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Taking the Easy Way Out

Who Switches Health Care Insurer in the Netherlands?

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Who switches health care insurer in the Netherlands?

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ABSTRACT

This thesis investigates the relation between consumer characteristics – socio-demographic variables and three new variables; decision avoidance, financial literacy and risk aversion – and the decision to switch health care provider in the Netherlands. Dutch Household Survey panel data of the years 2006 through 2010 is analysed with different logistic model specifications. Results show that being older, having at least one child and experiencing high levels of decision avoidance reduce the probability to switch but having a partner, a high education level and a modal income increase this probability. It can be concluded that besides socio-demographic variables, psychological constructs can have an influence on mobility rates in the Dutch health care insurance market.

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Introduction

January 2006 was a month of change in the Netherlands, the reformed Health Insurance Act (HIA) was implemented. The new act unified the old HIA – which distinguished between public and private health care – and introduced freedom of choice alongside a system of risk adjustment to compensate the health insurers for enrolees with high medical expenses. The rationale behind this reform was to motivate health insurers to improve health care efficiency by introducing the possibility of price competition by insurers, abolishment of monopolies and the essential element: freedom of choice. Despite all effort, switching rates between health insurers stay at a low rate of 3% per year.

The question is who belongs to the small group of persons switching health care provider. What are for example the socio-demographic determinants and are there any other factors determining the decision to switch health care insurer? A lot of researchers have focused on the socio-demographic determinants. Mosca and Schut-Welkzijn (2007) investigated the Dutch situation specifically in 2006 and show that the most important factors are age, health status, education level, income level, area of residence, having a partner and having at least one child. In their lab experiment, Schram and Sonnemans (2011) investigated the individual decision making process of Dutch participants. Results show that besides the factors Mosca and Schut-Welkzijn (2007) mention, contact with the insurer is one of the driving factors behind the choice to switch health care provider. Where the before mentioned researchers investigated the Netherlands, additional international research on the topic of health insurance switching has been conducted (e.g. Tumlinson et al.,1997, Shmueli et al.,2005 and Abraham et al.,2006).

However, as far as I know, no researcher investigated the impact of decision avoidance, financial literacy or risk aversion as determinants of the decision to switch health care insurer. Examining these factors can be of importance because for example decision avoidance manifests itself as a tendency to avoid making choices, leading to no action (e.g. Anderson, 2003).

Additionally, financial literacy is stressed to be important when considering decision making regarding financially complex products (e.g. Moore, 2003, Lusardi and Mitchell, 2007 and van Rooij et al., 2011). As a third, for example Gounaris and Stathakopoulos (2004) state risk aversion to be one of the antecedents of brand loyalty.

This unique study jointly estimates the impact of socio-demographic variables, decision avoidance, financial literacy and risk aversion on the decision to switch health care provider. Through three different logistic model specifications, using the Dutch Household Survey panel data of the years 2006 through 2010, the consumer related determinants of mobility in the Dutch health insurance market are described.

This thesis is structured as follows. The first section explains the structure of the Dutch health care system as it is since 2006. Thereafter, in section II, relevant literature with respect to brand loyalty, decision making regarding financially complex products, determinants of health insurance switching and literature with regards to decision anomalies is discussed. After this literature review, the used methodology and developed hypotheses are presented. Section IV discusses the data and provides descriptive statistics. In section V the empirical results are analysed. Finally, section VI concludes the paper and presents practical implications.

I. Introduction to the Dutch health care system

The famous and internationally appreciated health care system in the Netherlands was implemented in 2006. The former Health Insurance Act, implemented in 1941, distinguished between private health care for the richer inhabitants and public health care insurance.

After the reforms in 2006, each citizen has freedom of choice concerning health care provider, but is obliged to enrol. Insurers are not allowed to refuse enrolees for the basic health insurance package. To compensate for the incurred cost of for example chronically ill enrolees, a system of risk adjustment was introduced (www.rijksoverheid.nl).

The Care Insurance Act is financed in three ways; a government contribution and two contributions paid for by the enrolees – nominal and income dependent contributions. Where the nominal contribution is a fixed monthly payment, the income dependent contribution is calculated as a percentage of income.

The first contribution paid for by the enrolee, the nominal contribution, is paid directly to the health insurer. In addition to that, the health insurance has a compulsory excess payment, which can be increased by a voluntary excess. Because a bigger excess reduces financial risk born by the insurance company, the insurer offers a lower premium when enrolees increase this voluntary excess. Since the nominal payment is fixed, citizens with a low income are compensated with an additional income dependent care allowance. This care allowance is funded by the government and distributed by the tax authority.

The income dependent contribution is compensated for by the employer of a Dutch citizen. Employees only pay the tax over this contribution. The income dependent insurance premium is collected by the tax authority, since this organisation has access to all income information. Thereafter, the premium is transferred to the insurers in two steps. First, the Minister of Finance deposits the money in the care insurance fund. After that, the fund reallocates the resources to the health insurers.

This reallocation is based on the risk profile of the insurer, because health insurers are not allowed to refuse people for the basic health insurance package. In this way insurers are compensated for their expensive clients, such as elderly and chronically ill people.

Risks that cannot be borne by the Care Insurance Act, for example long-term care or admission to a nursing home, are covered by the Special Health Care Act. The government funds these expenses with money collected via the general income tax payments and therefore all citizen can appeal for support by the Special Health Care Act.

In addition to the coverage of the basic health care package and the Special Health Care Act, consumers may sign up for supplementary health care packages. For this supplementary package, health insurers are allowed to refuse or select clients based on a questionnaire. But even with a supplementary insurance consumers ought to pay an own contribution for many subscription medicines, psychological help and maternity assistance.

The main reason for implementing this new system of health insurance based on consumer choice was to increase efficiency in the health care market.

But this outcome is only achieved when people actively switch health care provider. This can be regarded as a weakness of the system, since the health care market is complex and opaque for many customers. The difficulty of comparing health care offerings of different providers, assessing your own health status and expected health care needs for the following year makes a comparison very difficult and therefore these factors discourage switching. In addition, the number of alternatives, price differences – even in the basic health care package – and many variations in the supplementary packages resulted into a web of complexity and inscrutability for many people. Finally, switching is only allowed once a year in December. For many people this is a month filled with preparation for St. Nicholas day, Christmas holidays and New Year's Eve, and is not one of the best moments to consider the appropriateness of your health care insurance package. The government and independent parties try to encourage citizens to carefully examine the differences by creating awareness by television advertisement, information on the internet and their comparison websites. In addition, health care providers actively pursue customers by advertisements, gifts or attractive discounts for special segments like students. Laske-Aldershof et al. (2004) already concluded that switching rates in the Netherlands are too low and states that there is a challenge for the government to implement a policy that encourages switching.

On the one hand, switching incurs costs of information seeking and comparing alternatives. On the other, switching health care provider is surely beneficial. The basic health care package, which is the same for every provider, displays vast premium dispersion. The supplementary health care packages for dental care or other additional care vary with respect to coverage. Also here price dispersion is highly present.

In addition, collective insurance can provide additional discounts. Considering the simple case of a young adult being a student without a job in the year 2012, basic health insurance prices range from 92 euro to 118 euro a month, for the same package of insurance. When this adult is healthy and expects no need for medical care, a voluntary excess could lower this price to about 70 euro's a month. Students, being a special segment, can even get an extra discount on top.

Since a student's income is very low, they receive a care allowance of around 70 euro's a month. So only the difference in this mandatory package can range from making a monthly profit because of care allowance, a voluntary excess discount and segment discount or paying about 50 euro's a month because you simple choose a care package without considering cheaper alternatives or segment discounts. Where the voluntary excess might be frightening, increasing the voluntary excess from zero to 500 euro's is not a real problem – even in the case you are not healthy. Saving about 50 euro's a month due to a lower price will lead to savings of 600 euro annually, which covers the 500 euro voluntary excess. Calculations based on supplementary packages are hard to make, because of package differences. But comparison websites often give a good indication of the lowest prices.

II. Literature review

As stated in the introduction, the general question: "What are the consumer related switching determinants in the Dutch health care insurance market?", or simply stated: "Who switches health care provider in the Netherlands?", can be answered by examining the diverse aspects of brand loyalty and insurance. Therefore this literature review will first address buying behaviour and brand loyalty.

Thereafter, literature with regards to financial complexity – a special feature of health insurance – is discussed. Decreasing the scope even further leads to a discussion of what determines health care insurance policy switching, leaving out the subject considering what determines choosing a specific policy – since this is not the topic of interest for this thesis. This literature review finally discusses the field of decision anomalies. So after reading this literature, you will have a first idea about which persons will switches health care provider more often.

A. Buying behaviour and brand loyalty

Starting in the field of marketing research, buying behaviour is widely investigated. The basic idea lies in the fact that a differentiated product, brand or store can lead to consumer brand loyalty. Many decades of research evolved in a sizable body of literature about buying behaviour and brand loyalty. Whole books, lectures and courses are dedicated to these topics. Knowing that reviewing this work is practically undoable, the next paragraphs will give a first insight in the field of buying behaviour and relatedly, brand loyalty.

As a general first step into buying behaviour, for example Aaker and McLoughlin (2007) state that different consumer segments, based on cultural, social, personal and psychological characteristics respond differently on competitive offerings. Consumer characteristics like age, sex and education level are important in determining segments which respond differently to competitive offerings. This general theory suggests that customers who differ on these characteristics display different types of decision making.

This general theory outlined above is tested in many empirical research papers and for a wide range of products and services.

For example Patwardhan et al. (2010) try to uncover secondary factors that influence consumer buying behaviour for chocolate and soap. Some contextual reasons are considered to be important, but these are not the primary determinants for short listing brands. Product popularity, attractive packaging, fragrance composition and ingredients are some of these secondary factors. In addition, Patwardhan et al. state that (electronic) media publicity influences consumers significantly. Considering private label brands, Krishna (2011) research's objective was to determine the factors affecting buying behaviour in the apparel retail sector. Krishna indicates brand image, design, store atmosphere and promotion are important factors affecting the preference of consumers for private label brands. Both social class and occupation are demographic factors that do not of influence buying behaviour. As a final example of research in the field of buying behaviour, Vantomme et al. (2006) state that when you want to turn non-users of ethical products into users, both explicit and implicit attitudes must be addressed. They suggest that exposure to fair-trade products should be increased. These products need to be visible and should become a part of daily life. Free samples of ethical products enhance contact with the products and increase positive affective reactions, leading to positive implicit attitudes. So, different researchers came up with a range of important factors related to buying behaviour.

Understanding buying behaviour is one part of the deal, but the main topic managers are interested in is brand loyalty. After examining brand loyalty literature and using logical and intuitive analysis, a conceptual definition of brand loyalty was developed. Jacoby and Kyner (1973) describe this definition by a set of six necessary conditions, which should apply collectively.

