Expected and Realized Income Changes: Evidence from the Dutch Socio-Economic Panel

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Abstract

Income expectations play a central role in household decision making. In the life cycle model for example, consumption and savings decisions reflect expectations of future income. In empirical applications where direct information on expectations is not available, it is usually assumed that expectations are rational, and reflected by observed future realizations. In this paper, we analyze direct subjective information on expected changes of household income in one panel wave of Dutch families. First, we describe these data and investigate how the expectations can be explained by, among other variables, income changes in the past. Second, we combine these data with information on realized income changes in the next panel wave, and analyze the differences between expected and realized changes. We find that, on average, households underestimate their future incomes significantly. In particular, this holds for those families whose income has fallen in the past.

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1 Introduction

In the dynamic process of household decision making, future expectations play a central role. In a life cycle framework, decisions on current consumption of nondurables and durables, housing, savings, portfolio choice, labor supply, etc., not only depend on current wealth, income and preferences, but also on the individual's or household's subjective distribution of family income, prices, and other input variables (see, for example, Deaton, 1992). In most of the empirical literature on life cycle models, no direct information on future expectations is used. To quote Dominitz and Manski (1994): "Skeptical of subjective data of all kinds, economists do not ordinarily collect data on income expectations. Instead, the standard approach is to infer expectations from panel data on realizations." [1] To estimate the life cycle model, it is then assumed that individuals' subjective expectations bear some relation to income realizations. This leads to the assumption of rational expectations, or to some alternative explicit model of expectation formation, estimated on the basis of realized incomes. [2]

Notable recent exceptions to this approach are, for example, Guiso et al. (1992, 1994), Lusardi (1993), and Alessie and Lusardi (1993). In these papers, characteristics of subjective income distributions directly derived from survey data, are used as explanatory variables to explain consumption, savings or portfolio choice. In line with this, interest in data on and the modelling of income expectations has increased. See Guiso et al. (1992), Dominitz and Manski (1994), and Alessie et al. (1994). [3] The former two analyze data on subjective income distributions on the basis of a cross-section. They do not compare income expectations with income realizations. The latter use panel data and show that expected changes in income are significantly correlated with actual income changes.

Our approach is in line with Dominitz and Manski (1994) and Alessie et al. (1994). We do not analyze consumption or savings, but focus on income expectations and realizations. We use the same subjective data on actual and expected income changes as Alessie et al. (1994), drawn from the Dutch Socio-Economic Panel (SEP). These questions are:

[1] See, for example, Hall and Mishkin (1982) and other references in Dominitz and Manski (1994).

[2] For example, Carroll (1994) uses two methods for estimating future income of individuals participating in the 1960-1961 *Consumer Expenditures Survey* (CEX). In the first method, he estimates age/income cross-sectional profiles using household characteristics. A particular household's expected future income is then assumed to be given by the average observed income of older households with similar characteristics. The second method regresses actual 1969-1985 income on 1968 personal characteristics using data from the *Panel Study of Income Dynamics* (PSID).

[3] Carroll et al. (1994) use a macro-economic measure of economic prospects, the Index of Consumer Sentiment, and find that it positively affects consumer spending.

A: Did your household's income increase, decrease, or remain unchanged during the past twelve months? Possible answers: strong decrease (1); decrease (2); no change (3); increase (4); strong increase (5).

B: What will happen to your household's income in the next twelve months? Possible answers: see A.

These questions are not very well specified. It is not clear whether nominal or real income is referred to, and it is not clear what distinguishes strong increases from increases, etc. The value of the questions is the fact that they are comparable: it seems reasonable to assume that the household has the same concepts in mind while answering questions A and B. Moreover, these questions have been asked at each wave of the panel, and it is possible to compare the expectation (B) in one year to the realization (A) the next year. In case of rational expectations and in the absence of macro-economic shocks, the distributions of these two should be similar. If not, then this would be evidence against crucial assumptions underlying the empirical work on life-cycle models: either rational expectations, or the absence of macro-economic shocks, or both.

