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Financial Incentive on Decision to Retire and the Influence from Financial Crisis in the Netherlands

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Abstract

The decision on retirement is influenced by many factors, such as health conditions, social circumstances, financial incentives, individual preferences, and so on. According to existing studies, financial incentives influence the determination of retirement at least to some extent. In the future, with a probably increased flexibility of retirement age, financial incentives may play an even more important role. Consequently, in our paper, we first test the effect of financial motives, based on data from 1995 to 2009 in the Netherlands. We find that the planned retirement age is significantly influenced by financial assets, yearly income, and expected pension benefits. Furthermore, we investigate whether, and to what extent, the financial crisis (from a financial viewpoint) has a real impact on the households' retirement decision, using the DNB Household Survey data from 2004 to 2009. We find that, in case of most Dutch employees, until now, the influence of financial crisis on planned retirement age is not obvious, while this influence is remarkable in case of risky financial assets holders.

Key words: retirement age, financial crisis, financial conditions, incentives

Content

1. Introduction

Nowadays, the aging problem is spreading worldwide. The developed countries are experiencing a challenge resulting from the significant change in their demographic structure. The labor participation rate of the elderly is lower in the Netherlands, compared with that in other western countries. In 1990, the employment rate of households aged 55 to 64 is 29.7% (OECD, 2005). At the end of the 1990s, it increased to 46.6%, but was still under the OECD average level (Euwals, van Vuuren & Wolthoff, 2006). Based on the research of Kakes and Broeders (2006), in case of no changes in the pension and retirement policy, the ratio of people aged 65 and above to the working people would double in 30 years, reaching to about 40%. With the more and more serious aging problem, the determinants of the retirement decision are becoming more and more important, and investigated by many researchers. The factors influencing the decision are various. In our paper, we will focus on the financial incentives.

Originally, to solve the high unemployment rate among young workers in the 1970s, the government implemented the early retirement policy. However, with the change of the demographic structure, the government was under great pressure to support the elderly. In the 1990s, the government realized that the early retirement policy encouraged households to retire earlier, which led to a more serious aging problem. The old policy was no longer suitable for the new situation. Consequently, the government took measures to prevent such an early retirement preference through a policy reform (Vonkova, and van Soest, 2009). In 2005, the Dutch government passed legislation that would phase out the tax-favored treatment of all employer-based early retirement programs (Capretta, 2007). Besides, the employment is not common among people aged above 65 years old in most of European countries, since the mandatory retirement policy is the main determinant. Although it is allowed to hire the workers after 65 years old on a temporary or part-time basis, which is significantly influenced by some factors, for example, not all pension funds allow for accumulating pension entitlements after age 65 (Vonkova and van Soest, 2009). As a consequence, the flexibility on the retirement age seems to be more and more necessary. At the same time, Belloni et al (2006) and Bovenberg and Gradus (2008) advice the government on a flexible retirement age in an

overview of European countries and the Netherlands, respectively. Moreover, the regulation to work after age 65 is included in the new plans of the Dutch government. In the new policy, it's possible to delay receiving the first pillar pension (AOW) in exchange for 5% higher benefits for every year of delaying. Meanwhile, the government implements a new policy to delay eligibility to age 67 for everyone (Vonkova and van Soest, 2009). Moreover, Vonkova and van Soest (2009) observe a decline in preferences for early retirement and, conversely, an increase in preferences for late retirement during the period of 2004 to 2008.

As a result, the flexibility of retirement age increases, and households will have more freedom in the choice of their retirement age with less limitations. It makes sense to believe that financial conditions will play a more crucial role in the determination of the retirement age. Therefore, it is also more worth researching whether, and to what extent, the current financial crisis influences the households' decision on retirement.

According to the contribution of previous researchers, we will use a simple regression model to check the influence of the financial variables on planned retirement age, especially for Dutch employees. At the same time, the Netherlands is considered as a country with a huge pension amount. But only a few papers investigate the relationship between Dutch planned retirement age and financial conditions. Besides, there are even less papers researching whether, and to what extent, the current financial crisis influences the decision on planned retirement age in the Netherlands.

With regard to the structure of our paper, we will first introduce the existing contribution on the relation between financial incentives and planned retirement age, and the influence of the current financial crisis in the Netherlands in chapter 2. In chapter 3, we will describe our simple regression model which is used to analyze the financial motivation including the reasons of variables selection, and the method how to select and calculate the variables from the dataset, DNB Household Survey. Then we will describe the sample selection problem, and the change of dataset with each selection step, while we will depict the original and final variables used in our model in chapter 4. In chapter 5, the pooled data model's estimation results are presented, and the model will be subject to a robustness check. Additionally, the yearly data model is used to

check the financial incentives, and the graphs illustrate the mean values' trend of planned retirement age and different financial variables which is used to analyze the impact of the current financial crisis. Finally, in section 6, we will draw conclusions followed by some recommendations and further research.

2. Literature review

First, financial incentives, especially through the pension benefits or so-called social security (AOW and/or occupational pension in the Netherlands) influence the decision to retire. This is found by many researchers in several countries in different ways. Boskin (1975) shows that social security retirement benefits have a pronounced effect on the decision to retire, and that the net earnings have a great negative effect on the probability of retirement. Kotlikof (1979) also presents an empirical research, revealing that private pension plans are linked to expected retirement. In addition, Burtless (1986) shows that the wealth in excess of $25,000 reduces the age of retirement. Recently, the financial incentives on the decision to retire have been tested in Germany (Hanel, 2009) through a policy reform on pension benefits. The reform changed accruals in pension benefits by means of a delay of claiming benefits. After the reform, the average date on claiming is 14 months later, and the workers stay more or less 10 months longer in employment. Similar financial incentives are found in Italy (Belloni & Alessie, 2009): the higher social security wealth, the higher the probability to retire; the higher accrual or peak value, the lower the probability to retire. Besides, when Montalto, Yuh, and Hanna (2000) try to find out the determinants of planned retirement age among fulltime job workers, they also find that the predicted effect of income increasing from $10,000 to $50,000 per year leads to an increase of 0.63 years in the planned retirement age. And an increase from $50,000 to $100,000 per year only results in an increase of 0.27 year in the planned retirement age. In the Netherlands, the addition of pension income with 10% lowers the planned retirement age by 3 months. On the contrary, a decrease by 10% leads to 3.2 months later retirement. However, some argue that the expected retirement age may be different from the actual retirement age (Vonkova & van Soest, 2009). Honing (1996), using data from the first wave of the HRS, finds that the expected retirement age and observed actual one are similar.

On the other hand, many researchers claim that, although the significance of the relationship between private wealth and retirement behavior exists, this association is weak. An early contribution by Diamond and Hausman (1984) investigates the effect of private wealth holdings in the United States in the 1970s and 1980s. They find that private wealth holdings have almost no effect on the retirement age, which is explained by the fact that wealth holding is probably decided by individual preferences in the past. Samwick (1998) mentions the importance of pension incentives for retirement in a cross-section of the population. Both the option value of retirement and the accrual in retirement wealth are statistically significant in changing the probability of retirement. But the small effect of retirement wealth cannot be proven to be misleading. Recently, using the DNB panel data from 1994-2008, Ooijen, Mastrogiacomo, and Euwals (2010) contribute to the relationship between private wealth and planned early retirement. They conclude that high wealth individuals plan to retire earlier, compared to the low wealth individuals, but the link is weak, implying that the level of financial wealth is a less important factor for the retirement decision. At the same time, with the abolishment of the fiscal assistance of pre-pension rights in 2006, the pension wealth has a similar effect as financial wealth.

In fact, according to the economic analysis from the European Commission, see Masselink and Noord (2009), a low unemployment rate, a sufficient account surplus, a low government debt, and a budget surplus present that the Dutch economy is healthy enough at the beginning of the oversea financial crisis of 2007. However, the economic performance becomes worse from 2008 on, which can be seen from a lack of GDP growth. The GDP growth of the Netherlands is influenced through three possible channels: a decreasing world demand, problems with bank balance sheets, and a decline in the producer and consumer confidence. Considering the households' profits, individual financial conditions can be affected due to the fluctuation of the stock and the housing market. Apart from that, Antolin and Stewart (2009) claim that pension fund nominal returns in the Netherlands in 2008 are about -18%. In terms of DB plans, the government decides that the benefits will not effectively be reduced before the end of 2011, but in DC plans, because of the dramatic decline of the equity prices, new retirees would receive more than 20% lower benefits than they expected with a one-year earlier retirement.

Furthermore, the anticipation of Dutch households is also influenced by financial shocks, which has been shown by Bissonnette, Nelissen, and van Soest (2009). The questionnaire is answered by Dutch households aged 25 and above, including questions, such as “what do you think is the probability that in 10 years the purchasing power of AOW benefits will be on average be less than now and more than now?” On the basis of the result, the probability that the anticipated purchasing power of AOW benefits in 10 years is considered lower than now exceeds 50%. The probability that purchasing power of occupational pensions in 10 years is less than now is more or less 50%, while there is growing tendency from 2006 to 2009. Comparatively, the probability that the purchasing power of AOW benefits in 10 years is more than now, is no more than 20%. The probability that the purchasing power of occupational pensions in 10 years is more than now is 20% as well, with a decreasing trend from 2007 to 2009. Apart from that, in Dutch opinions, the eligibility age of AOW and the retirement age will be higher than now with about 60% probability, while an obvious increasing trend from 60% in 2006 to 70% in 2009 is illustrated. Inversely, the probability that the eligibility retirement age will rise is only considered as less than 10%.

In conclusion, the current financial crisis has a real impact on the financial condition of Dutch households and their anticipation of the future economic tendency.

