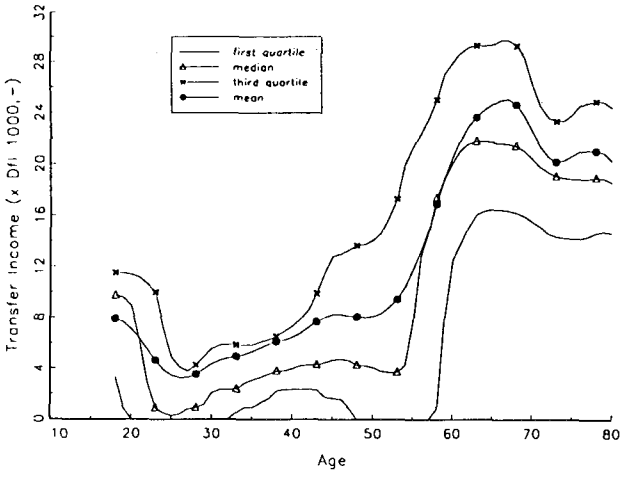

Figure 5(b). Distribution of Transfers across Age

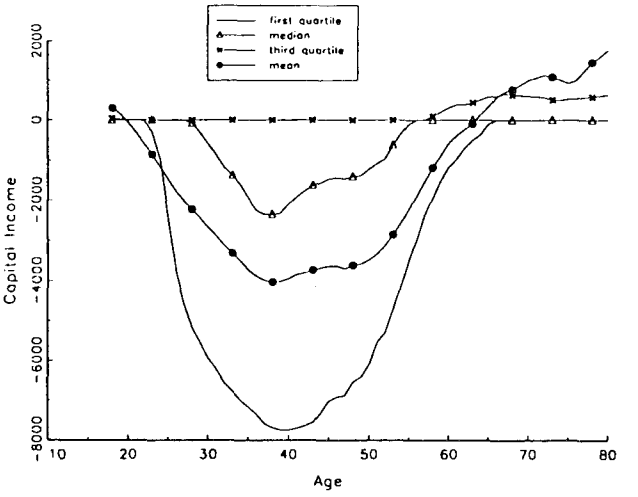

Figure 5(c). Distribution of Capital Income across Age

life cycle and do not hold a large amount of financial wealth when young. Figure 5(c) also suggests that mean capital income increases after the age of 60 and remains high thereafter. Note that the reported measure is likely to underestimate capital income, since unrealized capital gains on bonds, stocks, and housing are not included in this income component.

These profiles for income are relevant for studies aimed at assessing the relevance of precautionary accumulation. The extent to which households accumulate to provide for uncertain events depends on the degree of risk aversion and, in particular, on the income risk they are facing. The extent of income variation and the presence of income floors, or the insurance provided by the government through unemployment benefits or other transfers, are very important for evaluating the determinants of accumulation and the extent of precautionary savings. The

existence and generosity of transfers in the Netherlands suggest that precautionary accumulation for unemployment or disability risk may be of limited importance.

4. Panel Data

4.1. *Household Saving*

So far, we have considered mainly the cross-sectional aspect of the survey. However, as mentioned before, the same households are interviewed over time. The panel aspect of this data set provides a better window for studying household behavior than cross-sectional data alone. By looking at changes in wealth, we can calculate savings, as in Avery and Kennickell (1991). In addition, we can calculate income changes and examine whether saving and income changes are related.

The data were merged using the identification number of the head of the household.[18] If a household breaks up, the SEP follows both households and the household to which the head belongs continues to retain the original identification number. In our sample, we considered both the original household and its split-offs. We also have to pay attention to changes in the family composition, in particular, marriages and divorces. It is quite difficult to deal with these cases and we have had to make some restrictive assumptions. For example, we assume that in case of divorce total household wealth remains with the head of the household. In the case of a newly married couple, we assume that the new household member does not own any wealth when she/he enters into the sample. Given the potential problems with these assumptions, it might seem preferable to remove these households from the sample. However, as Avery and Kennickell (1991) pointed out, this could induce severe sample selection bias. Merging the data for 1987 and 1988, we obtain 3,472 households, while merging the 1988 and 1989 data sets we arrive at 3,758 households. Merging the three years together reduces the sample to 3,083 households.