The organization of this paper is as follows. In section 2 we discuss the data, drawn from the SEP wave of October 1984. We describe the data on income change expectations (answers to question B) and present some nonparametric regressions of these expectations on age and actual income, used to suggest appropriate parametric models. In section 3, we estimate an ordered response model explaining expected income changes from income changes in the past (question A), the level of actual income, and other background variables, such as age, family composition, and labor market status. In section 4, we compare the expectations (question B) in 1984 with the realizations (question A) in 1985 of the same households, exploiting the panel nature of the SEP data. We investigate to what extent people systematically under- or overestimate their income changes. For this purpose, we consider an ordered response model explaining the difference between realization and expectation, using the same explanatory variables as in section 3. At the end of the section we briefly comment on the validity of rational expectations and the presence of macro-economic shocks. In section 5, we summarize our findings.

2 Description of the data

Data were taken from the Dutch Socio-Economic Panel (SEP) which is administered by the Netherlands Central Bureau of Statistics (CBS). The SEP is a random sample 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 depending on the number of inhabitants (big cities are drawn with probability one). In the second step, addresses are selected randomly. [4]

For this section, we use the wave of October 1984 to elicit information on expected future income. Heads of households are asked to answer the question: "What will happen to your household's income in the next twelve months?" Answers to this question are given on a five-point scale: strong decrease (1); decrease (2); no change (3); increase (4); strong increase (5). This variable is denoted by INCEXP. This differs from the way in which Dominitz and Manski (1994) collected their data. Their income-expectations questions took the form: "What do you think is the percent chance (or what are the chances out of 100) that your total household income, before taxes, will be less than Y over the next 12 months?". With the responses to a sequence of such questions for different values of Y, Dominitz and Manski (1994) estimate each respondent's subjective probability distribution for the next year's household income.

Dominitz and Manski compare their study with that of Guiso et al. (1992). Guiso et al. asked households to attribute weights, summing up to 100, to given intervals of nominal earnings percentage increases one year ahead. Carroll (1994), however, argues that it is clear that many households did not understand the survey question since a very large proportion of households reported point expectations for the next year's income: in the survey used by Guiso et al. 34% of the households reported a degenerated subjective distribution. Lusardi (1993) concludes that this is not surprising. She argues that with a one-year time horizon, people may attribute non-negligible weights to a much smaller set of events than when considering the entire period of life until retirement. With a short time horizon, it is therefore not surprising that many households know with certainty their future nominal income.

The nature of our data does not allow us to estimate complete subjective probability distributions of respondents, and this is not what we aim at. We interpret INCEXP as an indicator that is positively correlated with the location of the subjective future income

[4] See CBS (1991) for details about contents, setup and organization of the SEP.

distribution. We try to explain differences in INCEXP across families from a number of variables. One of them is related to an income change in the past: the answer to the question "Did your household's income increase, decrease, or remain unchanged during the past twelve months?". The answer will be represented by the variable PREV_84, which, again, can take the values $1, 2, \ldots, 5$.

The original SEP data set contains 3787 households. Since we use actual household income as an explanatory variable, we removed all households for which at least one component of household income was missing. In particular, this implied removing most households with self-employed members, who usually did not provide reliable information on their incomes. We also removed a few observations with missing information on other explanatory variables. This reduced the data set to 2729 observations. Removing observations for which INCEXP or PREV_84 was missing, finally lead to a total number of 2683 households.

In Table 1 we display a bivariate frequency table of INCEXP and PREV_84. Note that both variables refer to income changes, not to income levels.

Table 1 : Bivariate frequencies (in %) of INCEXP and PREV_84.