Last but not least, Boston College (2009) mentions that, in general, older adults are postponing their plan to retire due to the current economic crisis, based on the result of several recent surveys. However, the reasons to retire almost always concern bad health condition, care giving demands, or job dissatisfaction, but not the economic crisis. According to the 2009 report from AARP (American Association of Retired Persons) on adults 45-age and older, 17% of the respondents postpone their plans of retirement. 27% of these (age 55-64) answer that they are postponing plans to retire. Furthermore, in a 2009 survey of employees and retirees, 34% of the workers have increased their planned retirement age in the past 12 months, especially the older works prefer a later retirement. Apart from that, the 2009 Pew (a nonpartisan "fact tank" that provides information on the issues, attitudes, and trends shaping America and the world) survey indicates that three quarters of adults aged 50-64 respond that it is becoming difficult

for them to finance the retirement period due to the current bad economic situation. At the same time, the youngsters and older (older than 65) share the same point. Whether the similar phenomenon can be found in the Netherlands, and supported by the financial data will be investigated in our paper.

3. Model description

First, based on the research of Montalto, Yuh, and Hanna (2000), several determinants of planned retirement age are tested by using the American 1995 Survey of Consumer Finances (SCF). They have investigated a lot of possible factors influencing the planned retirement age, involving several components, such as financial variables/access to resources, characteristics of employment, respondent demographic characteristics and perceptions, and the respondent's education. The financial variables mainly concern financial assets, income, and pension. In addition, Montalto, Yuh, and Hanna (2000) also test the effect of different racial people (divided by White non-Hispanic, Black non-Hispanic, Hispanic and other races). Furthermore, family size and gender are regarded as possible factors in Oojien, Mastrogiacomo, and Euwals (2010).

3.1 Pooled data model (1995-2009)

In our paper, we use non-financial assets, financial assets, income, and expected pension benefits as substitution. It is complicated to calculate the accurate value of a house. Therefore, we just use a dummy variable to present the rented house/apartment and owned occupied house/apartment. Moreover, it's obvious to show the different retirement plans between the house owners and house lessees. In terms of races, because the Netherlands is not a significant immigrant country, we ignore it. Moreover, it's not clear to distinguish the occupations in the Netherlands on the basis of the DNB survey. At the same time, there is no generally acknowledged way to record that. Therefore, we neglect the impact of occupation, too. Not only Montalto, Yuh, and Hanna (2000), but also van Oojien, Mastrogiacomo, and Euwals (2010), consider the age as a non-linear independent variable. Consequently, we test two variables – age and age^2 in our model. Considering the limitation and low response ratio to the questions

which are used to construct the variables in our model from 1995 to 2002, we collect the data in a pool to check the impact on the planned retirement age. In conclusion, we set up our simple regression model based on Montalto's (2000) and van Oojien's (2010) regression results (significant factors), as follows.

$$\mathrm{ER_i} = \beta_0 + \beta_1 \mathrm{NFA_i} + \beta_2 \mathrm{FAP_i} + \beta_3 \mathrm{INC_i} + \beta_4 \mathrm{EPB_i} + \beta_5 \mathrm{EDU_i} + \beta_6 \mathrm{HEALTH_i} + \beta_7 \mathrm{AGE_i} + \beta_8 \mathrm{AGE^2_i} + \beta_9 \mathrm{FZ_i} + \beta_{10} \mathrm{MALE_i} + \varepsilon_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

-- ER expresses the planned retirement age, it is the answer of "At what age do you expect to retire, or to make use of the early retirement arrangement?"

-- NFA expresses the non-financial assets.

Here, the non-financial assets mainly focuses on the accommodation condition and owned boat which are considered worth a lot, compared to cars, motorbikes, or caravans. NFA will be divided into two dummy variables: HOUSE and BOAT. If the answer to the question "Are you the tenant, subtenant, or owner of your current accommodation?" is owner, HOUSE is equal to 1. If the answer is tenant or subtenant, the variable HOUSE is equal to 0. Furthermore, if the answer is "otherwise", we'll check another question "what kind of house do you live in". If the answer is 1 to 8, the HOUSE is set as 1. If the answer is 9 (which means renting a room), the HOUSE is set to 0. Otherwise, the variable HOUSE will be considered as missing value. In terms of BOAT, we use the answer to "how many boats do you have". If it's 0, then BOAT is set to 0. Otherwise it's 1.

-- FAP expresses the financial asset minus debt in the last year.

The details of the financial assets' components are expressed from B1 to B25 (see appendix, Table 1), while the details of the debt components are expressed from S1 to S8 (see appendix, Table 1). FAP's value is the sum of above mentioned all of the financial assets (B1 to B25) minus the debt (in 1000 euro). According to the description of the DHS codebook, each component of financial asset is expressed in three variables: a. the number of component or whether the respondent has such a component; b. the total amount value of such a component; c. the missing value flag of a certain component (if the respondent doesn't know the amount of a

certain subcomponent, then the respondent is asked to select an answer from a series of bracketed answer, then the value is the middle of the selected interval and added to the amount of such component). Here, we only use the value of the total amount value of a component. The expression of the formula can be found in the appendix (Formula 1).

-- INC expresses the net income in last year. It only includes pay/salary, unemployment benefits and interest/dividends/other income, and inheritance.

Its value is also the sum of all above mentioned income (in 1000 euro). If a respondent did not know the gross amount, he/she was asked to indicate the interval in which the amount would be (i.e., between x and y euro). In that case for calculating the total income the middle of the given interval is used ((x+y)/2). (The variable extensie_c is used to indicate if the amount is the middle of such an interval.) However, this modified value only exists from 2004 to 2009. Therefore, the value of modified value for a component is considered as 0 before 2004. In detail, except for the salary, the missing value of other components is calculated as 0. The formula is in the appendix (Formula 3).

-- EPB expresses the expected pension benefits in individual opinion.

It is equal to the value of the answers to the question: “How much do you expect your net retirement pension (including general old-age pension) to be (in percentages) in relation to the last net income you receive before you retire after the age of 65? (If you are pre-retired, please mention the last net income before you pre-retired.) We use the answer without 100 percent.

-- EDU expresses the education level with three dummy variables – HEDU, MEDU and LEDU as high, median, and low education level.

From 1995 to 2001, the variable EDU is valued as follow:

LEDU=1, if the answer to question “Highest level of education completed” is

1. Kindergarten/primary education;

2. Continued primary education [VGLO] or elementary secondary education [LAVO];

3. Continued special (low-level) education [MLK, VSO, LOM], secondary education [MAVO/MULO];

10. Special (low-level) education [special onderwijs].

MEDU=1, if the answer is

4. Pre-university education [HAVO, VWO, Atheneum, Gymnasium, HBS, MMS, Lyceum];

5. Junior vocational training [e.g. LTS, LEAO, Lagere Land-en Tuinbouwschool];

6. Senior vocational training [e.g. MTS, MEAO, Middelbare Land-en Tuinbouwschool];

11. Vocational training through apprentice system [leerlingwezen].

HEDU=1, if the answer is

7. Vocational colleges [e.g. HTS, HEAO, opleidingen MO-akten];

8. Vocational colleges 2nd tier [e.g. accountant NIVRA, actuaries, opleidingen MO-B-akten];

9. University education.

Otherwise it is considered as missing value.

From 2003 to 2009, the variable EDU is valued as follow:

LEDU=1, if the answer to question “highest level of education completed” is

1. Continued special education;

2. Kingergarten/primary education;

8. No education.

MEDU=1, if the answer is

3. VMBO [pre-vocational education];

4. HAVO, VWO [pre-university education];

5. Senior vocational training or training through apprentice system.

HEDU=1, if the answer is

6. Vocational colleges;

7. University education.

Otherwise it is considered as missing value.

-- HEALTH expresses the health condition measured using three dummy variables – GH, FH and PH as good, fair, and poor health condition.

GH=1, if the answer to question "In general, would you say your health" is 1 or 2 (excellent and good); FH=1, if the answer is 3 (fair); PH=1, if the answer is 4 or 5 (not so good and poor).

-- FZ presents the family size expressed by the number of household members.

-- AGE is calculated by the survey year minus the year of birth, which expresses the current age of the respondent.

-- MALE presents the gender. It is equal to 1 if the respondent is male, otherwise, it is 0.

As a conclusion, in the pooled data model, the median education level and fair health condition will be considered as base level. Therefore, the model can be presented as follows:

$$\mathrm{ER_i} = \beta_0 + \beta_1 \mathrm{HOUSE_i} + \beta_2 \mathrm{BOAT_i} + \beta_3 \mathrm{FAP_i} + \beta_4 \mathrm{INC_i} + \beta_5 \mathrm{EPB_i} + \beta_6 \mathrm{HEDU_i} + \beta_7 \mathrm{LEDU_i} + \beta_8 \mathrm{GH_i} + \beta_9 \mathrm{PH_i} + \beta_{10} \mathrm{AGE_i} + \beta_{11} \mathrm{AGE^2_i} + \beta_{12} \mathrm{FZ_i} + \beta_{13} \mathrm{MALE_i} + \varepsilon_i \dots\dots (2)$$

To proceed, we need to improve distributional assumptions in terms of ε_i. We use the statistical Gauss-Markov conditions. These conditions state: 1. Linearity: $\mathrm{E}(\varepsilon_i) = 0$; 2. Independence: $\varepsilon_i \perp x_i$; 3. Homoskedasticity: $\mathrm{V}(\varepsilon_i) = \sigma^2$; 4. No autocorrelation: $\mathrm{E}(\varepsilon_i \varepsilon_j) = 0, \forall i \neq j$, we find that our model cannot satisfy all of the assumptions well. First, in terms of the people in one family, their plans of retirement probably affect each other, which might lead to autocorrelation problem. Second, the occupation is related to the education level, financial asset, and yearly income to some extent. Because the occupation is included in the error term,

the error term is not definitely independent of explained variables. Last but not least, it is not clear that the linearity and homoskedasticity assumption are satisfied.

3.2 Yearly data model (2003-2009)

Furthermore, in order to investigate the influence of the financial crisis on planned retirement age, we investigate the regression model yearly from 2003 to 2009. The model used is the same as Model (2) but FA instead of FAP. Additionally, FA includes stocks from substantial holding, indicator business equity (profession), and indicator business equity self-employed, besides the components mentioned in model (2).

