Households' response to wealth changes: do gains or losses make a difference?

Robert-Paul Berben,[1] Kerstin Bernoth[2] and Mauro Mastrogiacomo[3]

1. Introduction

Over the past decade, many major industrial countries have witnessed large swings in stock-market capitalisation. For example, in the US market capitalisation stood at about 50 percent of GDP in 1995 and rose to 150 percent in 2001, while in the Netherlands market capitalisation grew from 60 percent to 180 percent. After the burst of the ICT[4]-bubble in 2001, these upward trends were partially reversed. Between 2001 and 2003, market capitalisation in the US was reduced by 70 percentage points, while in the Netherlands it fell by more than 100 percentage points. A worldwide drop in asset prices of this size was unprecedented in recent history. This raises the question whether asset wealth losses may effect private consumption differently than asset wealth gains.

Poterba (2000), well before the collapse of asset prices in 2001, already put forward the "intriguing issue" of the potential asymmetry in how wealth changes affect consumer spending. More specifically, he raised the possibility that consumers might react more rapidly when wealth contracts than when it expands. Subsequent research for the US using macro data on consumption and asset wealth seems to contradict this view. For example, Apergis and Miller (2005) and Stevans (2004) show that during an "upswing" in equity prices, private consumption responds more strongly than during stock-market downturns.[5] In order to identify sufficient upswings and downturns, these authors use time-series data starting in the 50's. However, in view of the ongoing liberalisation of financial markets worldwide, it is at least questionable whether using data from the 50's-80's is appropriate when one is interested in an accurate estimate of the current impact of changes in wealth on spending.

In this paper, we use a micro-dataset for the Netherlands covering the period 1993-2005 to estimate the spending response to changes in asset wealth. The dataset does not provide information on non durable consumption. We assess therefore the response of active savings and of a limited set of durable goods, respectively, to capital gains on holdings of stocks, bonds and mutual funds. These appear to be the asset categories that generate the largest saving responses (Juster et al., 2006). Moreover, following Poterba's suggestion, we differentiate between capital gains and losses. Despite the relatively short time period that is covered by our dataset, we have sufficient observations to identify the different impacts of capital gains and losses, as many households experience financial gains in the first part of the time period, while facing financial losses in the second part. The high quality Dutch micro-dataset allows us to measure capital gains, or "pure" changes in wealth (therefore isolating portfolio choices). In this we follow Grant and Peltonen (2004), Juster et al. (2006) and some of the studies contained in Haliassos et al. (2002).

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1 De Nederlandsche Bank.

2 De Nederlandsche Bank, ZEI-University of Bonn.

3 CPB, Netspar.

4 Information and Communication Technology.

5 Case et al. (2003) show that increases in housing market wealth have positive and significant effects upon consumption, but declines in housing market wealth have no effect at all upon consumption.

This study is in part motivated by the results of Mastrogiacomo (2006). Using the data of the Dutch Social Economic Panel he shows that the perception of financial wealth realisations is asymmetric. Individuals need comparatively larger improvements in financial wealth to feel a bit more wealthy than they need financial losses to experience a small wealth decrease. His study focuses on the psychological perception of financial wealth (individuals are asymmetric per se) and does not link changes of financial wealth to consumption behaviour.

The remainder of this study is organised as follows. Section 2 describes the data and the construction and composition of the financial wealth variables. Section 3 studies the relation between financial wealth and active savings as well as at the relation between financial wealth and consumption of durables. Section 4 summarises, while tables and figures are in the Appendix.

2. Data

For the investigation of wealth effects on active savings and consumption in the Netherlands, we make use of the DNB Household Survey (DHS). The DHS is administered by CentERdata, which is associated with Tilburg University, the Netherlands. The survey is sponsored by De Nederlandsche Bank (DNB), the Dutch central bank. The aim of the DHS is, among others, to furnish information on both economical and psychological determinants of savings. The survey is conducted annually, starting 1993. In this study, we use the waves up to and including 2005. Each year, the survey contains approximately 1,500 households (well over 2500 individuals).[6]

The DHS provides very detailed information on households' assets and liabilities, which enables us to calculate an approximation of active household savings. In addition, the survey contains data on households' stocks of cars, caravans, boats, and motorbikes. No further information concerning the consumption of (non-)durable goods is available.