PREV_84 → INCEXP ↓	1	2	3	4	5	total
1	3.02	1.04	1.60	0.11	0.07	5.85
2	5.40	15.06	11.52	0.67	0.48	33.13
3	2.72	7.60	33.77	4.77	1.42	50.28
4	0.56	0.86	4.55	3.35	0.97	10.29
5	0.00	0.07	0.15	0.11	0.11	0.45
total	11.70	24.64	51.58	9.02	3.06	100.00

Most of the households (50.3 percent) do not expect their current income to change. This is in line with Dominitz and Manski (1994), who find that realized household income is the dominant predictor of expected future household income. More striking is that about 39.0% expect an income decrease, while only 10.7% expect an income increase. [5]

[5] Similar results are obtained using a different data source: according to the CBS (1993), the fraction of families in 1984 expecting that their financial situation will worsen, is about 20 percent points higher than the fraction expecting an improvement.

To a lesser extent, the same is true for the realized household income in the previous twelve months (36.3% and 12.1%, respectively). 55.3% of the households expect the same to happen to this year's income compared to last year's income. Finally, note that the dispersion in expected income changes is much smaller than in realized income changes. In particular, the number of families expecting a change is about the same as the number of families which have experienced a change, but there are few households who expect a large increase or a large decrease. In terms of expected income levels, this suggests that the expected level is determined by the current level and an (incomplete) adjustment in the direction of last year's change. This seems an important refinement of Dominitz and Manski's finding, who only use information on income levels and not on income changes.

To suggest and motivate appropriate parametric models, we present some nonparametric regressions of INCEXP on age and actual after tax family income. [6]

Figure 1 : Nonparametric regression of income expectation (INCEXP) on age with 95% uniform confidence bounds (dashed lines).

In Figure 1 the nonparametric regression of income expectation on age is displayed. We see that heads of households, on average, more often expect a fall in income when

[6] We used the quartic kernel. For the bandwidth, we used 8.0 in Figure 1 and Figure 3, and 1.0 in Figure 2 and Figure 4. For more details on nonparametric regression we refer to Härdle and Linton (1994).

they are older. This pattern changes at the age of (approximately) 60 years. After this age, many people retire and live from some, often predetermined, retirement benefits.

Figure 2 : Nonparametric regression of income expectation (INCEXP) on the logarithm of net income where net income is in tens of thousands with 95% uniform confidence bounds (dashed lines).

In Figure 2 the nonparametric regression of income expectation on the logarithm of the net income level is plotted (for details on the computation of the net income level, we refer to the Appendix). Due to the small number of households receiving a very low income (less than 10,000 Dutch guilders per year) the first part of the regression line is very inaccurate. [7] For households with an income above 10,000 Dutch guilders, we see a positive relationship between income expectation and the logarithm of net income: the lower the income, the more often the head of the household expects a fall in family income.

3 A model for expected income changes

Since INCEXP is a discrete variable with a natural ordering (from 1, strong income decrease expected, to 5, strong increase), we model it with an ordered probit model:

[7] To be precise, 2.6% of the households receive an annual net income less than 10,000 Dutch guilders.

$$\begin{aligned} y_i^* &= x_i\beta + \epsilon_i, \\ y_i &= j \text{ if } m_{j-1} \leq y_i^* < m_j \quad (j = 1, ..., 5). \end{aligned} \tag{3.1}$$

Here y_i^* is an unobserved variable, and y_i, INCEXP of family i, is its observed counterpart; x_i is a row vector of family characteristics, including actual income and dummy variables for the possible outcomes of PREV_84, the income change in the past. See Table 2 for the included variables and Tables A1 and A2 in the Appendix for definitions and summary statistics of these variables. ϵ_i is the error term. It is assumed that, conditional upon x_i, it follows a standard normal distribution (with zero mean and unit variance, due to normalization). The bounds satisfy $m_0 = -\infty$, $m_1 = 0$ (by normalization), $m_5 = \infty$; $m_2 < m_3 < m_4$ and β are the parameters to be estimated.