Regarding to the yearly model from 2003 to 2009, we use some different questions to set our variables' value so that the valid value is more and better. Here, we only mention the difference of variables. The others are calculated similarly as the above.

-- NFA, BOAT is still the same as the above. But the HOUSE's value is set according to the question "type of accommodation". If the answer is rented house/flat or subrented house/flat, HOUSE is 0; if the answer is owner-occupied property, HOUSE is 1; otherwise, we'll set the value through the same method as that in pooled data model.

-- FA, the financial asset in added up including three additional components: stocks from substantial holding, indicator business equity (profession) and indicator business equity self-employed.

4. Dataset

The data come from the CentER dataset, the DNB Household Survey 1995-2009. CentERdata collects economic data through a panel which includes about two thousand households every year. The data are collected through the Internetpanel of CentERdata (the CentERpanel). Participants do not necessarily have to have their own computer with internet. If a household does not have access to internet, CentERdata provides a so-called set-top box with built-in internet connection and, if necessary, a television set as well, which makes sure that the households can fill in the questionnaires via the television set. Additionally, there is an obvious

difference in the questionnaire between the year before 1995 and the year after 1995. As a result, for consistency, we only use the data from 1995 to 2009.

4.1 Sample selection

Six documents for each year from 1995-2009 contain our useful variables, so we first merge the variables together for each year. Then we merge the data from 1995 to 2009 in one document. The next step is to remove the respondents who have a missing value in one or more variables, and select the respondents we'll research.

In detail, regarding the selection based on the occupation, the households are firstly selected through the DHS question "Primary occupation of the respondent". We only include the household whose answer is "employed on a contractual basis", "works in own business", "looking for work after having lost job", "looking for first time job", "works in own household", "unpaid work, keeping benefit payments" and "works as a volunteer". If the answer is "other occupation", we'll continue to check the answer to question "what do you consider to be your primary occupation". Subsequently, we only choose the respondent whose answer is "paid job", "looking for a job after having lost my former job", "looking for first-time work/ looking for work after having been without job for a long time", "work in my own household", "unpaid work, keeping my benefit payments" or "work as a volunteer". Otherwise, it is removed. Consequently, the order of missing value deletion/selection is as follow:

1. Remove the respondents with missing value in financial asset;

2. Remove the respondents with missing value in yearly income;

3. Remove the respondents with missing value in planned retirement age;

4. Remove the respondents with missing value in expected pension benefits;

5. Remove the respondents with missing value in education condition;

6. Select the respondents who satisfy the requirement (it will be mentioned in following) on occupation;

7. Remove the respondents with missing value in house condition.

The observation changes in each selection step can be found in the appendix (Table 2)

Considering the sample selection problem, first, in terms of the removed households with missing value on financial assets and income, it is possibly caused by two conditions. On the one hand, these respondents really don't care and are not sure about their financial asset and income. Consequently, their planned retirement age can be influenced limitedly by financial and income conditions. So, if they were included into the data, they would lower the significance of financial asset. On the other hand, other respondents don't answer the question due to personal or private problems, which will lead to inaccuracy of our regression results. Secondly, the respondents with missing values of planned retirement age are removed. That is because these respondents might not care about the retirement age or they don't have any plan of retirement. This likely cannot lead to variation, since we only pay attention to the planned retirement age. In addition, the respondents with missing value of expected pension benefits are removed. It's unclear to decide what the result will be if they are included. In our paper, we ignore the households who are self-employed, because their income data that is about the balance sheet of their company is always missing data in the survey. Besides, in the Netherlands, employers have a different pension system compared to the employees. Moreover, it's complicated and meaningless to calculate the disabled household's asset and income, because they are always not in a working condition and there are many different allowances from the government. Therefore, we remove the respondents who are disabled. Additionally, the students are removed because the majority of the students are not financially independent and it's really a long time for them to consider the retirement problem.

At last, using the data without selection or deletion, we check the statistic description of the variables – age, family size, and gender. It is shown in following table:

Table 1 the comparative description of age, family size, and gender

		Original	Final
Age	observations	74513	3053
	mean	37.57	49.03
	standard deviation	37.713	9.784
family size	observations	74980	3053
	mean	3.21	2.54
	standard deviation	1.424	1.304
gender	observations	74980	3053
	mean	0.51	0.79
	standard deviation	0.500	0.410

As a conclusion, compared to the original dataset, in our final dataset, the households' average age increase remarkably and there is an obvious gender bias on male. Moreover, there are ways, such as Heckman Selection Models, to correct for the sample selection, but this is beyond the scope of this thesis.

4.2 Sample statistic description

Firstly, based on the Table 3 in appendix, there are totally 3053 observations in pooled data model. In details, the planned retirement age ranges from 25 to 98 years old, while the mean value is equal to 62.83 years old. In the following part, the numbers about financial asset and yearly income are all in 1,000 euro. Considering the financial variables, the lowest value of financial asset is only -298.87, and the highest value is 2902.50. The mean value of financial asset is 43.9400 with standard deviation 102.75. And the scope of yearly income is from 0 to 2300 per year, while the mean value is 53.7811 per year, the standard deviation is 58.97. Besides, the mean value of the ratio of expected pension benefits to last year income is 66.66%. Then, the two dummy variables HOUSE and BOAT, respectively their average value are 0.79 and

0.04. That implies majority of respondents are living in occupied house/apartment, and few households own a boat. Regard to the age, in our dataset, the youngest respondent is 25 years old, and the oldest is 86. Meanwhile the mean of age is 49.03. Moreover, the number of members in one family is from1 to 7. The average level of family size is 2.54. In terms of gender, the mean value of such dummy variable is 0.79. It means more than 3 quarters respondents are male in our dataset.

Secondly, the description results of yearly data model from 2003 to 2006 can be found in Table 4 in appendix. The numbers of observations from 2003 to 2006 are separately 351, 446, 430, 409, 445, 398 and 387. Because we focus on the financial incentives, the financial variables are introduced in details. During the period from 2003 to 2007, the lowest value of financial asset goes down straightly from -121.45 to -246.35 (in 1,000 euro). After that, it goes up to -120.95 (in 1,000 euro) in 2009. Moreover, the highest level of financial asset ranges from 300 to 600 (in 1,000 euro). But in 2008 and 2009, it reaches about 850,000 euro. Meanwhile, the standard deviation of financial asset fluctuates from 54,700 to 76,100 euro. In terms of yearly income, the lowest level is 0 euro per year. The highest yearly income increases from 150,000 euro per year in 2003 to 195,000 euro per year in 2009, except for a great shock in 2005. The standard deviation of yearly income is more of less 20, except for that in 2005 equals 42.9. Moreover, the occupied house/apartment ratio is above three fourth. And the boat is only owned by minority of households. Furthermore, the male respondents occupy more than half in each year.

5. Empirical analysis

5.1 Pooled data model

In the pooled data model, there are totally 3467 respondents involved without missing data. The regression result is presented in table 2:

Table 2 Regression result of pooled data model (1995-2009)

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	71,344	1,349		52,870	,000***
	HOUSE	-,383	,162	-,044	-2,366	,018**
	BOAT	,042	,331	,002	,127	,899
	FAP	-,002	,001	-,063	-3,359	,001***
	INC	-,006	,001	-,095	-4,984	,000***
	EPB	-,010	,003	-,051	-2,740	,006***
	HEDU	,524	,132	,074	3,961	,000***
	LEDU	-1,014	,294	-,065	-3,449	,001***
	GH	,415	,190	,041	2,177	,030**
	PH	,447	,533	,016	,839	,402
	AGE	-,367	,060	-1,020	-6,124	,000***
	AGE2	,004	,001	1,029	6,130	,000***
	FZ	-,091	,053	-,034	-1,725	,085*
	MALE	,708	,163	,082	4,351	,000***

a. Dependent Variable: ER

b. * is significant at 10% level, ** is significant at 5% level, *** is significant at 1%

c. $R^2 = 0.049$, Adjusted $R^2 = 0.045$

Source: 1995-2009 DNB Household Survey (3053 households)

From the regression result table, first, we can find that the R^2 is 4.9%. Combined with such significant variables, it means that all of the variables' variation can explain 4.9% of the variation of planned retirement age. On the other hand, the left 95.1% is explained by the error. According to the researches of Hanel (2009) and van Ooijen, etc. (2010), the policy reform can influence the planned retirement age obviously. Therefore, it makes sense to argue that most people decide his/her retirement age based on the government policy such as legal retirement age in the Netherlands. However, on the basis of our regression result, it's obvious that the financial asset, education level, health condition (good health condition), family size, and gender can influence the planned retirement age significantly. In details, the households who

own occupied house/flat are likely to retire earlier about 4.6 months than who rent house/flat. In terms of boat, we find that although in the Netherlands, the water area is not a restriction to own a boat, it may only be seen as a luxury or individual habit but not like house, because the respondents who don't have boat lean to retire only approximate half a month earlier than who has one while it's insignificant. Furthermore, similarly with the result of van Ooijen, Mastrogiacomo, and Euwals (2010), the financial aspect – financial asset and income are both significant at 1% level. But from the view of economic significance, the yearly income is more significant, because the household who has additional 1,000 euros in financial assets plan to retire around 0.7 days earlier. Comparatively, the yearly income increased by 1,000 euro will lead to 2-days early retirement.

Besides, the education level and health condition are not only significant but also have large effect on the planned retirement age except for the poor health. Compared to the median education level, the households with high education level would prefer to retire half a year later, and those with low education level are likely to retire more 1 year earlier. In terms of the health condition, the relative planned retirement age for those who regard him/her self in good health plan to retire 5 months later. On the other hand, the households with poor health plan to retire more than 5 months later, but it is insignificant.

Moreover, although the family size is only significant in 10% level, the respondent prefers to retire about 1 month earlier with one more members in his/her family.

Last but not least, in the Netherlands, the difference between genders is always considered by researchers. In our paper, we find the similar result that male's planned retirement age is more than 7 months later than female.

