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Insurance Search and Switching Behavior at the time of the Dutch Health Insurance Reform

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PRELIMINARY AND INCOMPLETE

Abstract

The Netherlands introduced a new health insurance system in January 2006, a system based on managed competition. Such a system critically hinges on consumers that search. It is for this reason we think it is important to investigate the extend to which consumers search, how they search and why they search ór don't search. The price dispersion observed in the insurance market after the reform suggests the number of consumers that searches is low.

We set up a search model for insurance that includes the main features of the Dutch health insurance market after the reform and test the hypotheses from this model on the data.

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Thanks to ... from ... for making the data available.

1 Introduction

Competitive markets are welfare maximizing, and the law of one price should hold. In many markets there is, however, a substantial degree of price dispersion. This may either be because products are not homogenous or because consumers face costs to obtain information about prices. Firms can exploit their market power to set prices above marginal costs. Consumer search models are often used to describe such markets. This paper focusses on the Dutch health care insurance market and tests to what degree a simple consumer search model can describe the behavior of consumers. In the empirical analyses we exploit the major health insurance reform which took place in the Netherlands on January 1, 2006.

Before the Dutch health insurance reform there was a mix of private and public insurance against the costs of health care. In the new system, which is one of *managed competition*, all insurers compete with each other within rules set by the government. These rules oblige everyone to buy basic insurance coverage at an insurance company of her own choice. Insurers are not allowed to refuse applicants for the basic coverage and to differentiate premiums by any measure of risk (age, health, etc.). A risk equalization fund compensates insurers who have a disproportionate number of high-risk individuals among their insurees.

Insurance companies are free to set their own price for the basic coverage and to compete for insurees. If individuals indeed search sufficiently for the lowest premium, the system should provide incentives to insurers to improve their efficiency and lower their premiums. However, the monthly premiums for the basic coverage range from €82.50 and €97.75. By switching insurer some people could, therefore, save up to 15% of the insurance premium, which suggests that individuals do not have full information.

We develop a simple consumer search model to describe the behavior of individuals and firms. Our model builds on Stahl (1989), Janssen, Moraga-González and Wildebeest (2005) and Janssen and Moraga-González (2004). Individuals in model are only heterogeneous in their health, which determines their utility of high insurance coverage. Each individual receives an offer for health insurance from their current insurer and maybe an offer from a collective contract. After that individuals decide whether or not to search the market for an insurer with a lower premium.

The model provides a number of testable predictions on insurance choice and search behavior. We use data from the Dutch Health Care Consumer Panel collected by the Netherlands Institute for Health Service Research (NIVEL). Participants in the consumer panel have to complete questionnaires frequently, and, therefore, the data are

extensive on choice and search for insurers. The data confirm the prediction on insurance choice (i.e. there is adverse selection and a lower premium increases coverage). However, the data are not in agreement with predicted search behavior.

We argue that search costs are heterogeneous and that individuals with low search costs are more likely to obtain an offer from a collective contract. This generates a situation of price discrimination which causes that individuals without an offer from a collective contract (and most likely high search costs) pay a higher premium and also obtain a reduced insurance coverage. Stahl (1989) argues that fewer informed consumers (as is the case in the market for individuals without collective contract) leads to more dispersion is premiums. From this observation one may question the usefullness of allowing for collective contracts. Without collective contracts there would be less variation in premiums and insurance coverage within the full population, which might equalize the access to health care.

Our paper contributes to the literature on testing consumer search models. Only a small empirical literature focusses on search in insurance markets. Pauly, Herring and Song (2002) consider the choice for health insurances and Brown and Goolsbee (2002) focus on the market for life insurances. Both papers use data from the US to investigate the consequences of the introduction of internet search, which should have lowered search costs. Both papers show that the empirical predictions are in agreement with the consumer search models (e.g. Stahl, 1989). Sorensen (2000, 2001) considers the retail market for prescription drugs. Sorensen (2000) concludes that the data are in agreement with search theory and that less than one-third in prize dispersion can be attributed by pharmacy heterogeneity. All empirical papers on consumer search use, however, the observed distribution of prices to infer the importance of incomplete information and search. Our data contain direct measures for consumer search. Furthermore, we study a well-defined institutional setting in which the rules and timing of actions are very much regulated.

The remainder of the paper is as follows: we start in section 2 with providing more background and details on the reform of the health insurance system in The Netherlands. Section 3 builds and discusses the search model. The data used for the empirical part are discussed in section 4 and section 5 gives results and discussion on the empirical analyses. Section 6 concludes.

2 The Dutch health insurance reform

In this section we first briefly discussed the old system for health insurance. Next we provide details of the new system and the and the major reform which took place in the Netherlands on January 1, 2006. We focus mainly on aspects which are important for our study.

2.1 The old system

Before the reform there was a mix of public and private insurance against the costs of health care. All employees, self-employed and social security recipients earning less than some income threshold were compulsory insured under the Sickness Fund Act. In 2005 the income threshold was €33,000 for employees and €21,050 for self-employed, which covered about 65% of the population.[1] The Sickness Fund Act guaranteed an extensive coverage against a relatively low insurance premium. In 2004 the annual premium was only €300.[2] The additional costs of the Sickness Fund Act were covered from general taxation and government contributions.

About 30% of the population earned more than the income thresholds for the Sickness Funds and thus had to get health care insurance on the private market.[3] Individuals were free to choose their insurer and coverage. In practice, private insurance plans were in coverage and quality of care very similar to Sickness fund insurance (with the exception of optional deductables). However, the premium had to fully cover the costs and therefore premiums with diversified by for example age and health risks. For a 30-year old without health problems the insurance premium for coverage similar to that of the sickness funds was about €230.

2.2 The new system

On January 1, 2006 a health insurance system of managed competition was introduced. This new system consists of three compartments. The first compartment is *catastrophic* insurance, which includes long-term care and care for chronically ill. This compartment

[1] Some civil servants (for example the police force) were covered by a compulsory insurance scheme irrespective of their income. This was about 5% of the total population.

[2] In 2005 a no-claim was introduced to reduce moral hazard. Insurees who did not visit a specialist or hospital or used prescribed medication could receive a cashback up to €225. The introduction of the no-claim increased insurance premiums with about 24%.

[3] Chronical ill with a high income, who would be refused by private insurers were covered by a special insurance.

is public and covers the entire population.

The second compartment is *basic* insurance of which the composition is determined by the government. The basic insurance is offered by all insurers and covers care provided by GPs, specialists, hospitals and physiotherapists and pharmaceutical care. It is compulsory for everyone to obtain basic insurance from one of the insurers. Insurers are obliged to accept everyone and are not allowed to differentiate insurance premiums. Insurers should thus compete on the price. In 2006, 43 different basic insurance labels were offered by 33 insurers.[4] In 2006 the nominal premium was about €1050 per year.[5] However, there was substantial dispersion in premiums. Figure 1 shows that monthly premiums rage from €82.50 to €97.75.

At the start of the new system Risk Equalization Fund was introduced to compensate insurers for an eventual disproportionate percentage of 'high risks' insurees due to the obligation to accept all applicants. This Fund is funded by a special tax, or income-based 'insurance premium'.

The third compartment contains *supplementary* insurance, which covers for example dental care, alternative medicine and extensions of the coverage from the regular insurance. Supplementary insurance is elective and both the premium and composition is decided by the insurers. Most insurers offer three or four different supplementary plans, ranging from limited additional coverage to very extensive coverage. In 2006 in total 137 different supplementary plans were available on the market, with a monthly premium ranging from €5 to €77 (see Dutch Healthcare Authority, 2006). Supplementary coverage is very popular, 92.6% of consumers obtained some supplementary insurance.