It is useful to first consider whether attrition is a serious problem and, in particular, whether it is correlated with household wealth. For example, we expect a greater attrition rate among the wealthier households due to our exclusion criteria that households had to provide complete answers to the asset and debt questions for at least two consecutive years. Wealthier households typically have a more diversified portfolio and hence a bigger chance of being dropped from the sample. Moreover, these households may be more sensitive to privacy issues. Alessie and Zandvliet (1993) perform an analysis of this issue and find some, but not strong, evidence that both the low and high wealth households have a greater tendency to drop out of the sample.

In Table 3(a), we summarize the changes in the asset components between 1987 and 1988 and between 1988 and 1989. The first thing to notice is that the sizes of the changes are small but the standard deviations are very large. For example, the mean value of savings derived from first differencing wealth is approximately DFL 4,500 between 1987 and 1988, but the standard deviation is

[18]For married couples (or couples living together), the head of the household is the male. For single parent households, the head is the parent.

DFL 61,416. In carefully examining these changes we have notices that the self-employed experienced large variations in wealth over the period. With the exception of some special cases, there is not enough information available to infer whether these differences are correct or the result of reporting errors. We considered dropping the self-employed from the sample, but even after excluding the self-employed, the sample variation for savings is still large due to the influence of outliers. We have examined the existence of outliers and deleted the households whose net worth changed by more than DFL 440,000 (this selection affects 4 households for the 1987–88 panel and 7 households for the 1988–89 panel data set). With these exclusions the standard deviations drop substantially, and we report the changes in wealth after these deletions as well. Even though the mean does not change very much, the standard deviations are sometimes half what they were before. For the changes in debt shown in Table 3(b), the standard deviations are substantially reduced by restricting the sample. The main change in the debt components concerns the mortgage, even though there are relatively big changes in loans and credit and also in the negative balance of the checking accounts.

As Avery and Kennickell (1991) found, savings derived from first differences of wealth range from large negative values to large positive values, and we have to be cautious in interpreting these figures. To assess the validity of these measures, in Alessie and Lusardi (1993), we examine the consumption data that can be derived from these savings measures. First, we compare the mean of consumption with data from the Dutch Family Expenditure Survey (Doorlopend Budget Onderzoek). We find that figures are similar. Second, we have checked whether consumption assumes negative values, but we find that this is true only in a few cases. Third, the age-consumption profile has the typical hump-shape. It starts low for the young and increases with age up to approximately the mid-forties.[19] It is also possible to perform consistency checks on the answers provided by the households by using the data on the motives to save that we will explain later, and in general these tests show there is some consistency in the savings data.

However, as other studies have pointed out, savings derived both from differencing wealth and from income minus consumption, show extreme variability (Avery and Kennickell, 1991; Bosworth, Burtless, and Sabelhaus, 1991; Browning and Lusardi, 1996). As Avery and Kennickell (1991, p. 432) mention in their conclusions, "either the measurement error in these data is quite large, or idiosyncratic factors are very important, or both." Even with these considerations in mind, the characteristics of the savings data require that appropriate econometric techniques be used. The size and standard deviations of these changes suggest that is is important to rely on robust estimators when using savings data from micro data sets.

[19]We have performed two additional checks for the saving data. First we regress saving on variables thought to be related to savings and examine whether our regression results are similar to other common findings in the literature. Second, we exploit some additional information about savings provided in the SEP. Households are asked to report whether they have saved in the past 12 months and their current financial situation (in this question households have to report whether they are incurring more debt, decumulating assets, or saving a small or a substantial amount of money). We find that our constructed savings measures are consistent with household reports and with the other common findings in the literature as reported by Browning and Lusardi (1996).

TABLE 3(a)