We define households' active saving as the money put in checking and saving accounts (CS) and invested in three financial assets: equities (E), bonds (B), or mutual funds (MF). More precisely, we define active saving as follows:

$$s_{i,t} = \left(X_{i,t}^{CS} - X_{i,t-1}^{CS}\right) + x_{i,t}^{E} p_{i,t}^{E} + x_{i,t}^{B} p_{i,t}^{B} + x_{i,t}^{MF} p_{i,t}^{MF} \qquad (1)$$

where $X_{i,t}^{j}$ denotes the stock of money held at the end of year *t* by household *i* in asset *j*, $x_{i,t}^{j}$ describes the flow of asset *j*, thus, the number of assets sold or purchased during year *t*, and $p_{i,t}^{j}$ denotes the price of asset *j* at time *t* paid by household *i*. Out of all financial wealth categories, these four are the most popular ones in the Netherlands. Table 1 gives an overview of the ownership rates of these wealth classes calculated on the basis of the answers collected by the DHS.[7] We see that the ownership of checking and saving accounts is nearly 100%. Around 10% of Dutch households reported in 1993 that they were holding money in equities. In 2001, equity ownership peaked around 18%. After the burst of the ICT bubble in 2001, stock ownership decreased to around 15% in 2005. We observe a similar pattern for the ownership of mutual funds. During the 90's, the relative number of households investing in mutual funds rose from around 14% in 1993 to around 30% in 2001. Between

[6] More information can be found at www.uvt.nl/centerdata/dhs.

[7] In the case that households report to hold a certain type of an asset but do not report the amount held in this asset, we follow Alessie et al. (2002) and replace the missing information by imputed values provided in the DHS data set. Since the relatively rich households are over-sampled in the data set, ownership rates are weighted with the sample weights to make them representative for the Dutch population.

2001 and 2005, mutual fund ownership showed a decreasing trend and reached a participation of 22% in 2005. Compared to the investment in stocks or mutual funds, bonds seem to be relatively unpopular for Dutch households. Only about 5% of the households report between 1993 and 2005 that they have invested in this investment category. This pattern is consistent with results appeared in the literature for the Netherlands and the US (cfr. Alessie et al. (2002), Bertaut (1998)).

We focus in our study on financial asset capital gains, namely returns on equity, bond, and mutual fund holdings. In contrast to most earlier studies on the relationship between wealth effects and spending, we attempt to calculate "pure" wealth effects. We differentiate between two components. First, wealth changes due to sales and purchases, which we define to be one component of active saving. Second, return effects appear, which we refer to as capital gains (passive savings)[8] and that we define as:

$$w_{i,t} = X^{E}_{i,t-1} r^{E}_{i,t} + X^{B}_{i,t-1} r^{B}_{i,t} + X^{MF}_{i,t-1} r^{MF}_{i,t} \,, \tag{2}$$

where $X^{j}_{i,t-1}$ describes again the stock of money hold in asset *j* and r^{j}_{t} describes the annual return between

t-1 and *t* of asset *j*.

Unfortunately, the DHS neither provides any direct information about households' sales and purchases of financial assets nor about their price and annual return, which complicates the calculation of household savings and asset capital gains according to equation (1) and (2).[9] We solve this problem by approximating the missing variables. The DHS provides information about the amount of money held at the end of a year in various asset classes, thus $X^{j}_{i,t}$, of which we can calculate the annual change of money held in asset *j*, $X^{j}_{i,t} - X^{j}_{i,t-1}$.

By definition, the annual change of asset wealth consists of two different parts. The first is the change due to sales and purchases and the second is the capital gain between *t-1* and *t*:

$$X^{j}_{i,t} - X^{j}_{i,t-1} = x^{j}_{i,t} p^{j}_{i,t} + X^{j}_{i,t-1} r^{j}_{i,t}, \tag{3}$$

with *j=E, B, MF*. The first term on the right hand side is the "active savings" part, which is needed for the calculation of households' active savings according to equation (1), and the second term is the capital gain in the particular asset, which is used for the calculation of household financial assets capital gain according to equation (2). Thus, after approximating the capital gains, we can use equation (3) to finally calculate the amount of active savings of the households.

The first and ideal way to split the annual change of money held in equities into its active savings and capital gains part is to extract the information directly from survey responses. The DHS contains two relevant questions, namely, a question asking household members about the amount of equities they hold and a question, which asks for the value of these equities. If respondents answer these two questions in two consecutive years, we can distinguish between a wealth change due to price effects on the one hand, and between wealth developments due to changes in the stock of the assets. This can be applied to 45 households. In the cases where we do not have this information about equity wealth, we approximate the capital gain on equity holdings by multiplying the total amount of money hold in equities at time *t-1* by the total annual return of the "Amsterdam Exchange Index" (AEX) at

[8] Most studies simply calculate the periodical change of wealth hold in a financial asset category, in which way one cannot differentiate between these two possible reasons for wealth increases.

[9] The only exception is equity wealth, where this information is available.

time *t*.[10] To calculate the capital gain on mutual fund holdings, we proceed as follows. If we know what institutions households invested their mutual funds in, we multiply the amount of wealth hold in this asset category by the return on the largest and the most liquid fund offered by this institution. If this information is not available, we multiply the amount of wealth held in mutual funds by the annual AEX return. For the calculation of the capital gain in bond holdings, we multiply the reported bond wealth at time *t-1* with the return on the Dutch 10-year benchmark government bond.