The system allowed individuals to voluntarily take an excess on their basic insurance. The annual reduction in premium was about €36 for every €100 additional excess. However, this option was not very population, over 95% of all individuals chose zero excess. Insurers could give for collective contract a maximum 10% discount on both the basic and supplementary insurance. The majority of collective contracts were offered via employers, but also other groups, such as labor unions, could negotiate collective contracts. In an individual received a collective offer also the partner was eligible for the discount. About 44% of all individuals were participating in a collective contract and the average discount was about 7.5%.

[4]The majority of the insurers are included in one of six large holdings. Only 11 insurers operate solo (see Vektis 2007).

[5]Children under age 18 are covered by their parents' insurance and their premium is paid by the government.

2.3 The reform

The reform was announced far before January 1, 2006. A large media campaign was setup to inform people about the new health insurance system and to explain the rules. In October 2005, 98.8% of the respondent in our data knew about the reform. However, only in December 2005 all insurers had to make an offer to all their insurees for a new heath insurance plan.[6] The offer was a combination of the basic insurance and supplementary coverage which was closest to the individual's old insurance plan. This offer was the default option for an individual. Individuals could change insurer or supplementary coverage until May 1, 2006, but the insurance bought provided coverage in retrospect from January 1. However, in the year of the introduction, insurers were obliged to accept *everybody* insured with them in 2005 for the supplementary coverage of their choice until March 1. In fact, all insurers announced that they would accept everyone for all supplementary coverage until March 1. The implied that almost all changes in insurer or supplementary coverage occurred before March 1.

The duration of all health insurance contracts is one year. Individuals can thus only change insurers on January 1 of each year. The long period for switching only applied to the year of the reform. Since then switching insurer or supplementary coverage in only possible in January (after all insurers have posted their premiums and conditions in December). Insurers usually take care of the administration involved in changing insurance company.

3 A consumer search model for health insurance

In this section we discuss a search model for health insurances and derive a number of empirically testable predictions. Consumers receive a default option without costs, but can also learn about other insurance plans by making search costs. Insurers post premiums both for basic insurance and one type of supplementary insurance and accept all applicants. We explicitly allow for discounts due to collective contracts.

3.1 Consumer behavior

Each consumer i is characterized by her health h_i, which is in the population distributed according to the distribution function $G(h)$. Each insurer offers the same two types of

[6] Most insurers already announced the premium for the basic insurance in October and November 2005. However, some insurers lowered their premium after learning the premiums of their competitors.

insurances, a basic insurance and an insurance with high coverage. All consumers derive the same (expected) utility u_l from basic insurance coverage. The expected utility consumers derive from the insurance with high coverage depends on the consumers health $u_h(h_i)$. In particular, individuals in good health derive less expected utility from an insurance with high coverage than individuals in bad health, so $u_h'(h_i) < 0$.

At the introduction of the new health care system, each consumer received an offer from their current insurer. The offer is characterized by a premium p_0 for the basic insurance and $(1+\beta)p_0$ for the insurance with high coverage. We impose that each insurer increases the premium with the same fraction β for obtaining supplementary insurance. Obviously, an individual prefers the insurance with a high coverage if $u_h(h_i) - u_l > \beta p_0$. The left-hand side of the inequality is decreasing in (good) health and the right-hand side is increasing in the premium p_0. This implies that individuals are more likely to take insurance with high coverage if they are in bad health (adverse selection) or if the premium p_0 is low.

Hypothesis 1: *Individuals with worse health are more likely to buy health insurance with high coverage (adverse selection).*

Hypothesis 2: *A lower premium induces individuals to take more health insurance coverage.*

Each consumer has a probability δ of also receiving an offer from a collective contract. The premiums of the collective contracts are p_c and $(1+\beta)p_c$, for basic insurance and insurance with high coverage respectively. Individuals prefer the collective contract if $p_c < p_0$, which also implies that those individuals who decided to take the collective contract over the initial offer are more likely to take insurance with high coverage. Let p_{ns} denote the lowest premium an individual gets offered. So without offer from collective contract $p_{\text{ns}} = p_0$ and with offer from collective contract $p_{\text{ns}} = \min\{p_0, p_c\}$.

After individuals have received the offer from their current insurer and maybe an offer from a collective contract, they can decide to search the market for an insurer with a lower premium. Before searching the market the consumer only knows that the distribution of premiums in the market equals $F(p)$. If the consumer decides to search, she makes costs c and will observe the premiums of all N insurers in the market.[7]

[7]We assume that when searching consumers observe all premiums because at the moment of the health insurance reform many independent websites listed the premiums of all insurers and explicitly allowed for comparing insurance plans between insurers. In our data over 60% of the individuals who

Obviously, the consumer will switch to another insurer if any of the other $N-1$ insurers in the market will offer a lower premium than the current best offer $p_{\min}$. The lowest premium $p_{\min}$ of the other $N-1$ insurers in the market is the first order-statistic of $N-1$ draws from the distribution function $F(p)$, which has expected value

$$\mathrm{E}[p_{\min}] = \int F^{N-1}(p)dp$$

Individuals only search if their expected benefits exceed the search costs c. The expected benefits are in terms of finding an insurer with a lower insurance premium. An individual searches if

$$\max\{u_h(h_i) - (1+\beta)p_{\mathrm{ns}}, u_l - p_{\mathrm{ns}}\} < \max\{u_h(h_i) - (1+\beta)\mathrm{E}[p_{\min}], u_l - \mathrm{E}[p_{\min}]\} - c$$

For individuals who received a collective offer p_{ns} is the lowest of two offers rather than just the initial offer. This implies that for a consumers with an offer from a collective contract the left-hand side will in expectation be smaller. Such an individual is thus less likely to devote effort for searching the market for a better offer.

Hypothesis 3: *Consumers without an offer from a collective contract more likely search for a lower premium.*

For ease of exposition we assume that the support of $F(p)$ is bounded from $[\underline{p}, \bar{p}]$. We can distinguish three types of individuals. First, individuals in bad health who always choose health insurance with a high coverage. For these individuals health h_i is below $\underline{h}$ for which $u_h(\underline{h}) - u_l = \beta\bar{p}$. Second, there are individuals in such good health that they always only take basic insurance, so h_i exceeds $\bar{h}$ for which $u_h(\bar{h}) - u_l = \beta\underline{p}$. And third, there are individuals with heath h_i between $\underline{h}$ and $\bar{h}$ who prefer basic insurance in case of high premium $\bar{p}$ and insurance with high coverage in case of low premium $\underline{p}$.

For individuals with such a bad health that they always prefer health insurance with high coverage, the search decision simplifies to

$$(1+\beta)p_{\mathrm{ns}} > (1+\beta)\mathrm{E}[p_{\min}] + c \qquad \text{or} \qquad p_{\mathrm{ns}} > \mathrm{E}[p_{\min}] + \frac{c}{1+\beta}$$

searched for a better offer indicate that they used such websites.

For individuals in good health the search decision is

$$p_{\text{ns}} > \text{E}[p_{\min}] + c$$

Since premiums do not depend on the health status, this implies that the individual in bad health has a lower premium threshold for searching than the individual in good health.

Hypothesis 4: *Individuals with worse health are more likely to search the market.*

Individuals in the third group only obtain health insurance with a high coverage if the premium is sufficiently low. Searching the market (or getting an offer from a collective contract) can only reduce the premium. And therefore some individuals who switch insurer to get a lower premium might also switch to a health insurance with high coverage.

In the model we made three important assumptions. First, we imposed that there is dispersion of premiums in the market, i.e. $F(p)$ is non-atomic. In the next subsection we sketch the behavior of insurers to argue that in equilibrium there is indeed premium dispersion. However, if there would not be any dispersion of premiums in the market, search would never be beneficial. So consumer behavior would reduce to only choosing between basic insurance and health insurance with high coverage for which the model predicts adverse selection.

