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Insurance Search and Switching Behavior

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Insurance Search and Switching Behavior

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Abstract

This paper looks into the search behavior of consumers in the market for health insurance contracts. We consider the recent health insurance reform in The Netherlands, where a private-public mix of insurance provision was replaced by a system based on managed competition. Although all insurers offer the same basic package (determined by the government), there is substantial premium dispersion. We develop a simple consumer search model containing the main features of the Dutch health insurance system. This model provides us with a number of hypotheses, which we test using data from the Dutch Health Care Consumer Panel. The data confirm the standard predictions on consumer choice (i.e. there is adverse selection and a lower premium increases coverage). We also find that consumers with lower search costs are more likely to receive a group contract offer. This generates a situation of price discrimination where individuals without group contracts and higher search costs pay higher premiums and buy lower insurance coverage.

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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 focuses on the Dutch health insurance market, and tests to what degree and under what conditions a simple consumer search model can describe the behavior of consumers in this market. In the empirical analyses, we exploit a major health insurance reform which took place in the Netherlands on January 1, 2006. The reform forced everyone to reassess their health insurance contract.

Before the 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. The current Dutch system has many similarities with the Swiss health insurance system, and is an inspiration for the health insurance reforms of the Obama administration. These ambitions have renewed international interest in incentives for competition between health insurers.

The Dutch regulations oblige everyone to buy a basic insurance package of which the content is determined by the government. Insurance companies are not allowed to refuse applicants for this basic package 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 insurance package and to compete for insurees. A recent survey indicated that consumers primarily focus on premiums in the decision process (Dutch Healthcare Authority, 2006). If individuals indeed search sufficiently for the lowest premium, the system should provide incentives to insurers to improve their efficiency and lower their premiums. Consumer search for a health insurance, therefore, plays an essential role in this system. However, the annual premium for the basic coverage ranges from €990 to €1170. By switching insurer some people could, therefore, save up to 15% of the insurance

premium, which suggests that individuals do not have full information or that search costs are prohibitively high. A second contribution of this paper is that it provides more insight into consumer search behavior in a system of managed competition.

We provide a simple consumer search model, which builds on Stahl (1989), Janssen and Moraga-González (2004) and Janssen, Moraga-González and Wildebeest (2005). Individuals in our model are heterogeneous in their health, which determines their utility of insurance coverage. Each individual receives an offer for health insurance from their current insurer, and, in addition, may receive an offer for a group contract. These group contracts are mostly offered via employers and give a discount on the premium. After having received the offer(s), individuals decide whether or not to search the market for a lower priced insurance contract. This decision depends on the individual's search costs. We consider the case in which individuals are heterogeneous in search costs and in the probability of receiving an offer for a group contract.

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 Services Research (NIVEL). Participants in the consumer panel complete questionnaires frequently, and, therefore, the data are extensive on choice and search for insurance contracts. The data confirm the predictions on insurance choice (i.e. there is adverse selection and a lower premium increases coverage). The search behavior of the individuals in the data matches the predictions from a model where the probability to receive a group offer is negatively correlated with search costs. This generates a situation of price discrimination which causes that individuals without an offer for a group contract (and most likely higher search costs) pay a higher premium, and also buy less extensive insurance coverage. Stahl (1989) argues that reducing the number of informed consumers (as is the case in the market for individuals without group contracts) leads to more dispersion in premiums. From this observation one may question the usefulness of allowing for group contracts. After all, without group contracts there would be less variation in both premiums and insurance coverage, which might equalize access to health care within the population.

Our paper contributes to the empirical literature on consumer search models, and particularly to the small literature on search in insurance markets. Maestas, Schroeder and

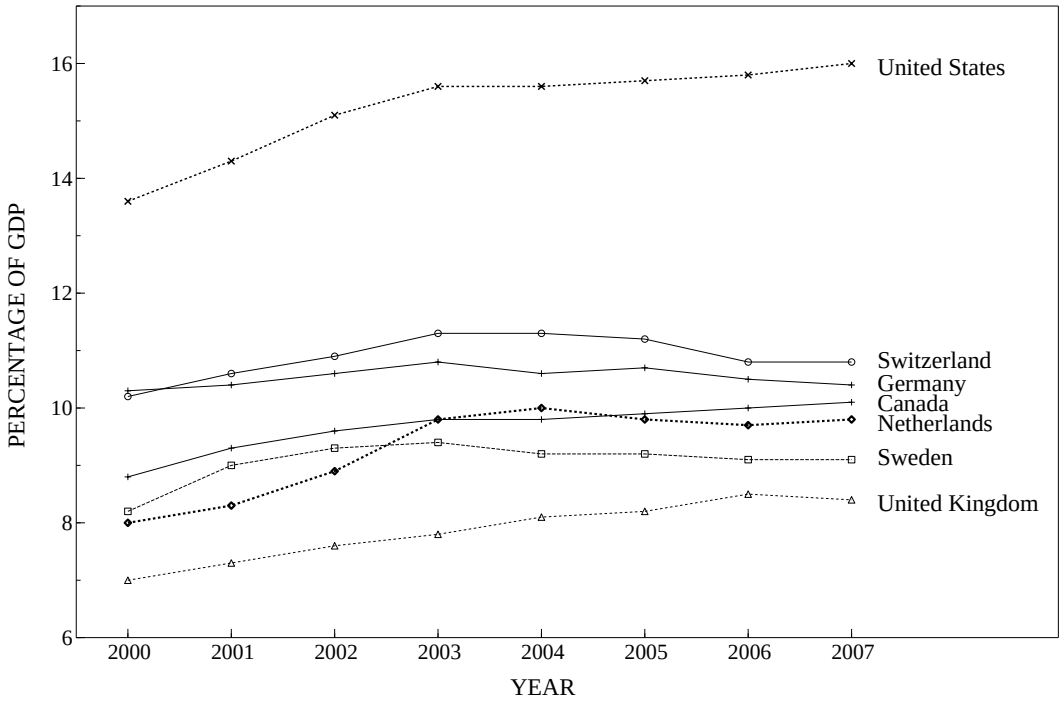
Goldman (2009) estimate search costs in the Medigap market using the equilibrium model for price dispersion developed by Carlson and McAfee (1983). They find that average search costs equal $72. Pauly, Herring and Song (2002) consider the choice for health insurance and Brown and Goolsbee (2002) focus on the market for life insurance. 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 empirical predictions are in agreement with consumer search models (e.g. Stahl, 1989). Sorensen (2000, 2001) considers the retail market for prescription drugs. Sorensen (2000) concludes that less than one-third of the price dispersion can be attributed to pharmacy heterogeneity. All papers use, however, the observed distribution of prices to infer the importance of incomplete information and search. Our data contain direct measures for individual search behavior. Furthermore, we study a well-defined institutional setting in which the rules and timing of actions are highly regulated.

The remainder of the paper is as follows: section 2 provides more background and details on the reform of the health insurance system in The Netherlands. Section 3 presents the search model. The data used for the empirical part are discussed in section 4, and section 5 gives results of the empirical analyses. Section 6 discusses the use of group contracts by insurers. Section 7 concludes.

2 The Dutch health insurance reform

In the Netherlands, the health insurance system is split into three compartments. The first compartment, the catastrophic insurance, is a public insurance that covers the entire population. It insures individuals against the costs of long-term care (e.g. nursing homes, and mental health institutions). The second compartment includes insurable risk and care that all individuals should have access to. The third and last compartment is supplementary coverage. The Dutch health insurance reform in 2006 only affected the second and third compartment. Total health care expenditures as a percentage of GDP were, both before and after the reform, average for European standards. As shown in Figure 1, expenditures (9.8% in 2007) were well below those of the United States (16.0%) and also Switzerland (10.8%),

Figure 1: Total health care expenditures as percentage of GDP (Source: OECD).



but above the United Kingdom (8.5%).