Besides our focus on the financial asset wealth, we add two more wealth variables as controls, namely the annual change of housing wealth and pension wealth. We define housing wealth at time *t* as the self reported current house value. Table 1 shows that around 50% of the respondents of the DHS own a house or an apartment. In the observed time period, house prices showed a tremendous appreciation, with growth rates exceeding 20% in 2000. Alessie and Kapteyn (2002) find significant effects of housing wealth on the take up of a second mortgage in the Netherlands, which is indeed a way to consume out of housing wealth. Further, many previous studies focussed on the impact of housing wealth on consumption and found a significant effect. The reason for the inclusion of a variable measuring the annual change of pension wealth into our regressions is that during the sample period some major institutional reforms in the Netherlands have exogenously changed the level of pension wealth. This may have had a significant impact on households' active savings (see Hubbard, 1985). Pension wealth is calculated as the discounted sum of future benefits minus premiums. We have taken into account information regarding individual pension plans, such as planned retirement age and pension arrangements. Further details are available from the authors upon request.

The time profile of the capital gains is presented in Figure 1. Capital gains and active savings clearly move in opposite directions, again suggesting a negative correlation. Thus, Figure 1 provides evidence that households tend to increase their active savings when they experience wealth losses, and vice versa.

While the DHS does not report a direct measure for households' consumption expenditures, it does contain a number of questions asking household members about the number of cars (*CA*), caravans (*CV*), motorbikes (*M*) and boats (*B*) they own, and about their estimated second-hand market value. This enables us to approximate durable-good consumption. For example, in year 2004 individuals are asked:

How much was the estimated market value of the [1st to 5th] car you have mentioned, on 31 December 2003?

Similar questions are asked about caravans, boats, and motorbikes. We use this information to calculate a measure of households' purchases (or sales) of a durable goods item as follows:

$$V_{i,t}^{j} = (1-\delta)V_{i,t-1}^{j} + c_{i,t}^{j}, \qquad (4)$$

with *j=CA,CV,M,B*. $V_{i,t}^{j}$ denotes the (second hand-)market value of household *i* of item *j* in year *t*. δ is the rate of depreciation, and $c_{i,t}^{j}$ is the amount of money the household has spent on the item *j* in the course of year *t*. Note that this amount of money can be negative. In that case, the household has sold a durable item. In the remainder of the study, we focus on total

[10] Although the share of foreign assets in Dutch portfolios is on the rise, the home bias is still substantial (IMF, 2005).

consumption of durable goods,[11] which is calculated as the sum of $c_{i,t}^{j}$ over the four goods items,

$$c_{i,t} = c_{i,t}^{CA} + c_{i,t}^{CV} + c_{i,t}^{M} + c_{i,t}^{B}. \quad (5)$$

The DHS does not provide information on depreciation rates. We therefore assume that the depreciation rate may take the following values: 0%, 10%, 20%, 30%, cf. Padula (2004). Of course, assuming a uniform rate of depreciation over time, items, and households is arbitrary, and clearly matters for the calculation of $c_{i,t}^{j}$. However, we are not interested in obtaining estimates of durable goods consumption per se, and it is not immediately obvious whether and how idiosyncratic variation in depreciation rates would bias the empirical findings in the remainder of the study. A final issue is that the DHS does not allow us to differentiate between purchases of new items and of second-hand items. This obfuscates a direct comparison to durable goods (vehicles) consumption in the National Accounts, since the latter excludes purchases of second-hand items.[12]

Figure 2 shows the median household expenditure on the four durable goods item, considering only households that actually made a purchase and assuming $\delta = 0.10$.[13] The figure indicates that durable goods consumption slowed down from 2001 onwards.

3. Impact of wealth changes on savings and durable consumption

3.1 Savings

Our estimates of the relationship between household savings and wealth returns are based on the following equation:

$$s_{i,t} = \theta_1 w_{i,t-1}^{P} + \theta_2 w_{i,t-1}^{N} + \theta_3 x_{i,t} + \alpha_i + \lambda_t + u_{i,t}\ ,\ i = 1, \ldots, N\ ,\ t = 1, \ldots, T, \quad (6)$$

where *i* denotes the household and *t* the time. $s_{i,t}$ stands for active savings. $w_{i,t}^{P}$ and $w_{i,t}^{N}$ describe the vector of wealth gains and wealth losses, respectively.[14]

A number of authors, like eg Dynan and Maki (2001), have noted that households' consumption or savings reactions to wealth effects may occur with a substantial time lag (owing to uncertainty about the persistence of the change). As attrition is high in the DHS, we must assume that active savings react at most with one period lag to wealth changes.