The model is estimated by maximum likelihood. Results are presented in Table 2. As expected from Table 1, those who experienced a strong income decrease (PREV84_1 = 1) or a decrease (PREV84_2 = 1) in the past twelve months, have significantly [8] less optimistic income change expectations than the reference group of those who have not experienced a change. Those who have experienced a strong fall are more pessimistic than those with a moderate fall. Similarly, those who have experienced an income gain are more optimistic than the reference group. However, those with a large income rise in the past are less optimistic than those with a moderate past increase. This could be due to the small number of observations in this category.

Gender of the head of the household appears to play no role. A quadratic age pattern has been included, as suggested by Figure 1. INCEXP decreases until about 58 years of age (*ceteris paribus*). This could be a cohort effect as well as a true age effect. The relatively optimistic view of young people could be explained by the fact that earnings increases are usually much larger in the beginning of the working career. For pensioners, income is usually quite stable, which explains the increase for the elderly.

The variables DSELF ... DOTH refer to the labor market status of the head of the household. The reference group consists of the employees. They are somewhat less optimistic than the self-employed or company directors. Those on unemployment benefits, unemployment assistance, or disability benefits, are significantly more pessimistic about future income changes than employees. In particular, the disabled often expect an income decrease. This can be explained by the fact that the Dutch system of disability benefits went through a substantial reform, which was completed in 1987, but was initiated earlier. In 1985, disability benefits decreased from 80 percent to 70 percent of the gross wage in the last job. As a result, the after tax replacement ratio for those

[8] Throughout, we use a (two-sided) significance level of five percent.

on disability benefits decreased from 81.3 percent in 1983 to 78.2 percent in 1984, 72.1 percent in 1985, and 71.3 percent in 1986 (cf. Aarts and De Jong, 1990, p. 39).

Table 2 : Parameter estimates for the probit model.

DEPENDENT VARIABLE: INCEXP		
Variable	Estimate	T-statistic
INTERCEPT	3.648	14.8
PREV84_1	−0.975	−12.9
PREV84_2	−0.667	−12.2
PREV84_4	0.694	8.55
PREV84_5	0.436	3.37
GENDER	0.010	0.12
AGE	−0.622	−6.28
AGE2	0.054	5.30
LOG_INC	3.E-4	0.01
LOG_INC2	0.091	3.77
DSELF	0.421	2.01
DDIR	0.321	1.73
DUNEM	−0.421	−3.85
DRET	−0.123	−1.20
DDIS	−0.607	−6.13
DSOCS	−0.379	−2.27
DOTH	−0.133	−1.38
DSINGLE	−0.037	−0.46
DSINGLEP	0.018	0.17
DTWO	−0.324	−5.26
m_2	1.539	33.1
m_3	3.357	56.3
m_4	4.933	41.1
log-likelihood	−2647.7	

The final three explanatory variables capture family composition and labor market status of the spouse. The reference group consists of one earner households. Expectations of singles or single parents do not differ significantly from the expectations of one earner households. Heads of two earner households, however, significantly more often expect a fall of household income. This may reflect the fact the wife may consider to stop working. A similar effect is found by Dominitz and Manski (1994). We also considered including variables referring to the presence of children in various age groups, but these appeared

to have very low significance levels. [9]

In Table 3, we present 95 % confidence intervals for the probabilities that some reference heads of households expect an income decrease (INCEXP < 3) or an income increase (INCEXP > 3). The first reference case is a male employee, head of a one earner family, with average age and income level. We look at the impact of the income change in the past twelve months. Second, we consider a disabled head of household.

Table 3 : 95 % confidence intervals for the probability of an expected decrease of income and the probability of an expected increase of income as a function of PREV_84.