We will first briefly discuss the old system. Next, we will provide details on the new system and on how the reform, the transition from the old to the new system, was executed.

2.1 The old system

Before the reform, there was a mix of public and private insurance provision in the second compartment. All head of the households earning less than some income threshold were compulsory insured, as were their dependents, under the Sickness Fund Act. In 2005 the income threshold was €33,000 for employees and benefit recipients, and €21,050 for self-employed. For pensioners eligibility depended on Sickness Fund coverage at age 65. The Sickness Funds 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

[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.

paid directly to the insurer was only about €300.[2] The main source of funding were income-related contributions made by workers covered by the public insurance and their employers.[3]

Individuals earning more than the income threshold had to buy health insurance in the private market.[4] Individuals were free to choose their insurer and the extent to which they wished to be covered. In practice, private insurance plans were in coverage, care provider and quality of care very similar to Sickness Fund insurance (with the exception of optional deductibles). However, the premium had to fully cover the costs, and, therefore, premiums were 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 €2760 per year.[5] The left-hand side of Figure 2 summarizes the old system, the right-hand side the new system.

2.2 The new system

On January 1, 2006, a system of managed competition was introduced in the second compartment. The distinction between Sickness Fund insurance and private insurance disappeared, and the former providers of Sickness Fund insurance were transformed into private insurance companies. Within the second-compartment all insurers offer the same *basic* health insurance package of which the content is determined by the government. Coverage of this basic insurance is less extensive than the coverage under the former Sickness Fund Act. It is compulsory for all inhabitants of The Netherlands to obtain basic insurance from one of the insurers. Insurers are obliged to accept everyone, and are not allowed to differentiate premiums (community rating). A Risk Equalization Fund was introduced to compensate insurers for an eventual disproportionate percentage of 'high-risk' insurees.[6] Insurers primarily

[2]In 2005, a no-claim was introduced to reduce moral hazard problems. 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%.

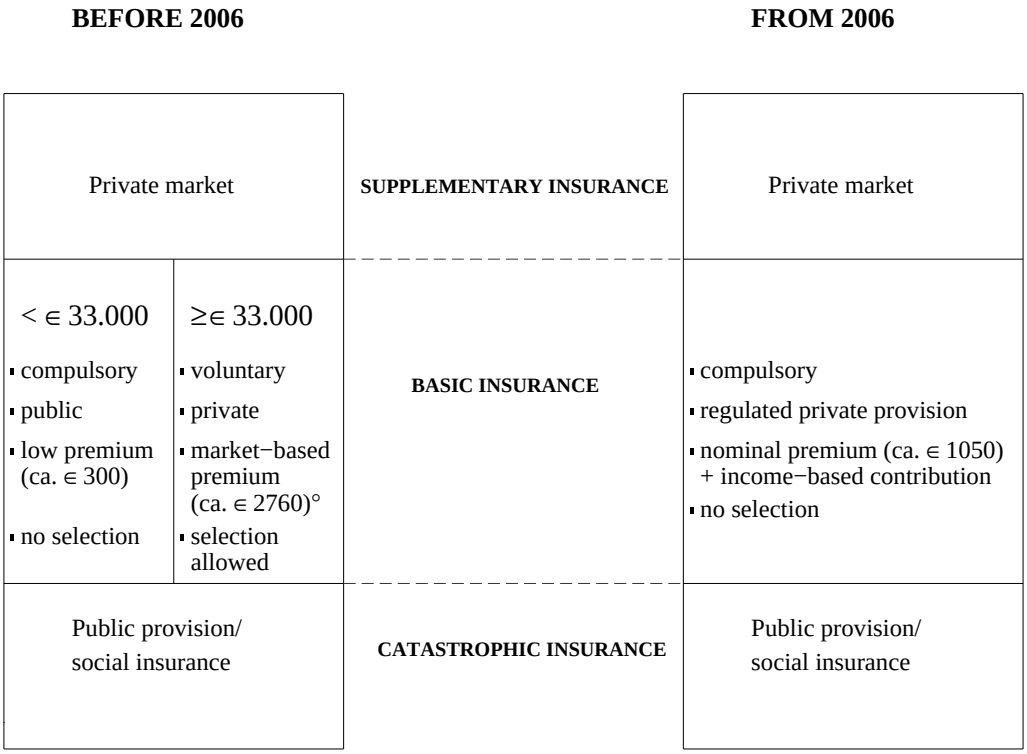
[3]The contribution was 7.95% of income, of which 6.25% was to be paid by the employer.

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

[5]However, most employees received compensation of about 50% of the premium from their employer for having to take private health insurance.

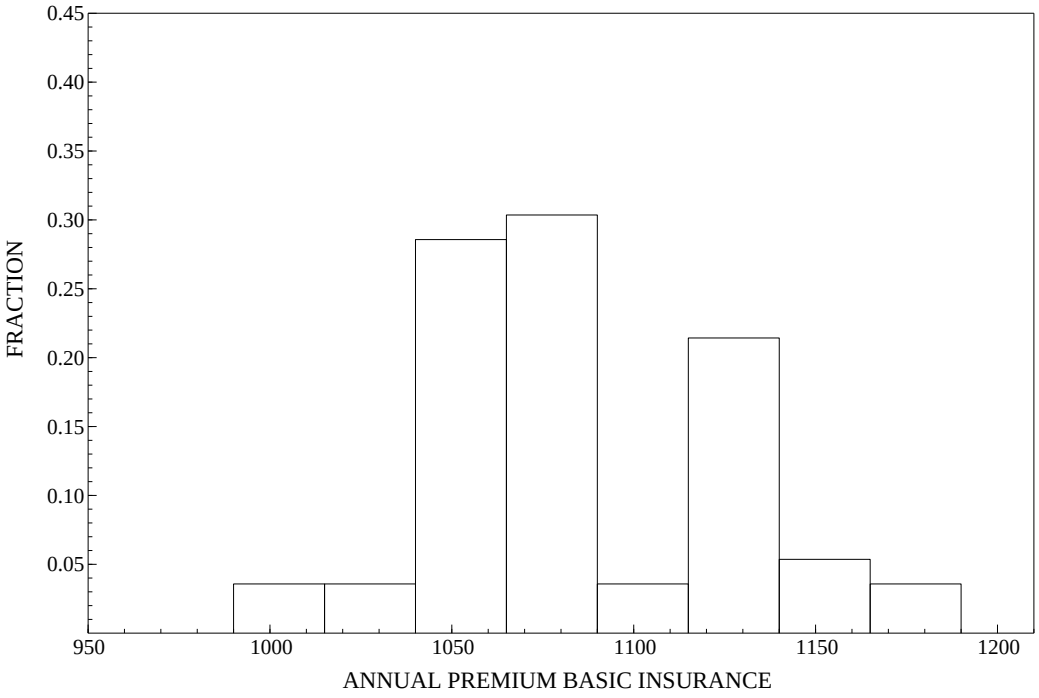
[6]The Risk Equalization Fund uses gender/age category interactions, main source of income (as a proxy for socioeconomic status), region, long-term medication use (categorized in 20 groups), and medical diagnosis (in 13 groups).

Figure 2: The Dutch health insurance reform.



°= the given premium is for a 30−year old healthy male

Figure 3: Histogram annual insurance premium.



compete on the price of the basic insurance package, as the quality of the delivered care was equal among insurers (they all offer access to all providers).