We assume therefore that active savings react on asset returns with a one year lag. As current asset returns (those in period *t*) are used to define current active savings, we include

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[11] The totality of durable consumption in the DHS does only include vehicles. These account for about 20% of the entire stock of durables registered by National Accounts.

[12] Ownership rates for all four items are fairly stable over time. The vast majority of the households own at least one car. Ownership of caravans, motorbikes and boats is less widespread.

[13] Similar graphs are obtained for the remaining depreciation rates.

[14] It is well known that financial indicators like returns on savings, suffer of high measurement error, and that this may bias the estimated coefficients towards zero. This is even more the case in our study, where capital gains are defined on the base of assets returns and net financial wealth that are both measured with error. In order to account for this problem we have limited our definition of assets returns only to the most volatile components of financial wealth, that also show higher MPC's relative to the total of financial wealth. We have for instance excluded returns on checking, saving, deposit and business accounts as well as the returns on stocks that back up long term mortgages.

only the lag in our model in order to avoid any spurious negative relation due to the definition of active savings and assets returns. An alternative would be to instrument current asset returns, however the most obvious instrument would be the lag of these returns themselves.

The wealth vector consists of financial asset wealth as defined in equation (2), augmented by housing wealth and pension wealth changes. $x_{i,t}$ in equation (6) is a vector of household controls, such as income, age, family size and education, λ_t are time effects to account for the business cycle, α_i denotes the individual effect, and $u_{i,t}$ is a white noise error term. We follow Mundlak (1978) and assume that the individual effects are correlated with some explanatory variables. More specifically, the relationship between α_i and $x_{i,t}$ is specified as $\alpha_i = \beta' \overline{x}_i$. This is done by including the "individual means over time" of some relevant explanatory variables, $\overline{x}_i$ into the estimations. As the variance of the household-specific residual is not equal across households, OLS estimates of our model would be biased and return very low standard errors. We use therefore bootstraping to correct for this.

Table 2 shows the estimation results. Similar to Alessie and Kapteyn (2002) and Engelhardt (1996), we apply a median regression approach, which is robust to outliers. Column A contains the results for the model in which we include all three wealth variables linearly, thus, without differentiating between positive and negative wealth changes (therefore capital gains and losses are kept together). Column B describes the results for the model in which we explicitly distinguish between capital gains and losses, and positive and negative changes in housing and pension wealth.

From the estimation results in column A, we see that lagged financial asset wealth shows the expected negative sign (though it is not significantly different from zero). Thus, a capital gain is associated with a decrease in active savings and vice versa. The estimation results in regression B, where we distinguish further between lagged capital gains and losses, confirm our asymmetry hypothesis. Households react more strongly to capital losses than to gains. The coefficient on capital losses is about twice the size of the coefficient on capital gains. A capital gain of 1,000 euro causes a non statistically significant decrease in active savings of 59 euros. A capital loss of the same magnitude induces households to increase their active savings by 150 euros. The null hypothesis of both these coefficients being not significantly different from zero is rejected at conventional statistical levels ($\chi^2_{(2)}$=34.6). In comparison to the results found in the macro-econometric literature (like eg Poterba (2000) and Mehra (2001)), our estimated marginal propensity to consume out of equity, bond, and mutual fund returns are somewhat larger.[15] These are in line with the results of Juster et al. (2006). As we focus on the relation between these two effects and not on their level, we do not enquire this further.

It is however possible that households in general tend to put money aside. In that case, interpreting the coefficients ceteris paribus may be misleading. Thus, we are also interested in comparing the effect of capital gains and losses on savings by looking at the predictions of our models for three different subgroups in the populations: those with no assets, those with capital gains and those with losses. Using the estimates of model B in table 2, we compute the expected savings for these groups separately. In addition summary statistics show that gains and losses in these returns are of almost identical magnitude (approximately 1,000 euro on average). We take the expected active savings of those with no assets as a benchmark. If all consumers were symmetrically reacting to wealth changes, we would

[15] Notice that our estimates refer to active savings, these are the complement to income of the sum of durable and non-durable consumption. It is therefore not possible to compare the coefficients estimated here, with those of studies that either focus on durable or non-durable consumption. As the complement is the sum of these two variables it is perfectly plausible, and indeed expected, that the coefficients are larger than standard MPC's.

expect those with capital losses to have extra active savings (relative to the benchmark) of the same magnitude of the lower expected active savings of those with capital gains.

More formally, we subtract the expected value of active savings of those with no assets from the expected savings of those with capital gains or losses. Thus, let *y* denote the predicted active savings, then the ratio:

$$ER = -\frac{E(y \mid (return < 0)) - E(y \mid (return = 0))}{E(y \mid (return > 0)) - E(y \mid (return = 0))}, \quad (7)$$

measures the excess reaction. The calculated ratio is on average equal to 1.8. We compute this measure for different age-related subgroups and find that it is equal to 3.4 for the elderly. This means that households reaction to capital losses is between 2 to 3 times larger than their reaction to a capital gain of the same size. This result supports our asymmetry hypothesis that households respond much stronger to financial losses than to financial gains. These estimates are in line with the results of Mastrogiacomo (2006) that measures an asymmetric perception of financial wealth changes ranging from 1.5 to 4.8, also depending on age.