5.2 Robustness check

In order to check whether the financial variables are robust, we add the squares of the financial asset, yearly income and expected pension benefits as new variables. The regression result is as follow with the three new variables: FAP2, INC2 and EPB2. Besides, the new variables are calculated as follow: $\mathrm{FAP2} = \frac{\mathrm{FAP}^2}{10^6}$; $\mathrm{INC2} = \frac{\mathrm{INC}^2}{10^5}$; $\mathrm{EPB2} = \frac{\mathrm{EPB}^2}{10^4}$.

Table 3 Regression result with quadratic financial variables

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	70,790	1,351		52,401	,000***
	HOUSE	-,298	,162	-,034	-1,841	,066*
	BOAT	,136	,330	,007	,411	,681
	FAP	-,003	,001	-,078	-2,980	,003***
	INC	-,014	,002	-,234	-7,348	,000***
	EPB	-,019	,012	-,101	-1,601	,109
	HEDU	,657	,134	,093	4,915	,000***
	LEDU	-1,025	,294	-,066	-3,481	,001***
	GH	,437	,190	,043	2,303	,021**
	PH	,383	,531	,014	,722	,470
	AGE	-,336	,060	-,932	-5,583	,000***
	AGE2	,004	,001	,960	5,708	,000***
	FZ	-,106	,053	-,039	-2,014	,044**
	MALE	,870	,164	,101	5,301	,000***
	INC2	,607	,108	,168	5,596	,000***
	FAP2	,456	,549	,021	,830	,407
	EPB2	,963	1,131	,053	,851	,395

a. Dependent Variable: ER

b. * is significant at 10% level, ** is significant at 5% level, *** is significant at 1%

c. $R^2 = 0.060$, Adjusted $R^2 = 0.055$

Source: 1995-2009 DNB Household Survey (3053 households)

The regression result shows that with three new variables, the adjusted R^2 increases and the variable INC2 is significant at 1% level. But the other two new quadratic variables are insignificant. Therefore, we redo the regression without the insignificant quadratic variables. The result is as follow:

Table 4 Regression result with yearly income square

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	70,767	1,346		52,571	,000***
	HOUSE	-,308	,161	-,035	-1,907	,057*
	BOAT	,131	,330	,007	,398	,691
	FAP	-,002	,001	-,063	-3,373	,001***
	INC	-,014	,002	-,240	-7,609	,000***
	EPB	-,009	,003	-,050	-2,660	,008***
	HEDU	,651	,134	,092	4,875	,000***
	LEDU	-,998	,292	-,064	-3,412	,001***
	GH	,427	,189	,042	2,252	,024**
	PH	,354	,530	,013	,668	,504
	AGE	-,342	,060	-,951	-5,720	,000***
	AGE2	,004	,001	,979	5,854	,000***
	FZ	-,101	,052	-,037	-1,929	,054*
	MALE	,868	,164	,101	5,286	,000***
	INC2	,620	,108	,171	5,752	,000***

a. Dependent Variable: ER

b. * is significant at 10% level, ** is significant at 5% level, *** is significant at 1%

c. $R^2 = 0.060$, Adjusted $R^2 = 0.055$

Source: 1995-2009 DNB Household Survey (3053 households)

According to the above regression result, the adjusted R^2 is still 0.055 which means our model can be improved by adding the new variable INC2. In addition, we can find that the relation between yearly income and planned retirement age is not strictly linear. Therefore, with the increasing of yearly income, the households prefer to retire earlier, but they prefer to retire later if they are rich enough. The scatter of relation between yearly income and planned retirement age has the same result (Graph 1 in appendix). However, only one household's yearly income is above the average level. That means the quadratic line may not illustrate the tendency precisely. Therefore, to deal with such phenomenon, we use Log (1+INC) instead of INC to redo the regression.

Table 5 Regression result with logarithm of yearly income

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	70,576	1,360		51,892	,000***
	HOUSE	-,263	,161	-,030	-1,631	,103
	BOAT	,130	,329	,007	,396	,692
	FAP	-,002	,001	-,061	-3,324	,001***
	LOGINC	,084	,231	,021	,363	,716
	EPB	-,007	,004	-,035	-1,837	,066*
	HEDU	,705	,134	,100	5,247	,000***
	LEDU	-,938	,293	-,061	-3,200	,001***
	GH	,444	,189	,044	2,352	,019**
	PH	,258	,530	,009	,486	,627
	AGE	-,308	,060	-,855	-5,108	,000***
	AGE2	,003	,001	,883	5,230	,000***
	FZ	-,114	,052	-,042	-2,179	,029**
	MALE	,947	,166	,110	5,717	,000***
	LOG2INC	-,130	,040	-,196	-3,247	,001***

a. Dependent Variable: ER

b. * is significant at 10% level, ** is significant at 5% level, *** is significant at 1%

c. $R^2 = 0.065$, Adjusted $R^2 = 0.061$

Source: 1995-2009 DNB Household Survey (3053 households)

From Table 5, we can find that the adjusted R^2 is increased to 0.061. That implies that using the logarithm of yearly income can improve our model further. Considering the coefficient of LOGINC and LOG2INC, Graph 2 in the appendix illustrates the same result, a concave parabola. And the linear relation is still negative. Moreover, we calculate the top value of logarithm yearly income is about 0.323. As a conclusion, for the relative poorer households, with less yearly income, they prefer to retire earlier. Conversely, for the relative richer of households, the lower yearly income can lead to later retirement. However, the variable of LOGINC is not significant any longer. Therefore, we check the jointly significance of LOGINC and LOG2INC with F-test. The

details of calculation can be found in the appendix (Formula 4). Based on my calculation, these two variables are jointly significant.

Furthermore, in the Graph 2 in the appendix, we find that there are still some outliers considering the planned retirement age, especially those households whose planned retirement age is lower than 40. In details, three respondents prefer to retire at 25 years old, when they are separately 50, 53, 61 years old. Two of them are female, while their family sizes are both 2. So we consider it is possible that their partners are rich enough for them to retire so early. The other respondent is male, but he own about 93,610 euro and earn 68,230 euro per year. The left one who plan to retire at 30 years old is a 28-years old male. Considering his financial asset, it is even negative. Therefore, it is likely that he answers the question about planned retirement age randomly, or he conceals some private information.

At last, we substitute FAP by Log (FAP) but the regression result is not improved (the regression result is in Table 5 in the appendix).

5.3 Yearly data model

First, based on the analysis above, we find that the model can be improved through substituting INC by LOGINC and adding variable LOG2INC. Therefore, we modify our original yearly data model as follows:

$$\begin{aligned} \mathrm{E(ER)} = {} & \beta_0 + \beta_1 \mathrm{HOUSE} + \beta_2 \mathrm{BOAT} + \beta_3 \mathrm{FAP} + \beta_4 \mathrm{LOGINC} + \beta_5 \mathrm{EPB} + \beta_6 \mathrm{HEDU} + \beta_7 \mathrm{LEDU} \\ & + \beta_8 \mathrm{GH} + \beta_9 \mathrm{PH} + \beta_{10} \mathrm{AGE} + \beta_{11} \mathrm{AGE}^2 + \beta_{12} \mathrm{FZ} + \beta_{13} \mathrm{MALE} \\ & + \beta_{14} \mathrm{LOG2INC} \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (3) \end{aligned}$$

Subsequently, we analyze the dataset by year from 2003 to 2009. All of the result from 2003 to 2009 is shown as follows:

Table 6 Regression result of Yearly data model (2003-2009)

	2003	2004	2005	2006	2007	2008	2009
HOUSE	-0,460	-0,265	-0,470	0,127	-0,300	-1,046 **	-0,583
	(0,396)	(0,472)	(0,464)	(0,445)	(0,499)	(0,501)	(0,417)
BOAT	-1,139	-1,106	-1,061	1,283	1,265	0,225	0,183
	(0,911)	(1,116)	(1,017)	(1,076)	(1,155)	(0,992)	(0,940)
FA	-0,002	-0,006	-0,002	-0,005	-0,004	-0,008 ***	-0,006 ***
	(0,003)	(0,004)	(0,003)	(0,003)	(0,003)	(0,003)	(0,002)
LOGINC	2,806 **	0,124	-1,827 **	0,367	1,646	-0,559	-1,429 **
	(1,362)	(0,870)	(0,724)	(1,470)	(1,115)	(0,934)	(0,722)
EPB	-0,003	0,003	0,010	0,018	0,000	0,019	0,024 **
	(0,012)	(0,013)	(0,016)	(0,013)	(0,014)	(0,012)	(0,010)
HEDU	0,711 **	0,468	1,536 ***	1,263 ***	0,677 *	0,303	0,612 *
	(0,345)	(0,416)	(0,383)	(0,380)	(0,385)	(0,383)	(0,334)
LEDU	-2,493	-0,891	-5,315 ***	1,280	-0,287	-0,606	-2,888 *
	(1,722)	(1,284)	(1,805)	(1,452)	(1,578)	(1,469)	(1,702)
GH	0,453	0,531	1,402 **	0,189	0,802	0,985 *	0,660
	(0,480)	(0,581)	(0,561)	(0,539)	(0,626)	(0,529)	(0,429)
PH	2,046	0,793	-2,456	-0,216	0,503	0,576	0,480
	(1,791)	(1,598)	(1,538)	(1,621)	(1,655)	(2,095)	(1,108)
AGE	0,208	0,165	-0,092	0,483 ***	-0,221	-0,262	0,013
	(0,170)	(0,180)	(0,162)	(0,167)	(0,179)	(0,174)	(0,141)
AGE2	-0,003	-0,002	0,001	-0,005 ***	0,002	0,003 *	0
	(0,002)	(0,002)	(0,002)	(0,002)	(0,002)	(0,002)	(0,002)
FZ	-0,231 *	-0,143	0,066	-0,471 ***	-0,169	0,040	-0,133
	(0,131)	(0,151)	(0,151)	(0,136)	(0,144)	(0,146)	(0,122)
MALE	1,234 ***	1,609 ***	0,762 *	1,047 **	1,438 ***	1,335 ***	1,199 ***
	(0,388)	(0,461)	(0,435)	(0,422)	(0,435)	(0,423)	(0,364)
LOG2INC	-0,562 **	-0,164	0,260 **	-0,131	-0,284	0,088	0,203
	(0,226)	(0,180)	(0,131)	(0,253)	(0,193)	(0,166)	(0,134)
Constant	55,185	58,99	64,237	50,762	64,631	66,859	62,867
Observations	351	446	430	409	445	398	387
R square	0,091	0,046	0,109	0,088	0,056	0,089	0,092