In 2006, the market consisted of 33 insurance companies. Some of these operated under more than one label, so that in total 43 basic insurance packages were offered. The average nominal premium was about €1050 per year.[7] However, there was substantial dispersion in premiums. Figure 3 shows that annual premiums range from €990 to €1170.[8]

Insurance companies also offer *supplementary* insurance, including, for example, dental care, extended coverage for treatment by physiotherapists, treatment of mental illnesses, coverage for alternative medicine, etc. About 80% of the insurers offer a range of supplementary packages for all care except dental care and have a separate range of dental insurance plans. The other insurers combine dental and supplementary insurance in one plan. Most insurers offer three (49%) or four (23%) different supplementary plans, ranging from limited additional coverage to very extensive coverage. Supplementary insurance is elective, and

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

[8]There is no systematic difference in price level between former Sickness Funds and private insurers.

both the premium and composition is decided by the insurer. Although insurers are allowed to select for the supplementary insurance, most insurers do not. Insurers that do select, only do this for the plan with the most extensive supplementary coverage. Only one insurer differentiated premiums for supplementary plans by age. In 2006, in total 137 different supplementary plans were available in the market, with an annual premium ranging from €59 to €930 (see Dutch Health Care Authority, 2006). Of these 137 plans, 10 plans required answering questions about the insurees' health. Supplementary coverage is very popular, 92.6% of consumers obtained some kind of supplementary insurance.

The basic insurance does not involve copayments, but the system allows individuals to choose for a deductible up to €500. The annual reduction in basic insurance premium was about €36 for every €100 additional deductible. However, this option was not very popular, more than 95% of all individuals did not take any voluntary deductible. Insurers are allowed to offer group contracts, and to grant a premium reduction of at most 10% on the basic and supplementary insurance in these group contracts. The majority of the group contracts were offered via employers, but also other groups, such as labor unions, could negotiate group contracts for their members. If an individual received an offer for a group contract, then also the partner was eligible for the discount. In 2006, about 44% of all individuals were participating in a group contract, and the average discount was about 7.5% (Vektis, 2007).

The differentiation in supplementary insurance packages makes the comparison of premiums more difficult than for basic insurance. Insurers might exploit this, for example, by setting a low premium for basic insurance and high premiums for supplementary insurance. To get some idea about the pricing strategy of insurers, we first consider only insurers with separate dental plans. Recall that 80% of all insurers has separate dental plans and that the other 20% includes dental care in supplementary packages. Figure 4 plots for these insurers the average premium for a supplementary insurance plan against the price of the basic insurance package. There is a strong and significant correlation between the premium for basic insurance and the average premium for supplementary coverage (0.703 and significant at the 1% level). Next, we also take account of dental plans by adding the average premium for dental insurance. Furthermore, we include the remaining 20% insurers, who include dental coverage in their supplementary insurance plans. As can be seen from the scatter plot in

Figure 4: Scatterplot of premium for basic insurance package and the average price of supplementary insurance.

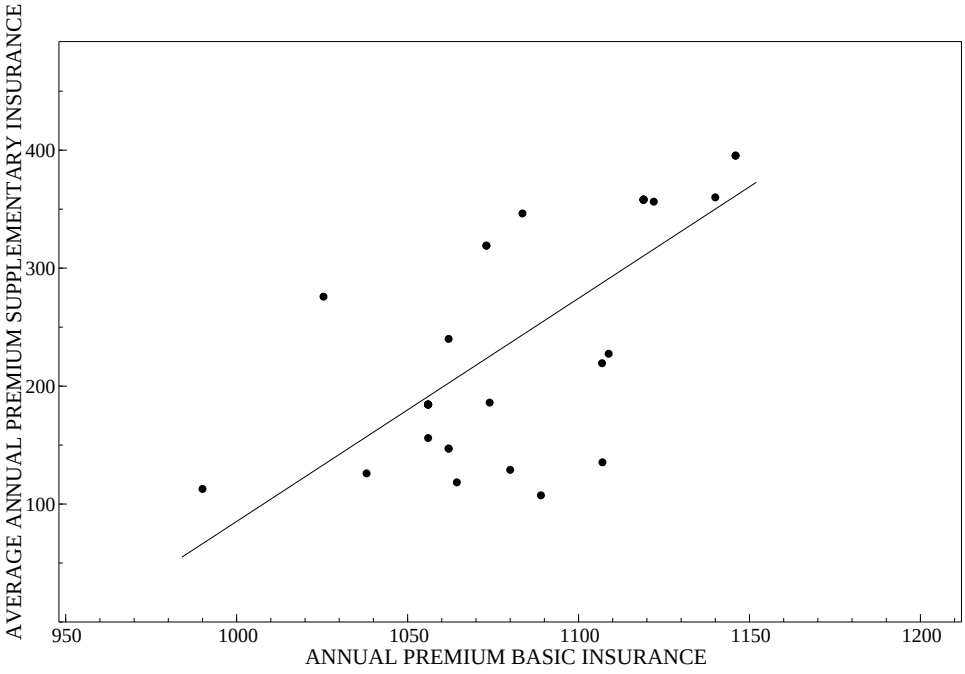


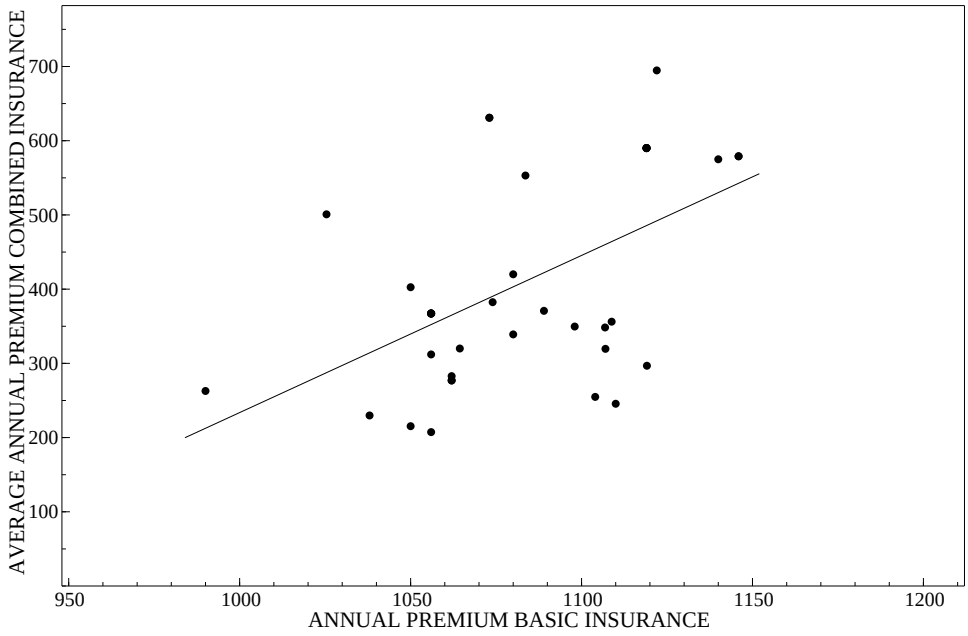
Figure 5, the correlation remains positive and significant (0.528 and significant at the 1% level). Rather than cross-subsidizing between basic and supplementary insurances, the positive correlations seem to suggest that there are more expensive and cheaper insurers in the market. The analyses above are robust against taking the average supplementary package. Considering, for example, the cheapest or most expensive package gives similar results.