Employed man				
PREV_84	probability of an expected (strong) decrease		probability of an expected (strong) increase	
	lower	upper	lower	upper
1	0.600	0.749	0.006	0.020
2	0.483	0.636	0.015	0.039
3	0.238	0.376	0.064	0.139
4	0.073	0.168	0.189	0.367
5	0.103	0.263	0.115	0.296

Disabled man				
PREV_84	probability of an expected (strong) decrease		probability of an expected (strong) increase	
	lower	upper	lower	upper
1	0.801	0.901	0.001	0.004
2	0.702	0.839	0.002	0.010
3	0.441	0.631	0.015	0.049
4	0.189	0.375	0.064	0.180
5	0.246	0.500	0.033	0.132

Note: confidence intervals are calculated for P[INCEXP $\in \{1, 2\}| \tilde{x}$] and P[INCEXP $\in \{4, 5\}| \tilde{x}$] where $\tilde{x}$ is the vector of explanatory variables evaluated at some specific values: the mean of AGE and LOG_INC, DSINGLE = 0, DSINGLEP = 0 and DTWO = 0 (so this implies a head of the household who is a single-earner).

The effect of PREV_84 appears to be quite strong. Those employed men who have experienced a serious income fall, expect another income fall with probability of at least

[9] Results of, for example, Kapteyn et al. (1988) suggest that heads of households tend to take little account of the contribution of children's earnings to household income.

60 percent, while their probability of expecting a future income increase is quite small. The reference employees whose income has increased, expect a decrease with probability less than 27 percent, and expect an increase with probability at least 10 percent. The disabled heads more often expect an income fall and less often expect an income rise. In most cases, their confidence intervals do not overlap with those of the corresponding employee.

4 Link to realized income changes

In this section we compare the expected income changes to the realized income changes of the same individuals in the same time period. For this purpose, we use the next wave of the SEP. Assuming that no macro-economic shocks have taken place, this gives us an indication to what extent people systematically under- or overestimate their income changes.

Since the SEP is an unbalanced panel, some of the households that were present in the October wave of 1984, are missing in the October wave of 1985. From the 2683 households we used in the previous analysis, 498 households left the panel. Six of the remaining households did not provide information on their realized income changes. This results in a total of 2179 households of which both expected and realized income changes are available. We estimated the ordered probit model in the previous section again, but now with these 2179 households. This yielded almost the same results. That is, the same parameters were significant and all these significant parameters had the same sign. This suggests that the attrition does not lead to serious selectivity problems.

From the October wave of 1985 we only take the answer to the question: "Did your household's income increase, decrease, or remain unchanged during the past twelve months?". The answer is denoted by PREV_85, which is comparable with PREV_84. As before, we can look at a bivariate frequency table to get some first information on the relationship between expected income changes (INCEXP) and realized income changes (PREV_85). This is done in Table 4. About 23.2% of the households experienced a decrease in household income, while the income of 20.2% of the households increased. When we compare the (univariate) frequencies of PREV_85 (Table 4) with those of PREV_84 (Table 1), we see a shift to the right. This means that, on average, PREV_85 is higher than PREV_84. For 49.7% of the households the expected and realized income changes are the same. Most of them neither expected nor experienced an income change. The dispersion in expected income is (again) much smaller than in realized income (see

also Table 1).

Table 4 : Bivariate frequencies (in %) of INCEXP and PREV_85.

PREV_85 → INCEXP ↓	1	2	3	4	5	total
1	1.79	1.33	1.88	0.60	0.09	5.69
2	3.49	8.31	16.84	3.21	0.60	32.45
3	1.65	5.46	34.24	7.25	1.56	50.16
4	0.41	0.78	3.49	5.05	1.51	11.24
5	0.00	0.00	0.09	0.05	0.32	0.46
total	7.34	15.88	56.54	16.15	4.08	100.00

It seems reasonable to assume that the head of the household has the same concepts in mind while answering questions on INCEXP and PREV_85. Therefore, if the value of INCEXP is greater than the corresponding value of PREV_85, then the head of the household has overestimated future household income. Analogously, if the value of INCEXP is smaller than PREV_85, then income has been underestimated. From Table 4, it follows that 15.4% of the households overestimated their future income. On the other hand, 34.9% of the households underestimated their future income. From this, it is obvious that, on average, people significantly underestimate their future income. [10]

It would be interesting to know what can explain, and to what extent, the fact that, on average, people underestimate their income. For this purpose we construct the variable DEV which denotes the deviation between realized and expected income change: PREV_85 − INCEXP. Note that this variable can in principle vary from −4 to 4. However, as can be seen from Table 4, no observations are in the category corresponding to −4. Therefore DEV only takes the values −3 to 4. A negative value of DEV corresponds with overestimation and a positive value corresponds with underestimation.