Brand loyalty is defined as the biased, behavioural response, expressed over time, by some decision-making unit, with respect to one or more alternative brands out of a set of such brands and is a function of psychological processes. This definition, among others, is used in many research papers.

When considering brand loyalty specifically, a limited review is presented below. A main point of interest is the question how brand loyalty is build and what effect it has. Therefore, Gounaris and Stathakopoulos (2004) looked at the antecedents and consequences of brand loyalty. Relationships between consumer characteristics like risk aversion and variety seeking and the interaction of these consumer drivers with social and brand drivers is investigated. In the end, these drivers are the antecedents of specific types of brand loyalty and brand behaviour. Gounaris and Stathakopoulos state that the preferred way to retain market share and sales is through premium loyalty. This type of loyalty is established by an emotional as well as a normative connection between the consumer and the brand. If premium loyal customers do not find their favourite brand, they are likely to buy nothing or go to a different store to get their favourite brand. This type of customers exhibit a high instance of repeat purchases and attachment to the brand, even price variations would not influence their brand choice. Gounaris and Stathakopoulos conducted a random survey among 850 Greek consumers of whisky in the Athens area. Results show that the consumer characteristics risk aversion and variety seeking to be respectively positively and negatively related to premium loyalty. Gounaris and Stathakopoulos were not the only researchers investigating the nature and effects of brand loyalty. In a recent paper, of Betra et al. (2012), they use a grounded theory approach to develop both first-order and higher-order models of brand love – a predictor of brand loyalty.

This modelling procedure based on survey data leads to seven core elements of brand love. For example passion-driven behaviour reflects the desire to use the brand frequently and invest time and money in it. This can be achieved by a product which needs personalization, accessories and has for example an attractive design or package. Another core element is self-brand integration, a brand which is able to express consumers' identity and connect to life's deeper meanings and values like happiness. Positive emotional connections, rather than just positive feelings, is a core element representing a sense of attachment by endowing the brand with an aura of authenticity or vision of its founders. A sense of long term relationship, the fourth element, can be ascertained by loyalty programs. Together with an overall positive and strong attitude this leads to the final and seventh core element of brand love: anticipated separation distress if the brand were to go away. It is clear that some of the antecedents Gounaris and Stathakopoulos (2004) referred to (e.g. risk aversion and an emotional connection) correspond with the core elements of Betra et al. (2012). As a final research example in the field of brand loyalty, Dong et al. (2011) investigated diverse functional forms of the satisfaction-loyalty relationship. Their research is based on the Chinese Customer Satisfaction Index survey, a nationwide survey which resulted in a dataset covering 146.300 customers across 18 different product categories. They provide evidence that this functional form varies across economic and demographic characteristics of customers, product categories and market characteristics, but the linear form remains the most prominent. The marginal effect of purchase importance on loyalty is negative and reaches its peak at medium levels of satisfaction, where purchase importance appears to be more critical. In contrast, hedonic nature has a positive effect which is critical at a medium level of satisfaction. As a third, a lower level of competition increases loyalty.

However, this effect decreases when the satisfaction level increases from medium to high. On the other hand, competition is not of importance when considering extremely low levels of satisfaction, consumers will switch anyway. The effect of the socio-demographic variable income is negative and even more severe for higher income levels. Nonetheless, as it is the case with most of the moderators, this effect vanishes for extremely high levels of satisfaction. In addition, women and older people can be indicated as less loyal. The final investigated moderator, education, appears to have a negative effect on loyalty. When satisfaction increases, this effect turns out to be positive.

So in conclusion, buying behaviour and brand (dis)loyalty are the base on which this research is build. When answering the question "Who switches health care provider in the Netherlands?" this should be kept in mind.

B. Financial complexity

Where all of the before mentioned factors relate to the average product market as well as the (health) insurance market, a special feature of the health insurance market is its financial complexity.

The question is if people can make proper decisions regarding a complex and financially related topic. Examining financial literacy leads to the conclusion that many consumers lack even basic knowledge of economic concepts such as risk diversification, inflation and interest rates (Lusardi and Mitchell, 2007). Those who are not financially literate are less likely to invest in stocks (van Rooij et al., 2011), save for retirement (Lusardi and Mitchell, 2007) and are more likely to end up with extraordinary loan terms and interest rates (Moore, 2003).

Financial literacy is therefore a major concern when discussing financially related topics like health insurance. Van Rooij et al. (2007) investigated financial literacy among a total of 1500 Dutch Household respondents in 2005 and 2006. Results show that financial literacy increases with education level. Nearly 16% of those who enjoyed only primary education are in the highest quartile of basic financial literacy, compared to almost 71% of the group who enjoyed university education. Also, advanced financial literacy increases with age. Perhaps, this is due to learning and participation in financial markets. Regarding sexes, men are more likely to be in the highest quartile of basic financial literacy compared to women – 49% versus 31%. This result is even more extreme when examining advanced financial literacy – 37% versus 12%.

In conclusion, when trying to determine the characteristics of persons who switch health care provider, financial complexity of the (health) insurance market should be kept in mind.

C. Switching health care provider

Going deeper into the financially complex area of health insurance, determinants of switching between policies or providers are investigated by numerous researchers. For example, Tumlinson et al. (1997) found that switchers are mainly in the age group 30 to 49 years – 43% – or are between 49 and 65 years old –30%. In addition, Abraham et al. (2006) try to connect information awareness and switching behaviour but results appear insignificant. The non-significant effect of socio-demographic control variables differs between these two studies.

More relevant research for this thesis is conducted in a multi-country setting by Laske-Aldershof et al. (2004), via a lab experiment by Schram and Sonnemans (2011) specifically in the Netherlands by Mosca and Schut-Welkzijn (2007) and in Israel by Shmueli et al. (2005).

First of all, Laske-Aldershof et al. (2004) seek to explain the observed cross-country variance in switching rates in Germany, the Netherlands, Switzerland, Belgium and Israel. They start with investigating the rationale behind health insurance reforms across these countries. In the Netherlands, for example, modification of the system was mainly motivated by improving the efficiency of health care and introducing incentives to customers. Eventually, this will lead to a more efficient and cheaper health care system. In general, available choice options, choice setting, net switching benefits and consumers' preference to switch are potential explaining factors of cross-country differences in switching rates. Laske-Aldershof et al. argue that switching rates in the Netherlands are too low. It is stated that the government needs to implement an active policy to encourage consumers in switching health care provider. In addition, the only moderate premium variation in compulsory insurance policies reduces consumer benefits of switching. In the end, an efficient and a health care system driven by consumer choice relies on consumers who actively switch providers.

Where Laske-Aldershof et al. (2004) studied the determinants of switching mainly based on country specific rules, market structure, institutional features and premium dispersion, Schram and Sonnemans (2011) study the individual decision making process in a controlled environment. The 148 Dutch participants made choices among insurance policies facing uncertainty and a large set of alternatives differing on several dimensions.

The influence of switching costs, the number of alternatives and speed of health deterioration on switching behaviour were investigated. A number of important conclusions can be drawn. First, increasing the number of alternatives increases switching but leads to consideration of a smaller fraction of the available information, resulting in lower decision quality. Second, the introduction of switching costs improves decision quality but lowers switching rates. Third, when investigating health deterioration some support is found for the boiling frog effect. This factor influences decision making only when changes are sudden instead of gradual. Finally, characteristics like age, sex and risk preferences are not of significant influence on switching.

Thirdly, in their short paper Mosca and Schut-Welkzijn (2007) investigated the choice determinants of switching in the Dutch health insurance market in the year 2006. The Dutch Household Survey database is used to investigate the influence of many factors. Results show that gender has no significant influence on switching but age, a low urbanisation level and having contact with the insurer lowers the probability of switching. Persons with middle or high education, good or excellent health status, those who live in urban areas, with children and a high income switch more often.

Finally, Shmueli et al. (2005) devoted specific attention to the (in) significance of socio-demographic variables. The Israeli National Insurance Institute Health Registry of 1999 and 2000 is used to compare switchers and non-switchers on socio-demographic characteristics. They found that mobility rates are not very different across sexes but particularly high switching rates are found in the groups with ages 15 to 34 and 0 to 4. The high switching rates in these groups are mainly due to technical switching – switching due to mostly exogenous decisions.

For example, moving to another city or region, marriage and having children leads to health care provider switching in Israel. In addition, the mean age of switchers is low – 26 years compared to the average age of insured population of 32. In general, aging leads to a lower propensity to switch. The general finding of declining switching rates with age is argued to be a result of higher switching costs, higher effort to retrieve information and the discomfort of changing doctors. In addition to the differences in age, wages of switchers are about 20% lower when compared to those who stayed. The gap even increases with age. This effect cannot be explained by higher price elasticity of poor people, because premium competition is not allowed in Israel. A possible reason lies in the fact that new enrolees with supplementary insurance encounter a waiting period, which discourages movers. Simply stated, a waiting period is the period of time specified in the insurance policy which must pass before part or all of you health care coverage starts. Since poor people are less likely to have an supplementary insurance, they will experience lower switching costs resulting in a higher switching rate. Finally, mixed results are found among the relationship between disability and switching. In general disables persons are less likely to switch, but in certain subpopulations the opposite is the case. Shmueli et al. did not investigate the effect of education level in great detail.

So in conclusion, previous investigated determinants like socio-demographics should be included in the search for characteristics of persons who switch health care provider in the Netherlands.

D. Decision anomalies

Besides studies on the effect of demographics, number of alternatives, relationship with the provider and price or quality differences, decision anomalies may play a role when discussing persons who switch health care provider.

Harris (2003) specifically looked at the effect of consumer activism. Active consumers are characterized by traits like seeking and using information on costs and quality variations, considering a range of alternatives and formulation of an independent judgment about quality. As part of the results, Harris found that switched consumers possess greater levels of consumer activism. In addition, Harris states that higher consumer activism is associated with a good health status.

Harris' research points at so-called decision anomalies, specifically decision avoidance – which is stated by Harris (2003) to be less pronounced by active consumers. Anderson (2003) states that decision avoidance manifests itself as a tendency to avoid making choices by postponing it or by seeking easy ways out – involving no action or change. Anderson summarises the four independent phenomena under the umbrella of decision avoidance, found by different researchers. After all, a rational-emotional model of decision avoidance is developed. First of all, status quo bias is an inflated preference for the current state of affairs – leading to the tendency to prefer options that cause no change to this state. Second, omission bias is an inflated preference for options that do not require action. Thirdly, choice deferral is demonstrated in a situation where an individual chooses not to choose for the time being. It is characterized by postponing a decision or refusing to select an option. Fourth and finally, inaction inertia refers to the tendency to omit action when this person already declined a similar but more attractive opportunity.