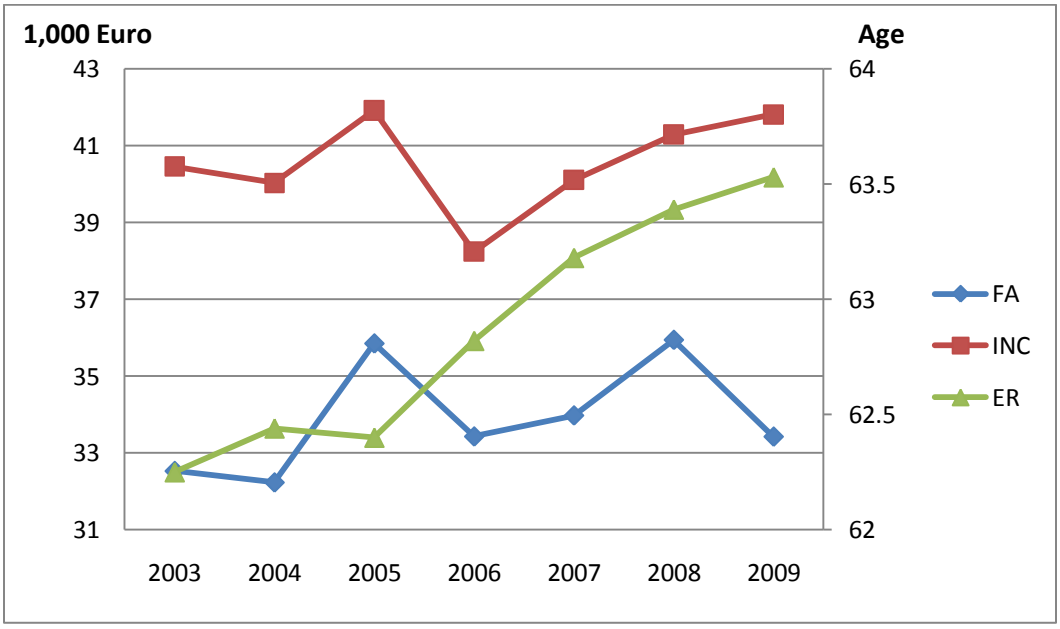
Source: DNB Households Survey 2003-2009

*** is significant at 1% level, ** is significant at 5% level, * is significant at 10% level

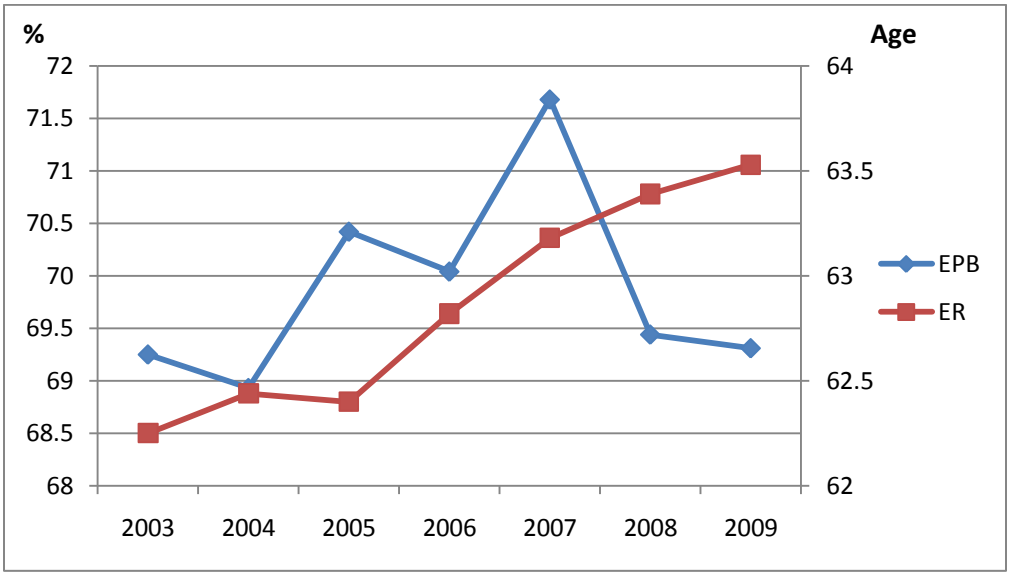
Compared with the result in pooled data model, the significance level is not obvious for each year. That is possibly caused by the amount of observations. In the yearly data model the

number of observations is only about one tenth of that in the pooled data model. We can believe that if there were enough observations, the significance level would be similar with the result in the pooled data model for the variables. Furthermore, even under such conditions, some variables are still significant Moreover, we can find that the variables, MALE, is significant from 2003 to 2009. And the high education level (HEDU) is always significant except in 2004 and 2008. However, the other variables are not always significant in different years. Besides, even the effect of one variable in different years is different, for example, the low education level and house have a relatively negative impact on planned retirement age, but they are positive in 2006. We admit that for every year the number of observations is around 400 which may be not large enough, resulting in inaccuracy. Subsequently, we draw the mean value of financial asset, yearly income, expected pension benefits and planned retirement age from 2003 to 2009 to show the tendency in these years (Graph 1 and Graph 2). To compare the value among different years, we deflate the value of financial asset and yearly income to 2009.

Graph 1 the comparative trend of financial asset (FA), income (INC) and planned retirement age (ER)



Graph 2 the comparative trend of expected pension benefits (EPB) and planned retirement age (ER)



Although the effect of the financial crisis is not obvious due to starting from 2008, we can find some phenomenon from the trend of expected pension benefits (Graph 2). Before 2008, the trend of EPB is increasing, except that in 2006 it decreases a little due to the early retirement policy reform in the Netherlands. In addition, the expectation can react to the current situation faster. Therefore, the sharp decrease in the expected pension benefits can be caused by the financial crisis. Comparatively, the employee's income is constant and protected by the contract and government. The mean value of yearly income can only be influenced by higher unemployment rate during the financial crisis. However, this possible decline is not shown in Graph 1. Therefore, the yearly income in the Netherlands is not influenced significantly by the current financial crisis. There are at least two possible reasons: 1. the unemployment benefits are high which can compensate the loss due to unemployment; 2. the government react effectively after the happening of financial crisis and keep a low unemployment rate. Moreover, we can find that before 2006, the increasing of retirement is always accompanied by a decrease of yearly income, and vice versa. In terms of financial assets (Graph 1), the significant decrease in 2009 exists. It is possible that the financial crisis really affects the financial asset of Dutch employees in 2009. Regarding the planned retirement age, except a little decline in 2005, its trend is arising from 2003 to 2009. Moreover, we can review them in the combined method. Consequently, we can find that in 2004 a decrease takes place in financial assets, yearly income,

and expected pension benefits. Comparatively, the planned retirement age increases. After that, with the going up in financial assets, yearly income, and expected pension benefits, planned retirement age goes down. The phenomenon in 2006 is same as that in 2004. From 2007 on, only the expected pension benefits match the change of retirement well.

5.4 Yearly data model concerning risky financial assets holders

Based on the above analysis, we can't show sufficient evidence that the financial crisis affects the planned retirement age through financial viewpoint. It implies that the financial crisis until now has really a limited effect on Dutch households' retirement plan. Consequently, we focus on the households who have risky financial asset to attempt to find out larger impact on such special group of people. The additional variable, risky financial asset (RFA) is included in new regression test.

Table 7 Regression result of Yearly data model concerning risky financial asset holders (2003-2009)