HOUSEHOLD CHANGES IN ASSETS

	Merged Data Set April 1987–1988		Merged Data Set April 1987–1988 Excluding Self-Employed and Outliers		Merged Data Set April 1988–1989		Merged Data Set April 1988–1989 Excluding Self-Employed and Outliers	
Asset Components	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
ΔChecking accounts	−507	9,588	−316	6,062	251	8,143	166	6,537
ΔNet balance checking accounts	−803	12,959	−421	6,365	327	8,718	205	6,675
ΔSavings, deposit accounts	1,088	19,401	1,365	13,596	128	14,888	265	13,148
ΔSavings certificates	198	8,630	175	6,755	−255	8,370	−156	6,792
ΔBonds, mortgage bonds	312	14,286	201	8,249	−311	18,960	−207	15,353
ΔShares, options	−88	12,455	−30	8,651	1,733	29,299	1,253	21,153
ΔValue primary residence	3,036	38,149	3,360	30,987	4,905	31,401	4,746	30,130
ΔValue other real estate	−431	35,831	121	12,821	314	30,605	−69	14,402
ΔValue of the car(s)	947	8,336	796	7,898	79	6,584	198	6,034
ΔNet worth in own company	345	30,701	—	—	−397	28,403	—	—
ΔCash value of life ins. mortg.	72	738	62	675	124	1,038	115	1,014
ΔClaims against priv. persons	36	6,775	13	6,656	−710	10,786	−662	10,718
ΔOther assets	131	11,449	−2	6,303	555	16,689	480	12,705
ΔGross assets	5,140	66,527	5,744	35,140	6,418	53,675	6,131	34,981
ΔNet worth	4,542	61,416	4,351	25,547	4,982	51,819	4,469	27,936

Note: This table reports, in column 1, changes in the asset components in the period 1987–89. The second and third columns report the mean and standard deviation of asset changes between April 1988 and April 1987. Columns 4 and 5 report the mean and standard deviation in the same period when we restrict the sample by excluding the self-employed and some major outliers. The number of observations are 3,472 and 3,261 respectively. Columns 6 through 9 report mean and standard deviation for asset changes between April 1989 and April 1988 in the total and in the restricted sample. The number of observations are 3,758 and 3,541 respectively.

TABLE 3(b)

HOUSEHOLD CHANGES IN LIABILITIES

	Merged Data Set April 1987–1988		Merged Data Set April 1987–1988 Excluding Self-Employed and Outliers		Merged Data Set April 1988–1989		Merged Data Set April 1988–1989 Excluding Self-Employed and Outliers	
Debt Components	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
ΔLoan or credit	−820	23,831	−26	4,109	423	12,002	392	9,426
ΔInstallment credit	−35	1,244	−25	1,192	45	1,702	29	1,108
ΔMortgage debt	1,278	26,952	1,386	23,612	1,166	24,784	1,306	23,455
ΔOther loans	−177	9,755	−113	4,766	−61	18,226	67	5,310
ΔOther debt	56	3,658	66	3,752	−62	3,014	−94	3,206
ΔGross debt	598	36,394	1,393	24,508	1,435	32,108	1,661	25,017
ΔNet Worth	4,542	61,416	4,351	25,547	4,982	51,819	4,469	27,936

Note: This table reports changes in household liabilities in the period 1987–1989. In columns 2 through 5, it reports means and standard deviations of liability changes between April 1988 and April 1987 in the total sample and in the restricted sample, where the self-employed and some major outliers have been excluded. The number of observations are 3,472 and 3,261 respectively. In columns 6 through 9, it reports means and standard deviations of liability changes between April 1989 and 1988 in the total and the restricted sample. The number of observations are 3,758 and 3,541 respectively.

Note that changes in wealth could measure not only the household decision to save, but also the capital gains or losses on the assets and liabilities held in the households portfolios. Given that the holdings of bonds and stock affect only a limited part of the population, we have examined two measures of savings; we consider total net worth with and without housing equity.

The use of smoothed quantiles is particularly useful when looking at savings. We compare first the distribution of savings in the three years under consideration over the life cycle. Median savings between 1987 and 1988 and between 1988 and 1989 are shown in Fig. 6.[20] Even with the medians, the profile of savings is fluctuating, especially between the 30-40 age band. Median savings tend to decrease after the age of 50, but they remain positive showing that at least 50 percent of the households do not dissave when old.