This is seen even in the case that this subsequent option is still a gain from their reference point. The last two decision anomalies are of less importance when considering health care insurance choices. Choice deferral is not an option, since choices must and can be made only annually. Inaction inertia is also not an option, since choices must be made and there are numerous options available at once – and not subsequently – for the general public. Anderson (2003) states the four antecedents of these types of decision avoidance to be as follows. First, preference stability – the degree to which peoples values and their related decisions are stable over time. Secondly, the rational influences of cost of changing the status quo, taking action and costs for delay are considered by individuals. The third antecedent of decision avoidance is anticipated regret – pointing at individuals who want to minimize regret from decisions. There are numerous factors outlined by Anderson (2003) that influence anticipated regret, for example reversibility, anticipated future opportunities and loss aversion – which can lead to risk aversion. The final and fourth important antecedent of decision avoidance is selection difficulty. All these factors have an influence on decision making regarding health care insurance policies. Where costs of changing are considered in different research papers, selection difficulty is obviously also of great importance because decisions about a financially related and opaque topic are difficult to make. Anticipated regret for choosing a "wrong" care package can be high and when preferences change, choosing the status quo can be suboptimal.

So when investigating the characteristics of persons who switch health care provider in the Netherlands, the phenomenon of decision avoidance is of interest. To sum up the literature review, a lot of research is conducted in the area of consumer loyalty.

Also, several researchers addressed the area of (health) insurance and financially complex products. Investigating a set of demographic control variables together with quality and price differences, relations with the provider, consumer activism or financial literacy leads to contradictory results regarding demographics and stress the importance of the other variables mentioned.

III. Methodology

The basic intuiting regarding brand loyalty and ultimately health insurance policy switching resulted in various determinants and mostly contradictory and insignificant effects as explained in section II. The current section develops different models which should answer the (simplified) general question “Who switches health care provider in the Netherlands?” This section concludes with the hypotheses which are tested this thesis. A whole set of variables s is used in this section, the definition of these variables and their way of construction is explained in depth in section IV – regarding data and descriptive statistics.

Since no one can exactly determine who will switch health care provider, probabilities are used. Therefore, the general research question is answered by running a logistic regression. As dependent variable, the responses to the question *IN41A* – what sort of medical insurance do you have at present? – are recoded into the binary variable *insurance*. The independent variables – which are not investigated before – are on a scale level: factor scores on the measure of risk aversion, decision avoidance as well as the score on financial literacy.

The set of basic variables suggested by literature are socio-demographic variables – sex, age, income, education level, presence of partner, presence of children, urbanisation of place of residence, general health status, health status compared to previous year and suffering from chronic illness. These basic variables are measured on a nominal, interval or scale level.

Since the dependent variable is qualitative and coded as a dummy variable – a limited dependent variable – a linear regression is not usable. The term limited dependent variable refers to a problem where the value a dependent variable may take is limited to certain integers or even when it is a binary number. Using a linear regression in the case of a limited dependent variable will result in predicted probabilities for the dependent variable of below zero or above one. In addition, applying linear regression in this case results in an error term with a highly non-normal distribution and the error term suffers from heteroskedasticity.

A logistic regression model (logistic model) is able to overcome the limitation of a linear probability model which can produce estimated probabilities greater than one or below zero. A logistic model uses a function that transforms the regression model so that estimated probabilities are within the (0, 1) interval. The regression model will have a more S-shaped appearance instead of a straight line. Therefore the values zero and one are the asymptotes of the logistic regression function and estimated probabilities will never reach zero or one but only come infinitely close. Ordinary least squares cannot estimate this non-linear model, so maximum likelihood is used instead (Brooks, 2008).

A basic logistic model has the form of

$$P_i = \frac{1}{1 + e^{-(\beta_1 + \beta_2 x_{2i} + \cdots + \varepsilon_i)}}$$

Where P_i is the probability that$y_i = 1$.

In order to answer the general question of what characterises a person who switches health care provider in a specific year, this basic logistic model is extended with many more variables and a time dimension. This results in a model to be estimated as

$$P_{it} = \frac{1}{1 + e^{-z_{it}}}$$

Where

$$z_{it} = \beta_1 + \beta_2 sex_i + \beta_3 age_{it} + \beta_4 children{:}\, yes_{it} + \beta_5 education{:}\, high_{it} + \beta_6 urban{:}\, strongly_{it} + \beta_7 urban{:}\, moderately_{it} + \beta_8 partner{:}\, yes_{it} + \beta_9 generalhealth{:}\, good_{it} + \beta_{10} healthchange{:}\, better_{it} + \beta_{11} healthchange{:}\, worse_{it} + \beta_{12} chronicill{:}\, no_{it} + \beta_{13} income{:}\, above\ modal_{it} + \beta_{14} income{:}\, modal_{it} + \beta_{15} riskaversion_i + \beta_{16} decisionavoidance_i + \beta_{17} financialliteracy_i + u_{it} \quad (1)$$

And P_{it} is the probability that$Insurance_{it} = 1$. In addition, *age*$_{it}$ for example indicates that the variable *age* is not only individual-specific but also time-specific.

A major problem with applying a simple logistic model on a dataset with panel nature is that it ignores the fact that the same individual might appear more than once. This will result in correlation in the error term, because observations of the same individual are likely to be correlated.

Where equation (1) ignores the panel nature of the dataset, a random effects logistic model, (2), is estimated in addition. The random effects logistic model is estimated under the assumption that the correlation between disturbances belonging to the same individual is constant over time, so-called equicorrelation. This results in individual random effects. In this model, the error term is decomposed into two components: u_{it} andα_i. Like common practice, this is modelled as follows

$$u_{it} \sim IN(0, \sigma_u^2)$$

$$\alpha_i \sim IN(0, \sigma_\alpha^2) \qquad (2)$$

These elementary assumptions are applied to come up with a random effects model. The assumptions under (2) show that the individual and time-specific error term – u_{it} – is drawn from an independent normal distribution – IN – with mean 0 and standard deviation σ_u^2. The second component of the error term – α_i – is independent of the first component, u_{it}. This implies a constant error term for the same individual over time as given by

$$\rho = corr(v_{i2}, v_{i1}) = \frac{\sigma_\alpha^2}{\sigma_\alpha^2 + \sigma_u^2}$$

The random effects logistic model imposes α_i to have no correlation with the right hand side variables.

In addition, Mundlak (1978) points at a major problem that is often overlooked when dealing with pooled datasets. The essence of the discussion lies in the fact that the error term – ε_i – is likely to be correlated with the right hand side variables when having time-varying variables in an equation, as stated before.

Mundlak explicitly takes into account this fact: observations with regards to the same individual are not independent. For example Kropko (2010) uses Mundlak's approach and states that estimates for the time-invariant and rarely changing independent variables are between effects but they might suffer from omitted variable bias because the between effects of time-varying variables remain excluded. Mundlak recommended a random effects model in which each (time-varying) independent variable is broken down into so-called between and within parts, so that the before mentioned problem is solved. Major critic of Mundlak on running a pooled model like (1) or a random effects model (2) is that these models will average these effects. This results in a biased matrix combination of within and between estimates. In essence, Mundlak allows for some correlation with the time averages of the time-varying variables and the random effects model imposes full independence. The inclusion of between effects provides a test for the existence of within effects. Between variables are not supposed to be interpreted. A model which allows for some correlation between all right hand side variables, a fixed effects model, would lead to a drop out of time-invariant variables – which are most important in this thesis, namely risk aversion, financial literacy and decision avoidance. In order to test the existence of within effects of time-varying variables equation (1) must include individual-specific averages for the time-varying variables.

This will result in an adjustment of (1).

$$z_{it} =$$

$$\beta_1 + \beta_2 sex_i + \beta_3 age_{it} + \beta_4 children{:}\, yes_{it} + \beta_5 education{:}\, high_{it} +$$

$$\beta_6 urban{:}\, strongly_{it} + \beta_7 urban{:}\, moderately_{it} + \beta_8 partner{:}\, yes_{it} +$$

$$\beta_9 generalhealth{:}\, good_{it} + \beta_{10} healthchange{:}\, better_{it} + \beta_{11} healthchange{:}\, worse_{it} +$$

$$\beta_{12} chronicill{:}\, no_{it} + \beta_{13} income{:}\, above\ modal_{it} + \beta_{14} income{:}\, modal_{it} +$$

$$\beta_{15} riskaversion_i + \beta_{16} decisionavoidance_i + \beta_{17} financialliteracy_i + \beta_{18}\overline{age_i} +$$

$$\beta_{19}\overline{children{:}\, yes_i} + \beta_{20}\overline{education{:}\, high_i} + \beta_{21}\overline{urban{:}\, strongly_i} +$$

$$\beta 22 urban{:}moderately i + \beta 23 partner{:}yes i + \beta 24 generalhealth{:}good/excellent i + \beta 25 h$$

$$ealthchange{:}worse i + \beta 26 healthchange{:}better i + \beta 27 chronicill{:}no i +$$

$$\beta 28 income{:}above\ modal i + \beta 29 income{:}\ modal i + uit$$

(3)

Where for example $\overline{age_i}$ is the individual-specific time-average value of age for the i[th] respondent. Sex is assumed to be constant. Due to the limited availability of data for the variables *risk aversion, decision avoidance* and *financial literacy* this results in time-invariant variables, as stated before. A disadvantage of using a Mundlak approach lies in the fact that when time varying variables are relatively constant over time it results in a multicollinearity problem. Therefore, model (2) is used to see if this is a problem.

A. Hypotheses

Where the previous literature, discussed in section II, suggested some variables of interest, the first part of section III outlined the methodology used to test hypotheses concerning these – and new – variables.

This subsection comes up with thirteen hypotheses and the reasoning behind the expected signs of the relationship between consumer characteristics and inclination to switch health care provider. Previous literature often finds insignificant or contradictory results for the basic variables and some variables are only rarely investigated. Therefore, in addition to literature, intuitive reasoning is also used to come up with an expected sign for the alternative hypotheses.

Abraham et al. (2006) states that women appear to exhibit more concern about health care quality, in comparison to men. However, this will not boil down to a statement that women are more inclined to switch than men per se. Nevertheless, the basic variable sex appears to have consistent but insignificant influence on switching behaviour. Results of Abraham et al. (2006), Schram and Sonnemans (2008) and Shmueli et al. (2005) show that female respondents are more prone to switch – although again insignificantly. Therefore the following hypotheses emerge.