Housing wealth did not return significantly different results for positive and negative changes nor results that significantly differ from zero ($\chi^2_{(2)}$=3.6). Positive and negative changes are defined relative to the average change of the value of the house for each household. Thus, our results partly contradict the results of Engelhardt (1996), Blake (2004), Disney et al. (2003), and Grant and Peltonen (2004), who find significant effects of housing wealth on consumption. We propose three explanations for the non-significance of house values changes. The first one is given by Poterba (2000), who argues that the extent to which an unanticipated increase in house prices raises a household's real wealth depends on the time horizon over which the household plans to live in its current home. When the house prices rise, the implicit "user cost" of living in a house also rise. Thus, when households expect to live in their homes for many years, the positive wealth effect associated with a house price increase can be largely offset by the increase in the effective cost of buying housing services. The second explanation we find is related to the first one. If households expect to stay for many years or even until death in their houses, they have no plans to monetize their wealth increase following a rise in their house price, and therefore, the house value has no significant impact on savings. The third explanation is specific to the Netherlands. Alessie and Kapteyn (2002) show the already quoted relation between housing wealth and the take up of a second mortgage. In the Netherlands second mortgages are also tax deductible if invested in the renovation of the house itself. This regulation creates a subsidy to durable consumption re-invested in house improvements (and therefore endogenous to the value of the house) that is as high as the payroll tax. The strong incentive to get a second mortgage and to re-invest it on the house suggests that no significant relation should be found between non-durable consumption (and therefore also active savings), other durable consumption (vehicles for instance) and housing wealth changes.

Pension wealth developments have jointly significant impact on active savings ($\chi^2_{(2)}$= 15.1). They also show the expected asymmetric effect. However in Models A and B, the coefficient of changes in pension wealth turns out to be negative but not always significant. A possible explanation for this result, beside the obvious technical explanation, is that individuals are on average not well informed about their pension wealth (Lusardi, 2006) and therefore do not adapt their savings to changes in their retirement wealth. This explanation finds also support in a study of Rooij et al. (2004), who also use the DHS to show that the average respondent considers himself financially unsophisticated, and is not very eager to take control of retirement savings investment when offered the possibility to increase his expertise.

Some of the taste shifters included are significant. Family size has a negative effect on active savings. Savings seem to be unaffected by the age of the head, but the relation between income and age may well be responsible for this. Income itself does not turn out to be

significant, however the labor market status, which definitely signals household income, did. We also included time effects to control for business-cycle-related factors and the endogenous variables mentioned above, but for reasons of exposition, we do not report them explicitly in our table.

3.2 Consumption of durables

As we explained in some detail in Section 2, the DHS does not provide for questions about households' consumption expenditures. An exception are vehicles, which represent durable goods consumption in the DHS. We measure "durables consumption" as the net adding to the stock of cars, caravans, motors and boats. The estimation strategy is primarily geared towards gauging the impact of capital gains and losses on durable goods consumption. Our model for consumption is similar to that for active savings:[16]

$$c_{i,t} = \theta_1 w^P_{i,t} + \theta_2 w^N_{i,t} + \theta_3 x_{i,t} + \alpha_i + \lambda_t + u_{i,t}, \; i = 1, \ldots, N, \; t = 1, \ldots, T, \tag{8}$$

where i indexes households, and t indexes time. $c_{i,t}$ is the amount of money that is spent on durable goods estimated according to equation (4). The rest of the controls were already introduced in previous estimations, and we also replace asset gains and losses with lags; but there are two notable differences. First, we exclude pension wealth. Second, we add the stock of durable goods in the previous period.[17]

Like above, we allow for (random) individual effects, denoted α_i. For example, some households may simply like to buy a new car every year, for reasons that we cannot observe using the survey data. However, likelihood-ratio tests strongly rejected the presence of such individual effects. Instead, we follow Mundlak (1978) and assume that the individual effects are correlated with some observables.

Table 3 shows the results for the depreciation rate equal to 20 percent per year. The results for the remaining depreciation rates (0%, 10% and 30%) are qualitatively similar, and are available from the authors upon request. The table reports two models that combine different sets of regressors. The models have been estimated by median regression. The column headed A contains the results for the model in which we use the "pure" wealth effects introduced in Section 2 and the change in house value, without differentiating between gains and losses. The column headed B contains the results for the model which distinguishes between lagged gains and losses. We assume again that these wealth changes accrue to the households in the course of the year, and can in principle be spent immediately.