2.3 The reform

The reform was announced long before January 1, 2006. A large media campaign was set up to inform people about the new health insurance system, and to explain the rules. In October 2005, 98.8% of the respondents in our data knew about the reform. In December 2005, every insurance company had to inform their insurees about the insurance packages it was going to offer under the new health insurance system and their premiums.[9] Insurers offered their insurees as default option a combination of basic insurance and supplementary insurance plan that was closest to the individual's old insurance plan. Individuals could

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

Figure 5: Scatterplot of premium for basic insurance package and the average price of supplementary insurance plus dental insurance, or a combined plan.



change insurer or the level of supplementary coverage until May 1, 2006, but the insurance bought provided coverage in retrospect from January 1. In the year of the introduction, insurers were also obliged to accept all their former insurees for *any* level of supplementary coverage until March 1.[10] This implied that almost all changes in insurer or supplementary coverage occurred before March 1.

All health insurance contracts run from January 1 to December 31. Insurers have to post their premiums and conditions for the following year in December, and individuals can only change insurer during the month of January. So, the long period for switching only applied to the year of the introduction of the new system.

3 A consumer search model for health insurance

This section discusses a search model for a health insurance and derives a number of empirically testable predictions. The model is as simple as possible without loosing the main

[10]It was also announced that in later years insurers could deny supplemental insurance coverage for new clients.

characteristics of the Dutch health insurance market. First, consumers receive an offer for insurance from their current insurer, which is the default. Second, some consumers also receive an offer for a group contract, which gives a discount on the premium. Third, insurers post premiums both for basic insurance and one type of supplementary insurance, and have to accept all applicants. Fourth, if consumers decide to search the market, they observe all prices. The most simplifying assumption is that we impose that all insurers offer the same two insurance packages: basic insurance (which we refer to as 'low coverage'), and basic insurance plus supplementary insurance (which is 'high coverage'). In reality insurers offer several supplementary packages, that differ in level of coverage. However, the intuition from the model is the same if we would extend it to allow for more packages, but this would complicate the analysis.

3.1 Consumer behavior

Each consumer i is characterized by his health h_i, which is in the population distributed according to the distribution function $G(h)$. Each insurer offers the same two insurance packages. All consumers derive the same (expected) utility u_l from the insurance package with low coverage (only basic insurance). The expected utility consumers derive from high coverage (basic plus supplementary insurance) 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 $u_h'(h_i) < 0$. Health h_i could thus also be interpreted as a measure of expected health care.

At the introduction of the new health insurance system, each consumer receives an offer from her current insurer. The offer is characterized by a premium $p_{0,i}$ for insurance with low coverage and $(1+\beta)p_{0,i}$ for insurance with high coverage. We impose that each insurer increases the premium with the same fraction β for obtaining supplementary insurance, which seems in agreement with the observed pricing structure outlined in Subsection 2.2. The default level of coverage is the level closest to the previous contract, but we assume that switching to the other coverage level of the same insurer is costless for the individual (as she is costlessly informed about all coverage levels by his former insurer). Obviously, an individual prefers the insurance with high coverage if $u_h(h_i) - u_l > \beta p_{0,i}$. The left-hand

side of the inequality is decreasing in (good) health, and the right-hand side is increasing in the premium $p_{0,i}$. 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 $p_{0,i}$ 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.*

Consumer i has a probability δ_i of receiving an offer for a group contract. The premium of the offered group contract is $p_{g,i}$ for low coverage and $(1+\beta)p_{g,i}$ for high coverage. Individuals prefer the group contract if $p_{g,i} < p_{0,i}$, which also implies that those individuals who decide to take the group contract are more likely to take insurance with high coverage. Let $p_{\text{ns},i}$ denote the lowest premium individual i gets offered without having searched the market. So, without an offer for a group contract $p_{\text{ns},i} = p_{0,i}$, and with an offer for a group contract $p_{\text{ns},i} = \min\{p_{0,i}, p_{g,i}\}$.

After individuals are informed about the insurance premium of their current insurer, and possibly also have received an offer for a group contract, they can decide whether to search the market for an insurer offering a lower premium. Before searching the market the consumer only knows that the distribution of premiums in the market equals $F(p)$. This assumption is very similar to Carlson and McAfee (1983) and Maestas, Schroeder and Goldman (2009), who assume that individuals know the rank of a premium, but do not know where the lowest premium is offered. If the consumer decides to search, she makes cost c_i, and will observe all premiums of all N insurers in the market. We assume that when consumers search, they observe all premiums in the market, because the government had launched a website where consumers could compare insurance plans between insurers. It explicitly aimed at lowering search costs. Independent consumer organizations followed with their own websites. In our data, over 60% of the individuals who searched for a better offer indicate that they used such websites. Our search assumption also has the advantage that we do not have to impose

that search is with replacement (e.g. Carlson and McAfee, 1983; and Maestas, Schroeder and Goldman, 2009), which seems unrealistic in markets with few suppliers.

Obviously, the consumer will switch to another insurer if any of the other $N-1$ insurers in the market offers a lower premium than the current best offer p_{ns}.[11] 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 search costs c_i. The expected benefits are in terms of finding an insurer with a lower insurance premium. An individual searches if

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

It is obvious that individuals with low search costs are more likely to search. For individuals who received an offer for a group contract, $p_{\text{ns},i}$ is the lowest of two offers rather than just the initial offer. This implies that for a consumer with an offer for a group contract the left-hand side will in expectations be smaller (expected gains from continued search are smaller). Such an individual is thus less likely to devote additional effort to search the market for a better offer.

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 insurance with low coverage, so h_i exceeds $\bar{h}$ for which $u_h(\bar{h}) - u_l = \beta\underline{p}$. And third, there are individuals with health h_i between $\underline{h}$ and $\bar{h}$ who prefer insurance with low coverage in case of high premium $\bar{p}$ and insurance with high coverage in case of low premium $\underline{p}$.

For individuals in such bad health that they always prefer health insurance with high

[11] If an individual also received an offer for a group contract, there are in fact only $N-2$ other insurers. Only if the offer for a group contract is with the same insurer the individual was previously insured with, there are still $N-1$ other insurers. For ease of exposition we ignore this, as taking account of this complicates notation without changing our testable predictions.

coverage, the search decision simplifies to

$$(1+\beta)p_{\text{ns},i} > (1+\beta)\text{E}[p_{\min}] + c_i \qquad \text{or} \qquad p_{\text{ns},i} > \text{E}[p_{\min}] + \frac{c_i}{1+\beta}.$$

For individuals in good health that always prefer to have low coverage, the search decision is

$$p_{\text{ns},i} > \text{E}[p_{\min}] + c_i.$$

If premiums and search costs do not depend on the health status, the above implies that individuals in bad health have a lower premium threshold for searching than individuals in good health.

Individuals in the third group only obtain health insurance with high coverage if the premium is sufficiently low. If an individual searches the market (or receives an offer for a group contract) she may find a premium that is lower than the initial offer. For some individuals in the third group this premium will be sufficiently low to make the expected utility of high coverage larger than the expected utility from low coverage. Therefore, some individuals who switch insurer to get a lower premium might also switch to a health insurance package with high coverage.

In our model, there are three sources of heterogeneity: individuals differ in their health status h_i, search costs c_i and probability of receiving an offer for a group contract δ_i. All three elements are important in the decision to search, and also determine the level of insurance coverage that is chosen. If health status, search costs and the probability of receiving a group contract are independently distributed within the population, then (i) both bad health and low search costs induce more search, and (ii) actually receiving a group offer reduces search.