$H_{1,0}$: Women do not switch health care provider more often
$H_{1,a}$: Women do switch health care provider more often

With regards to age, Tumlinson et al. (1997) found that persons aged between 30 and 64 years switch more often. In addition, Schram and Sonnemans (2008) found a negative relationship between age and switching. Finally, Shmueli et al. (2005) shows a higher switching rate for persons between the age ranges 0 to 4 and 15 to 34, but the technical reasoning put forward is not applicable in the Netherlands. Also, neither one of the studies found a significant relationship. But Mosca and Schut-Welkzijn (2007) found a significant negative relationship between age and switching. In addition, Shmueli et al. (2005) state that older people have a lower

tendency to switch, because of higher switching costs. This includes the effort needed to collect information about different health care providers and the discomfort of changing physicians. The following hypotheses are tested.

$H_{2,0}$: Older persons do not switch health care provider less often
$H_{2,a}$: Older persons do switch health care provider less often

The influence of having children is not widely investigated. However, Mosca and Schut-Welkzijn (2007) studied the combined influence of having a partner and one child, the variable “couple”. This variable is highly significant, leading to the conclusion that couples change health care provider more often. Also, one of the reasons put forward by Shmueli et al. (2005) concerns the effect of changed consumer choices for people with children. These changed preferences might originate from a search for better quality or availability of for example gynaecological care. Changed preference should naturally result in considering if the current health care provider is still the best choice in the new situation. Therefore the following hypotheses emerge.

$H_{3,0}$: Persons with children do not switch health care provider more often
$H_{3,a}$: Persons with children do switch health care provider more often

The effect of education is widely investigated. For example Abraham et al. (2006) state that higher educated persons switch more, but again insignificantly.

Other studies like Shmueli et al. (2005), Mosca and Schut-Welkzijn (2007) and Laske-Aldershof et al. (2004) state that higher education leads to more switching between health care providers. In addition, Schram and Sonnemans (2008) found that economics, business, medicine and psychology students switch more often. Naturally, the following hypotheses arise. A possible reason for these results is the fact that highly educated persons are often more informed about changes in the health care system and in addition, they have more knowledge about the complex health care system.

$H_{4,0}$: Persons with high education level do not switch health care provider more often

$H_{4,a}$: Persons with high education level do switch health care provider more often

Few researchers have looked at the urbanisation level of the place of residence. Mosca and Schut-Welkzijn (2007) investigated the Netherlands and found that people living in the three big cities Amsterdam, Rotterdam and The Hague switch more often. This measure is highly significant and might be due to the fact that the presence of different health insurers that compete is much higher in these cities – compared to other parts of the country, for example the southern provinces. Persons living in these southern provinces switch less often. Based on this evidence, the following hypotheses are developed.

$H_{5,0}$: Persons living in urban areas do not switch health care provider more often

$H_{5,a}$: Persons living in urban areas do switch health care provider more often

Only few researchers investigated the influence of having a partner. Mosca and Schut-Welkzijn (2007) looked at the variable “couple” which is highly significant. In addition, having a partner may change your preferences and insights into the health care system. So regarding the variable partner, the following hypotheses come to mind.

$H_{6,0}$: Persons having a partner do not switch health care provider more often
$H_{6,a}$: Persons having a partner do switch health care provider more often

Regarding general health, Mosca and Schut-Welkzijn (2007) found that persons with a good or excellent health status are more prone to switch. This intuitive result stems from the fact that healthy persons do not face any risk of being declined or skimmed by the insurer – in case of supplementary care packages. In addition, healthy persons can compare providers on only a few characteristics since many policy characteristics are not applicable to them. This decreases switching costs in terms of effort. So regarding the variable general health, the following hypotheses emerge.

$H_{7,0}$: Persons having a better general health status do not switch health care provider more often
$H_{7,a}$: Persons having a better general health status do switch health care provider more often

One remarkable research addresses the topic of changing health status specifically in a lab experiment.

The precise effect – without having to rely on self reported measures of health changes – is measured while controlling for other characteristics. The so-called boiling frog effect predicts that sudden changes would influence behaviour, whereas gradual changes would not have any influence. Schram and Sonnemans (2008) show that the boiling frog effect might be present in their study. In addition – when generalising Shmueli et al. (2005) research – changed circumstances can lead to changed preferences and needs regarding health care. Therefore, the following hypotheses are developed.

$H_{8,0}$: Persons experiencing a change in health status do not switch health care provider more often

$H_{8,a}$: Persons experiencing a change in health status do switch health care provider more often

Regarding chronic illness or disabilities, the fact that selection by health care providers is allowed for supplementary care packages discourages switching. The reason is in the fact that these persons need additional care in general. Abraham et al. (2006) found that chronically ill persons indeed switch less. In addition, Shmueli et al. (2005) found the overall ratio of recipients of a disability benefit among movers to be lower than among stayers. However, this ratio increases with age. Based on this information, the following hypotheses emerge.

$H_{9,0}$: Persons which do not suffer chronic illness or disability do not switch health care provider more often

$H_{9,a}$: Persons which do not suffer chronic illness or disability do switch health care provider more often

Discussing income levels, two forces can drive switching. First of all, persons with a lower income might be actively looking at the best price-quality trade off and therefore might switch more often. The second force reasons from another point of view, stating that income and education often go hand in hand and therefore people with a higher income are better able to compare and decide which package is best for them. Mosca and Schut-Welkzijn (2007) indeed found a significant positive effect of income on switching. Since waiting periods, as mentioned in the study of Shmueli et al. (2005), are – not yet – applicable in the Netherlands, their results cannot be generalised. The following hypotheses are tested.

$H_{10,0}$: Persons having a higher income do not switch health care provider more often

$H_{10,a}$: Persons having a higher income do switch health care provider more often

With regards to risk aversion, it is expected to have a positive effect on brand loyalty as investigated by Gounaris and Stathakopoulos (2004). Consumers making safe choices by buying the same brand over and over again, without thoroughly investigating price changes of the product. In addition, Schram and Sonnemans (2008) found risk attitude – measured by the Holt/Laury measure of risk aversion – to be negatively related to health care policy switching, although insignificantly.

In addition, anticipated regret – one of the driving forces behind decision avoidance – is indirectly driven by for example risk aversion.

$H_{11,0}$: Persons experiencing low risk aversion do not switch health care provider more often

$H_{11,a}$: Persons experiencing low risk aversion do switch health care provider more often

The concept of decision avoidance is related to the status quo bias and for example omission bias as explained by Anderson (2003). People tend to avoid decisions by accepting the status quo or go for choices that do not require action. Intuitively the following hypotheses emerge.

$H_{12,0}$: Persons experiencing low decision avoidance do not switch health care provider more often

$H_{12,a}$: Persons experiencing low decision avoidance do switch health care provider more often

The final concept under investigation is financial literacy. The world of insurance policies is very complex and financially related. A lack of financial knowledge thus results in higher switching costs, due to higher costs of information seeking. As van Rooij et al. (2007) investigated, persons having low financial literacy are less likely to invest in stocks, also a financially related and complex decision. The results of van Rooij et al. (2011) confirm this by investigating financial literacy and retirement planning. Therefore, these final hypotheses are developed.

$H_{13,0}$: Persons having high financial literacy do not switch health care provider more often

$H_{13,a}$: Persons having high financial literacy do switch health care provider more often

The thirteen hypotheses are tested in diverse logistic regression models and results are outlined in section V. Ultimately, these hypotheses and the results will provide the characteristics of persons who switch health care provider more often.

IV. Data and descriptive statistics

To test the hypotheses mentioned in the previous section, reliable data is essential. This section starts with an introduction to the DNB Household Survey and the way they gather data, which is used in this research. It follows with a description of the data used and the creation of the dataset. Finally, it discusses the way the variables – used in section III – are constructed.

The data used in this study is gathered from the DNB Household Survey (DHS). The DHS is an annual household survey which was first launched in 1993 and covers information on work, pensions, housing, mortgages, income, health, assets, debt and economic and psychological concepts. This results in a rich dataset covering about 2000 CentERpanel participants yearly. The data is collected through an internet panel, since access to the internet is widely spread in the Netherlands. According to Statistics Netherlands, in the year 2011, 95% of the Dutch households had access to the internet. But to participate in the DHS, participants do not necessarily need their own computer with internet.

CentERdata provides so-called set-top boxes with built-in internet connection and a television to fill out the questionnaire when needed.

The questionnaires conducted in 2007 until 2011 are used to investigate the main research question: “Which persons switch health care provider?”. The 2007 survey was conducted from April 2007 to December 2007 and asks questions about for example income and insurance of the previous year. This is the first year that the question regarding switching health care provider was asked. The 2011 survey is the most recent available survey. In addition, the 2009 survey of economic and psychological concepts, *psy09*, is used to grasp information about the respondents’ scores on the concepts risk aversion and decision avoidance. Finally, the publicly not available, but specially designed module by Rob Alessie, Maarten van Rooij and Annamaria Lusardi was part of the 2010 survey. This module about financial literacy is linked to the main dataset. The exact wording and official coding of the questions is presented in Appendix A.

The section general information on the household, *hhi*, includes all members in the household, but all other questions - questionnaires *inc*, *psy* and financial literacy questions - are only asked to persons aged over sixteen. This leads to around 4000 yearly observations for general questions, around 2000 yearly observations for questions on health and income and about 1800 observations on economic and psychological concepts in 2009. Only the 2009 survey of economic and psychological concepts is used, because this survey includes the relevant questions on risk aversion and decision avoidance. Finally, 1665 respondents answered the questions on the special financial literacy module, added to the 2010 survey.

The number of yearly responses per question is presented in Appendix B, note that information for the economic and psychological concepts as well as information about financial literacy questions is only presented for relevant years. The created dataset pools the yearly surveys. These yearly surveys consist out of the individual modules. So for example, the year 2007 survey has as base the *hhi07* database, including all households and their members. To this database the relevant variables of the *inc07* are added. The yearly surveys of 2007 until 2011 are pooled and then the relevant variables of the *psy09* and financial literacy module are added. The *psy09* and financial literacy variables are added in the end, because this is the only way to assign the answers on these questions to the respondents in every year consistently.

The final dataset is scanned on errors, for example a missing value for gender for a respondent in a particular year and – when possible – corrected. After corrections and selection based on the availability of an answer on the dependent variable – change in health care provider compared to last year – the dataset includes 9538 responses on general variables, 8949 responses on the income question, 7022 valid responses on questions related to decision avoidance, 6599 responses to questions on risk aversion and finally 5367 responses to financial literacy questions.

All information in the final dataset is related to the unique identifier, the combination of household index and an index of the individual household member. The main independent variables used are about general personal information; sex, year of birth, number of children in the household, highest education completed, urbanisation of place of residence and having a partner.

The used independent variables of the health and income questionnaire are general health status, health status compared to last year, having a chronic illness or disability and total or estimation of net household income of the previous year. Used independent variables of the 2009 survey of economic and psychological concepts are several questions on risk aversion – originally reported by variable names *spaar* – and questions on decision avoidance – indicated by variable names *toek*. Finally, there are three questions in the final dataset regarding financial literacy – *q5, q6* and *q7*. Again, as a reference, original coding of the used questions is registered in appendix A and the yearly number of responses to each of the relevant questions is presented in appendix B.