The second key assumption is that we imposed that the premium for insurance with high coverage is proportional to basic health insurance. Alternatively, we could choose an additive specification implying that the premium for health insurance with high coverage equals $p + \beta$. Such a specification would imply that consumers choose between basic insurance and insurance with high coverage on comparing $u_h(h_i) - u_l$ and β. Since this is independent of the premium, individuals make their coverage choice already before learning about the initial offer. The individual's health status affects the decision for coverage, but is also no longer relevant in the choice for searching an insurer. The model thus simplifies to a consumer search model with homogeneous products and homogenous individuals. In this specification the only possible equilibrium is one where no consumer searches the market because all insurers have the same premium.

The final key assumption is that individuals who search the market observe all premiums in the market. This differs from the usual assumption in consumer search models (e.g. .....) that searching consumers see premiums sequentially and make search costs

for observing each additional premium. Our predictions are robust against changing the search rule. Both search rules generate dispersion of premiums in equilibrium and similar behavioral predictions for consumers.

3.2 Premium dispersion in equilibrium

The testable predictions of consumer behavior depend on existence of dispersion in premiums in the market. In this subsection we argue that in equilibrium there is indeed premium dispersion in the market. Suppose there are N insurers in the market, which all have the same marginal costs m for insurance with basic coverage and $(1+\beta)m$ for insurance with high coverage.[8] Insurers only differ in their pre-reform market share θ_j.

Each insurer keeps individuals from its market share if these individuals do not get a offer from a collective contract with a lower premium and do not search. Only the insurer with the lowest premium in the market attracts individuals who decide to search. We assume that all insurers have the same market share in collective contracts as their overall market share. And all insurers give in a collective contract the same discount α on the premium.

From the behavior of consumers we know that there is heterogeneity in search behavior. Individuals in bad health search at a lower expected premium reduction than individuals in good health. Insurers with a high market share can post a relatively high premium, which would imply that they might lose some individuals who get offers from collective contract with other insurers and some individuals with bad health who search the market. The big insurer would thus lose some of its market share, but make a relatively high profit per insuree. An insurer with a low market share might post a much lower premium to avoid losing relatively many insurees who get offers from collective contracts from other insurers and to induce many consumers to search the market. This means that the small insurer makes a relatively low profit per insuree, but gains relative to its market share many new insurees (if it manages to become the insurer with the lowest premium). Obviously, the degree of price dispersion depends on the size of the search costs c. But also the variation in market shares θ_j and the distribution of health $G(h)$ in the population are important.

Premium dispersion is not only a theoretical prediction. But after the Dutch health care reform substantial premium dispersion was observed in the market. Indeed, the

[8] Obviously, marginal costs should depend on the health status of the insuree. However, recall that the risk equalization fund compensates insurers for taking individuals with bad health in such way that expected costs of all insurees are the same.

lowest premium in the market was posted by a small insurer (named *AnderZorg*). Insurers are very reserved to give information on market shares. However, in the newspapers one of the five insurers with over one million insurees (*Agis*, which posted the highest premium among them) was considered as the biggest loser of the reform, while the other four insurers with over a million insurees mainly maintained their market share because of writing many collective contracts. In particular, using our own data to calculate the fraction collective contracts, there is a positive correlation (0.40) between the premium posted by insurers and the fraction of insurees under collective contracts.

4 The data

Our data are from the Dutch Health Care Consumer Panel which is collected by the Netherlands Institute for Health Services Research (NIVEL). The panel contains about 1500 individuals and should be representative for the overall population. For women the age structure in the panel largely coincides with Dutch population, for men older individuals are overrepresented in the panel. Individuals in the consumer panel complete questionnaires on health care, health insurance and related issues between two and five times per year. After 2 to 3 years panel members are replaced to maintain representativeness. The content varies substantially between questionnaires. In the empirical analyses we will use the information from the 15 questionnaires send out between 2004 and 2008. This observation period covers the time period around the Dutch health insurance reform. It should be noted that most questionnaires are not send to all panel members. Usually around 70% of the panel members receive a particular questionnaire. The main disadvantage is that sample sizes become smaller quickly when combining variables from different questionnaires. Socioeconomic and other background variables are only asked once, at the moment a participant first enters the consumer panel.

In December 2005, so just before the reform, the participants received a set of questions about the offer of their current insurer. It was also asked if they were planning to search the market for health insurance at another insurer. In April 2006 information about the actual choice of the insurance plan and insurer was collected, as well as information on the total number of collective offers participants received and whether they accepted one of these collective offers. We thus know the names of the pre-reform and the post-reform insurer and we know if the individual is participating in a collective contract. We observed whether or not individuals have a voluntary excess or

supplementary coverage, but not which coverage. However, individuals report the total amount of premium for health insurance. So combining this with the known premium for basic coverage of each insurer (and the participation in a collective contract) allows to determine the amount paid for supplementary coverage.

Table 1 contains descriptive statistics. We distinguish between individuals with and without an offer from a collective contract. More than 70% of all individuals received an offer from a collective contract. Individuals with a collective contract are more often employed and less often retired, so they are also on average younger, have a higher income and are more educated.[9] This is the direct consequence that two-third of the collective contracts are with employers and one-third with labor unions, consumer organizations, etc. Both types of collective contracts include an average reduction of about 6.5% on the basic insurance and 8.5% of supplementary insurance. Couples are more likely to receive an offer from a collective contract. Collective contract most often cover all family members, so a couple is more likely to receive at least one offer. There are however no differences in self-assessed physical and mental health between both groups, neither in the average nor in the distribution, and also expected health care use is very similar. It should be noted that self-assessed health is asked when individuals first enter the panel, while expected heath care use was asked in April 2006.

Individuals with an offer from a collective contract change insurer and insurance plan more often, but end up with a similar plan in terms of fraction taking excess and some supplementary insurance. It should however be noted that about 95% of the individuals take some supplementary insurance and only 7% take voluntary excess. Individuals with an offer from a collective contract pay only 3.1% less on health insurance while having about 7% discount on the premium. Comparing the premiums that are paid, individuals with a collective offer spend more on supplementary insurance, both before and after discounts. Table 2 compares health insurance decisions in our sample to nationwide behavior. In our sample more individuals have a collective insurance (54%) than nationwide (44%). In terms of supplementary insurance, voluntary excess and insurance premium our sample matches the nationwide statistics fairly well.

The questionnaire of April 2006 contained a question on search behavior. In particular, individuals were asked to answer the question *"Did you search for a new health*

[9]We do not observe income directly, but rather observe the amount of government compensation an individual receives. Very low income households (less than €17,500 per year) receive the maximum monthly compensation of €33.58 for a single and €96.25 for a couple. Partial (income dependent) compensation was paid to low income household (below €25,068 for singles or €40,120 for couples).

insurance contract?". Table 3 displays the fraction of individual searching the market. In total about 45% of the individuals reports to have searched actively for other health insurance plans. Search is however less common among individuals without an offer from a collective insurance.

It should be noted that only about 30% of all individuals did not receive an offer from a collective contract, while 33% of the individuals received multiple offers from collective contracts. The table shows that searching is positive related to the number of offers received from collective contracts. This remains true after stratifying the sample by labor market status.

The question about expected health care use that was asked in the April 2006 questionnaire had 6 options to choose from. Answers 1 to 5 formed a categorical scale from *very little* to *a lot*. The sixth answer was *don't know*. The 9% of individuals that answered *don't know* were removed from the sample for all analyses that used the expected use of health care variable. Furthermore, the categories *quite a lot* and *a lot* were merged where the categories are used as dummy variables as the latter has only few observations.