However, there are good reasons to believe that within the population the different sources of heterogeneity may be correlated to each other. Since search costs are usually unobserved, the question arises how a correlation between search costs and health and the probability to receive an offer for a group contract affects the way in which search in the population is correlated to both health and receiving an offer for a group contract. Table 1 summarizes these effects. Search costs and health have the same effect on the decision to search. So if search costs and health are negatively correlated, we may observe within the population that

Table 1: Population correlation between search and both health and group offers.

	$corr(h, \text{search})$
$corr\,(h,c)=0$	-
$corr\,(h,c)<0$	-/+
$corr\,(h,c)>0$	-
	$corr(\delta, \text{search})$
$corr\,(\delta,c)=0$	-
$corr\,(\delta,c)<0$	-/+
$corr\,(\delta,c)>0$	-

(good) health is not or even positively correlated to searching. Similarly, low search costs and receiving an offer for a group contract both induce individuals to search. This implies that we can only observe individuals with a group offer to search more than individuals without a group offer if search costs are negatively correlated to the probability of receiving a group offer.

Corollary 1: *Receiving a group offer can only be positively correlated to search if the probability of receiving a group offer is negatively correlated to search costs.*

Corollary 2: *Health can only be positively correlated to searching, if health and search costs are negatively correlated.*

Before taking the model to the data, we will discuss the assumptions made in the model. In the model we made four important assumptions. We will discuss the robustness of the model against deviations from these 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 (recall that one starts with an offer and search is costly). In this case, consumer behavior would reduce to only choosing between low and 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. Recall that this assumption is

justified by the observed premiums for basic and supplementary insurance (see Subsection 2.2). Alternatively, we could choose an additive specification implying that the premium for health insurance with high coverage equals $p + \beta$. Such a specification implies 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 no longer relevant in the choice for searching. The model thus simplifies to a consumer search model with homogeneous products. And the reason for premium dispersion is that individuals are heterogenous in their search costs.

The third key assumption is that individuals who search the market observe all premiums in the market. Also Salop and Stiglitz (1977) make this assumption, but more recent search models usually assume that when searching, consumers see premiums sequentially, and make search costs for observing each additional premium. However, our predictions are robust against changing the search rule. Both search rules generate dispersion of premiums in equilibrium, and similar behavioral predictions for consumers.

The final key assumption is that individuals know the distribution of premiums $F(p)$. However, individuals may not know this distribution, but only have some personal belief B_i about the shape of the distribution. Before individuals decide to search, they first receive an initial offer $p_{0,i}$ and maybe an offer for a group contract $p_{g,i}$. Individuals use these offers to update their beliefs, and the search decision depends on $\mathrm{E}[p_{\min}|p_{0,i}, p_{g,i}, B_i]$. The interesting feature is thus that a group offer provides additional information. Individuals with an offer for a group contract thus may have more accurate information about the distribution of premiums in the market.

3.2 Premium dispersion in equilibrium

The testable predictions for consumer behavior depend on existence of premium dispersion. In this subsection, we argue that this should be present in equilibrium. 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.[12] Insurers only differ in their pre-reform market share θ_j for $j = 1, \ldots, m$.

Each insurer keeps its clients if these do not get an offer for a group contract with a lower premium, and in addition do not search. Only the insurer with the lowest premium in the market attracts individuals who decide to search. We assume that each insurer has the same market share in group contracts as their overall market share. We furthermore assume that all insurers give the same discount α on the premium when they make an offer for a group contract to a potential client. These assumptions are mainly made for simplification, such that the decision process of firms is one dimensional, i.e. setting the level of the basic insurance premium.

From the behavior of consumers we know that there is heterogeneity in search behavior, for example, because individuals in bad health undertake 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 an offer for a group contract from an other insurer, and some individuals with bad health or with low search costs who search the market for better offers. The big insurer would thus lose some 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 an offer for a group contract from an other insurer, and to induce the clients of other insurers 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 distribution of the search costs c_i, 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. After the Dutch health insurance reform substantial premium dispersion was observed in the market (see again Figure 3). Indeed, the lowest premium in the market was posted by a small insurer (named *Ander-Zorg*). Relating premiums to market shares is difficult, because insurers are very cautious in

[12] Obviously, marginal costs should depend on the health status of the insuree. However, recall that the Risk Equalization Fund compensates insurers for insuring individuals in bad health in such way that the expected costs of all insurees are the same.

providing 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 to be the biggest loser of the reform. The other four insurers with over a million insurees mainly maintained their market share because of writing many group contracts. In particular, using our own data to calculate the fraction of group contracts, there is a substantial, positive correlation (0.40) between the premium posted by insurers and the fraction of insurees covered by a group contract.

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 is aimed to be representative for the overall population. For women the age structure in the panel largely coincides with the Dutch population, for men older individuals are somewhat 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 two to three years panel members are replaced to maintain representativeness. The content varies substantially between questionnaires. In the empirical analyses we use information from the 15 questionnaires send out between 2004 and 2008. This observation period covers the time period around the Dutch health insurance reform (2006). Most questionnaires are not sent to all panel members, in order not to overwhelm them with questionnaires. Usually around 70% of the panel members are randomly selected to receive a particular questionnaire. Combining variables from different questionnaires thus quickly reduces the sample size. Socioeconomic and other background variables are only asked once, at the moment a participant first enters the consumer panel.

In December 2005, a month before the introduction of the new system, participants answered a set of questions about the offer they received from their current insurer. It was also asked whether they were planning to search for better deals offered by other insurers. The April 2006 questionnaire contains information on actual consumer search behavior, the choice of the insurance plan and insurer, as well as information on the total number

Table 2: Descriptive statistics.

	offer for group contract	
	no	yes
fraction	28%	72%
age (in years)	56	51
female	60%	55%
couple	76%	81%
has children	35%	47%
low income	39%	29%
very low income	12%	6%
years of education	12	12
employed	35%	58%
retired	44%	28%
physical health (1-5 scale; 1=excellent, 5=very poor)	3.0	2.8
mental health (1-5 scale; 1=excellent, 5=very poor)	2.4	2.4
expected health care use (1-5 scale; 1= very much, 5=very little)	2.8	2.7
changed insurer	11%	25%
changed plan, same insurer	12%	15%
has deductible	7%	7%
has supplementary insurance	96%	95%
annual total insurance premium (in €)	1298	1271
annual premium basic insurance (in €)	1049	1006
annual premium supplementary insurance (in €)	247	265
basic insurance premium before discount (in €)	1049	1053
supplementary insurance premium before discounts (in €)	247	281
health insurance from sickness fund in 2005	66%	58%
private health insurance in 2005	30%	36%
civil servant health insurance in 2005	4%	7%
observations	322	844

of offers for a group contract participants had received, and whether they accepted one of these offers for a group contract. We thus know the names of the pre-reform and the post-reform insurer and hence whether the individual has switched insurer. We observe whether an individual participates in a group contract, has a voluntary deductible, and has supplementary insurance coverage. We do not know the extent of the supplemental insurance coverage. However, individuals were asked to report the total amount of premium they pay for health insurance. We combine this information with external information about the premium for basic coverage of each insurer (and the reduced premium for participation in a group contract), which allows us to determine the amount paid for supplemental coverage.