Regarding the household control variables, we see that many of them enter with the expected sign. The coefficients on these variables differ little across specifications. Durables consumption is increasing in income. A household that has a net income of €30,000 and that earns an additional €1,000 will increase its spending on durables - on average - by about 5 euro. In other words, the marginal propensity to consume (MPC) on durables out of current net income is approximately 0.5 percent. This is a fairly small number, and is related to the fact that many households only occasionally spend a substantial amount of money to buy a new car. Next, the coefficients on age and age squared indicate that consumption expenditures on durable goods are increasing. This can be understood as follows.

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[16] More elaborate theoretical models of durable goods consumption can be found in Attanasio (1999) and Caballero (1994).

[17] This variable is motivated by theoretical (S,s) models, see Eberly (1994) and Attanasio (2000). According to these models, the amount spent on durable goods depends on the extent to which the past level of the stock of durable goods differs from an optimal level. In the present paper, we assume that this gap is associated with the level of the stock of durable goods.

Households generally begin their economic life with zero stock of durables and may find it difficult to quickly build up this stock, for example due to liquidity constraints. As a consequence, during the first part of their life cycle households tend to progressively accumulated durables. When they grow older they may, or may not, gradually reduce this stock, cf. Fernandez-Villaverde and Krueger (2002). Furthermore, for a given level of household net income, larger families spend less on durable goods. One explanation is that these households simply have to spend more on, for instance, food, clothing, housing and children. Finally, durables consumption is (strongly) decreasing in previous year's stock of durable goods. This is consistent with theories that stress the lumpiness of durable goods purchases, cf. Caballero (1994). When a household makes a big purchase, it generally does so by aiming to adjust its stock of durable goods towards an certain optimal level. This implies the household is likely to be near its optimal level next year as well, making further (large) purchases unwarranted.

Looking at the wealth variables, we find that durables consumption is not significantly related to asset wealth. The impact of a change in housing wealth in non-significant as well. The latter is broadly consistent with anecdotal evidence for the Netherlands. During the housing boom in the late 90's, many households (partly) re-invested their housing wealth in the form of new kitchens, bath-rooms. It was less common to use housing wealth to buy a new car.

When we differentiate between lagged wealth gains and losses, it turns out that the impact of asset wealth gains and losses and of housing wealth gains and losses on durables consumption are non-significant. Nevertheless, the estimated impact of lagged asset losses is much larger than the impact of lagged asset gains. So, consistent with our results on active savings, households tend to cut down spending on durables facing a drop in wealth more strongly then they step up spending when they experience a wealth gain. We estimate the MPC out of asset wealth and housing wealth for this specific class of durable goods to be about 0 and 0.003, respectively. Compared to existing estimates, these are fairly low numbers. For instance Altissimo et al. (2005) put the MPC of asset wealth for total consumption at 1.5 to 7.5 percent for European countries. We think that the size of our estimates reflects the limited set of durables that we dispose of, as households not very often buy a new car. Furthermore, expenditures on cars amount to only 20% of total durable consumption according to National Accounts. This means that our results may not easily carry over to total durable consumption.

4. Summary

The marginal propensity to consume out of financial wealth serves as input to different models that economists employ. However, calibration based on macro studies that exploit information about remote past may not provide a good tool. The recent rise in stock-market participation of households should be central in new estimations of this parameter. Behavioural economics also shows that individuals responses to gains and losses need to be taken into account when considering any reaction to wealth changes.

In this paper, we looked at asymmetric wealth effects at the micro level from different perspectives. First, we use the data of the DNB household panel to analyse the relationship between wealth gains and losses on actual and planned savings. The result is that a positive return in financial assets has a significant negative effect on active household savings. If households experience a capital loss, they compensate this loss with an increase in active savings. This compensation is asymmetric: the impact of a capital loss is about twice as large as the impact of a capital gain. We suggest that the magnitude of this asymmetry increases with age. Our estimates of this excess reaction are in line with those of the loss aversion literature (Knetsch, 1989) and studies on wealth perceptions for the Netherlands (Mastrogiacomo, 2006).

Second, we estimate the impact of wealth on durable goods consumption, which is the only directly reported consumption information present in the data. To our knowledge, we are the first estimating this relationship at the micro level. We find that though these effects are small, they can as well be asymmetric.

Our methodology still contains an important restrictive element. We only distinguish between capital gains and losses. In reality, households may be expecting a certain positive capital gain on average, and behave differently depending on whether the actual capital gain exceeds this level or falls short of it. This is an interesting topic for future research.