The dependent variable "What sort of medical insurance do you have at present?" – *IN41A* – is taken from the yearly health and income questionnaire. The answer on this question is recoded into the binary variable *insurance* with value zero for "no medical insurance" or "the same insurer compared to last year" and value one for "different insurer compared to last year". Table 1 gives a first insight into the binary dependent variable. This question is only asked to respondents over age 16 so the number of responses is around or just below 2000. The 2007 survey investigated the first year of the new health care insurance system, 2006. In this first year, 17.5% of the respondents switched health care provider. In the years thereafter switching percentages declined and are just above 3% in the 2010 and 2011 surveys. The percentage of respondents who are not insured is low and stays below 1% yearly.

Table 1 Switchers versus non-switchers per survey year

Variable/year	*2007*	*2008*	*2009*	*2010*	*2011*
insurance	2031	1871	1857	1966	1831
Switcher	17.5%	5.1%	2.3%	3.1%	3.3%
Non-switcher	81.9%	94.4%	97.1%	96.1%	96.6%
No insurance	0.6%	0.7%	0.6%	0.8%	0.2%

Valid number of responses (question IN41A, here called insurance) and calculated percentage of switchers versus non-switchers per survey year, excluding missing responses

Most of the variables are recoded or reverse coded to get sound variables and constructs. After recoding, some categories are comprised to get categories with a respectable amount of observations. The distribution of answers on the constructed nominal and interval variables and their (comprised) answer categories is reported in table 2. For convenience, the recoding scheme for the dummy variables is outlined in appendix C. The variable names are created so that interpretation is as you would expect. For example the variable *geslacht* is recoded into the dummy *sex: female* with coding one for when the respondent is female and coding zero when the respondent is male. Besides the variable *sex: female*, coding for the dummy variables *children: one or more*, *education: high*, *urban: strongly*, *urban: moderately*, *partner: yes*, *general health: good / excellent*, *health change: better*, *health change: worse*, *chronic ill: no*, *income: modal* and *income: above modal* are outlined in appendix C.

Table 2 Distribution of answers per nominal or ordinal variable

Variable/answer			
	male	*female*	
sex	54.5%	45.5%	
	yes	*no*	
children	38.0%	62.0%	
	high	*medium or low*	
education	49.5%	50.5%	
	high	*moderate*	*low*
urban	38.5%	22.3%	39.2%
	yes	*no*	
partner	80.4%	19.6%	
	good / excellent	*not so good or bad*	
general health	78.6%	21.4%	
	worse	*same*	*better*
health change	13.1%	75.0%	11.9%
	yes	*no*	
chronic ill	25.4%	74.6%	
	under modal	*modal*	*above modal*
income	16.4%	25.6%	58.0%

Distribution of answers per nominal or ordinal variable in comprised dataset, valid percentages.

Table 2 shows that sexes are almost equally represented in the database – 45.5% of the responses are from female respondents versus 54.5% by male respondents. The reader might be surprised that – when looking at table 2 – only 38% of the responses came from respondents with children.

This might be due to the fact that the mean age of the respondents is around 51 years. And the question specifically asks if there are children in the household and not if the respondents have children per se. With regards to education levels, the table shows that neither one of the categories is under or overrepresented, with 49.5% having a high degree of education and 50.5% having either a low or medium level of education. Again, the diverse and large amount of education levels are recoded along the coding scheme in appendix C. Categorisation of high, medium or low education is the same as used by CentERdata. Urbanisation level of the place of residence is based on self assessment and not for example on zip codes. Respondents state 40% of the time that they live in highly urban areas or low urbanised areas. The 20% left replied that they live in a moderately urbanised area. As can be seen in table 2, the vast majority of respondents – over 80% – lives with a partner. Maybe this is not a good representation of the Dutch population – but when your husband fills out a survey about your household, you are more motivated and likely to join yourselves. When looking at the health status of respondents, table 2 shows that the vast majority has either a good or excellent health status – 78.6%. In addition, when comparing to the year before, respondents do not experience a change in health status often– 75% of the time. Finally, around 25% of respondents suffer from chronic illness, a handicap or disorder. The variable *income* might need a little more explanation because it is a sensitive question. For this reason, respondents are asked directly to give their precise net household income – *in49a* – or are allowed to give an estimate – *in50*. There are eleven categories to choose from, ranging from “below 8.000 euro” to “more than 75.000 euro”. Both variables are recoded and finally the variable *income* emerges.

The Dutch Bureau for Economic Policy Analysis (CPB) definition of modal and average income is taken into account when comprising categories (statline.cbs.nl and www.gemiddeld-inkomen.nl). Modal and average incomes are slightly different but relatively constant over the relevant period. It increases from approximately €20.000 in 2007 to almost €22.000 in 2012. Comprising and recoding the categories leads to three categories. An income below modal – below 16000 euro's – a modal income – between 16000 and 26000 euro's –an income above modal – above 26000 euro's. Table 2 depicts that the category "above modal" – including persons with a net yearly household income above €26.000 – is quit overrepresented. Although, 16.4% of responses stated that their household income is below €16.000.

After a first insight into the nominal and ordinal variables of the dataset, it is time to discuss the variables and constructs which are measured on a scale level. The distribution of these scale variables is displayed in table 3. The first socio-demographic scale item that comes to mind is obviously age. Table 3 shows that the mean and median age of respondents are respectively 51 and 53, where the oldest respondent is 93 years old and the youngest participant who filled out his own questionnaire has an age of 15 in the year the questionnaire is about – so an age of 16 at the date of answering the question.

In addition to the variable *age*, the score on financial literacy is comprised out of three simple questions related to interest compounding, inflation and risk diversification. Each question is recoded into value one for a good answer and value zero for a wrong answer, choosing the option "do not know" or refusing to answer the question. The values on these three questions are added up and form the variable *financial literacy*.

Naturally, table 3 shows that minimum and maximum values are zero and three. The mean value of financial literacy is 2.422, meaning that on average a respondent answers between the 2 and 3 questions correctly.

The final independent variables – *risk aversion* and *decision avoidance* – are not just normal variables but constructs. Constructs are complex psychological concepts, used to measure not directly observable things. Factor analysis is used to look at groups of variables – attributes – that tend to be correlated and to identify underlying factors of constructs that explain this correlation. The scores on these constructs are calculated based on the answers given on specific related questions. Consistency of the construct is checked with Chronbach's alpha (CA) – the measure of internal consistency. The value of CA should be as high as possible, to raise this value by dropping attributes that do not have a high correlation with the other attributes of interest.

The questions on attitude towards risk – the attributes *spaar1* to *spaar 6* - are reverse coded when needed so that eventually a score of 7 relates to risk aversion and a score of 1 relates to risk loving behaviour. When looking at appendix D, based on the Cronbach's Alpha measure of internal consistency, all six questions are taken into account. Chronbach's Alpha, with value 0.662, could not be raised by deleting an item. A factor analysis with extracting one factor based on the principal component method resulted in the new construct *risk aversion*. Table 3 displays the statistics on this and other scale variables. The range of scores lies between -3.261 and 1.494, where respondents with high scores experience a high degree of risk aversion. The second psychological construct is based on the original questions *toek1* to *toek12*. Internal consistency checks suggest the deletion of *toek4* and *toek5*, see appendix D.

The final Chronbach's Alpha score of 0.782 could not be raised further by deleting an additional variable. The factor analysis resulted into the variable *decision avoidance*. Table 3 shows the dispersion in factor scores for *decision avoidance* is larger than for the variable *risk aversion*, minimum and maximum values lay in the range -3.587 and 6.748. Respondents with a higher score are the more decision avoidant respondents. The respondents with a lower score are the more active decision makers.

Table 3 Descriptive statistics regarding the used scale variables

	age	*financial literacy*	*risk aversion*	*decision avoidance*
Mean	51.048	2.422	0.001	0.000
Std. deviation	15.993	0.715	0.999	1.000
Median	53.000	3.00	0.095	-0.054
Minimum	15.000	0.00	-3.261	-3.587
Maximum	93.000	3.00	1.494	6.748
No. observations	9538	5367	6599	7022

Descriptive statistics on scale variables in used dataset, using valid responses.

V. Results

This section estimates the multinomial logistic regression models and tests the hypotheses as outlined in section III. The main part of section V concludes with a summary of the most important determinants of health care insurer switching. In addition, sub-section A explains the main robustness checks performed.

The results of testing the relationship between consumer characteristics and switching health care provider are displayed in table 4.

Results are presented per model, each individually discussed before in section III. Column (1) presents the logistic model, column (2) the random effects logistic and finally, column (3) displays the logistic model with Mundlak correction. The used variables and dummy's can be interpreted naturally and are outlined in section IV. For example, *education: high* means that this dummy variable takes value one when the respondent has a high education level. Asterisks indicate the level of significance for the relevant variable, where more asterisks indicate a higher significance level. For example, three asterisks result in significance on a 1% level whereas one asterisk indicates a 10% significance level.

When interpreting results, differences between models should be clear. As stated in the methodology section, model (1) ignores the panel nature of the dataset. Model (2) takes this into account by estimation under the assumption that correlation between disturbances belonging to the same individual is constant over time – imposing full independence. Finally, model (3) is less strict and allows for some correlation with the time averages of the time varying variables. A test of joint significance of the time averages shows that model (3) indeed adds value over model (2). As stated before, the individual-specific time-averages – indicated by a bar– are not supposed to be interpreted. To enhance readability, individual-specific averages are left out in table 4 and documented in appendix E.

As a first insight into the importance of the three newly added variables in this research – *risk aversion*, *financial literacy* and *decision avoidance* – appendix F shows that the results of adding just the basic set of variables reduces the deviance (-2 log likelihood) of the model by 59.511 with thirteen degrees of freedom. This is significant at the 1% level. Adding the variable *decision avoidance* reduces the deviance of the model even further with 10.244, which is also a significant

contribution to the model on a 1% level. This variable really does add explanatory power to the model with only basic variables. Adding *financial literacy* as a next step does not evolve in any significant contribution – with only a reduction in the -2 log likelihood of 1.155. This is an indication that *financial literacy* does not add any explanatory power to the whole model. Finally, when adding *risk aversion* it can be seen that this adds no explanatory power, this variable reduces the deviance with only 0.462. All in all, the whole simple logistic model is significant in explaining switching behaviour – reducing the -2 log likelihood by 71.372.