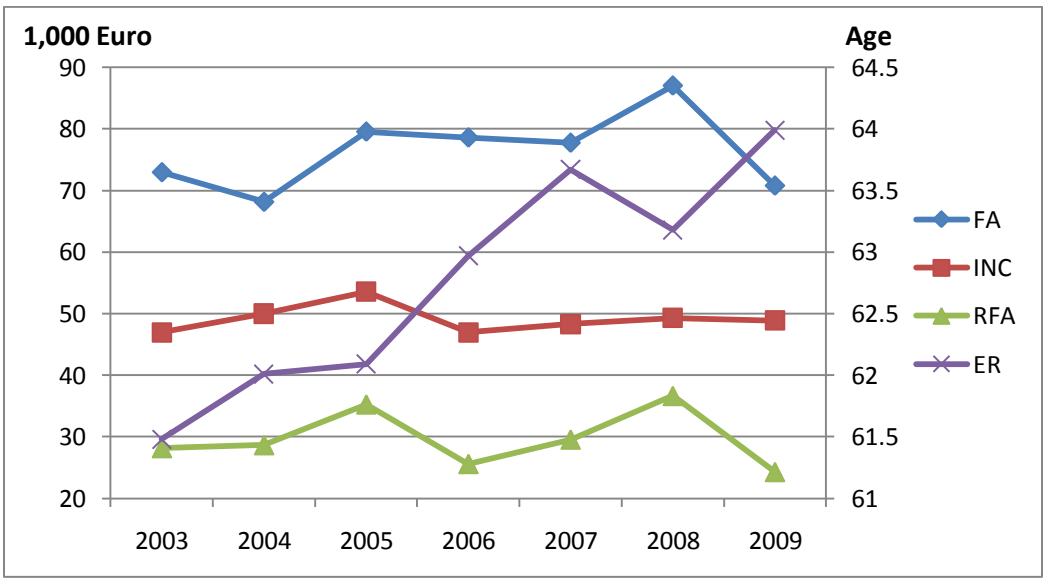
	2003	2004	2005	2006	2007	2008	2009
HOUSE	-1,543 **	0,135	-0,031	-0,389	-1,370 *	-0,620	0,935
	(0,705)	(1,228)	(0,945)	(0,964)	(0,817)	(0,838)	(1,123)
BOAT	-1,079	1,576	-1,107	1,914	0,908	0,360	1,171
	(1,138)	(2,159)	(1,726)	(2,043)	(1,341)	(1,420)	(1,529)
FA	0,012 **	-0,005	-0,010 *	-0,006	-0,009 **	-0,009 **	-0,005 *
	(0,005)	(0,010)	(0,006)	(0,005)	(0,004)	(0,003)	(0,003)
LOGINC	0,751	2,500	-2,251	-2,541	-3,239 *	1,690	-0,010
	(2,766)	(2,345)	(1,429)	(1,949)	(1,703)	(4,188)	(1,521)
EPB	-0,020	-0,010	0,001	-0,007	-0,040 **	0,069 **	0,018
	(0,017)	(0,035)	(0,029)	(0,031)	(0,019)	(0,028)	(0,021)
HEDU	-0,136	-0,781	0,340	1,629 **	1,036 **	1,175 *	0,269
	(0,536)	(0,979)	(0,699)	(0,722)	(0,523)	(0,621)	(0,658)
LEDU		-1,566	-7,644 ***	0,494	-2,642	-2,777	
		(2,957)	(2,256)	(2,574)	(2,846)	(3,114)	
GH	0,073	1,882	2,083 **	0,140	0,179	1,608 *	1,705 *
	(0,876)	(1,694)	(1,021)	(1,137)	(0,924)	(0,928)	(0,864)
PH	1,892	2,242	-5,198 **	3,646	-0,331	1,497	0,756
	(2,025)	(3,403)	(2,152)	(3,428)	(1,527)	(2,463)	(2,012)
AGE	0,110	-0,495	-0,617 *	-0,089	-0,650 **	-0,592 *	-0,084
	(0,333)	(0,517)	(0,324)	(0,326)	(0,279)	(0,334)	(0,335)
AGE2	-0,001	0,006	0,007 **	0,001	0,007 **	0,007 *	0,001
	(0,004)	(0,006)	(0,004)	(0,004)	(0,003)	(0,004)	(0,004)
FZ	-0,304	-0,310	-0,022	-0,436 *	-0,069	-0,223	-0,033
	(0,215)	(0,318)	(0,257)	(0,229)	(0,185)	(0,200)	(0,238)
MALE	0,456	-0,244	0,924	0,953	0,887	2,935 ***	0,025
	(0,675)	(1,315)	(0,875)	(0,894)	(0,666)	(0,705)	(0,780)
LOG2INC	-0,290	-0,862 *	0,331	0,141	0,369	-0,294	0,020
	(0,435)	(0,454)	(0,230)	(0,341)	(0,277)	(0,599)	(0,266)
RFA	-0,020 **	0,008	0,015 *	0,003	0,008	0,002	-0,006
	(0,008)	(0,013)	(0,008)	(0,009)	(0,008)	(0,006)	(0,006)
Constant	62,398	75,928	76,324	72,457	87,565	65,314	61,96
Observations	91	125	129	110	127	113	118
R square	0,244	0,128	0,263	0,172	0,245	0,316	0,122

Source: DNB Households Survey 2003-2009

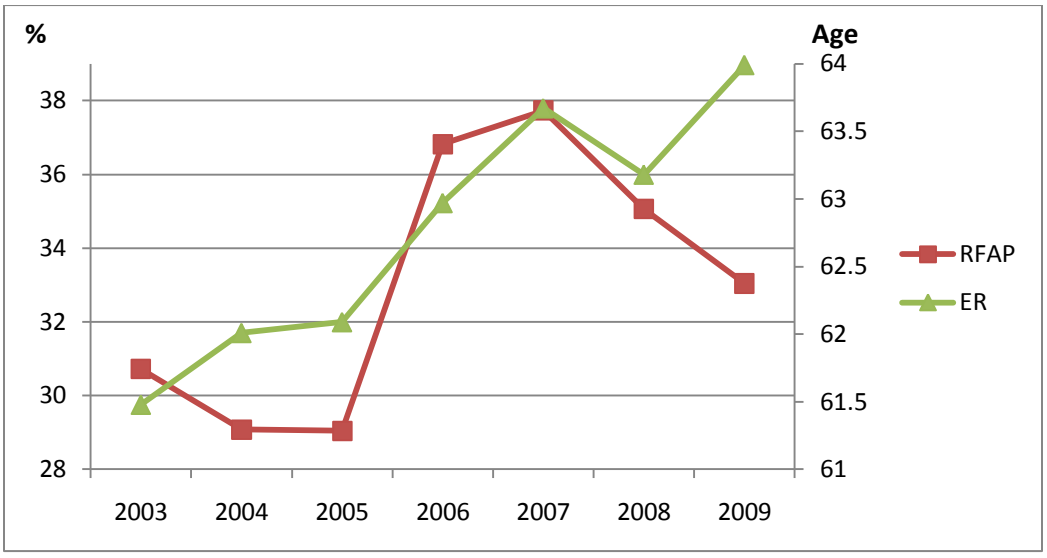
*** is significant at 1% level, ** is significant at 5% level, * is significant at 10% level

Based on the above results, we find that in part of the years, the R^2 increases obviously. That means the risky financial assets improve the model, but it is might caused by the increase of variables' number. Considering the adjustedR^2, we find that only in several years, the adjusted R^2 are increased. Besides, the significance of the financial variables – financial assets, yearly income, and expected pension benefits, is more obvious. Compared with the significance level of the previous results, the significance level decreases in 2008 and 2009, but it is still significant. In 2003, 2005, and 2007, the financial variables' significance level increases remarkably. That is because we focus on the risky financial holders, they normally pay more attention to their financial assets. Furthermore, considering the even fewer observations, only approximate 100 for each year, the significance level for financial variables is obvious. If we had more observations, the significant level would increase. However, the significance of gender disappears. To investigate the financial crisis effect, we draw the tendency of financial crisis, risky financial crisis, yearly income, expected pension benefits, proportion of risky financial crisis in financial crisis. They are as follow:

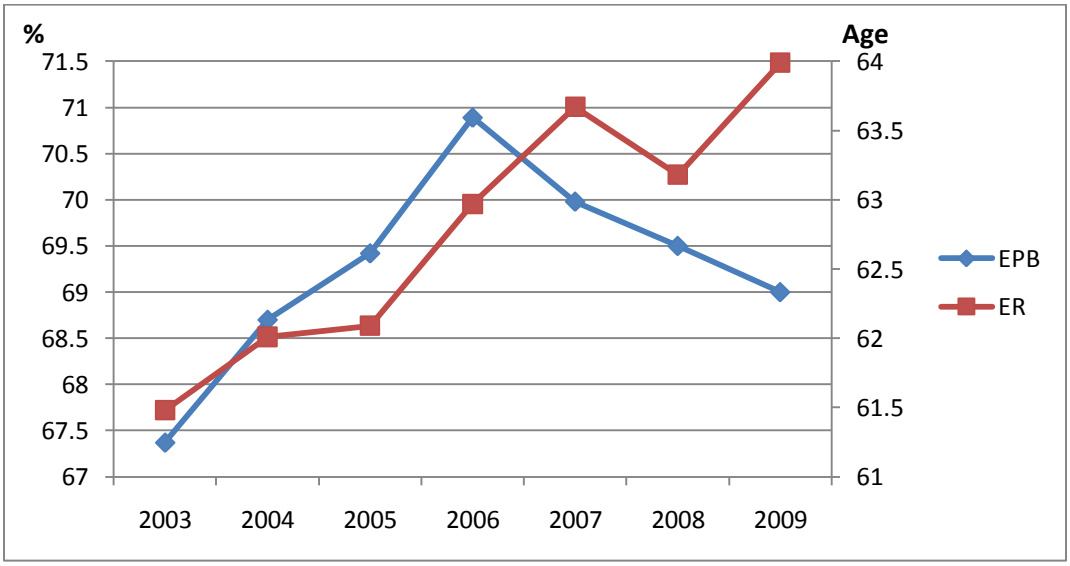
Graph 3 the comparative trend of financial asset, yearly income, risky financial asset and planned retirement age (risky financial asset holders, 2003-2009)



Graph 4 the comparative trend of percentage of risky financial asset in financial asset and planned retirement age (risky financial asset holders, 2003-2009)



Graph 5 the comparative trend of expected pension benefits and planned retirement age (risky financial asset holders, 2003-2009)



On the basis of the graph 3 to 6, the tendency of financial variables and expected retirement age satisfy our anticipation that the current financial crisis from 2008 influence the financial aspect as well as the planned retirement age. First, Graph 3 illustrates that in 2009, financial assets and risky financial assets decrease almost 20,000 euro suddenly after an increase in 2008.

It makes sense to believe that it is the result of the financial crisis. Besides, the sharp decreasing of risky financial asset can be explained by the reason that risky financial asset holders sell part of the risky financial asset to avoid the risk resulting from the financial crisis. In terms of income, it still keeps almost constant during the 7 years. At the same time, the proportion of risky financial asset hold goes down more than 2% in 2009. Comparatively, it experiences a significant increase from 29% in 2005 to 38% in 2006. Subsequently, in graph 6, expected pension benefits goes up from 2003 to 2006 by increasing 3.5%. After 2006 it keeps going down from 71% to 69%. The first decline in 2007 can be explained by the policy reform. The continuous decreasing can be partly explained by the following financial crisis. Considering the trend of planned retirement age, it increases slowly from 61.5 in 2003 to 62 in 2005. But due to the policy reform, a sharp rising happens that it increases to more than 63.5 until 2007. Besides, the planned retirement age decreases in 2008 and increases in 2009. Considering the relation between various variables and planned retirement age, we can find that the financial crisis has a relatively larger effect on the risky financial asset holders, and their reaction is obvious to the financial condition. First, in Graph 3, it illustrates that there is a negative relationship between planned retirement age and financial assets. At the same time, except in 2007, the negative relation between planned retirement age and risky financial asset also exists. However, there is no obvious link between the percentage of risky financial asset in financial asset and planned retirement age. Last, except in 2007 and 2009, the increasing of expected pension benefits always accompany with the same change of planned retirement age.