Appendix
Tables and figures

Table 1

Households' assets ownership rates by year

	Checking and saving accounts	Bonds	Stocks	Mutual funds	House ownership
	%	%	%	%	%
1993	91.3	6.1	10.4	14.2	47.7
1994	93.4	4.8	6.2	13.9	45.7
1995	91.3	4.4	10.2	15.5	48.5
1996	92.3	4.9	13	17.9	50.3
1997	90.9	3.5	13.6	18.6	50.4
1998	89.5	3.7	15.5	21.5	51.8
1999	88	3.5	18.3	25.4	48.8
2000	92.3	3.2	14.4	24.6	52.4
2001	93.8	3.4	17.4	29.5	50
2002	94.3	3.5	17.1	28.7	50.8
2003	96.1	4.2	16.7	18.4	50
2004	95.4	4.4	15.6	21.5	50.7
2005	95.7	4.9	14.5	21.7	48.3

Explanatory note: All statistics use sample weights. Weights are constructed on the base of income deciles and home ownership in a larger and representative dataset that is held every 5 years. The weights after 2000 are therefore constant and return a flat pattern of homeownership.

Source: DHS, own computations.

Table 2

Estimation results for active savings

	A		B	
	estimate	**st.error**	**estimate**	**st.error**
Lag capital gains and losses (*10^{-3})	–163.97	78.51		
Lag capital gains (*10^{-3})			–97.69	183.92
Lag capital losses (*10^{-3})			–161.62	62.74
Change in house value (*10^{-3})	–1.43	5.12		
House value increase (*10^{-3})			-6.33	5.00
House value decrease (*10^{-3})			–37.17	18.02
Change in pension wealth (*10^{-3})	–1.41	2.56		
Pension wealth increase (*10^{-3})			–2.87	3.44
Pension wealth decrease (*10^{-3})			–0.46	4.27
Total income (*10^{-3})	–4.66	24.91	–7.26	26.57
Total income squared (*10^{-6})	-0.05	0.22	0.03	0.22
Head works	447.51	378.05	472.01	372.46
Partner works	999.70	544.16	864.70	549.88
Education	–160.73	133.63	–172.06	141.58
Family Size	–156.17	75.87	–151.96	74.34
Age	60.11	74.15	71.98	75.09
Age squared	–0.55	0.78	–0.64	0.77
Constant	–2262.61	1828.37	–2824.14	1951.19
N	3081		4486	
Time effects	yes		yes	
Endogenous variable	yes		yes	

Explanatory note: Among the endogenous variables we include household income, total non financial assets, labor market participation of the partner, pension wealth. Time effects are included using yearly dummies. Bootstrapped standard errors.

Source: DHS, own computations.

Table 3

Estimation results for durables

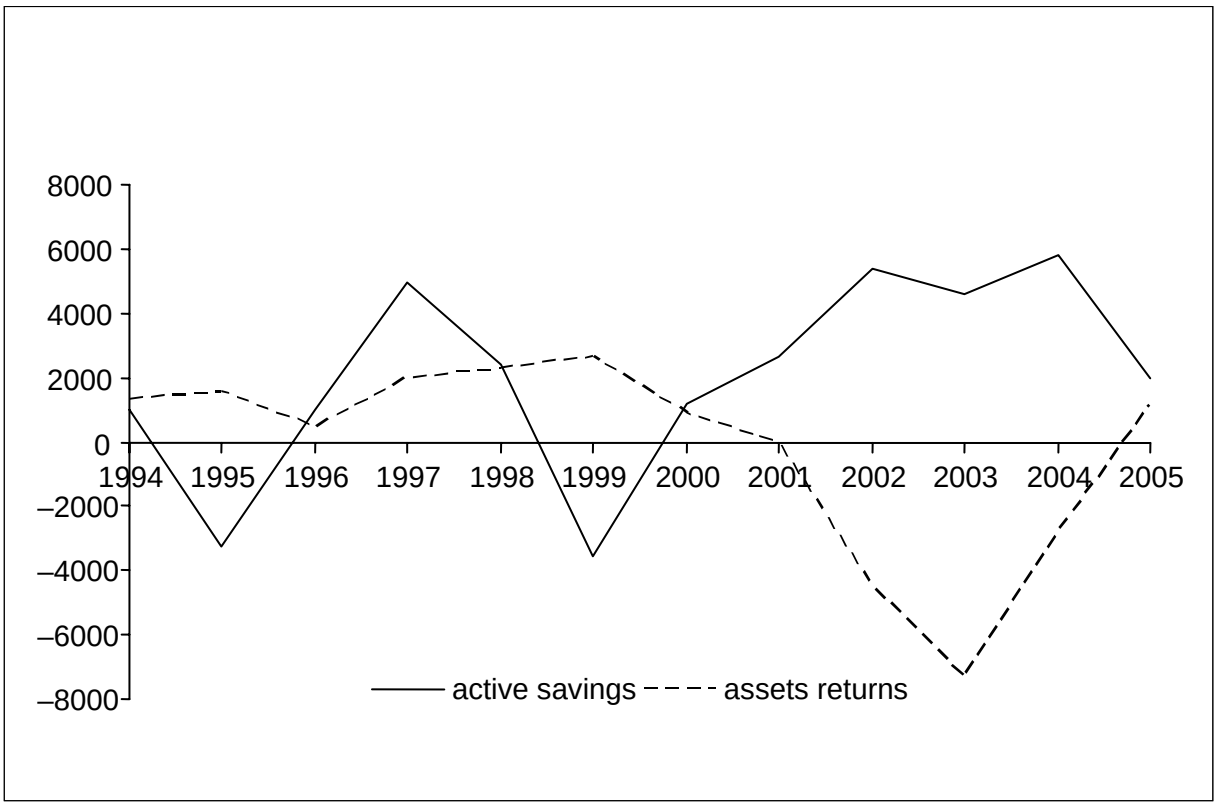
	A		B	
	coeff	**st. error**	**coeff**	**st. error**
Lag capital gains and losses (*10^{-3})	–0.002	0.027		
Lag capital gains (*10^{-3})			–0.016	0.030
Lag capital losses (*10^{-3})			0.053	0.051
Change in house value (*10^{-3})	0.003	0.004		
House value increase (*10^{-3})			0.001	0.004
House value decrease (*10^{-3})			–0.020	0.017
Stock durables previous year	–0.315	0.045	–0.317	0.044
Household income (*10^{-3})	0.005	0.009	0.005	0.008
Income square (*10^{-6})	–0.002	0.027	–0.002	0.026
Education	0.149	0.291	0.182	0.285
Family size	–0.290	0.302	–0.351	0.304
Age	0.025	0.057	0.027	0.056
Age square (*10^{-3})	0.020	0.305	0.004	0.303
Partner works	–0.178	0.351	–0.079	0.348
N	2560		2560	
Time effects	yes		yes	
Endogenous variables	yes		yes	
Pseudo R^2	0.07		0.07	
F-test asymmetric wealth effect			0.1	