Table 4, presented below, presents the estimated multinomial logistic regression coefficients. Standard deviations are presented in parentheses, and finally the asterisks indicate the level of significance. It is shown that, as argued before, only the variable *decision avoidance* is significant across models when looking at the newly added variables. With a highly significant estimated coefficient of -0.204 in model (3), it is one of the important factors driving consumer mobility. In addition, it can be seen that, for example, age has a large and negative effect on the probability to switch health care provider – with an estimated coefficient of -0.778 in model (3). Also, the positive effect of having a partner should not be underestimated, having an estimated coefficient of 0.451. Consistent with previous research, many of the socio-demographic variables show up insignificantly.

Table 5 displays the expected signs for the variables as stated in the hypotheses – section III.A – as well as the resulted signs from the different model estimates of table 4.

Table 4: Logistic regression models: determinants of switching behaviour in Dutch health care market in 2006 through 2010

	Logistic model (1)	Random effects logistic model (2)	Logistic model with Mundlak correction (3)
constant	-2.316*** (0.539)	-2.598*** (0.663)	-3.119** (0.613)
sex: female	0.190 (0.139)	0.181 (0.177)	0.201 (0.144)
age	-0.031*** (0.005)	-0.039*** (0.007)	-0.778*** (0.062)
children: one or more	-0.288* (0.157)	-0.365* (0.201)	-0.575 (0.585)
education: high	0.082 (0.139)	0.090 (0.173)	1.699* (1.013)
urban: strongly	0.114 (0.151)	0.114 (0.192)	0.117 (0.156)
urban: moderately	0.025 (0.175)	0.067 (0.220)	0.022 (0.180)
partner: yes	0.531*** (0.188)	0.623*** (0.235)	0.451** (0.198)
general health: good/excellent	0.196 (0.198)	0.217 (0.228)	0.224 (0.327)
health change: worse	0.096 (0.220)	0.102 (0.244)	0.085 (0.282)
health change: better	0.197 (0.194)	0.145 (0.221)	-0.284 (0.259)
chronic ill: no	-0.117 (0.166)	-0.172 (0.193)	-0.187 (0.285)
income: above modal	0.153 (0.233)	0.157 (0.262)	0.340 (0.332)
income: modal	0.451* (0.242)	0.576** (0.270)	0.519 (0.329)
risk aversion	-0.046 (0.067)	-0.036 (0.086)	-0.050 (0.069)
decision avoidance	-0.201*** (0.067)	-0.211** (0.085)	-0.204*** (0.069)
financial literacy	0.106 (0.107)	0.146 (0.134)	0.089 (0.109)
Individual-specific averages			See appendix E
R-square: pseudo / **Cox & Snell** / **Nagelkerke**/	0.577/ 0.016 / 0.044	0.577/ 0.434 / 0.434	0.579/ 0.057/ 0.16

Estimated multinomial logistic regression coefficients – with standard deviations in parentheses. Significance levels are indicated as follows; *sig on 10% level, **sig on 5% level, *** sig on 1% level.

Table 5: Logistic regression models: predicted and actual signs of the estimated coefficients

	Expected sign	Logit model (1)	Random effects probit model (2)	Logit model with Mundlak correction (3)
sex: female	+	+	+	+
age	-	-***	-***	-***
children: one or more	+	-*	-*	-
education: high	+	+	+	+*
urban: strongly	+	+	+	+
urban: moderately	+	+	+	+
partner: yes	+	+***	+***	+**
general health: good / excellent	+	+	+	+
health change: worse	+	+	+	+
health change: better	+	+	+	-
chronic ill: no	+	-	-	-
income: above modal	+	+	+	+
income: modal	+	+*	+**	+
risk aversion	-	-	-	-
decision avoidance	-	-***	-**	-***
financial literacy	+	+	+	+

Expected sign for the coefficients. In addition, signs of the estimated coefficients for different model specifications. Asterisks indicate the level of significance; * significant on a 10% level, ** significant on a 5% level, *** significant on a 1% level.

Out of the thirteen variables, five are significant on at least a 10% level for model (2). With regards to model (3) four out of 13 are significant. When focussing on the sign of the variables, one out of thirteen appears to be opposite to expectations. The variable *children: one or more* is marginally significant in model (1) and (2). The fact of having children was expected to have a positive relation with switching behaviour, but appears negative in all three model specifications. In addition, signs across models are consistent with only one (insignificant) exception, model (2) indicates a negative effect of an improved health status compared to last year – *health change: better* – where the other models show a positive (insignificant) sign for this dummy variable. As a final general remark, the dummy variable *chronic ill: no* shows a negative sign – contrary to expectations – but is significant in neither one of the models.

Consulting table 4 and 5 we will have a look at the hypotheses stated in section III.A. With regards to the influence of gender or sex, it can be stated that the sign is positive, as expected. It would be interpreted as women switching health care provider more often compared to men. However, this dummy variable is not found significant, so $H_{1,0}$ is not rejected.

The second set of hypotheses considers the effect of age. This variable is highly significant and negatively related to switching behaviour. The meaning and interpretation of this is very simple and intuitive. The older a respondent becomes, the less prone he or she is to switch. A possible reason for this result was stated in the hypotheses section, Shmueli et al. (2005) argues that older people have higher switching costs, which includes for example costs of collecting information and discomfort of switching. It can be concluded that older persons switch health care provider less often, so $H_{2,0}$ is rejected.

The third set of hypotheses speculates on the effect of having children or not. The effect on switching was argued to be positive in the hypotheses section. However, this dummy variable has a consistent and negative sign in all models. In addition, the variable is marginally significant in base model (1) and extended model (2). A possible explanation for this effect is as follows. Before or during pregnancy preferences might change as Shmueli et al. (2005) argues, but when children are there, needs are uncertain. This uncertainty increases switching costs, because parents not only need to investigate their own health care needs, but also their children's needs. Choosing the best health care provider is a challenging task. When adding more variables – more persons – and increasing uncertainty of needs – children's needs – this task becomes even harder. All in all, we can state that $H_{3,0}$ cannot be rejected: persons with children do not switch health care provider more often. In fact, we can state that persons with children do switch health care provider less often, keeping in mind that this variable is only marginally significant.

With regards to education level – the fourth set of hypotheses – results show that the expected sign is supported by the data. Having a high education level increases switching behaviour – but only on a marginally significant level in model (3). The effect is not very strong, but present. So it can be stated that $H_{4,0}$ is rejected, when looking at model (3). The data proves that there is a minor but present role for education level in explaining switching behaviour. So as stated before, this effect might be attributed to a tendency of increased information awareness of highly educated persons (Abraham et al. 2006), or highly educated persons being more informed about changes in the health care system for example.

A fifth set of hypotheses considers the effect of urbanisation. Mosca and Schut-Welkzijn (2007) found that living in urban areas increases switching behaviour.

The current dataset – extended to multiple years in comparison to Mosca and Schut-Welkzijn – does not confirm this finding, although the sign of variables related to urbanisation are positive. This may be due to the fact that in 2006 – the year Mosca and Schut-Welkzijn investigated the Dutch market – the healthcare system was reformed first. Nowadays, health care providers compete harsh and not only on the streets of urban areas but also on the internet, radio, television and in magazines. So the effect of urbanisation per se might be less nowadays. When looking at the results, it can be stated that $H_{5,0}$ is not rejected –so consumers living in urban areas do not switch health care provider more often.

The hypotheses about the effect of a partner, $H_{6,0}$ and $H_{6,a}$, claim a positive effect on switching behaviour. This is indeed the case; all models indicate a positive sign which is significant or highly significant. A reason suggested by Mosca and Schut-Welkzijn (2007) might apply also in the extended dataset at present. Having a partner may change your preferences, insights into and knowledge about the healthcare system. Confirmed by all models, $H_{6,0}$ is rejected and it is affirmed that persons having a partner do switch health care provider more often.

The influence of general health status is captured by a seventh set of hypotheses. The alternative hypothesis states that persons with a better general health status do switch health care provider more often. This is indeed the case when looking at the results, but the effect is non-significant without exception. So $H_{7,0}$ is not rejected.

With regards to changes in health status, previous research results are not conclusive, but theory suggests a positive relationship.

Results in table 4 and 5 show that a better or worse health status – compared to the year before – have a positive influence on switching, but these effects are not significant. Additionally, a better health status lowers the probability of switching in model (3), although again insignificantly. So $H_{8,0}$ – persons experiencing a change in health status do not switch health care provider more often – cannot be rejected. Sudden health changes do not influence switching behaviour in the dataset at present.

The ninth set of hypotheses is related to chronic illness. Results contradict predictions and show a negative relation between the absence of a chronic illness and switching health care provider. So compared to persons with a chronic illness, being free of disabilities or handicaps does not result in an increase of the switching probability. Although results contradict expectations in all three models, the effect is non-significant without exception. In the end, $H_{9,0}$ – persons who do not suffer chronic illness or disability do not switch health care provider more often –is not rejected.

The final set of hypothesis with regards to basic variables relates to income. As hypothesised, the effect of a higher income is positively related to switching. However, the effect is marginally significant or significant in two out of tree models. This significance is explicitly for a modal income, and not for an income above modal. This effect can be explained by the fact that government measures most of the time have positive effects on higher and lower incomes, but modal incomes are often worse off in the Netherlands (Pommer et al., 2011). Pommer et al. (2011) show that middle incomes receive less benefit from public services. Lower income groups benefit more and the highest income group benefits significantly more than average.

Where low income groups receive more social security benefits and for example care allowance. High incomes profit from favourable tax treatments, participation in higher education and use of cultural facilities and transport provisions. However, the gap with middle incomes is slightly reduced over time. This intuitively strengthens the effect of a modal income on switching behaviour. Actively looking for a bargain and switching every year is beneficial for persons with a middle income, who have a hard time when looking at the below average benefits of public services and government measures for this group.

When looking at one of the three special variables inserted in this research, people experiencing a low degree of risk aversion indeed switch more often – though not significantly more than their risk averse counterparts. Therefore, $H_{11,0}$ is not rejected. Where literature about the relation of risk aversion and switching of financially complex products is surprisingly thin and results are up till now still insignificant, general literature suggest a negative effect of risk aversion on switching.

The second non-basic variable is *decision avoidance*. As the reader might see, this variable is negatively related to switching behaviour. The expectations come out, and are highly significant. People who tend to avoid making decisions are less likely to switch health care provider and the difference with their more active counterparts is highly significant. Where research on this variable in relation to switching behaviour is also thin, the suggested relationship comes out. Consequently, $H_{12,0}$ is rejected and it is stated that persons who score low on decision avoidance do switch health care provider more often.

The final newly added variable is *financial literacy*, this measure is in line with predictions but insignificant across all models.