5 Empirical results

In this section we use the data to test the hypotheses from the theoretical model. This should provide insight in the relevance of a consumer search model to the behavior of individuals during the Dutch health insurance reform. Below we sequentially discuss the hypotheses and test their validity

5.1 Testing the hypotheses

Hypothesis 1: *Individuals with worse health are more likely to buy health insurance with high coverage (adverse selection).*

Adverse selection implies that individuals with high expected health care use (those in bad health) take more supplementary health insurance. We investigate the presence of adverse selection by investigating how the value of supplementary coverage depends on expected health care use and on self-assessed health. In the theoretical model there were only two levels of health care insurance, implying a binary indicator for taking supplementary insurance. In reality, there is, however, a range of additional coverages. Taking the premium of the supplementary insurance as measure for it coverage is not

attractive because of discounts and variation in insurance premium between insurers. Alternatively, we define the coverage of the supplementary insurance as the premium paid for supplementary insurance (before discounts) divided by the premium for basic insurance (before discounts). This gives the coverage of supplementary insurance as fraction of the basic insurance coverage, which is the same for all individuals at all insurers. This variable shows that supplementary insurance increases the coverage by on average 27%.

Column (1) in Table 4 shows the estimation results from regressing the coverage of supplementary insurance on expected health care use. Individuals who expect very little use of health care have significantly less supplementary insurance than individuals who expect to use more health care. Beyond expecting to use more than very little health care, the supplementary insurance coverage is not increasing in expected health care use. This suggests that individuals with little expected health care use prefer a low level of supplementary insurance coverage, while for individuals who expect more health care use their expected utility increases if they take more substantial supplementary insurance coverage, which is consistent with our consumer search model.

The question on expected heath care use was asked in the same questionnaire as the question on the obtained health insurance plan, which was in April 2006. This might cause two problems. First, the question concerned the full year 2006 and individuals might thus already have a partial observation on their health care use. Furthermore, individuals report their expected health care use after having decided about their health insurance plan. The expected health care use may thus reflect moral hazard as well as adverse selection. The next question in the questionnaire can be used to distinguish between moral hazard and adverse selection. In particular, the question asked: *"Did you take into account the amount of health care you expect to use this year in deciding upon which health insurance to purchase?"* Individuals positively responded to this question could indicate the degree to which expected health care use influenced their insurance decision. Table 17 summarizes the response on these questions. Individuals who expect to use a lot of health care are more likely to indicate that their expected health care use influenced their health care insurance decision.

As an alternative to expected health care use, we can also use self-assessed health to investigate adverse selection. Self-assessed health is asked only once when an individual first enters the panel. This implies that it is always asked before the health insurance reform and thus before individuals decide about their insurance plan. However, for

some individuals the information on self-assessed health is already a few years old[10]. Column (2) of Table 4 show the results from regressing the supplementary health insurance coverage on self-assessed physical and mental health. Only physical health has a significant impact on the health insurance decision. Recall that a higher value of health indicates worse health. Individuals with a good physical health thus obtain on average less extensive supplementary health coverage than individuals with bad physical health. Again this indicates significant adverse selection, which suggests that the first hypothesis from the consumer search model is confirmed by the data.

Hypothesis 2: *A lower premium induces individuals to take more health insurance coverage.*

To investigate this second hypothesis we regress the supplementary insurance coverage not only on expected health care use or self-assessed health but also on the premium for the basic health insurance. Columns (3) and (4) of Table 4 report the results for this regression. The basic insurance premium has significant negative impact on the supplementary insurance coverage. So individuals who pay a lower premium are more likely to obtain more supplementary insurance coverage (even after controlling for expected health care use or health). This confirms the second hypothesis from the consumer-search model.

To investigate the robustness of conclusion we add additional control variables. First, we include gender and income in the regression. The results are shown in the columns (5) and (6). Women are more likely to take more health insurance coverage, which is consistent with the common belief that women are more risk-averse than men. Furthermore, health insurance is a normal good (i.e. health insurance coverage increases significantly with the income of individuals). But what is more important is that the effect of the premium on supplementary health insurance remains negative and significant. This is also the case when adding age, households composition and years of education to the regression (see column (7) and (8)). None of these covariates has a significant effect on supplementary health insurance coverage and other covariate effects do not change after including these additional variables.

Hypothesis 3: *Consumers without an offer from a collective contract more likely search for a lower premium.*

[10] As panel members are replaced after 2 to 3 years, the information about health can at maximum be 2 or 3 years old.

Individuals who received an offer from a collective contract can choose (without having searched the market) between two offers. Their best offer has thus in expectation a lower premium than individuals who did not receive an offer from a collective contract. The expected returns from searching the market are lower for individuals with an offer from a collective contract, and, therefore, they should not search as often.

Figure **??** shows for individuals with an without an offer from a collective contract, the density function of the initial offers p_0 from the current insurer (before the reform). The density functions do not differ. So as long as at least some individuals benefit from collective contracts, individuals with an offer from a collective contract on average receive a better best offer. It should be noted that if the offer from a collective contract was not the final accepted offer, our data are not informative on this offer.

Recall from the previous section that individuals with an offer from a collective contract are on average more likely to search (see Table 3). Recall that this table was based on individuals indicating searching for *a new health insurance contract*. A potential problem might be that individuals could consider a collective contract as a new health insurance contract. They would then classify themselves as searchers after having compared the initial offer and the collective offer, which is not regarded as searching in our model. Therefore, we consider a follow-up question (to the search question): *"What sources did you use when searching for a health insurance contract?"* Multiple answers were allowed. Individuals most often report having used the internet (73%), especially the websites that compare insurance contracts from all insurers (84% of those having used the internet used these websites) and websites of insurance companies (80% of those having used internet used these). Other sources where advice from a family member (23%), contact with a health insurer via e-mail or telephone (21%) and advertisements (19%).

We consider as a more strict definition for search only using one of the (independent) websites that compare insurance contracts of all insurers. According to this definition, 32% of those with a collective offer and only 19% of those without a collective offer search. Table 5 shows in a probit model the effects of getting an offer from a collective contract on searching according to this strict definition. Column (1) shows that receiving an offer from a collective contract significantly increases the propensity to search. Column (2) shows that this effect remains also after controlling for the individual labor market status. In column (3) we also add the premium p_0 for the initial offer for the basic insurance coverage. This shows that individuals with a collective offer are significantly more likely to search if the initial offer was high, while the opposite is

true for individuals without a collective offer. This results remains present also after controlling for other observed characteristics (see column (4)). The search behavior is thus not consistent with the third hypothesis from our simple consumer search model. In the next subsection we investigate further why the data reject this hypothesis.

Table 6 shows how often individuals switch insurer at the moment of the reform. We distinguish between individuals with and without an offer from a collective contract and those who searched and did not search the market. As one might expect individuals who have searched the market and those who received an offer from a collective offer are much more likely to switch insurer than their counterparts. It should be noted that in the table we used the strict definition of searching, which explains that even some individuals who did not receive an offer from a collective contract and did not search, still might switch insurer. This confirms that searching actually increases the likelihood of switching insurer and thus measures relevant individual behavior.

Hypothesis 4: *Individuals with worse health are more likely to search the market.*

Individuals in bad health derive more expected utility form an expensive health insurance with extensive coverage. Recall from the first hypothesis that this adverse selection was present in the data. Individuals with bad health are thus also more likely to benefit from searching the market. Since we imposed that all individuals have the same search costs and the premiums associated to offers are not correlated to health, individuals with worse health should search more often.

In Table 7 we show again estimation results for a probit model for searching, but we include health as explanatory variable. Again we use expected health care use and self-assessed health as measures for individual health. Column (1) and (2) indicate that both health and expected use do not have a significant impact on search behavior (although the coefficients have the expected signs). In column (3) and (4) we add individual characteristics, but this does not change the effect of health on search behavior. Finally, if we also add the premium of the initial offer, the effects of health on search behavior do not change. The results show positive, but insignificant effects of bad health and high expected health care use on searching. This implies that we cannot reject the fourth hypothesis of the model. However, the effects of health on searching are at most very small (if at all present).

5.2 Explaining search behavior

The consumer search model fails in explaining the search behavior of individuals and particularly the difference in search behavior between individuals with and without offers from collective contracts. In this subsection, we will investigate further what determines search behavior.