Table 2 provides some descriptive statistics. We distinguish between individuals with and without an offer for a group contract. More than 70% of all individuals received an offer for a group contract. Individuals with an offer for a group contract are more often employed, and less often retired, so they are also, on average, younger, have a higher income, and are

higher educated.[13] Recall that about two-third of the group contracts are with employers, and one-third with labor unions, consumer organizations, etc.[14] Group contracts give an average reduction of about 6.5% on the basic insurance, and a 8.5% reduction in premium for supplementary insurance (Dutch Healthcare Authority, 2006). Couples are more likely to receive an offer for a group contract, mainly because such an offer covers all family members. There are, however, no differences in self-assessed physical and mental health between both groups, neither in the average nor in the distribution. Also expected health care use is very similar. Self-assessed health was only asked when individuals first entered the panel[15], while expected health care use was asked in April 2006, after individuals made their health insurance choice.

Individuals with an offer for a group contract change insurer and insurance plan more often, but have a similar health insurance plan in terms of choice for a deductible and the presence of supplementary coverage. Individuals with a group contract pay in total only 3.1% less on health insurance while they receive about 6.5% discount on the premium for the basic insurance package. Comparing premiums that are paid, individuals with an offer for a group contract spend more on supplementary insurance, both before and after discounts. Table 3 compares health insurance decisions in our sample to nationwide behavior. In our sample more individuals have a group contract (55%) than nationwide (44%). In terms of supplementary insurance, voluntary deductibles and insurance premium our sample matches the nationwide statistics fairly well.

The questionnaire of April 2006 contained a question on consumer search behavior. In particular, individuals were asked to answer the question: *Did you search for a new health insurance contract?* Table 4 displays the fraction of individuals searching the market. In total about 46% of the individuals reports to have searched actively for other health insurance plans. Search is more common among individuals who have received at least one offer for a group contract. Only about 30% of all individuals did not receive an offer for a group

[13]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 annual compensation of €402.96 for a single, and €1155.00 for a couple. Partial (income dependent) compensation was paid to low income household (below €25,068 for singles and €40,120 for couples).

[14]These are national level figures. In our sample we observe that 85% of the group contracts is obtained via the employer

[15]Since individuals are replaced every two to three years, this information is at most three years old.

Table 3: Sample descriptives and national statistics.

	Sample	National*
Percentage with insurance on group contract	55%	44%
Percentage with supplementary insurance	95%	93%
percentage among insured on group contract	96%	94%
percentage among individually insured	94%	92%
Percentage switch insurer	21%	18%
percentage among insured on group contract	30%	28%
percentage among individually insured	11%	10%
Percentage with deductible	7%	5%
percentage of which has deductible of € 200	33%	18%
percentage of which has deductible of € 300	11%	10%
percentage of which has deductible of € 400	3%	4%
percentage of which has deductible of € 500	22%	31%
average annual premium paid for basic insurance (in €)	1014.72	1025.04
average annual premium basic insurance before discounts (in €)	1053.24	1059.96

* Source: Vektis (2007)

Table 4: Percentage of searchers by received number of offers for a group contract and labor market status.

	All		Employed		Retired		Other	
no offer for group contract	31%	(267)	45%	(95)	17%	(117)	36%	(55)
1 offer for group contract	47%	(377)	50%	(208)	33%	(114)	65%	(54)
2+ offers for group contract	58%	(309)	65%	(193)	38%	(76)	63%	(40)
average	46%	(953)	55%	(496)	28%	(307)	53%	(150)

Note: number of observations in parentheses.
Note: *other* contains unemployed, disabled, in full-time education and home duties.

contract, while 33% of the individuals received multiple offers for a group contract. The table shows that searching is positively related to the number of offers for a group contract received. This remains true after stratifying the sample by labor market status.

Expected health care use was asked in the April 2006 questionnaire. Respondents had six options, answers 1 to 5 formed a categorical scale from *very little* to *very much*. 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 involved the use of the variable expected health care use. Furthermore, the categories *much* and *very much* were merged, because only very few individuals expected to use very much health care.

5 Empirical results

This section provides insight in how well the consumer search model describes observed behavior at the time of the Dutch health insurance reform. We start with testing the model's 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 needs (those in bad health) take a higher level of insurance coverage, i.e. buy more supplementary insurance. We test for adverse selection by investigating how the degree of supplementary coverage depends on expected health care use and on self-assessed health. Taking the premium of the supplementary insurance as a measure for coverage is not appealing, because of premium discounts in group contracts and the large variation in insurance premiums between insurers. Alternatively, we construct a measure that relates the additional expenditures on supplementary insurance to the price of the basic package. We define the degree of supplementary coverage as the ratio of the premium for supplementary insurance (before discounts) over the premium for basic insurance (before discounts). This gives the degree of supplemental insurance coverage as a fraction of basic insurance coverage, the latter being the same for all individuals at all insurers.

Table 5 presents the results of regressions for supplemental insurance coverage. Column (1) shows the results of a base specification where only expected health care use is included. Individuals who expect very little use of health care (the reference group) have significantly lower supplementary insurance coverage than individuals who expect to use more health care (i.e. little, average or (very) much expected care use). Beyond the reference category 'very little expected care' supplementary insurance coverage is not increasing in expected health care use. This suggests threshold behavior, which is consistent with our consumer search model. Individuals with very little expected health care use prefer a low level of (supplementary) insurance coverage. If the expected health care use is more than very little, it is beneficial to take higher supplementary insurance coverage.

Table 5: Estimation results from regressing supplementary insurance coverage.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
very little expected care	0		0		0		0	
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)	
(very) much expected care	0.024		0.032*		0.038**		0.035*	
	(0.018)		(0.018)		(0.018)		(0.018)	
physical health		0.011*		0.014**		0.017***		0.016**
(1=excellent, 5=very poor)		(0.006)		(0.006)		(0.006)		(0.006)
mental health		−0.009		−0.010		−0.008		−0.008
(1=excellent, 5=very poor)		(0.006)		(0.006)		(0.006)		(0.006)
annual basic insurance			−0.0003***	−0.0004***	−0.0002*	−0.0003***	−0.0002*	−0.0003***
premium			(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
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)
observations	858	933	858	933	823	893	817	888

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

Table 6: How did expected health care use affect your insurance choice?

	Expected use of health care			
	very little	little	not much, not little	(very)much
bought extensive supplementary coverage	6.7%	12.0%	16.0%	25.8%
bought very limited or no supplementary coverage	9.2%	11.5%	5.2%	2.5%
observations	120	357	369	198

The question on expected health care use was asked in the same questionnaire as the question on the health insurance choice (April 2006). This may cause two problems. First, expected health care use is asked over the full calendar year of 2006, and individuals might already have a partial observation on their health care use. This can potentially weaken the link between expectations and insurance choice. Furthermore, individuals report their expected health care use after having decided about their health insurance plan. The expected health care use may thus reflect adverse selection as well as moral hazard. To get a better idea of the importance of adverse selection, we also consider the question *Did you take into account the amount of health care you expect to use this year in deciding upon which health insurance to purchase?* When answering positively, individuals could indicate *I bought extensive supplementary coverage*, or *I bought very limited supplementary coverage* or *I bought no supplementary coverage*. Because this question refers to expected health care use at the time the insurance decision was made, it separates adverse selection from moral hazard. We group very little and no supplementary coverage and show the answers in Table 6, broken down by expected health care use. Indeed, the higher the expected health care use, the more likely it is that an individual took more extensive supplementary coverage.

As an alternative to expected health care use, we can also use self-assessed health to investigate adverse selection. Recall that self-assessed health is asked only at the moment an individual first enters the panel. For our sample it is therefore always asked before the reform, and thus before individuals had to decide on their insurance plan. Column (2) of Table 5 shows the results from regressing 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 insurance coverage. This indicates adverse selection, which, again, confirms the first hypothesis from the consumer search model.

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 5 report the results. The basic insurance premium has a significant negative impact on supplementary insurance coverage. 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), which confirms the second hypothesis from our consumer search model.