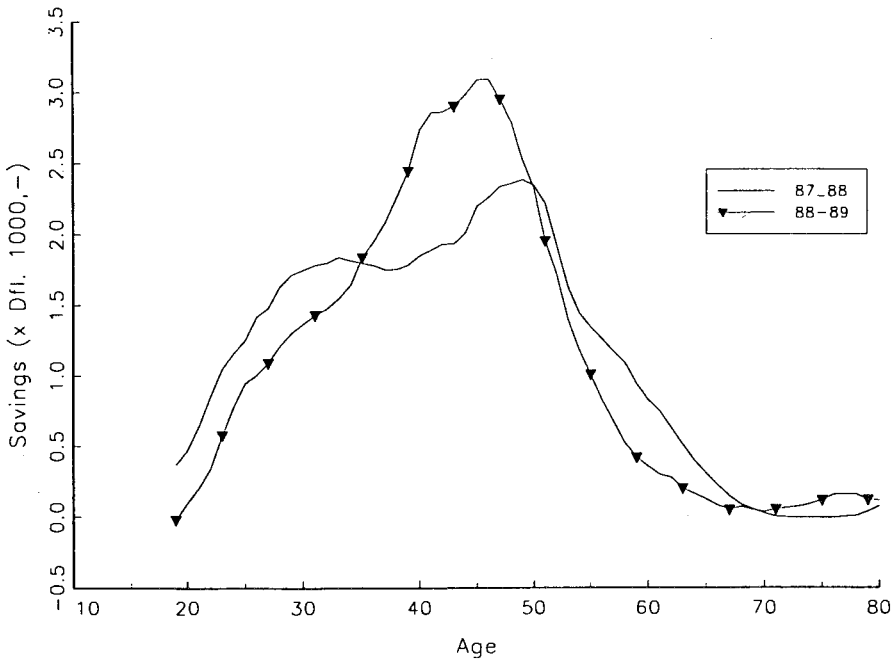

Figure 6. Median Savings across Age: 1987-89

It is also useful to examine in more detail the distribution of savings across the life cycle with and without considering the value of the house in a typical year. As for wealth, there is substantial heterogeneity in household saving. Figures 7(a) and (b) show that there is some dissaving across the entire life cycle. While savings take positive values in the third quartile, the value decreases after the age

[20]The bandwidth for Figures 6, 7(a) and (b) is 16.

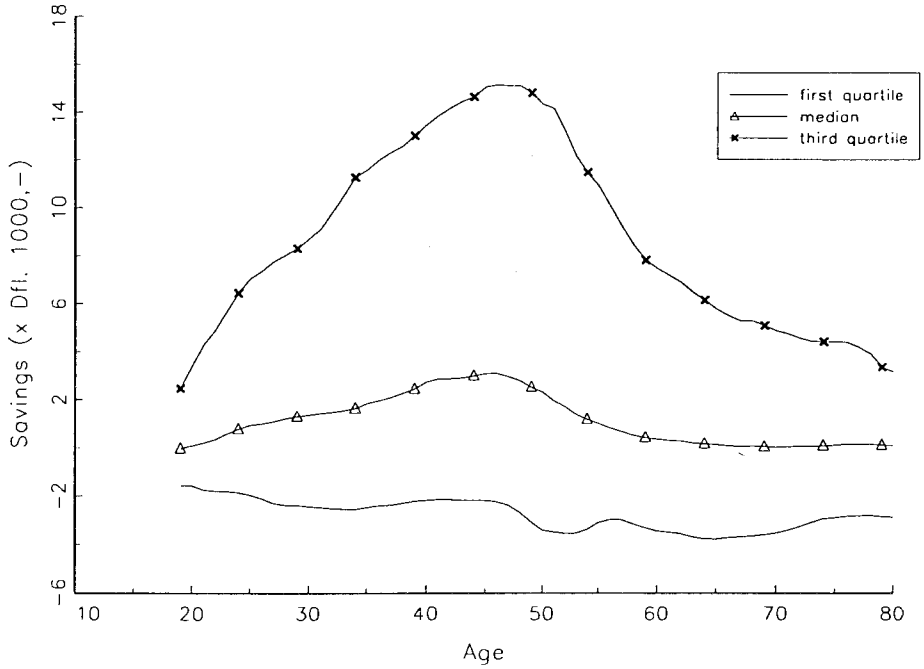

Figure 7(a). Distribution of Savings across Age in 1989 (including housing)