In relation to a financially complex product it is undoubtedly that financial knowledge increases awareness and therefore switching. But since the three questions used to create a measure of financial literacy are very basic, the effect might be less than expected. When using more difficult financially related questions, differentiation among respondents is easier and effects may become stronger. Given that the effect is insignificant, $H_{13,0}$ is not rejected and we state that – significantly speaking – persons having high financial literacy do not switch health care provider more often.

To sum up, the most important determinants of health care insurer switching seem to be age, having a partner and decision avoidance – factors which appear significant on a 1% of 5% level. In addition the fact of having children, a modal income or a higher education level is significant on a 5% or 10% level – depending on the model used.

A. Robustness

Robustness of the results presented before is checked in several ways. For example, results do not deviate when the natural logarithm of age is used instead of the variable age. As argued in the literature review, the term age can be a combined effect of learning and switching costs due to aging. So that might advocate for a non-linear relationship between age and the probability to switch health care provider. To address this probable non-linear effect, age squared is used but not found significant. Also, when models (1) through (3) are estimated without using the new and highly significant variable decision avoidance, results are identical in terms of significance. Finally, various studies include some basic socio-demographic variables – which in this research are all variables except *financial literacy*, *risk aversion* and *decision avoidance* – and various other variables.

When only using the basic variables, the sample size almost doubles. Running (1) through (3) with this sample size of 9538 leads to different results. When looking at the effect of the basic variables, it can be seen that significance drops in general. The variable *children: one or more* is no longer significant, the influence of having a partner becomes marginally significant or it turns into a non-significant variable. The influence of the variable *income: modal* looses power and turns into an insignificant variable. In conclusion, it can be stated that only the variable age still shows up highly significant, and the influence of having a partner is marginally significant in one out of three models. All other variables are insignificant when including only basic variables. Therefore, it is not astonishing that researchers like Abraham et al. (2006), Tumlinson et al. (1997) or Schram and Sonnemans (2011) found insignificant effects of socio-demographic variables or contradictory insignificant results.

VI. Conclusion

The purpose of this thesis was to provide a better understanding of the characteristics of people who switch health care provider in the Netherlands. The empirical investigation moves beyond the basic socio-demographic variables and includes risk aversion, financial literacy and decision avoidance to obtain a better insight in these rarely addressed concepts. This purpose was pursued through an empirical analysis of a panel dataset comprising five survey years and with an ultimate size of between 5367 and 9538 observations in total – depending on the inclusion of specific variables.

The data used is gathered from the DNB Household survey, giving information about the years 2006 through 2010 and an additional module on financial literacy designed

by Alessie, van Rooij and Lusardi. This module, which was inserted in the 2010 survey, was not made publicly available.

Using limited dependent variable models with different specifications (simple logistic, random effects logistic and a logistic model with Mundlak correction) leads to consistent results.

Basic socio-demographic variables gave no clear-cut significance result in previous research – by for example Tumlinson et al. (1997), Shmueli et al. (2005), Abraham et al. (2006), Mosca and Schut-Welkzijn (2007) and Schram and Sonnemans (2008) – and some socio-demographic variables are not investigated frequently. Therefore this research includes all available socio-demographic variables and shows that age and the fact of having at least one child is of significant negative influence on switching behaviour. Having a partner, a high education level or a modal income influences switching behaviour significantly in a positive way, where significance of a high education level or a modal income is only present in one and two out of three model specifications respectively. When looking at the variables which contribute significantly to the explanation of switching behaviour, only the marginally significant variable with respect to children goes against reasoning from literature and intuition. You would expect that having children leads to changed preferences and demands, leading to a higher probability of switching. In explaining the negative sign of this variable, one can state that taking into account more uncertain needs and more persons makes comparing alternatives even more challenging, leading to increased switching costs and therefore less switching.

When looking at the main variables of interest; risk aversion, financial literacy and decision avoidance, all signs are in line with literature but only the latter has a

significant (negative) influence on switching behaviour. The highly significant result with regards to decision avoidance is an indication that the people more prone to decision anomalies are less likely to switch health care provider. Consistency of this result must be addressed in further research; new specifications of this construct might be tested to see whether the result holds. The insignificance of financial literacy – in literature found of major influence on financial decision making – might be explained by the fact that only three simple questions are asked to measure this variable. Additional research might focus on the effect of using a more advanced measure of financial literacy – as used by van Rooij et al. (2007, 2011) in the case of stock market participation and retirement planning – in the area of switching health care provider. The insignificance of risk aversion – in line with results of Schram and Sonnemans (2008) – must be addressed in further research. New and possibly better measures may or may not find new insights into this construct.

This master thesis is limited with respect to scope, only the Dutch health care market is investigated. When trying to generalise results to other countries, regulation differences – for example in the case of Israel, investigated by Shmueli et al. (2005), where waiting periods and switching due to exogenous reasons is common – must be taken into account. Another limitation of this research lies in the fact that the number of observations drops from 9538 when considering only basic questions to 5367 when investigating also the three additional variables. This is due to the fact that the financial literacy questionnaire was only implemented in the 2010 survey and questions on risk aversion and decision avoidance are only asked in 2009.

People who did not participate in these surveys are not taken into account when analyzing the effect of all used variables on switching behaviour. As a consequence, measures of the constructs risk aversion, decision avoidance and financial literacy

are static. When excluding these additional variables, the sample size increases to 9538 and only age appears to be highly significant and the effect of having a partner reduces to marginally significance in one out of three models. Therefore the insignificant results of for example Abraham et al. (2006), Tumlinson et al. (1997) or Schram and Sonnemans (2011), regarding socio-demographic variables, are not surprising.

Every study, and also this research, has its limitations and questions according to generalisability. Nevertheless, results do point in the direction of a number of policy implications. As stated by Laske-Aldershof et al. (2004), switching rates in the Netherlands are too low and the researchers suggest an active government policy to encourage consumers to switch health care provider. Results of the current study show that age, having children and – the difficult to observe variable – decision avoidance lowers switching. Therefore, a government policy should be targeted at older people and parents preferably. Paying specific attention to for example couples is not necessary, because they already switch more often. When social policy tries to level incomes – e.g. modal incomes will receive more benefits from public services – persons with a modal income probably will not switch more often in the future. Nowadays, besides having a partner, the effect of having a modal income and a higher education level increases switching. So when budget constraints are present, policy should be focussed on older people, parents and currently still on persons with a modal income.

Highly educated people or couples are not of major concern. From literature – for example Shmueli et al. (2005) – age and changing preferences is suggested to increase switching costs. Therefore it is suggested to increase the accessibility and user-friendliness of health care policy comparison programs. This might also lower

the costs of selection difficulty, action and change, concepts that are – according to Anderson (2003) – of influence on decision avoidant behaviour.

Not only the government but also health care insurance companies might take advantage of this study and its results. First of all, from a social point of view, full and transparent information disclosure is recommended. This will result in equal opportunities to compare health care policies and encourages adequate responses to that information. Second, competition is harsh and year after year a substantial amount of money is invested to attract and retain customers. From a cost-benefit point of view, loyal customers who are not inclined to switch are easy to retain. Clients who are older or are a parent are less prone to switch, so slight changes in policy conditions or prices might not trigger them as much as other clients. However, clients who have a higher education level or a partner can be characterised as deserters, making them easier targets to attract from other insurers. Market share can be improved by targeting the media battle at those customers. In addition, they might be attracted by gifts, special discounts or policy conditions specifically addressed to them.

Since income levels and decision avoidance are harder to observe at first sight, recommendations are harder to make. However, for example the more tangible concepts of selection difficulty and costs of action and change are of influence on decision anomalies as investigated by Anderson (2003). Reducing these emotional influences will inhibit the occurrence of decision avoidance.

In addition, persons with a modal income live in specific neighbourhoods; attention can be paid to those regions of interest.

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Appendices

A. Exact wording and coding of original questions

Format

VARIABLE NAME

Question

Number and response options

Insurance

IN41A

What sort of medical insurance do you have at present?

1 no medical insurance

2 different insurer compared to [year$_{-1}$]

3 same insurer compared to [year$_{-1}$]

General information on the household

GESLACHT

Sex of the respondent

1 male

2 female

GEBJAAR

Year of birth of the respondent

any answer

AANTALKI

Number of children in the household

Any answer

OPLMET

Highest level of education completed

1 (continued) special education

2 kindergarten/primary education

3 VMBO (pre-vocational education)

4 HAVO, VWO (pre-university education)

5 senior vocational training or training through apprentice system

6 vocational colleges

7 university education

8 no education (yet)

9 other sort of education/training

STED

Degree of urbanization of the town/city of residence

1 very high degree of urbanization

2 high degree of urbanization

3 moderate degree of urbanization

4 low degree of urbanization

5 very low degree of urbanization

PARTNER

Is there a partner present in the household?

0 no

1 yes

Health and income

GEZ3

In general, would you say your health is:

1 excellent

2 good

3 fair

4 not so good

5 poor

GEZ4

Compared to one year ago, would you say your health is better now or worse?

1 much better

2 somewhat better

3 about the same

4 somewhat worse

5 much worse

GEZ5

Do you suffer from a long illness, disorder, or handicap; or do you suffer from the consequences of an accident?

1 yes

2 no

IN49A

What is the total net income for your household in [$year_{-1}$]?

Don’t know

amount

IN50
Please indicate about how much the TOTAL NET INCOME of your household was over the period 1 January [year$_{-1}$]through 31 December [year$_{-1}$].

The total net income of the household means the sum of the net incomes of all household members. By net income we mean the income after deduction of taxes and social security benefits.

1 less than € 8.000

2 between € 8.000 and € 9.500

3 between € 9.500 and € 11.000

4 between € 11.000 and € 13.000

5 between € 13.000 and € 16.000

6 between € 16.000 and € 20.000

7 between € 20.000 and € 26.000

8 between € 26.000 and € 38.000

9 between € 38.000 and € 50.000

10 between € 50.000 and € 75.000

11 more than € 75.000

Economic and psychological constructs

The following statements concern saving and taking risks.

Please indicate for each statement to what extent you agree or disagree.

Please indicate on a scale from 1 to 7 to what extent you agree with the following statements, where 1 indicates „totally disagree" and 7 indicates „totally agree".

totally disagree totally agree

1 2 3 4 5 6 7

SPAAR1

I think it is more important to have safe investments and guaranteed returns, than to take a risk to have a chance to get the highest possible returns.

SPAAR2

I would never consider investments in shares because I find this too risky

SPAAR3

If I think an investment will be profitable, I am prepared to borrow money to make this investment

SPAAR4

I want to be certain that my investments are safe

SPAAR5

I get more and more convinced that I should take greater financial risks to improve my financial position

SPAAR6

I am prepared to take the risk to lose money, when there is also a chance to gain money

Now follow some statements about the future.

Please indicate for each statement to what extent you agree or disagree.