6. Conclusions

In summary, first, we set a regression model based on the previous researches to analyze the effect of financial incentives on Dutch employees' planned retirement age with pooled dataset from 1995 to 2009. Consequently, we find that the living condition, the financial assets, yearly income, and expected pension benefits all can influence the individual planned retirement age significantly, which is in line with the results in many previous researches. Besides, the education level, health condition, age, family size, and gender can be considered as the determinants in the Netherlands as well. Then, we use the robustness test to improve our model. Apart from that, the improved model is used to analyze the yearly financial incentive,

but due to a few observations, the effects are not significant and consistent. Besides, with the graphs of the financial variables' mean value trend, the consequences of the financial crisis do not seem to be great among the majority of the Dutch employees. However, comparing the financial conditions in different years to the different expectations on retirement, the effects of financial incentives are illustrated in the graphs. In the further study when we focus on the reaction of risky financial holders to the current financial crisis, we find that the impact of the current financial crisis on their retirement plans is more obvious.

As a result, the effects of financial incentives on planned retirement age are significant. Additionally, the influence of the financial crisis on planned retirement age is limited, but is relatively remarkable on special groups, such as risky financial assets holders.

We have the same suggestion as Belloni, et al. (2006) and Bovenberg and Gradus (2008) for the government to increase the flexibility of the retirement age. On the basis of the conclusion above, in case of the financial crisis, if households can choose the retirement age more freely, they can arrange their retirement plan better. And then it is also advantageous for the government pension department and insurance companies to finance their balance sheet.

For the future research, it is worth continuing the investigation associated with the impact of the financial crisis on the planned retirement age. The influence of the current financial crisis still exists, and the questionnaire about financial assets and yearly income in 2009 presents the condition of 2008. Therefore, the short-coming of dataset is that it might not reflect the current condition happening in the Netherlands. And we expect that the dataset of the DNB Household Survey 2010 might show more information about the effect of the current financial crisis. Furthermore, the fewer observations restrict the accuracy of our yearly data model. In addition, the sample selection bias is another short-coming for our paper. As a result, in a future study, more observations and corrected sample selection are expected to show more accurate result of the financial crisis' effect.

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Appendix

Formula 1

$$FAP = B1b + B2b + B3b + B4b + B6b + B7b + B8b + B11b + B12b + B13b + B14b + B15b + B16b + B17b + B18b + B24b + B25b - (S1b + S2b + S3b + S4b + S5b + S6b + S7b + S8b)$$

Formula 2

$$FA = B1b + B2b + B3b + B4b + B6b + B7b + B8b + B11b + B12b + B13b + B14b + B15b + B16b + B17b + B18b + B24b + B25b + B28b + B29b + B30b - (S1b + S2b + S3b + S4b + S5b + S6b + S7b + S8b)$$

Formula 3

$$INC = LOON + WW + ERF + RENTE + LOON\_C + WW\_C$$

Formula 4

Completed model:

$$\mathrm{E(ER)} = \beta_0 + \beta_1\mathrm{HOUSE} + \beta_2\mathrm{BOAT} + \beta_3\mathrm{FAP} + \beta_4\mathrm{LOGINC} + \beta_5\mathrm{EPB} + \beta_6\mathrm{HEDU} + \beta_7\mathrm{LEDU} + \beta_8\mathrm{GH} + \beta_9\mathrm{PH} + \beta_{10}\mathrm{AGE} + \beta_{11}\mathrm{AGE}^2 + \beta_{12}\mathrm{FZ} + \beta_{13}\mathrm{MALE} + \beta_{14}\mathrm{LOG2INC}$$

Reduced model:

$$\mathrm{E(ER)} = \beta_0 + \beta_1\mathrm{HOUSE} + \beta_2\mathrm{BOAT} + \beta_3\mathrm{FAP} + \beta_5\mathrm{EPB} + \beta_6\mathrm{HEDU} + \beta_7\mathrm{LEDU} + \beta_8\mathrm{GH} + \beta_9\mathrm{PH} + \beta_{10}\mathrm{AGE} + \beta_{11}\mathrm{AGE}^2 + \beta_{12}\mathrm{FZ} + \beta_{13}\mathrm{MALE}$$

(i) Test H_0: $\beta_4 = \beta_{14} = 0$ vs H_1: $\beta_4 \neq 0$ and/or $\beta_{14} \neq 0$

(ii) Test statistics: $F = \frac{(SSE_r - SSE_c)/2}{SSE_c/(n-15)}$

(iii) Reject $H_0 \leftrightarrow f \geq F_{0.05;2,3038} = 2.9987 \quad \mathrm{FINV}(0.05, 2, 3038)$

(iv) $val = \frac{(36276.97 - 35375.55)/2}{35375.55/3038} = 38.7063$

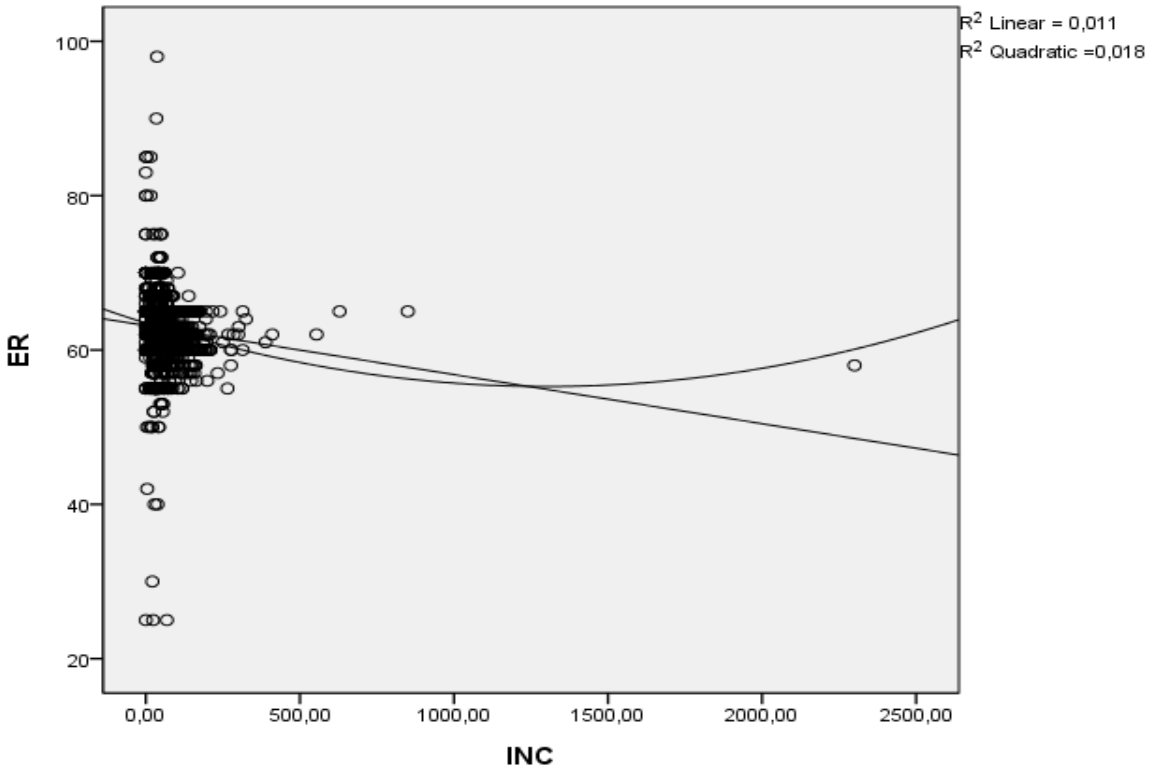
(v) H_0 is rejected since 38.7063 is larger than 2.9987

In conclusion, LOGINC and LOG2INC are jointly useful.

Table 1

Variable expression	
LOON	pay/salary
WW	unemployment benefits
ERF	inheritance
RENTE	interest/dividends/other income
B1	checking accounts
B2	employer-sponsored saving plans
B3	savings or deposit accounts
B4	deposit books
B6	saving certificates
B7	single-premium annuity insurance policies
B8	savings or endowment insurance policies
B12	mutual funds and/or mutual fund accounts
B13	bonds and/or mortgage bonds
B14	stocks and shares
B15	put-option bought
B16	put-option written
B17	call-option bought
B18	call-option written
B24	money lent out to family or friends
B25	savings or investment not mentioned before
B28	stocks from substantial holding
B29	indicator business equity (professions)
B30	indicator business equity self-employed
S1	private loans
S2	extended line of credit
S3	outstanding debts on hire-purchase contracts, debts based on payment by installment and/or equity-based loans
S4	outstanding debts with mail-order firms, shops or other sorts of retail business
S5	loans from family or friends
S6	study loans
S7	credit card debts
S8	loans not mentioned before