In our theoretical model we made a number of simplifying assumptions. First, we imposed that individuals are only heterogeneous in health, but have the same search costs. However, heterogeneity in search costs will only change the model predictions if the size of the search costs would be correlated to health. Indeed, Buchmueller, Feldstein and Strombom (2002) show for the US that less healthy individuals (so with higher expected health care expenditures) experience higher costs of switching medical provider and are also the least price sensitive. Second, we assumed that individuals know the distribution of premiums in the market. If individuals, however, don't know this distribution, receiving an offer from a collective contract might be informative on the spread of premiums and individuals might thus update their beliefs. Receiving an offer from a collective contract may then stimulate search. Third, we imposed that each individual has the same probability of getting an offer from a collective contract. In 2006, collective contracts were mainly with employers. This suggests that not every individual has the same probability of getting an offer from a collective contract. In particular, if getting an offer from a collective contract is correlated to the size of the search costs, the model predictions differ. Below we provide some empirical evidence on these three possible violations of the model assumptions.

There may be a number of reasons why the size of search costs would be related to individual health. First, within 85% of the couples both partners have the same insurer and they may have economies of scale when searching (i.e. one partner collects information and decides about which insurance to take). Furthermore, within a multi-person household, the probability is higher that someone has a bad health and thus high expected health care use. Second, older people, who on average have worse health than younger people, might have more problems collecting information. For example, older people may have more problems finding information on internet, which is the most used and probably cheapest search method. Indeed, only 50% of the people above age 65 have access to internet at home compared to about 90% of the individuals below age 65. However, even after controlling for household composition, age and other observed differences, getting an offer from a collective contract still has a positive and significant effect on search. Search costs may also be directly related to getting an offer from a

collective contract. An individual with such an offer has to compare this offer to the offer from the current insurer and therefore increases knowledge about the system, which reduces the costs of comparing further offers.

Another explanation why the size of search costs might be related to health is that individuals in bad health may be afraid that insurers will reject them. Before the reform it was common practice that in the private market insurers declined applicants. After the reform, insurers are not allowed to decline someone for basic insurance, but can deny supplementary insurance. Although all insurers announced beforehand that they would accept everyone even for supplementary insurance (which also happened), individuals with bad health might still worry about being rejected. The survey contains a question about about why people did not change insurer (which allows for multiple answers). Less than 1% indicates that they did not switch because they were afraid of being denied at another insurer.

A second possible explanation is that individuals do not know the distribution of premiums $F(p)$ in the market. Individuals believing that the variation in premiums is low, might decide not to search. Individuals who receive an offer from a collective contract may realize that the variation is premiums is larger than assumed. This may induce them to search actively. Although, we do not have any direct evidence on individual beliefs, it might be interesting to note that before the reform the government announced that the average premium would be about €1106. The actual premiums were between €990 and €1120, so most of them were below the premium announced by the government. This might imply that after learning their premium, most individuals believed that they received a good offer. If individuals are very unaware of the distribution of premiums, then those with a high offered premium from their current insurer (close to government's expectation) might believe that the variation in premiums is very low and thus will not search further. While those with a low premium offer from the current insurer may overestimate the variation in premiums and thus search for an even lower premium.

A third possible explanation is that not all individuals have the same probability of receiving an offer from a collective contract. Obviously, the probability of receiving an offer from a collective contract is related to being employed. However, even among employed workers there is substantial heterogeneity. In Table 8 we show estimation results from a probit model for getting an offer from a collective contract. Column (1) shows that indeed employed individuals are more likely to receive an offer from a collective contract. Health does not have a significant impact on whether or not individuals get an offer from a collective contract. Next, we include as regressor a variable

which measures the knowledge of individuals about the health insurance reform. This variable is based on 15 statements in the questionnaire of October 2005 (so before premiums were announced and collective offers were made) to which individuals had to answer true of false (or they could answer don't know). The knowledge variable equals the number of correct answers minus the number of wrong answers. This guarantees that someone who doesn't know an answer gets the same expected score when guessing as when answering don't know. The average score in our population equals 4.2 (with a maximum of 13 and a minimum of -7). In column (2) we add this as additional regressor. Individuals with more knowledge about the health insurance reform are much more likely to get an offer from a collective contract. Column (3) shows that this effect remains even after controlling for other individual characteristics. The only important individual characteristic is income. Offer from collective contracts are associated to high incomes.

Obviously, not all employed workers have the same probability of receiving an offer from a collective contract. The results imply that insurers mainly write collective contracts for firms with higher paid employees and with employees with more knowledge about the health care reform. Of course, it might be that this is mainly driven by the firms, because higher-income workers or workers with more knowledge about the reform push their firm harder to get a collective contract. Or larger firms (with previously many private insured employees) already had a collective contract with an insurer. Knowledge about the health insurance reform is also strongly positively correlated to searching.

Collective offers are thus made more to individuals who were more likely to compare insurers, i.e. individuals with low search costs. For most insurers the premium with a discount from a collective offer is below the regular premiums of the other insurers. Insurers can thus set higher regular premiums, because average search costs in the market for regular premiums are relatively high. This argument follows Stahl (1989) who shows within a consumer search model that if the number of informed (low costs) individuals is reduced (as is the case in the market without collective contracts) the prize dispersion increases. We saw above that individuals with a higher premium take less supplementary health insurance coverage.

The possibility of offering collective contract thus causes that insurers apply third degree price discrimination, which may be welfare reducing. Therefore, it is surprising that the government actually allowed for collective contracts. The main reason for the government to allow for collective contract was that it allowed insurers to insure most employees of a firm for health insurance and at the same time also insure the firm

for the costs of for example sickness absenteeism. The government hoped that such combinations of insurances would induce insurers to put more effort in prevention of health problems.

Our consumer search model should be modified such that it allows for heterogeneity in search costs and the probability of receiving a collective offer should be negatively correlated to search costs. If this is the case, then the model is, of course, capable of explaining that individuals with offers from collective contracts are more engaged in search. We simulated the model with both homogeneously and heterogeneous search costs. Results are listed in Table 14 and show that heterogeneity in search costs can generate that individuals with a collective offer more often search and obtain insurances with a lower premium for the basic coverage. Because of the lower premium, they obtain more supplementary coverage and pay an higher overall premium (which is also what the data show). However, heterogeneity in search costs between individuals with a without an offer from a collective contract can not explain that among individuals without an offer from a collective contract search is negatively related to the offer from the current insurer. Also choosing for the default in case of a decision overload as discussed by Frank and Lamiraud (2008) cannot explain this. It could only be explained is insurers base their premium on the estimated search costs among their insurees (recall that individuals are not randomly distributed over insurers, but that this is the consequence of the old combined public and private system). An alternative explanation could be that individuals do not have the correct belief about the distribution of premiums.

6 Conclusion

Policy implications: Having a Risk Equalization Fund is beneficial since it stimulates insurers to reduce premiums. Setting a low premium might attract many 'bad risks' and without a Risk Equalization Fund that compensates insurers, this would hold back insurance companies from setting a low premium. Collective contracts are disadvantageous as they give insurers some market power and thus the opportunity to raise premiums. An insurer could, for example, charge a very high premium on the individual market, which facilitates him to offer high discounts on collective contracts without depleting all profits. Another example would be collective contracts offered by insurers to particular high risk groups for whom the compensation from the Risk Equalization Fund is higher than the extra costs they claim. This kind of rent seeking behavior is

observed in later years. TO BE COMPLETED.

References

Blair, S.N., 1984. "How to asses exercise habits and physical fitness" in: Matarazzo, J.D., Weiss, Sharlene M., Herd, J.A., Miller, N.E. and Weiss, Stephen M., "Behavioral Health", *John Wiley & Sons, Inc.*, New York.

Brown, J.R. and Goolsbee, A., 2002. "Does the Internet Make Markets More Competitive? Evidence from the Life Insurance Industry", *Journal of Political Economy* 110, p.481-507.