To see how the age of the head of the household or the logarithm of net household income influence DEV, we regress DEV (nonparametrically) on these two variables. The results are displayed in Figures 3 and 4. In both figures we see hardly any evidence that

[10] This is confirmed by a simple conditional sign test. Out of the 1096 observations with some deviation between expected and actual change, only 336 overestimated their future income. This leads to a value of the test statistic of −12.8, exceeding the 97.5 percent critical value of the standard normal.

age or net household income can explain the difference between realized and expected income. We decided to maintain the quadratic specification that we used in the ordered probit model of section 3 in the model that explains DEV.

Figure 3: Nonparametric regression of the difference between PREV_85 and INCEXP on age with 95% uniform confidence bounds (dashed lines).

Figure 4: Nonparametric regression of the difference between PREV_85 and INCEXP on the logarithm of net income with 95% uniform confidence bounds (dashed lines).

To explain DEV, consider an ordered response model (see equation 3.1) with the same explanatory variables as in section 3 (Table 2). This yields the following results:

Table 5 : Parameter estimates for the probit model.

DEPENDENT VARIABLE: DEV		
Variable	Estimate	T-statistic
INTERCEPT	3.008	10.6
PREV84_1	0.368	4.61
PREV84_2	0.261	4.55
PREV84_4	-0.178	-2.12
PREV84_5	-0.044	-0.33
GENDER	-0.116	-1.20
AGE	-0.033	-0.31
AGE2	-0.004	-0.32
LOG_INC	-0.021	-0.33
LOG_INC2	-0.003	-0.11
DSELF	-0.357	-1.61
DDIR	0.039	0.19
DUNEM	-0.035	-0.30
DRET	0.036	0.32
DDIS	-0.288	-2.71
DSOCS	0.010	0.05
DOTH	0.048	0.46
DSINGLE	0.081	0.95
DSINGLEP	-0.182	-1.59
DTWO	-0.076	-1.18
m_2	0.757	7.13
m_3	1.633	14.4
m_4	3.060	26.5
m_5	4.109	34.3
m_6	4.956	36.5
m_7	5.861	24.4
log-likelihood	-2832.5	

We see in Table 5 that most of the parameters corresponding to the explanatory variables are insignificantly different from 0. The most important factor is the income change in the past (reported in October 1984, PREV_84). Especially when income has fallen in the past, people tend to underestimate their future income. Compared to those who have experienced no income change in the past, those whose income has increased in the past, have a smaller tendency to underestimate future income. The difference is significant for those who experienced a small increase, but not for those who experienced

a large increase.

Compared to employees, disabled persons appear to have less tendency to underestimate their future income changes. The explanation could be that some of the disabled did not anticipate the reduction of disability benefits in 1985 (see previous section), even though, according to the results in section 3, many people did.

As in section 3 we present 95% confidence intervals for the probabilities that some reference heads of households overestimate (DEV < 0) or underestimate (DEV > 0) their future income for different values of the income change in the past twelve months (PREV_84). These confidence intervals are displayed in Table 6.

Table 6 : 95 % confidence intervals for the probability of overestimating and the probability of underestimating future income changes as a function of PREV_84.