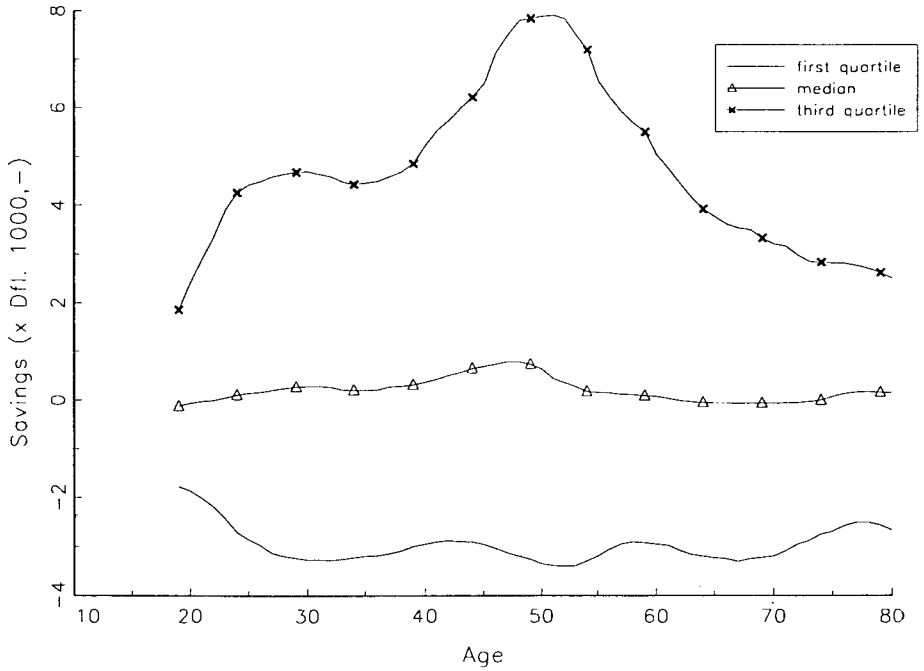

Figure 7(b). Distribution of Savings across Age in 1989 (excluding housing)

of 50. The profiles are similar whether or not the value of housing is included.[21] Even though they decline, saving remains positive for some elderly, indicating that a sizable fraction of households is not decumulating wealth when old.

4.2. *Correlation Coefficients*

After having examined wealth, income, and saving separately, it is now useful to examine their behavior over time and the relation between saving and income changes. For example, if the predictions of the life cycle-permanent income model are correct, saving should anticipate future declines in income. Merging together the data for wealth and income in the three years under consideration, we are left with 2,251 observations. We calculate Spearman rank correlation coefficients between contemporaneous and lagged savings and between contemporaneous and lagged income changes. For the first measure of savings, we find there is a big negative correlation between contemporaneous and lagged savings; the coefficient is -0.23. The correlation using the second measure of savings and lagged savings is -0.09. This smaller value can be explained by the increase in the value of housing over time. The correlation between the two measures of savings is 0.66. Camphuis (1993) calculates correlation coefficients for each category of wealth (in first differences) and he finds a strong negative correlation between bonds and shares, between shares and other real estate, and between other real estate and net worth of own company. As far as income is concerned, we find there exists a big negative correlation between income changes and lagged income changes; the coefficient is -0.29.

One explanation for these findings is the existence of a transitory component in these measures, but another important reason is the presence of measurement and classification error in these variables. Measurement error represents one of the major problems of household data, and it is exacerbated when considering data in first differences. A useful feature of this data set is the inclusion of many variables which could act as instruments for changes in income and for savings and could potentially reduce the problem of measurement error. We examine these variables in a separate section.

It is also interesting to examine the correlation between savings and future income changes. If the predictions of the rational expectations-permanent income model are correct, the correlation should be negative; savings should be high when income is expected to decrease.[22] In fact, the correlation coefficient between savings, calculated as the difference in wealth between 1987 and 1988, and future income changes is positive and very small; its value is 0.04 for the first measure

[21]We have also calculated savings correcting for the unrealized capital gains on stock and housing. The correction closely follows the procedure used by Bosworth, Burtless and Sabelhaus (1991). We exploit the panel feature of the data and calculate the capital gains on homes (for home-owners who do not move). These gains are then subtracted from the change in household net worth. For stocks, we estimate the capital gains each household would have enjoyed if stocks had risen at the rate of increase of the CBS stock market index. These imputed gains are then subtracted from the change in the household wealth. Even though savings are lower than reported in Figure 7(a), the shape of the age profile for the saving data corrected for the unrealized capital gains is very similar and our main considerations about savings do not change.

[22]See Campbell (1987) for the theoretical derivation and the empirical evidence using U.S. aggregate data and Alessie and Lusardi (1993) for the empirical evidence using household data.

of savings and 0.004 for the second measure of savings, again contradicting the predictions of the theoretical model.