Explanatory note: Depreciation rate equals 20% per year.

Source: DHS, own computations.

Figure 1

Active savings and capital gains

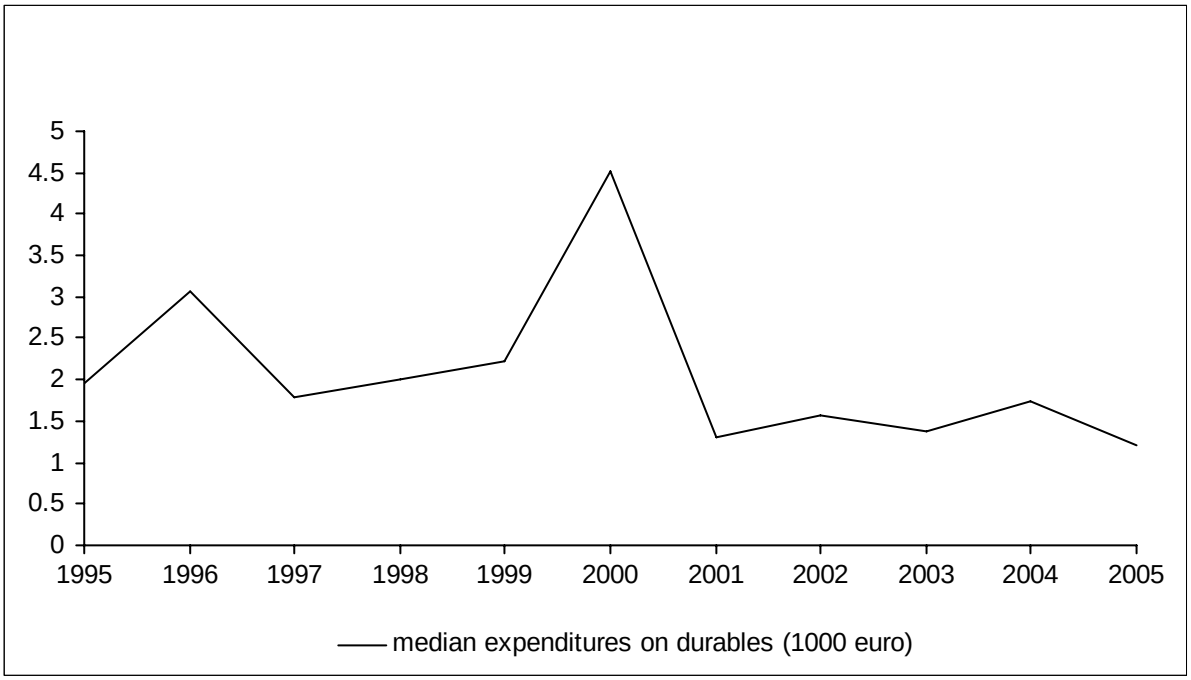


Explanatory note: we only consider returns on stocks, bonds, and mutual funds.

Source: DHS, own computation.

Figure 2

Consumption of durables



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