Please indicate on a scale from 1 to 7 to what extent you agree with the following statements, where 1 indicates „totally disagree" and 7 indicates „totally agree".

extremely uncharacteristic extremely characteristic

1 2 3 4 5 6 7

TOEK01

I think about how things can change in the future, and try to influence those things in my everyday life.

TOEK02

I often work on things that will only pay off in a couple of years.

TOEK03

I am only concerned about the present, because I trust that things will work themselves out in the future.

TOEK04

With everything I do, I am only concerned about the immediate consequences (say a period of a couple of days or weeks).

TOEK05

Whether something is convenient for me or not, to a large extent determines the decisions that I take or the actions that I undertake.

TOEK06

I am ready to sacrifice my well-being in the present to achieve certain results in the future.

TOEK07

I think it is important to take warnings about negative consequences of my acts seriously, even if these negative consequences would only occur in the distant future.

TOEK08

I think it is more important to work on things that have important consequences in the future, than to work on things that have immediate but less important consequences.

TOEK09

In general, I ignore warnings about future problems because I think these problems will be solved before they get critical.

TOEK10

I think there is no need to sacrifice things now for problems that lie in the future, because it will always be possible to solve these future problems later.

TOEK11

I only respond to urgent problems, trusting that problems that come up later can be solved in a later stage.

TOEK12

I get clear results in my daily work, this is more important to me than getting vague results

Financial literacy

Now, we continue with three questions on the returns of saving accounts and stock investments

Q5

Suppose you had €100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow: more than €102, exactly €102, less than €102?

1 More than €102

2 Exactly €102

3 Less than €102

8 Do not know

9 Refusal

Q6

Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be able to buy more than, exactly the same as, or less than today with the money in this account?

1 More than today

2 Exactly the same as today

3 Less than today

8 Do not know

9 Refusal

Q7

Do you think that the following statement is true or false?: Buying a single company stock usually provides a safer return than a stock mutual fund.

1 True

2 False

8 Do not know

9 Refusal

B. Number of observations per original variable per survey year

All raw information on the relevant variables is depicted in the table below. Columns indicate the survey years, where rows are the original variables before making any adjustments. Mind that the number of responses is reported before making any corrections, except taking out responses without an answer on *IN41A*, the dependent variable. An example, a correction is made when a respondent participates in the survey for several years and a value for gender is missing in one of these years. The implicit assumption is made that gender stays the same across years.

Table BI. Number of observations per variable per survey year

Variable/year	*2007*	*2008*	*2009*	*2010*	*2011*
IN41A	2031	1871	1857	1966	1831
GESLACHT	4378	4063	4185	4524	4166
GEBJAAR	4282	3930	4021	4317	3976
AANTALKI	4378	4063	4185	4524	4166
OPLMET	4368	4049	4175	4517	4156
STED	4370	4052	4170	4492	4142
PARTNER	4378	4063	4185	4524	4166
GEZ3	2031	1871	1857	1966	1831
GEZ4	2031	1871	1857	1966	1831
GEZ5	2031	1871	1857	1966	1831
IN49A	897	1068	1141	1110	1731
IN50	990	687	593	746	763
SPAAR1-6			1725		
TOEK1-12			1848		
Q5-7				1665	

Total number of observations per original variable per survey year, not every question is posed to every participant or answered by every participant. Dependent is variable IN41A.

C. Coding scheme for all used dummy variables

All original variables from the DNB Household Survey are recoded and renamed before using them in research. The recoding scheme is therefore presented below.

Table CI. Original variable names and used coding for newly constructed (dummy) variables

Original variable name	**Dummy name**	**Coding 1**	**Coding 0**
geslacht	*sex: female*	female	male
aantalki	*children: one or more*	≥ one	zero
oplmet	*education: high*	-pre-university -vocational colleges -university	-(continued) special -primary -pre-vocational -senior vocational /or apprentice -no or other
sted	*urban: strongly*	strong urbanisation	-moderate urbanisation -low urbanisation
sted	*urban: moderately*	moderate urbanisation	-strong urbanisation -low urbanisation
partner	*partner: yes*	yes	no
gez3	*general health: good / excellent*	-good -excellent	-fair -not so good -poor
gez4	*health change: better*	-somewhat better -much better	-about the same -somewhat worse

			-much worse
gez4	*health change: worse*	-somewhat worse -much worse	-about the same -somewhat better -much better
gez5	*chronic ill: no*	no	yes
in49a and in50	*income: modal*	-modal (16.000-26.000)	-below modal (<16.000) -above modal (>26.000)
in49a and in50	*income: above modal*	-above modal (>26.000)	-below modal (<16.000) -modal (16.000-26.000)

Original variable names and used coding for newly constructed (dummy) variables. Coding for "education: high" in Dutch would be pre-university is HAVO and VWO, vocational colleges is HBO and university is WO, pre-vocational is VMBO and senior vocational or apprentice is MBO

D. Analysis of constructs with regards to Chronbach's alpha

Results of a Chronbach's Alpha (CA) analysis on the questions with regards to risk aversion and decision avoidance respectively. CA is a measure of internal consistency within the construct under investigation. Interpretation of the output is naturally. The total CA score – with inclusion of the chosen variables – of the construct is given.

In addition, every variable receives a value for "CA when scale item is deleted" – which indicates the CA score of the total construct when the respective variable is left out of the analysis. Comparing these values determines if a variable must be dropped to get a higher internal consistency. When all variable specific variables give a lower score than the total construct CA, the variables left into that analysis give the most internal consistent and desired construct

Table DI. Chronbach's alpha analysis for the construct risk aversion

Chronbach's Alpha of total construct	0.662
Questions	CA if scale item deleted
spaar1	0.659
spaar2	0.610
spaar3	0.640
spaar4	0.603
spaar5	0.632
spaar6	0.571

Chronbach's alpha (CA) analysis for questions related to the measure risk aversion. Rows display the questions related to the construct and the CA score of the construct when that respective question is left out.

Table DII. Chronbach's alpha analysis for the construct decision avoidance

Chronbach's Alpha of total construct	0.740	0.762	0.782
Questions	CA if scale item deleted	CA if scale item deleted	CA if scale item deleted
toek1	0.717	0.738	0.757
toek2	0.707	0.729	0.749
toek3	0.693	0.722	0.750
toek4	0.750	**0.782**	
toek5	**0.762**		
toek6	0.734	0.756	0.777
toek7	0.733	0.753	0.774
toek8	0.722	0.744	0.764
toek9	0.716	0.743	0.768
toek10	0.712	0.740	0.767
toek11	0.701	0.729	0.757
toek12	0.717	0.746	0.773

Chronbach's alpha analysis for questions related to the construct decision avoidance. Rows display the questions related to the construct and the chronbach's alpha score of the construct when that respective question is left out. Columns display the chronbach's alpha scores of several analyses when some of the questions are left out. The question that is left out in the next analysis is in bold, and obviously this box appears black in the next analyses.

E. Individual-specific averages in the logit model with Mundlak correction (3)

To enhance readability of table 4 in the results section, the individual-specific time-average values are documented below. These values are displayed for convenience but are not supposed to be interpreted.

Individual-specific averages	
$\overline{age_i}$	0.755*** (0.062)
$\overline{children: one\ or\ more_i}$	0.352 (0.619)
$\overline{education: high_i}$	-1.622 (1.022)
$\overline{urban: strongly_i}$	0.056 (0.164)
$\overline{urban: moderately_i}$	0.013 (0.081)
$\overline{partner: yes_i}$	0.355 (0.486)
$\overline{general\ health: good/excellent_i}$	-0.078 (0.416)
$\overline{health\ change: worse_i}$	0.058 (0.467)
$\overline{health\ change: better_i}$	1.107*** (0.397)
$\overline{chronic\ ill: no_i}$	0.157 (0.361)
$\overline{income: above\ modal_i}$	-0.135 (0.448)
$\overline{income: modal_i}$	-0.365 (0.494)

The individual-specific time-averages in model (3). A test of joint significance shows with value 0.000 that model (3) indeed adds power over model (2).

F. Step by step logistic regression of full basic logistic regression model (1)

The output of a logistic regression analysis displays the reduction in the -2 log likelihood by including the chosen variables. When this reduction is large enough, this step will turn out significant. The interpretation is naturally, inclusion of the chosen variables leads to a reduction in the deviance of the model when the step is significant.

First step adds all basic variables; *sex: female, age, children: one or more, education: high, urban: strongly, urban: moderately, partner: yes, general health: good/excellent, health change: worse, health change: better, chronic ill: no, income: above modal* and *income: modal.*

Table FI. The first step of the logistic regression model (1), inclusion of basic socio-demographic variables

Step 1	Reduction in -2 log likelihood	Significance	Degrees of freedom	R squared
Step	59.511	0.000	13	
Model	59.511	0.000	13	
Cox & Snell R square				0.013
Nagelkerke R square				0.036

Results of estimating the logistic regression model by inclusion of the basic socio-demographic variables. A large enough (significant) reduction in the -2 log likelihood of the model must be interpreted as a reduction in the deviance of the model when these variables are added.

Table FII. The second step of the logistic regression model (1), addition of variable *decision avoidance*

Step 2	Reduction in -2 log likelihood	Significance	Degrees of freedom	R squared
Step	10.244	0.001	1	
Model	69.755	0.000	14	
Cox & Snell R square				0.015
Nagelkerke R square				0.043

Results of estimating the logistic regression model with inclusion of basic socio-demographic variables and in this second step inclusion of the variable decision avoidance. A large enough (significant) reduction in the -2 log likelihood of the step must be interpreted as a reduction in the deviance of the model when the variable decision avoidance is added.

Table FIII. The third step of the logistic regression model (1), addition of variable *financial literacy*

Step 3	Reduction in -2 log likelihood	Significance	Degrees of freedom	R squared
Step	1.155	0.283	1	
Model	70.910	0.000	15	
Cox & Snell R square				0.015
Nagelkerke R square				0.043

Results of estimating the logistic regression model with inclusion of basic socio-demographic variables, decision avoidance and in this third step inclusion of the variable financial literacy. A large enough (significant) reduction in the -2 log likelihood of the step must be interpreted as a reduction in the deviance of the model when the variable financial literacy is added.

Table FIV. The fourth step of the logistic regression model (1), addition of variable *risk aversion*

Step 4	Reduction in -2 log likelihood	Significance	Degrees of freedom	R squared
Step	0.462	0.497	1	
Model	71.372	0.000	16	
Cox & Snell R square				0.016
Nagelkerke R square				0.044

Results of estimating the logistic regression model with inclusion of basic socio-demographic variables, decision avoidance and financial literacy and in this fourth step inclusion of the variable risk aversion. A large enough (significant) reduction in the -2 log likelihood of the step must be interpreted as a reduction in the deviance of the model when the variable risk aversion is added.