5. Subjective Expectations and the Motives to Save

5.1. *Household Expectations about Future Income*

A useful feature of the SEP set is the provision of variables such as households' expectations about the behavior of income in the future and the motives to save. This information provides an additional check on the consistency of the data and enables a more detailed assessment of models of household behavior. In addition, these variables can act as instruments for both savings and income changes.

We begin by examining household expectations about future income. Households are asked to indicate whether they expect their income to change in the next twelve months. Table 4 reports the coefficients from a regression of actual income changes on the household expectations to check whether expectations are realized *ex post*. We report the results of two regressions. In the first regression the dependent variable is the first difference in income and in the second one we consider relative income growth. The majority of households anticipate either moderate or no changes in income, while a small fraction anticipated very big increases or decreases in income. We find that expected changes are significantly related to actual income changes. Even though the predictive power is low, households seem to be able to anticipate the behavior of their future income.[23] Note that when we run the same regression using savings, we find that savings have a (weak) positive rather than negative relationship with future income changes, again questioning the validity of the life cycle-permanent income model.

The survey provides information on the subjective probabilities of losing or keeping the job, and the data can be used to evaluate the relevance of unemployment risk. The question is formulated so that households can be ranked according to their probability of losing or keeping their job, i.e. people can be differentiated among different groups which have high, moderate, and low probability of losing (keeping) their job. This variable provides a useful proxy for the risk of unemployment and can be used to evaluate the extent of precautionary accumulation. The advantage of this variable, in comparison with other proxies that have been used in the precautionary saving literature, such as occupation dummies or the variance of income, is that it reflects the risk as perceived by the individual household.

5.2. *Why Do Households Say They Save?*

In addition to questions about future income, there are questions on the current and future financial situation of the household (households have to report whether they have to go into debt, decumulate assets, or can save some or a lot of money). These questions allow for some judgements and additional checks on the consistency of the savings data. For example, we could check whether the

[23]These variables prove to be critical for testing the predictions of the rational expectations-permanent income model, where we need to rely on instrumental variables or generalized method of moments estimators. See, for example, Alessie and Lusardi (1993).

TABLE 4

INCOME CHANGES AND EXPECTED INCOME CHANGES

Variables	# Observations	Estimates	Standard Error	Estimates	Standard Error
Constant		601.73	262.24	0.0273	0.0059
Income is expected to strongly increase	62	3,105.87	2,361.34	0.0745	0.0533
Income is expected to increase	1,469	1,595.20	548.82	0.0364	0.0124
Income is expected to decrease	937	−1,652.31	658.15	−0.0327	0.0148
Income is expected to strongly decreasc	128	−4,731.89	1,654.17	−0.1369	0.0375
Adjusted R-square		0.0032		0.0038	
F-value		7.13		8.15	
(p-value)		(0.0000)		(0.0000)	

Note: This table reports the parameter estimates and standard errors of the regression of income changes on dummies reflecting household expected income changes. Column 2 reports the number of observations for the expected changes in income listed in column 1. Columns 3 and 4 report the results of the regression in first differences, while columns 4 and 5 report the results of the regression in growth rates. Regressions are run on the pooled sample between 1987 and 1989. The number of observations are 7,561 for the regression in first differences and 7,457 for the growth rates.

people who claim they were able to save money indeed had positive savings. We do find that savings are higher for households that indicate they were saving. Additionally, we can distinguish among different types of financial situations that the household anticipates for next year and the next five years.

The questionnaire also lists several possibilities for the motives to save and asks the respondent to consider one or several combinations of the listed motives. The main possibilities are: to buy a house, to buy a car, to buy other durables, for unforeseen events, for children, for old age, for no specific purpose, and all possible combinations of the above motives. Examining the motives to save in more detail, it is interesting to note that the households who have indicated unforeseen events alone or in combination with other motives account for 22 percent of the total sample. This result is relevant in light of recent studies of savings which emphasize the precautionary saving motive, i.e. that people save to insure against risk. The percentage of people that have indicated the wish to buy a house as a motive to save is 13 percent, the percentage that indicated car purchase is 12 percent; 15 percent have indicated the purchase of other durables. There is a very small proportion of households, only 2 percent, that indicates that they save for old age. This is probably due to the fact that almost every employee (as well as persons who receive unemployment or disability benefits) in the Netherlands is covered by occupational pension schemes.