To investigate the robustness of this conclusion, we add additional control variables. First, in the columns (5) and (6), we include gender and income. Women take, on average, 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 more important, the effect of the premium on supplementary health insurance coverage hardly changes and remains negative and significant. This remains when adding age, household composition and years of education to the regression (see columns (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.

Corollary 1: *Receiving a group offer can only be positively correlated to search if the probability of receiving a group offer is negatively correlated to search costs.*

Recall from the previous section that individuals with an offer for a group contract indicate to search, on average, more often for *a new health insurance contract* (see Table 4). Although this indicates a positive relation between the probability to search and the

probability to receive a group offer, we have to be cautious. A potential problem here is that individuals might consider the offer for a group contract as a new health insurance contract. They may then classify themselves as searchers after having compared the initial offer with the offer for a group contract, which is not considered as searching in our model. Therefore, we also consider the follow-up question: *What sources did you use when searching for a health insurance contract?* Multiple answers were allowed, and there was room to mention other sources than the ones listed in the questionnaire. Individuals most often report having used the internet (73%), especially websites that compare insurance contracts from all insurers (84% of those having used the internet) and websites of insurers (80% of those having used internet). Other answers included advice from a family member (23%), contact with a health insurer via e-mail or telephone (21%) and advertisements (19%).

We consider as a stricter definition for search only using (independent) websites that compare insurance contracts of all insurers. According to this definition, 32% of those with an offer for a group contract, and only 19% of those without an offer for a group contract, have searched. Table 7 shows the results of a probit model for the effect of an offer for a group contract on search behavior, using the strict definition for searching. Column (1) shows that individuals with an offer for a group contract have a significantly higher propensity to search. Column (2) shows that this association remains after controlling for labor market status. In column (3) we also add the premium p_0 of the initial offer. This column shows that individuals with an offer for a group contract are significantly more likely to search if the price of the initial offer was high. The opposite is true for individuals without an offer for a group contract, although only significant at the 10% level. These individuals are less likely to search if the initial offer was high. This result remains after controlling for additional observed characteristics (see column (4)).

A possible explanation why a higher premium of the initial offer reduces search for individuals without a group offer is that individuals do not know the distribution of premiums $F(p)$ in the market. Individuals believing that the variation in premiums is low, are likely to decide not to search. Individuals who received an offer for a group contract may realize that the variation in premiums is larger than assumed, which may induce them to search actively. Although we do not have any direct evidence on individual beliefs, it is relevant to note that

Table 7: Probit model for searching

	(1)	(2)	(3)	(4)
offer for group contract	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)
annual basic insurance premium offered			−0.008*	−0.008*
∗no offer for group contract			(0.005)	(0.005)
annual basic insurance premium offered			0.006***	0.005**
∗offer for group contract			(0.002)	(0.002)
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)
intercept	−0.890	−0.617	7.943	8.120
	(0.082)	(0.122)	(4.820)	(5.130)
observations	1143	1143	948	893

***=significant at 1% level, **= significant at 5% level, *=significant at 10% level.
Note: the strict definition for search, i.e. search via comparison websites, is used here.
Note: column (2)-(4) applies the Conniffe and O'Neill (2008) correction for missing covariates.

before the reform the government announced that the average annual premium would be about €1106. The actual premiums were between €990 and €1120, so almost all insurers had a lower premium. This may imply that after learning their premium, most individuals believed that they received a good offer. If individuals are unaware of the distribution of premiums, then those with a high premium offer (close to that announced by the government) might have believed that the variation in premiums was very low and thus would not have searched further. While those with a low premium offer may have overestimated the variation in premiums, and thus searched for an even lower premium.

Table 8 shows the percentage of individuals that switches insurer at the moment of the reform. We distinguish between those with and without an offer for a group contract, and those who did and did not search the market for better offers. As one might expect individuals who have searched the market, and those who received an offer for a group contract, are much more likely to switch insurer than their counterparts. In the table we used the strict

Table 8: Percentage of switchers by offer receival for group contract and search behavior

	offer for group contract		no offer for group contract	
	search	no search	search	no search
switched insurer	34%	15%	28%	3%
not switched insurer	66%	85%	72%	97%
observations	417	410	92	220

Note: the strict definition for search, i.e. search via comparison websites, is used here.

definition of searching, which explains why some individuals who did not receive an offer for a group contract, and who did not search, still switch insurer. This table shows that searching actually increases the likelihood of switching insurer, and thus measures relevant individual behavior.

So what emerges from above is a strong positive correlation between having received an offer for a group contract and searching. This implies according to corollary 1 that unobserved search costs should be negatively related to the probability of receiving an offer for a group contract, or stated differently, individuals with low search costs are more likely to receive an offer for a group contract. We discuss the possible mechanisms in the next section.

Corollary 2: *Health can only be positively correlated to searching, if health and search costs are negatively correlated.*

Individuals in bad health derive more expected utility from a health insurance with extensive supplementary coverage. Recall from the first hypothesis that this adverse selection was present in the data. If within the population health and search costs are uncorrelated, we should observe that individuals in bad health are more likely to search. However, if health is negatively correlated with search costs, we may even find a positive correlation (since we cannot condition on the unobserved level of search costs).

In Table 9 we show estimation results for a probit model for the search decision, where we include health as an explanatory variable. Again, we use expected health care utilization and self-assessed health as measures for individual health. Columns (1) and (2) indicate that both expected health care use and self-assessed health do not have a significant impact on

Table 9: Probit model for searching.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
very little expected care	0		0		0		0	
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)	
(very) 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
(1=excellent, 5=very poor)		(0.050)		(0.062)		(0.064)		(0.066)
mental health		−0.012		−0.073		−0.082		−0.070
(1=excellent, 5=very poor)		(0.048)		(0.061)		(0.063)		(0.064)
offered annual premium			0.003	0.003	0.002	0.002	0.002	0.002
basic insurance			(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
female					0.130	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)
observations	1040	1128	649	711	620	678	617	675

***=significant at 1% level, **= significant at 5% level, *=significant at 10% level.
Note: the strict definition for search, i.e. search via comparison websites, is used here.

search behavior. In columns (3) and (4) we add the premium of the initial offer, but this does not change the effect of health on search behavior. Finally, in columns (5)-(8), we add individual characteristics. Again, this does not change the effect of health on search behavior. Columns (5) and (6) point out an effect of income on search behavior. If we include age and education, in columns (7) and (8), the effect of income is absorbed in these variables. The estimation results do not provide any strong evidence regarding the relationship between health and the probability to search.

6 Explaining group contracts

The finding that the positive correlation between receiving a group offer and the probability to search can only be explained by receiving a group offer being negatively correlated to search costs, raises the question what mechanisms could underly this negative correlation. In this section we discuss a number of possible pathways and investigate their importance in explaining the negative correlation between receiving a group offer and search costs.

Group offers are mainly made via employers. The probability of receiving an offer for a group contract is thus related to employment status. An offer for a group contract also includes coverage for the spouse. Having an employed spouse increases the probability of receiving a group offer. Couples may have economies of scale when searching for a health insurance. Indeed within 85% of the couples both partners have the same insurer. This may thus be a first mechanism explaining why low search costs are associated to offers for group contracts. In Table 10, the effect of the number of employed partners in the household on the probability of searching is shown. Column (1) only corrects for receiving an offer for a group contract and some individual characteristics. Column(2) adds the number of employed partners as additional control. Comparing columns (1) and (2) shows that taking into account the number of employed partners reduces the positive association between the probability to search and having an offer for a group contract, but the correlation remains substantial and significant. This mechanism can explain some, but not all, of the negative correlation between receiving a group offer and search costs.