Employed man					
PREV_84	Prob. of overestimating future income = P_o		Prob. of underestimating future income = P_u		T-value
	lower	upper	lower	upper	
1	0.033	0.183	0.298	0.664	2.94
2	0.042	0.209	0.266	0.619	2.47
3	0.072	0.290	0.190	0.515	1.28
4	0.097	0.361	0.141	0.451	0.47
5	0.070	0.329	0.161	0.523	0.94

Disabled man					
PREV_84	Prob. of overestimating future income = P_o		Prob. of underestimating future income = P_u		T-value
	lower	upper	lower	upper	
1	0.059	0.273	0.204	0.558	1.54
2	0.072	0.311	0.174	0.516	1.08
3	0.115	0.408	0.116	0.413	0.02
4	0.149	0.485	0.082	0.352	0.68
5	0.111	0.449	0.096	0.419	0.14

See also note Table 3. The T-value represents the absolute value of the T-statistic for the null-hypothesis that the probability of overestimating equals the probability of underestimating, that is $P_o = P_u$. The distribution under the null is calculated with the use of the delta method.

We see in Table 6 that especially for those whose income has fallen in the past, the probability of underestimating future income is quite high. Given a past (strong) decrease

in income for the employed man, the probability of underestimating is significantly higher than the probability of overestimating future income. In the case of a past (strong) increase in income, the null-hypothesis $P_o = P_u$ cannot be rejected. For the disabled men, we cannot conclude that they have a higher probability of underestimating future income. When we compare the confidence intervals for a disabled male head of household with those of the employed male head, we see that the intervals for the probability of overestimating future income are slightly shifted to the right and the intervals for the probability of underestimating future income are slightly shifted to the left. The intervals overlap to a large extent, however.

Macro-economic shocks and rational expectations

The common approach in the majority of empirical studies on life cycle models for household behavior, is to assume that the distribution of actual income changes and the distribution of expected income changes coincide. Our data show that this assumption is not realistic. Various explanations for this are possible. The first is an unanticipated positive macro-economic shock that may have taken place in 1985. This is in line with predictions and realizations of unemployment. In 1984, the Netherlands Central Planning Bureau expected unemployment to change from 820,000 in 1984 to 830,000 in 1985. In reality however, unemployment fell in 1985 to 760,000 (see CPB 1986, Table IV.1 and MEV 1985, p.22). Under- or overestimation of disposable income level for employees is less unambiguous. Both in nominal and in real terms, the predicted wage increase is close to the realized increase (see MEV 1985, Table IV.6, and MEV 1986, Table III.4).

This suggests that at least part of the underestimation could be explained by a macro shock. On the other hand, it then seems hard to understand why there are substantial differences between various groups. In particular, a macro shock cannot explain our finding that those who have experienced an income decrease in the past, underestimate their future income much more often than others: we cannot think of a good reason why the impact of macro-economic shocks would be correlated with the income change in the past (conditional on other characteristics, such as actual income, age, and employment status). [11]

A second explanation is that people are simply too pessimistic, on average. This

[11] The finding that the deviation between expected and actual income change in 1985 depends on the actual income change in 1984, is also confirmed by a likelihood ratio test, obtained by comparing our model with a restricted ordered probit model in which PREV84_1, ..., PREV84_5 are excluded. (The value of the test statistic was 44.2, exceeding $\chi^2_{4;0.05} = 9.49$.)

means that the rational expectations hypothesis is rejected. [12] This could be an additional explanation why people save more than the standard life cycle predicts. It seems related to the well-known precautionary savings motive (cf. Kimball (1990)), but it is very different: according to the precautionary savings motive, people have rational expectations, but are prudent. As a consequence, they save extra if their income uncertainty is high. Our findings seem to suggest that some groups of people simply have too pessimistic future expectations.

5 Conclusions

We have analyzed information on future income expectations of Dutch households. We used data on more than 2,000 households in the SEP, with information on realized income change in 1984, expected income change in 1985, [13] and, from the next panel wave, realized income in 1985. We have started with an analysis of the discrete variable concerning expected income changes. Our first finding is that about half of the population does not expect any change. This implies that the current income level is a dominant predictor of the future income level, a result earlier found by Dominitz and Manski (1994). Second, we find that many more people expect an income decrease than an income increase. To a large extent, this can be explained from the past: the realized income change in 1984 appears to have a very strong impact on the expected income change in 1985, although large expected changes are rare, even for those who experienced large changes in the past. Third, we find a positive correlation between actual income and expected income change. The rich expect to get richer, the poor expect to get poorer. The tendency to expect an income fall tends to increase with age, until close to retirement. Finally, labor market status of head of household and spouse are also significant. For example, disabled heads more often expect an income fall than others, anticipating the reform of the disability benefits system, which was initiated in 1985.