Buchmueller, T.C., Feldstein, P.J. and Strombom, B.A., 2002. "Switching Costs, Price Sensitivity and Health Plan Choice", *Journal of Health Economics* 21, p.89-116.

Colombo, N. and Tapay, F., 2004. "Private Health Insurance in the Netherlands: A Case Study", *OECD Health Working Papers* 18.

Conniffe, D. and O'Neill, D., 2008. "An Efficient Estimator for Dealing with Missing Data on Explanatory Variables in a Probit Choice Model", *NUIM Working Paper* #N1960908.

Dutch Healthcare Authority (NZa, Nederlandse Zorgautoriteit), 2006. "De tussenstand op de verzekeringsmarkt. Monitor zorgverzekeringsmarkt juni 2006" (The interim score on the health insurance market. Monitor health insurance market June 2006).

Frank, R. and Lamiraud, K., 2008. "Choice, Price Competition and Complexity in Markets for Health Insurance", *NBER Working Paper* 13817.

Janssen, M.C.W. and Moraga-González, J.L., 2004. "Strategic Pricing, Consumer Search and the Number of Firms", *Review of Economics and Statistics* 71, p.1089-1118.

Janssen, M.C.W., Moraga-González, J.L. and Wildenbeest, M.R., 2005. "Truly costly sequential search and oligopolistic pricing", *International Journal of Industrial Organisation* 23, p.451-466.

Pauly, M.V., Herring, B. and Song, D., 2006. "Information Technology and Consumer Search for Health Insurance", *International Journal of the Economics of Business* 13, 45-63.

Sorensen, A.T., 2000. "Equilibrium Price Disperion in Retail Markets for Prescription Drugs", *Journal of Political Economy* 108, p.833-850.

Sorensen, A.T., 2001. "An Emperical Model of Heterogeneous Consumer Search for Retail Prescription Drugs", NBER Working Paper 8548.

Stahl, D.O., 1989. "Oligopolistic Pricing with Sequential Consumer Search", *American Economic Review* 79, p. 700-712.

Vektis, 2007. "Zorgmonitor. Jaarboek 2007. Financiering van de zorg in 2006" (Health care monitor. Yearbook 2007. Financing health care in 2006).

Table 1: Descriptive statistics

	collective offer	
	no	**yes**
fraction	27.6%	72.4%
age (in years)	56.0	51.2
female	59.9%	54.6%
couple	75.9%	81.0%
has children	35.4%	46.7%
low income	38.9%	29.0%
very low income	12.2%	6.3%
years of education	11.8	12.4
employed	35.3%	58.4%
retired	44.1%	27.8%
physical health (1-5 scale; 1=excellent)	2.948	2.773
mental health (1-5 scale; 1=excellent)	2.408	2.389
expected health care use (1-5 scale; 1= a lot)	2.763	2.664
changed insurer	10.7%	24.8%
changed plan, same insurer	12.3%	15.4%
has voluntary excess	7.3%	7.1%
has supplementary insurance	95.8%	95.4%
total insurance premium (in €)	108.15	105.89
basic insurance premium (in €)	87.43	83.80
supplementary insurance premium (in €)	20.62	22.09
basic insurance premium before discount (in €)	87.43	87.74
supplementary insurance premium before discounts (in €)	20.62	23.41
health insurance from sickness fund in 2005	65.8%	57.8%
private health insurance in 2005	30.4%	35.6%
civil servant health insurance in 2005	3.7%	6.6%
number of observations	322	844

Table 2: Descriptives sample vs. national

	Sample	National*
Fraction with collective insurance	0.54	0.44
Fraction with supplementary insurance	0.95	0.93
fraction among collectively insured	0.96	0.94
fraction among indivdually insured	0.94	0.92
Fraction switch insurer	0.21	0.18
fraction among collectively insured	0.25	0.28
fraction among individually insured	0.11	0.10
Fraction positive excess	0.07	0.05
fraction of which has excess of € 100	0.31	0.38
fraction of which has excess of € 200	0.33	0.18
fraction of which has excess of € 300	0.11	0.10
fraction of which has excess of € 400	0.03	0.04
fraction of which has excess of € 500	0.22	0.31
average premium paid for standard insurance	84.56	85.42
average premium paid for collective standard insurance	82.04	82.25
average premium paid for individual standard insurance	87.63	87.75
average premium standard insurance before discounts	87.77	88.33

* Source: Vektis (2006)

Table 3: Fraction of searchers by receiving collective offers and labor market status.

	All	Employed	Retired	Other
no collective offer	0.311 (267)	0.453 (95)	0.171 (117)	0.364 (55)
1 collective offer	0.472 (377)	0.505 (208)	0.333 (114)	0.636 (55)
2+ collective offers	0.583 (309)	0.653 (193)	0.382 (76)	0.625 (40)

Note: number of observations in brackets

Other=unemployed, disabled, in full-time education or home duties

Table 4: Estimation results from regressing supplementary insurance coverage.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
little expected care	0.033**		0.034**		0.032*		0.028*	
	(0.017)		(0.016)		(0.017)		(0.017)	
average expected care	0.035**		0.038**		0.039**		0.038**	
	(0.017)		(0.016)		(0.017)		(0.017)	
much expected care	0.024		0.032*		0.038**		0.035*	
	(0.018)		(0.018)		(0.018)		(0.018)	
physical health		0.11*		0.014**		0.017***		0.016**
		(0.006)		(0.006)		(0.006)		(0.006)
mental health		−0.009		−0.01		−0.008		−0.008
		(0.006)		(0.006)		(0.006)		(0.006)
monthly basic insurance premium (/100)			−0.332***	−0.464***	−0.253*	−0.395***	−0.256*	−0.412***
			(0.128)	(0.132)	(0.130)	(0.138)	(0.133)	(0.139)
female					0.016*	0.018**	0.019*	0.021**
					(0.010)	(0.010)	(0.010)	(0.010)
low income					−0.034***	−0.031***	−0.031***	−0.030***
					(0.010)	(0.010)	(0.011)	(0.011)
very low income					−0.062***	−0.062***	−0.056***	−0.058***
					(0.016)	(0.017)	(0.020)	(0.021)
age							0.0001	0.0002
							(0.0004)	(0.0004)
single							0.001	−0.001
							(0.015)	(0.014)
has children							0.005	0.004
							(0.011)	(0.010)
years of education							0.002	0.001
							(0.002)	(0.002)
intercept	0.233	0.252	0.510	0.637	0.447	0.571	0.421	0.563
	(0.014)	(0.016)	(0.110)	(0.113)	(0.110)	(0.117)	(0.123)	(0.124)
number of observations	858	933	858	933	823	893	817	888

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

Note: The omitted category for expected use is *very little*

Note: Physical and mental health are measured on a 5-point scale, where 1 is *excellent* and 5 is *poor*.

Table 5: Probit searched for insurance via comparison websites

	(1)	(2)	(3)	(4)
collective offer	0.417***	0.342***	−14.612***	−13.949**
	(0.093)	(0.098)	(5.417)	(5.729)
employed		−0.047	−0.053	−0.237*
		(0.122)	(0.124)	(0.140)
retired		−0.692***	−0.687***	−0.493***
		(0.139)	(0.142)	(0.183)
monthly basic insurance premium offered X no collective offer			−0.097*	−0.097*
			0.055	(0.058)
monthly basic insurance premium offered X collective offer			0.073***	0.065**
			(0.028)	(0.029)
female				0.056
				(0.104)
years of education				0.054**
				(0.021)
age				−0.014***
				(0.005)
low income				−0.090
				(0.116)
very low income				0.015
				(0.220)
single				−0.064
				(0.136)
children				−0.064
				(0.108)
kennisnieuwstelsel2005				
intercept	−0.890	−0.617	7.943	8.120
	(0.082)	(0.122)	(4.820)	(5.130)
p-value test statistic		0.189	0.967	0.870
obs	1143	948/1143	603/948	570/893

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

Note: column (2) uses the O'Neill estimator, with a smaller number of observations for employed and retired and a larger number of observations for all other variables.