Individuals receiving an offer for a group contract may not be a random sample. To get some insight in the determinants of receiving such an offer, we estimate a probit model. Column (1) of Table 11 shows that employed individuals are, indeed, more likely to receive an offer and that health does not have a significant impact. This might be interpreted as evidence that the risk equalization fund works well. Adding income and education (results in column (2)) shows that individuals with a higher income are more likely to receive an offer for a group contract. Before the reform high income workers were privately insured. An indicator for being privately insured prior to the reform does only has a significant effect when when income is not included as covariate. The positive association between income

Table 10: Probit model for searching.

	(1)	(2)	(3)
offer for group contract	0.421***	0.329***	0.293***
	(0.103)	(0.102)	(0.107)
one employed partner		0.494***	0.445***
		(0.123)	(0.127)
two employed partners		0.531***	0.530***
		(0.126)	(0.131)
knowledge reform			0.068***
			(0.015)
female	0.212**	0.140	0.196**
	(0.088)	(0.088)	(0.093)
years of education	0.051***	0.045**	0.023
	(0.019)	(0.019)	(0.020)
low income	−0.115	−0.041	−0.065
	(0.104)	(0.106)	(0.111)
very low income	−0.030	0.128	0.076
	(0.177)	(0.180)	(0.187)
little expected health care use	−0.160	0.002	−0.042
	(0.144)	(0.123)	(0.129)
average expected health care use	−0.019	0.189	0.165
	(0.143)	(0.122)	(0.127)
(very) much expected health care use	−0.204	0.075	0.069
	(0.161)	(0.143)	(0.149)
intercept	−1.447	−1.841	−1.819
	(0.301)	(0.292)	(0.307)
observations	968	854	800

***=significant at 1% level, **= significant at 5% level, *=significant at 10% level.
Note: the strict definition for search, i.e. search via comparison websites, is used here.
Note: columns (2) and (3) apply the Conniffe and O'Neill (2008) correction for missing covariates.

Table 11: Probit model for receiving an offer for a group contract

	(1)	(2)	(3)	(4)
employed	0.574***	0.372***	0.370***	0.336**
	(0.125)	(0.136)	(0.142)	(0.147)
retired	−0.008	−0.068	−0.067	−0.035
	(0.128)	(0.134)	(0.140)	(0.179)
little expected use	−0.082	−0.124	−0.119	−0.098
	(0.129)	(0.135)	(0.140)	(0.141)
average expected use	0.032	−0.016	0.032	0.062
	(0.126)	(0.132)	(0.137)	(0.139)
(very) much expected use	0.011	−0.003	−0.012	0.002
	(0.144)	(0.150)	(0.156)	(0.157)
years education		0.025	0.027	0.026
		(0.020)	(0.021)	(0.021)
low income		−0.231**	−0.198*	−0.223**
		(0.108)	(0.113)	(0.114)
very low income		−0.495***	−0.455**	−0.384**
		(0.179)	(0.184)	(0.201)
knowledge reform			0.030*	0.031*
			(0.016)	(0.016)
female				−0.104
				(0.108)
age				−0.003
				(0.005)
single				−0.057
				(0.134)
has children				0.051
				(0.115)
intercept	0.321	0.307	0.124	0.350
	(0.139)	(0.286)	(0.299)	(0.452)
observations	952	910	846	833

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

and offers for group may thus as well reflect previous health insurance.

There may be several reasons why the type of health insurance before the reform may affect the likelihood of receiving an offer for a group contract. First, before the reform, firms with many high income employees already used to have an arrangement with an insurer that offered insurance at a lower rate. Second, higher educated and higher income employees might push their employer harder to establish a group contract. Higher incomes are thus more likely to receive an offer. However, this can only be an explanation for the negative correlation between search costs and group contract offers, if high income individuals have lower search costs. Before the reform high income individuals had to obtain private health insurance and were thus familiar with making health insurance choices.

A requirement for searching is that individuals understand the system after the reform. For example, even using the comparison websites requires individuals to give in some preferences for the insurance contract. Our data contain a questionnaire examining the knowledge about the new health insurance system. In particular, individuals were asked to answer true or false (or do not know) to 15 statements. Our knowledge variable equals the number of correct answers minus the number of wrong answers. This guarantees that someone who does not know an answer, gets the same expected score when guessing as when answering do not know. The average score in our population equals 4.2 (with a maximum of 13 and a minimum of -7). The statements were included in the survey of October 2005 (so before premiums were announced and offers for group contracts were made), and thus measures knowledge prior to making the search decision. In column (3) of Table 11 we add this knowledge variable. The results show that those who had more knowledge about the new system were much more likely to (later) receive an offer for a group contract. Adding additional controls (age, gender, household composition) does not change this result, as is shown in column (4).

Including the knowledge variable in the probit model for searching (column (3) of Table 10) reduces the impact of having received an offer for a group contract somewhat, but still a substantial and significant effect remains. This implies that while employment status and knowledge about the system are important for the relationship between search costs and group offers, this cannot be the full explanation. What are possible explanations for the

remaining association? First, as we already explained in Section 5 individuals may use the group contract offer to update the beliefs about the distribution of premiums $F(p)$, which may induce them to search. Second, an offer for a group contract may force individuals to compare two offers and thus reduce further search costs.

The insurance premium of the group contract is for almost all insurers below the lowest premium in the regular market. Insurers may target offers for group contracts to individuals with low search costs. The remaining population of individuals without a group contract offer has, on average, higher search costs. This allows insurers to set higher premiums. 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 for individual contracts), price dispersion increases as it does not pay for firms to compete for the lowest price.

The main reason for the government to allow for group contracts was that it would create the possibility for insurers to insure a substantial share of the employees of a firm and at the same time also insure the firm for the costs of, for example, sickness absenteeism. It was hoped that such combinations of insurances would induce insurers to put more effort in prevention of health related absences from work. What was not foreseen, was that the possibility of offering group contracts hence facilitates insurers to apply third degree price discrimination, which may be welfare reducing.

7 Discussion and conclusion

We presented a simple consumer search model for individual health insurance decisions at the moment of the Dutch health insurance reform. The model provided two hypotheses and two corollaries. Our data confirm both hypotheses on the choice for insurance plan. In particular, there is adverse selection in the market and health insurance coverage is decreasing in the premium.

The data also revealed that the probability of receiving a group offer is positively correlated with the probability to search. According the corollary this can only be the case if the probability of receiving a group offer is negatively related to search costs. We find an

important role for knowledge about the health care system. Those with more knowledge about the reform and the health care system are more likely to receive an offer for a group contract. For public policy it might be a serious concern that better informed individuals are more likely to receive an offer for a group contract. This might suggest that insurers use group contracts for cream-skimming, for example, by setting high premiums, but offering maximum discounts on group contracts to low health-risks employees. Furthermore, the group contracts take better informed individuals out of the regular market, which allows insurers to exploit the higher search costs of the remaining individuals in this segment. This will lead to lower competition, and more price dispersion. Since we saw that the choice of health insurance coverage is strongly related to the premium, it may also affect equity and access to health care within the population.

The system of managed competition seems to be successful in keeping premiums for health insurance low. In the year of the introduction insurers incurred substantial losses, mainly because of their attempts to attract as many insurees as possible. At that time experts feared that premiums would increase sharply to compensate for these losses. However, the rise in premiums was low in 2007 and 2008 and even negative in 2009. One might argue that the willingness of individuals to switch created enough competition to withhold insurers to increase premiums.

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