The behavior of these motives across the life cycle is presented in Figure 8.[24] The precautionary saving motive remains relatively stable across the life cycle, but it is somewhat greater for young and old households. Note that this motive may capture several types of risk, not only income or unemployment risk, but

[24]The bandwidth for Figure 8 is 14.

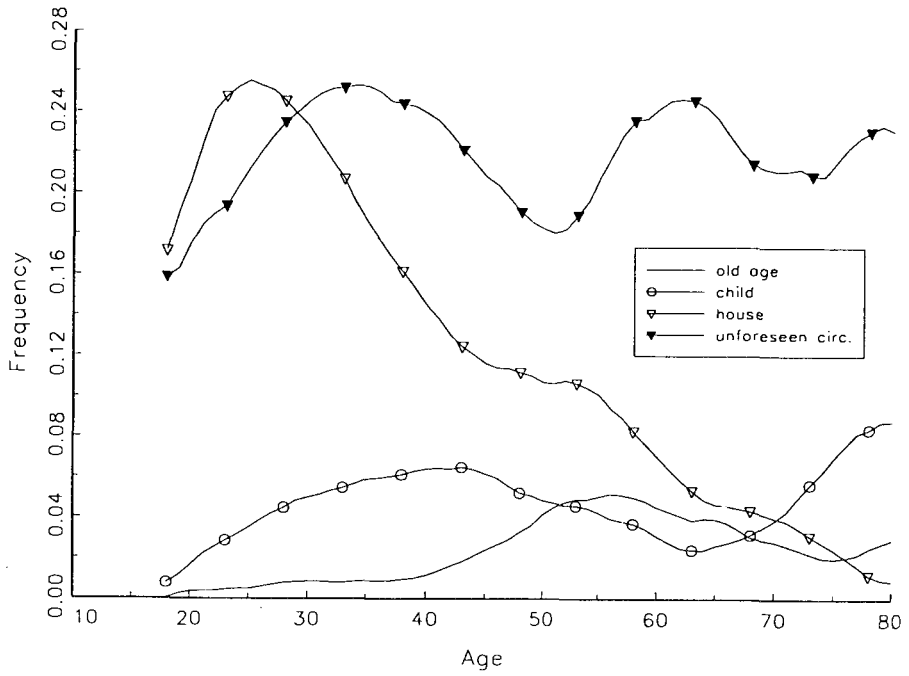

Figure 8. Motives for Saving across Age

also mortality risk. The motive related to the purchase of a house is concentrated among households below the age of 40; after 40 this motive becomes less important. Saving for children affects the young households between 30 and 40 and is presumably related to raising children. This motive seems to be relevant for the elderly as well, in particular the households over the age of 70, and it is possibly related to a bequest motive. These frequencies are consistent with the wealth and saving data, in particular with the data for the elderly.

6. Conclusions

In this paper, we examine wealth and income data from the Dutch Socio-Economic Panel. The survey provides detailed information about the assets and liabilities of each household member. This information makes it possible to study wealth holdings over the life cycle, portfolio choice, and wealth inequality. From first differencing wealth, we derive savings. The data on savings allow the researcher to further examine household accumulation. One can study questions such as: do the elderly dissave and do young people facing upward sloping earnings profiles borrow as predicted by the theoretical models? The SEP provides information on the motives to save, making it possible to check whether the reported answers conform with actual behavior. In addition to wealth data, the survey provides information about income. The income data are divided into many components, allowing an examination of the evolution of earnings, transfers, and capital income over the life cycle. The behavior of income is relevant per se,

but it is also important to understand wealth accumulation. The recent theory of precautionary saving has emphasized that the variability of income can lead to precautionary accumulation. The behavior of income is therefore relevant for evaluating the strength and empirical importance of the precautionary motive and the extent of precautionary accumulation.

The analysis of the profiles of wealth, savings, and income over the life cycle shows that there is substantial heterogeneity in the behavior of households that should be taken into account in the econometric modelling. As with all survey data, there is a misreporting and measurement error problem. This problem becomes more acute with data in first differences. However, a useful feature of this data set is the provision of many variables which could act as instruments and alleviate the measurement error problem.

The survey covers a long time span and is continuing. The income data are available since 1984, and new waves of wealth data are in the process of being edited and cleaned. This data set will enable researchers to examine household behavior in several dimensions and should prove extremely valuable for research and policy evaluations.

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