Note: columns (3)-(4) use the O'Neill estimator, with a smaller number of observations for monthly basic insurance premium and a larger number of observations for all other variables.

Table 6: Fraction of switchers by collective offer receival and search behaviour

	collective offer search	collective offer don't search	no collective offer search	no collective offer don't search
switched insurer	30%	21%	26%	7%
not switched insurer	70%	79%	74%	93%
observations	258	561	58	254

Note: measure of search used here is searched via comparison websites

Table 7: Probit searched for insurance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
little expected use	−0.178		−0.268		−0.261		−0.219	
	(0.138)		(0.169)		(0.172)		(0.176)	
average expected use	−0.084		−0.187		−0.175		−0.069	
	(0.136)		(0.167)		(0.170)		(0.176)	
much expected use	−0.247		−0.083		−0.054		0.084	
	(0.152)		(0.185)		(0.190)		(0.197)	
physical health		−0.061		0.002		0.037		0.096
		(0.050)		(0.062)		(0.064)		(0.066)
mental health		−0.012		−0.073		−0.082		−0.070
		(0.048)		(0.061)		(0.063)		(0.064)
offered monthly premium			0.033	0.031	0.028	0.024	0.029	0.029
basic insurance			(0.023)	(0.022)	(0.023)	(0.023)	(0.024)	(0.024)
female					0.13	0.145	0.065	0.057
					0.107)	(0.103)	(0.118)	(0.113)
low income					−0.280**	−0.317***	−0.081	−0.106
					(0.118)	(0.113)	(0.130)	(0.125)
very low income					−0.402*	−0.425**	0.094	0.036
					(0.215)	(0.205)	(0.253)	(0.241)
age							−0.014***	−0.017***
							(0.005)	(0.004)
single							−0.221	−0.166
							(0.158)	(0.154)
children							−0.049	−0.025
							(0.123)	(0.120)
years of education							0.078***	0.071***
							(0.024)	(0.023)
intercept	−0.408	−0.382	−3.208	−3.126	−2.781	−2.529	−3.148	−3.086
	0.118	0.137	2.005	1.995	2.087	2.081	2.133	2.125
obs.	1040	1128	649	711	620	678	617	675

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

Table 8: Probit receive collective offer

	(1)	(2)	(3)	(4)
employed	0.550***	0.536***	0.298**	0.364**
	(0.129)	(0.134)	(0.150)	(0.156)
retired	−0.036	−0.022	−0.068	−0.041
	(0.129)	(0.134)	(0.180)	(0.187)
physical health	−0.090	−0.120**	−0.115*	
	(0.058)	(0.060)	(0.062)	
mental health	0.075	0.101*	0.133**	
	(0.055)	(0.057)	(0.059)	
little expected use				0.015
				(0.178)
average expected use				0.179
				(0.179)
much expected use				0.124
				(0.195)
knowledge reform		0.033**	0.027*	0.038**
		(0.015)	(0.016)	(0.017)
female			−0.143	−0.142
			(0.108)	(0.114)
low income			−0.271**	−0.260*
			(0.115)	(0.120)
very low income			−0.402**	−0.386*
			(0.2030	(0.215)
age			−0.003	−0.003
			(0.005)	(0.006)
single			−0.065	0.012
			(0.136)	(0.141)
has children			0.047	0.053
			(0.117)	(0.120)
years education			0.020	0.026
			(0.021)	(0.023)
intercept	0.426	0.309	0.498	0.188
	(0.205)	(0.225)	(0.476)	(0.477)
obs.	942	879	829	755

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

Table 9: Probit switched insurer

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
collective offer	0.505***	0.468***	0.442***	0.441***	0.429***	0.471***	0.456***
	(0.108)	(0.111)	(0.115)	(0.115)	(0.120)	(0.141)	(0.119)
searched	0.384***	0.321***	0.322***	0.329***	0.293***	0.314***	0.332***
	(0.093)	(0.094)	(0.097)	(0.097)	(0.101)	(0.116)	(0.098)
employed		−0.006	−0.002	−0.046	−0.071	−0.135	−0.046
		(0.134)	(0.148)	(0.153)	(0.156)	(0.191)	(0.158)
retired		−0.344**	−0.247	−0.054	−0.045	0.065	−0.064
		(0.152)	(0.169)	(0.200)	(0.204)	(0.250)	(0.204)
female			0.105	0.058	0.095	0.064	0.037
			(0.098)	(0.102)	(0.106)	(0.123)	(0.103)
low income			−0.141	−0.179	−0.209*	−0.136	−0.215*
			(0.107)	(0.112)	(0.117)	(0.134)	(0.116)
very low income			−0.405*	−0.375*	−0.378*	−0.314	−0.356
			(0.208)	(0.226)	(0.230)	(0.285)	(0.227)
age				−0.008	−0.009*	−0.012*	−0.009*
				(0.005)	(0.005)	(0.006)	(0.005)
single				−0.006	−0.007	−0.063	−0.057
				(0.132)	(0.137)	(0.162)	(0.137)
children				0.070	0.062	0.059	0.051
				(0.106)	(0.110)	(0.127)	(0.107)
years of education				−0.017	−0.017	−0.011	−0.017
				(0.020)	(0.021)	(0.025)	(0.021)
knowledge					0.315		
					(0.281)		
monthly basic insurance premium offered						0.018	
						(0.028)	
physical health							0.063
							(0.061)
mental health							−0.038
							(0.057)
intercept	−1.344	−1.196	−1.198	−0.624	−0.728	−2.120	−0.610
	(0.096)	(0.142)	(0.188)	(0.436)	(0.466)	(2.506)	(0.468)
p-value test statistic		0.460	0.235	0.589	0.642	0.454	0.574
obs	1131	939/1131	890/1069	884/1061	852/995	566/1061	865/1037

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

Note: columns (2)-(5) and (7) use the O'Neill estimator, with a smaller number of observations for employed and retired and a larger number of observations for all other variables.

Note: column (6) use the O'Neill estimator, with a smaller number of observations for monthly basic insurance premium, employed and retired and a larger number of observations for all other variables.

Table 10: Supplementary coverage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
change insurer	−0.015	−0.018*	−0.018	−0.016	−0.022*	−0.018	−0.026*
	(0.011)	(0.011)	(0.011)	(0.011)	(0.012)	(0.011)	(0.014)
female		0.016*	0.021**	0.022**	0.021**	0.020*	0.020
		(0.009)	(0.010)	(0.010)	(0.011)	(0.0100	(0.012)
low income		−0.040***	−0.036***	−0.038***	−0.036***	−0.036***	−0.030**
		(0.010)	(0.011)	(0.011)	(0.011)	(0.011)	(0.014)
very low income		−0.065***	−0.056***	−0.063***	−0.061***	−0.064***	−0.018
		(0.018)	(0.021)	(0.021)	(0.022)	(0.021)	(0.026)
age			0.0003	0.0003	0.0001	0.0004	−0.00005
			(0.0004)	(0.0004)	(0.0004)	(0.0004)	(0.0005)
single			−0.003	−0.002	0.001	−0.001	−0.006
			(0.014)	(0.014)	(0.014)	(0.014)	(0.017)
haschildren			0.006	0.005	0.006	0.006	0.019
			(0.011)	(0.011)	(0.011)	(0.011)	(0.013)
years education			0.003	0.003	0.003	0.002	0.003
			(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
physical health				0.014**			
				(0.006)			
mental health				−0.008			
				(0.006)			
little expected use					0.027		
					(0.017)		
average expected use					0.033*		
					(0.017)		
much expected use					0.031*		
					(0.019)		
collective offer						0.006	
						(0.011)	
monthly basic insurance premium offered							0.010***
							(0.003)
intercept	0.265	0.274	0.214	0.202	0.199	0.213	−0.648
	(0.005)	(0.008)	(0.038)	(0.040)	(0.041)	(0.039)	(0.225)
obs.	948	907	900	880	808	888	583