In the second part of the paper, we compare realized income changes for 1985 with expected income changes for 1985. We find that realizations are substantially better than expectations, on average. We then focus on the deviation between realization and expectation. We find that particularly those who experienced an income loss in 1984, tend to underestimate their income in 1985. The first result may well be explained from

[12] Using completely different data and methods, Hey (1994) also finds evidence against the rational expectations hypothesis.

[13] To be precise, with 1984 (1985) here means from October 1983 (1984) to October 1984 (1985) (the time of the interview).

an unanticipated macro-economic shock in 1985. The second result, however, is hard to explain from a macro-economic shock and could be interpreted as evidence against the rational expectations hypothesis.

Whether this explanation is indeed correct, should be further investigated by considering more years. If the underestimation were persistent over a long period of time, macro-economic shocks can be excluded, and rational expectations would be rejected. Further work in this direction is on our research agenda.

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Appendix

Table A1: reference list variables.

INCEXP	Answer to the question : "What will happen to your household's income in the next twelve months ?" Possible answers are: strong decrease (1); decrease (2); no change (3); increase (4); strong increase (5).
PREV_84	Answer to the question : "Did your household's income increase, decrease, or remain unchanged during the past twelve months ?" Possible answers: see INCEXP. This variable is in the analysis also represented as dummy-variables: PREV84_i = 1 if PREV_84 = i; 0 otherwise ($i = 1, \ldots, 5$).
GENDER	Gender head of household: 1 = male; 2 = female.
AGE	Age head of household in tens of years.
LOG_INC	Natural logarithm of net household income where net household income is in tens of thousands (per year). The survey contains accurate information on income from about forty potential sources for each individual. After tax household income was constructed by adding up all income components of all family members.

Dummy-variables corresponding to social economic category:

DSELF	1 if head of household is self-employed; 0 otherwise.
DDIR	1 if head of household is director of ^{A}Inc. or ^{B}Ltd; 0 otherwise.
DEMP	1 if head of household is employed; 0 otherwise.
DUNEM	1 if head of household is unemployed; 0 otherwise.
DRET	1 if head of household is retired; 0 otherwise.
DDIS	1 if head of household is disabled; 0 otherwise.
DSOCS	1 if head of household is person on social security; 0 otherwise.
DOTH	1 corresponds with other persons than above mentioned without profession; 0 otherwise. Note: DSELF + ... + DOTH = 1.

Dummy-variables corresponding to family composition and labor market status of spouse:

DSINGLE	1 if head of household is single; 0 otherwise.
DSINGLEP	1 if head of household is single parent; 0 otherwise.
DONE	1 if household is a single-earner household; 0 otherwise.
DTWO	1 if household is a two-earner household; 0 otherwise. Note: DSINGLE + ... + DTWO = 1.

Table A2: summary statistics.

Variable	Nr. Obs.	Mean	Std. Dev.	Min.	Max.
INCEXP	2683	2.66	0.76	1	5
PREV_84	2683	2.67	0.90	1	5
PREV_85	2179	2.93	0.88	1	5
GENDER	2683	1.20		1	2
Age head of household	2683	46.6	17.0	18	89
Net household income	2683	34834	19845	600	235134
DSELF	2683	0.012			
DDIR	2683	0.015			
DEMP	2683	0.554			
DUNEM	2683	0.045			
DRET	2683	0.158			
DDIS	2683	0.068			
DSOCS	2683	0.024			
DOTH	2683	0.124			
DSINGLE	2683	0.227			
DSINGLEP	2683	0.079			
DONE	2683	0.490			
DTWO	2683	0.204			