Graph 1 Scatters of yearly income on ER



Graph 2 Scatters of logarithm yearly income on ER

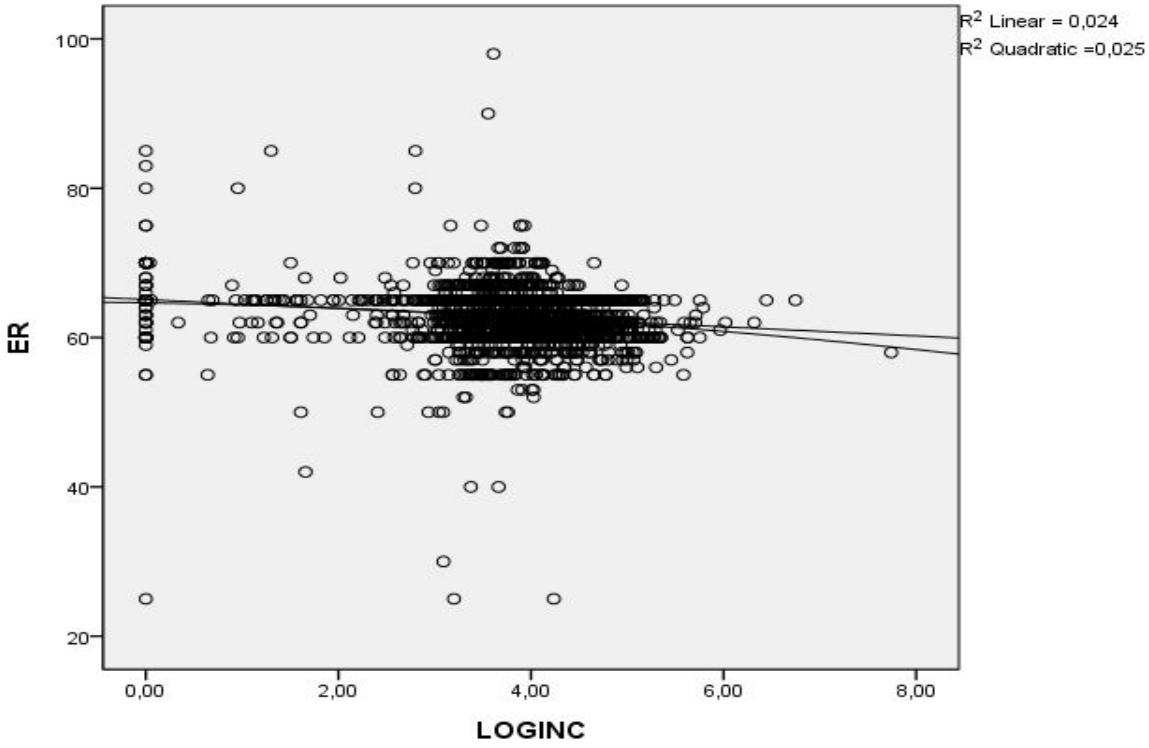


Table 2 Sample selection

	Observations
Total	75067
Selection 1 (financial asset)	34108
Selection 2 (yearly income)	28616
Selection 3 (planned retirement age)	6602
Selection 4 (expected pension benefits)	4517
Selection 5 (education)	4422
Selection 6 (occupation)	4101
Selection 7 (house condition)	3053
Final	3053

Table 3 Pooled data model 1995-2009

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ER	3053	25	98	62,83	3,522
HOUSE	3053	0	1	,79	,405
BOAT	3053	0	1	,04	,189
FAP	3053	-298,87	2902,50	43,9400	102,75347
INC	3053	,00	2300,00	53,7811	58,97193
EPB	3053	0	100	66,66	18,959
HEDU	3053	0	1	,49	,500
MEDU	3053	0	1	,45	,498
LEDU	3053	0	1	,05	,227
GH	3053	0	1	,86	,347
FH	3053	0	1	,12	,330
PH	3053	0	1	,02	,124
AGE	3053	25	86	49,03	9,784
AGE2	3053	625	7396	2499,84	911,309
FZ	3053	1	7	2,54	1,304
MALE	3053	0	1	,79	,410
Valid N (listwise)	3053				

Table 4 Yearly model descriptive statistics

4-A 2003

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ER	351	50	75	62,25	2,998
HOUSE	351	0	1	,78	,414
BOAT	351	0	1	,03	,174
FA	351	-121,45	333,72	29,2943	54,70393
INC	351	,00	150,00	36,4341	18,55438
EPB	351	0	100	69,25	13,346
HEDU	351	0	1	,47	,500
MEDU	351	0	1	,52	,500
LEDU	351	0	1	,01	,092
GH	351	0	1	,87	,341
FH	351	0	1	,13	,332
PH	351	0	1	,01	,092
AGE	351	24	68	45,33	9,391
AGE2	351	576	4624	2142,53	838,212
FZ	351	1	7	2,86	1,340
MALE	351	0	1	,69	,462
Valid N (listwise)	351				

4-B 2004

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ER	446	25	75	62,46	3,922
HOUSE	446	0	1	,76	,430
BOAT	446	0	1	,03	,168
FA	446	-199,16	455,19	29,7217	56,78964
INC	446	,00	155,12	36,8648	18,35773
EPB	446	0	100	68,95	14,363
HEDU	446	0	1	,45	,498
MEDU	446	0	1	,53	,500
LEDU	446	0	1	,02	,155
GH	446	0	1	,86	,344
FH	446	0	1	,12	,327
PH	446	0	1	,02	,124

AGE	446	23	65	45,29	9,764
AGE2	446	529	4225	2146,04	879,824
FZ	446	1	6	2,63	1,351
MALE	446	0	1	,70	,460
Valid N (listwise)	446				

4-C 2005

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ER	430	40	90	62,40	3,911
HOUSE	430	0	1	,77	,418
BOAT	430	0	1	,03	,184
FA	430	-159,83	537,84	33,4622	69,33144
INC	430	,00	628,91	39,1291	42,91255
EPB	430	0	100	70,42	11,753
HEDU	430	0	1	,47	,499
MEDU	430	0	1	,52	,500
LEDU	430	0	1	,01	,107
GH	430	0	1	,86	,347
FH	430	0	1	,12	,329
PH	430	0	1	,02	,127
AGE	430	18	65	44,63	10,675
AGE2	430	324	4225	2105,34	939,061
FZ	430	1	7	2,60	1,318
MALE	430	0	1	,67	,470
Valid N (listwise)	430				

4-D 2006

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ER	409	30	75	62,82	3,519
HOUSE	409	0	1	,79	,408
BOAT	409	0	1	,03	,162
FA	409	-221,40	612,40	31,6703	64,21984
INC	409	,00	114,00	36,2337	16,68077
EPB	409	0	100	70,04	13,175
HEDU	409	0	1	,44	,497

MEDU	409	0	1	,55	,499
LEDU	409	0	1	,01	,120
GH	409	0	1	,87	,336
FH	409	0	1	,12	,322
PH	409	0	1	,01	,110
AGE	409	23	65	45,46	9,856
AGE2	409	529	4225	2163,70	881,534
FZ	409	1	7	2,68	1,379
MALE	409	0	1	,67	,473
Valid N (listwise)	409				

4-E 2007

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ER	445	25	75	63,18	3,795
HOUSE	445	0	1	,82	,381
BOAT	445	0	1	,02	,155
FA	445	-246,35	437,53	32,7206	64,82584
INC	445	,00	159,70	38,6282	20,08769
EPB	445	0	100	71,68	13,912
HEDU	445	0	1	,47	,500
MEDU	445	0	1	,52	,500
LEDU	445	0	1	,01	,115
GH	445	0	1	,89	,308
FH	445	0	1	,09	,290
PH	445	0	1	,01	,115
AGE	445	25	64	45,09	10,066
AGE2	445	625	4096	2134,40	902,218
FZ	445	1	7	2,76	1,382
MALE	445	0	1	,64	,480
Valid N (listwise)	445				

4-F 2008

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ER	398	50	98	63,39	3,570
HOUSE	398	0	1	,83	,375

BOAT	398	0	1	,03	,178
FA	398	-229,87	868,99	35,1636	76,11247
INC	398	,00	165,05	40,3955	22,56800
EPB	398	0	100	69,44	14,872
LEDU	398	0	1	,02	,122
MEDU	398	0	1	,49	,501
HEDU	398	0	1	,49	,501
GH	398	0	1	,86	,346
FH	398	0	1	,13	,337
PH	398	0	1	,01	,087
AGE	398	25	65	46,67	10,186
AGE2	398	625	4225	2281,19	929,785
FZ	398	1	7	2,82	1,337
MALE	398	0	1	,65	,479
Valid N (listwise)	398				

4-G 2009

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
ER	387	50	72	63,53	2,971
HOUSE	387	0	1	,83	,377
BOAT	387	0	1	,03	,159
FA	387	-120,95	856,13	33,4217	72,34259
INC	387	,00	195,00	41,8154	22,45590
EPB	387	0	100	69,31	15,946
HEDU	387	0	1	,52	,500
MEDU	387	0	1	,47	,500
LEDU	387	0	1	,01	,088
GH	387	0	1	,83	,374
FH	387	0	1	,15	,355
PH	387	0	1	,02	,142
AGE	387	20	65	46,86	10,192
AGE2	387	400	4225	2299,02	932,738
FZ	387	1	7	2,76	1,351
MALE	387	0	1	,65	,479
Valid N (listwise)	387				

Table 5 Regression result with logarithm of financial asset

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	70,360	1,363		51,606	,000***
	HOUSE	-,222	,162	-,026	-1,369	,171
	BOAT	,138	,329	,007	,421	,674
	LOGFAP	-,096	,029	-,061	-3,362	,001***
	LOGINC	,157	,230	,040	,680	,497
	EPB	-,006	,004	-,033	-1,724	,085*
	HEDU	,711	,134	,101	5,287	,000***
	LEDU	-,924	,293	-,060	-3,154	,002***
	GH	,459	,189	,045	2,432	,015**
	PH	,245	,530	,009	,462	,644
	AGE	-,298	,060	-,828	-4,931	,000***
	AGE2	,003	,001	,857	5,063	,000***
	FZ	-,118	,052	-,044	-2,257	,024**
	MALE	,941	,166	,109	5,686	,000***
	LOG2INC	-,143	,040	-,216	-3,613	,000***

a. Dependent Variable: ER

b. * is significant at 10% level, ** is significant at 5% level, *** is significant at 1%

c. $R^2 = 0.065$, Adjusted $R^2 = 0.061$

Source: 1995-2009 DNB Household Survey (3053 households)