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

Table 11: Probit to test explanations of differences in search behaviour

	(1)	(2)	(3)
one partners with paid job	0.464***		
	(0.115)		
two partners with paid job	0.519***		
	(0.119)		
aged 65 or over		−0.415***	
		(0.113)	
part of couple		0.203*	
		(0.113)	
offer for collective insurance	0.437***	0.489***	0.520***
	(0.094)	(0.097)	(0.092)
female	0.112	0.153*	0.202**
	(0.084)	(0.087)	(0.080)
years education	0.058***	0.065***	0.062***
	(0.018)	(0.018)	(0.017)
low income	0.027	−0.009	−0.094
	(0.099)	(0.099)	(0.092)
very low income	−0.138	−0.186	−0.355**
	(0.173)	(0.211)	(0.163)
expected use of care	0.044	0.030	0.003
	(0.044)	(0.043)	(0.043)
intercept	−1.644	−1.495	−1.331
	(0.297)	(0.324)	(0.287)
obs	858/1065	973	1065

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

Note: column (1) uses the O'Neill estimator, with 858 obs. for the number of partners with a paid job and 1065 obs. for all other variables.

Table 12: knowledge about new health insurance system, October 2005

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
collective offer	0.054***	0.043***	0.043***	0.043***	0.051***	0.038***	0.037***
	(0.013)	(0.014)	(0.014)	(0.014)	(0.013)	(0.012)	(0.013)
years education		0.014***	0.015***	0.014***		0.014***	0.014***
		(0.002)	(0.003)	(0.003)		(0.002)	(0.002)
age		0.000	−0.0005	−0.0004		0.011***	0.011***
		(0.001)	(0.001)	(0.001)		(0.003)	(0.003)
agesquared						−0.0001***	−0.0001***
						(0.00002)	(0.00002)
female		−0.038***	−0.035***	−0.036***			−0.034***
		(0.013)	(0.013)	(0.013)			(0.012)
low income		0.017	0.015	0.014			
		(0.014)	(0.014)	(0.015)			
very low income		−0.040	−0.025	−0.027			
		(0.026)	(0.028)	(0.027)			
has children			−0.023	−0.024*			
			(0.015)	(0.015)			
single			−0.032*	−0.025			
			(0.017)	(0.017)			
employed		−0.005	−0.006	−0.006			
		(0.018)	(0.018)	(0.019)			
retired		−0.005	−0.011	−0.014			
		(0.021)	(0.022)	(0.023)			
physical health				0.000	−0.003	−0.002	0.000
				(0.008)	(0.007)	(0.007)	(0.007)
mental health				−0.009	−0.016**	−0.010	−0.009
				(0.007)	(0.007)	(0.007)	(0.007)
intercept	0.525	0.417	0.432	0.456	0.576	0.131	0.164
	(0.011)	(0.051)	(0.054)	(0.058)	(0.022)	(0.075)	(0.078)
obs	1096	877	877	861	1068	1059	1037

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

Table 13:

	age category				employment status	
	15-25	25-45	45-65	65-75	Empl.	Not empl.
internetfacilities						
Has access to internet	98	91	83	50	91	69
Has a PC	98	91	82	50	91	69
frequency of use						
Used internet in last 3 months	100	92	73	40	91	59
(Almost) daily	65	76	73	56	78	67
Not daily, but more than once a week	30	19	20	30	18	23
Less than once a week	4	4	7	14	4	10
internet skills						
Use a search engine	95	93	73	37	90	58
Send an email with attached documents	66	85	64	31	83	51
internet activities in last 3 months						
Communication (email, chatting)	94	96	92	90	95	93
Find information	65	95	91	82	94	86
News	46	61	50	41	60	54
Commercial products (banking, shopping)	17	86	77	60	83	68
Public Service	5	68	66	57	66	53
Where used internet last 3 months						
At home	95	94	96	98	95	96
At work	0	59	51	3	58	7
School/university	57	4	1	2	11	18
Elsewhere	37	14	6	11	15	18

Table 14: Simulation results

Searchcost equals c		
	no collective offer	collectiveoffer
fraction choose high coverage	0.220	0.256
fraction choose to search	0.143	0.003
average price paid for contract	1302.4	1255.8
Searchcost equals c_0 if no collective offer and c_1 if collective offer		
	no collective offer	collective offer
fraction choose high coverage	0.220	0.714
fraction choose to search	0.143	0.462
average price paid for contract	1302.4	1311.6

Note: parameters used in the simulations are listed in Table 15.

Table 15: Parameters used in simulation

Parameters taken from data	
mean p_0	1294
variance p_0	159
Other parameters	
α	0.92
β	0.40
c	500
c_0	500
c_1	200
$u_h - u_l$	430
N	20

Table 16: Effect of collective on insurance premium

	total premium paid (1)	total premium paid (2)	premium paid for std cov. (3)	value suppl. coverage (4)
female	1.441*	1.505*	0.009	1.737**
	(0.865)	(0.864)	(0.245)	(0.868)
years education	−0.146	−0.161	−0.223***	0.075
	(0.178)	(0.177)	(0.050)	(0.179)
age	0.012	0.014	0.009	0.015
	(0.030)	(0.030)	(0.009)	(0.030)
expected use of care	1.341***		0.527***	0.780*
	(0.439)		(0.125)	(0.443)
health		1.404***		
		(0.527)		
mental health		−0.631		
		(0.500)		
very low income	−5.049***	−4.606***	−0.461	−5.496***
	(1.686)	(1.673)	(0.483)	(1.703)
low income	−1.922**	−1.871*	0.099	−2.483***
	(0.964)	(0.971)	(0.274)	(0.966)
collective insurance	−3.589***	−3.202***	−5.286***	3.394***
	(0.843)	(0.847)	(0.239)	(0.848)
intercept	106.033	106.892	88.316	17.676
	(3.241)	(3.240)	(0.916)	(3.252)
obs.	945	939	990	895

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

Table 17: Did expected use of health care affect your insurance plan choice?

	Expected use of health care						
	v. little	little	not much, not little	quite a lot	a lot	don't know	total
had no effect	0.592	0.468	0.382	0.264	0.171	0.404	0.409
had effect:							
extensive suppl. cov.	0.067	0.120	0.160	0.282	0.143	0.173	0.156
very limited suppl. cov.	0.083	0.084	0.043	0.025	0.029	0.087	0.061
no suppl. coverage	0.008	0.031	0.008	0.000	0.000	0.029	0.016
large excess	0.042	0.017	0.005	0.018	0.000	0.000	0.014
small excess	0.033	0.025	0.024	0.012	0.000	0.000	0.021
zero excess	0.017	0.078	0.084	0.049	0.057	0.115	0.072
unspecified	0.158	0.176	0.293	0.350	0.600	0.192	0.251
observations	120	357	369	163	35	104	1148

Table 18: Knowledge about coverage of supplementary plan

	fysiotherapy	altern.medicine
used 1 or 2 times in 3 months in 2005	0.705***	0.735***
	(0.274)	(0.227)
used 3 or more times in 3 months in 2005	0.796***	0.928***
	(0.187)	(0.303)
female	0.149	0.270***
	(0.092)	(0.086)
age	0.001	0.004
	(0.003)	(0.003)
education	0.040**	0.046***
	(0.019)	(0.018)
receives maximum health cost benefit	−0.338*	−0.276*
	(0.174)	(0.167)
receives partial health cost benefit	0.030	−0.085
	(0.101)	(0.094)
intercept	−0.079	−1.103
	(0.323)	(0.303)
obs utilisation var. / obs other var.	829/1038	829/1038

***=significant at 1% level, **= significant at 5% level, *=significant at 10% level
Note: For the variables "used 1 or 2 times.." and "used 3 or more.."
only 829 observations could be used, for all other variables 1038